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Festival solutions' contributions towards urban circularity transitions

Analyzed through deepening, broadening, and scaling-up
in the context of the Green Deal Circular Festivals

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Abstract

Practitioners and academics agree that festivals are a great place to test innovations, and on their similarities to cities and urban systems. As a response to growing societal environmental awareness and to their huge impacts, sustainability and circularity have become priorities for festivals, with many circular solutions emerging from this industry. This research project aims to explore how the festival sector can contribute to urban circularity transitions, by framing circular solutions from festivals as transition experiments and analyzing how they can scale-up to cities. Using interviews with festival practitioners and Semilla Sanitation as a concrete example, it applies van den Bosch and Rotmans' "Deepening, Broadening and Scaling up Framework for Steering Transition Experiments" (2008) and an innovation systems analysis to analyze how scaling-up processes have taken place in the context of the Green Deal Circular Festivals (GDCF).

Five internal characteristics of scalable solutions, which define their transformation potential, are defined, and external conditions necessary for scaling-up are prescribed. The main actors and the roles they should take in the GDCF scaling-up process are identified, highlighting the role of municipalities as supporters of scaling-up processes and launching customers of solutions; and suppliers. A demand-driven matchmaking methodology is developed between the supply-side (solutions) and the demand-side (cities), which can be directly applied to solve urban challenges. The thesis proposes a blueprint for how to apply the frameworks presented to advance other sorts of transitions experiments in urban environments. The findings advance the link between cities and the events sector, and they can be generalized to different kinds of industries in the wider urban context, further advancing urban circularity transitions.

Key words: Urban circularity; Festivals; Solutions; Scaling-up; Innovation

Preface

Acknowledgements

The development of this research project was definitely a group effort. I would like to acknowledge and thank the following people for their collaboration and support during this process:

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Reflection

Professionally, working with GDCF was a great opportunity because I got to meet people who are actually passionate about sustainability from all over the festival industry- from event organizers, consultants to governments and policy actors, culminating in the ADE Green conference, which taught me this is a relevant topic and inspired me to pursue a career in this. I also got to experience actual consulting in site visits (to Music Meeting in Nijmegen, and We Love Green in Paris), making me feel useful, empowered and preparing me for a professional job in this industry. Sitting in on the meeting was a valuable experience for the research, as it allowed me to understand and assess the whole system, with its complex processes and diverse actors. Finally, it allowed me to achieve something I had been missing in my academic experience: real-world impact! My research project culminated in an article published in the government-sponsored GDCF website, including my findings in their database to share for any interested parties, and

in presentations to the Royal Haskoning Strategies and Management Consulting team, which will influence further transition projects.

Personally, writing the thesis was a difficult, but rewarding process. It helped me develop an optimistic view of solutions, while aware of biases and paradoxes (that a sustainable festival doesn't exist), which helped me to avoid the crippling cynicism that I realize I had experienced from the master's programme. I learned a lot about the scientific process and how it takes place in practice, which is very different outside the classroom and when you are passionate about the research subject. Although it took me much longer to finish the project than I had initially anticipated, and I struggled to keep myself motivated and on track with limited supervision, I am proud of my final product. The data and findings truly were driving me, and I realize I ended up with two large projects blended into one, but I also learned how to cut and self-edit due to the limited time and scope of the thesis. Overall, I found respect for the academic process, realizing the impact generating academic knowledge can have when used in the right way and applied to real-world practice- in this case, to refine the process of finding solutions and engaging in transitions, rather than just copy-pasting solutions.

Through some of my interviews (with Rob van Wegen and Tijl Couzij), I also discovered a personal interest in ethics, environmental justice, and neocolonialism. The conversations were incredibly insightful and aligned with some of the courses that resonated with me from my studies, and it was incredible to begin to consider how these constructs can relate even to the field of music festivals. It was encouraging to see practitioners are somewhat aware of the privilege that allows them to experiment and the responsibility that brings, but ironic to see tropes of neocolonialism permeating even these noble efforts. As in academia, and most other settings in society, it is mostly Northern-European front-runners developing solutions and trying to spread quick fixes as "aid" to festivals in different regions, but forgetting that nuance and cultural disbalances are a huge obstacle to their implementation, especially in the Global South. I could've written a whole thesis on this alone, but alas had no space or time left for it… although it has definitely inspired me to continue researching into these areas in the future!

> "We are very aware of the privileged position we have here in Northern and Western Europe [...] We, as a privileged country, have the responsibility to make [solutions] perfect before [they] get shipped over to the rest of Europe, because they can't afford this trial and error situation we're in [...] The world doesn't need beautiful examples. If you see the whole word burning and you are on your own saying 'but we're OK now', the world doesn't care that you as a person are OK, it's about the whole balance that's going on in the world. So we need to see that these great things that are going on are scalable, that they're adaptable, that they could travel."
>
> - Rob van Wegen

Table of Contents

List of Tables

List of Figures

List of Abbreviations

Acronyms:

Green Deal Circular Festivals (GDCF)
Greenhouse gas (GHG)
United Nations (UN)
Sustainable Development Goal (SDG)
Circular economy (CE)
Collaborative intermediary organization (CIO)
Multi-level Perspective (MLP)
Dutch Knowledge Network on System Innovations and Transitions (KSI)
Transition Management (TM)
Transition Arena (TA)
Deepening, broadening and scaling-up (DBS)
Hydrotreated Vegetable Oil (HVO)
Into the Great Wide Open festival (ITGWO)
Eurosonic Noorderslag (ESNS)
SAIL Amsterdam (SAIL)
DGTL festival (DGTL)
Netherlands Enterprise Agency (RVO)
Amsterdam Dance Event (ADE)
MOJO Events (MOJO)
Lab Vlieland (LV)
Netherlands Water Partnership (NWP)

Shorthands:

Semilla Sanitation (Semilla)
Nijhuis Saur Industries (Nijhuis)

1. Introduction

"Within the Green Deal we are working on becoming sustainable, climate-neutral and circular with these festivals; the next step could be that those lessons learned can be used for other sectors of our society as well."

- Laura van de Voort

Urbanization is one of the biggest global trends of recent decades, and it brings along with it grand challenges to sustain the livelihoods of urban populations across the globe. With more than half of the world population living in urban environments, cities are responsible for disproportionate amounts of total resource consumption and the primary source of greenhouse gas (GHG) emissions (UN DESA, 2019; Madlener & Sunak, 2011; Grimm et al., 2008). Recognizing their importance, the United Nations (UN) has created Sustainable Development Goal (SDG) 11 of 'Sustainable cities and communities', and specifies resource efficiency and waste management as critical to improving urban sustainability (United Nations, n.d.). Urban circularity transitions are ways through which society is searching for solutions towards sustainable livelihoods, since the circular economy (CE) has emerged as an alternative approach to the 'throwaway economy' that offers promising solutions to urban sustainability problems (Ellen MacArthur Foundation, 2013; Reike et al., 2018). National and municipal governments around the world have launched circularity-related initiatives, such as Green Deals or climate pacts, to introduce sustainability and circular strategies into their core development values and address urban sustainability problems (Dong et al., 2021; Green Deals, n.d.).

The Green Deal Circular Festivals (GDCF) is one such initiative launched in Europe by the Dutch government and several European festival organizations in 2019, structured as a consortium between key event producers, sustainability experts, government agencies and industry stakeholders, working together to advance 'green growth' in the industry of European festivals (Circular Festivals, n.d.-a). They collectively realize, however, that the power and responsibility of festivals goes beyond their own industry, and are now concentrating their efforts to explore how the festival sector can contribute to wider circularity transitions in cities. With the majority of the people in the world currently experiencing the effects of urban sustainability problems, it is imperative that new ways of thinking and acting are developed and solutions scaled-up to mitigate their effects. With this objective they are in the midst of developing a Joint Scale-Up Project with European cities in their network, aiming to scale successful circular and climate-neutral practices from festivals to cities and wider regions.

Developed during an internship with GDCF and as a Master's thesis for Radboud University, this research project aims to explore how the festival sector can contribute to urban circularity transitions, by following circular solutions from festivals and how they scale-up to cities. Using Semilla Sanitation as a concrete example, it will analyze how the scaling-up process takes place in the GDCF context, and what lessons can be learned from other successful (and unsuccessful) solutions. To support the Joint Scale-Up Project, it also aims to develop an understanding of the supply-side (the solutions), to begin an inquiry into the main challenges on the demand-side (cities), and to outline the process of demand-driven matchmaking between both. The thesis will be structured following the sub-questions below, and will

conclude with a holistic answer to the main research question below, along with some recommendations for GDCF on how to facilitate scaling-up processes and demand-driven matchmaking in their context to maximize their contribution to urban circularity transitions.

Research question: How can circular solutions from music festivals in the GDCF context contribute to urban circularity transitions through deepening, broadening, and scaling-up?

Sub-questions:

1. What makes **festivals good testing grounds** for urban circularity transition experiments?
2. Can **open-city events be a stepping-stone** between festivals and cities?
3. Can circular solutions from music festivals be considered **transition experiments**?
4. How can transition experiments be **deepened, broadened, and scaled-up** within the festival industry?
5. How should these experiments be **steered to maximize their contribution** to circularity transitions?

Societal and scientific relevance

Although events are an industry that is not necessary to cover basic human needs, they do have huge socio-environmental impacts on society. Since they offer entertainment to visitors and economic benefits to many businesses and people that earn their livelihood through events, however, the industry will not be stopping anytime soon. This project therefore has societal relevance in that it aims to help stimulate the implementation of circular systems in European music festivals to reduce the socio-environmental impact of large-scale events. It will do so by: helping GDCF (and other organizations) in better understanding how to implementation circular systems to solve existing operational challenges; formalizing a demand-driven matchmaking process that can help other events identify solutions and current best practices to implement; and contributing to the development of a model for circular festival certifications to be applied in events all throughout Europe. It is also relevant to wider society, as it aims to accelerate urban circularity transitions by facilitating the scaling-up process of existing solutions, therefore streamlining existing innovation processes. Finally, it will result in generalizable lessons or that could be applied to other industries and city management in general, enabling the advancement of the transition from several areas simultaneously. In this way, this research answers the call of previous event scholars connecting to SDG 9 of promoting sustainable industrialisation and fostering innovation in broader society (Celuch, 2021).

This study also has scientific relevance, as it hopes to develop a well-rounded scientific understanding of the potential of festivals and events towards urban circularity transitions. It aims to do so by gathering academic justifications for assumptions that are prevalent in the festival industry but for which academic knowledge gaps have been identified, namely that festivals and open-city events are similar to cities and thus good testing grounds for circular innovations. It answers the call for more knowledge regarding standard sustainability initiatives in the festival industry (Dodds et al., 2020) through an analysis of existing solutions from GDCF festivals, by building on Browne et al.'s (2019) study on water practices at camping festivals. That study is one of the only examples of studies on existing festival practices found so far, so this thesis contributes to that field but approaches it from a slightly different angle, studying solutions rather than practices for a more strategic supply-side analysis. This thesis also expands van den

Bosch & Rotman's "Deepening, Broadening and Scaling up Framework for Steering Transition Experiments" (2008), by demonstrating an empirical application of it in a festival setting and developing a sort of blueprint to operationalize the framework. Although it is clear that this process is very context-dependent, other practitioners should be able to follow this method to analyze their own contexts and identify the best strategies for their contexts. In these ways, this research hopes to contribute to transition theory and to address the knowledge gap of the management of circular solutions, in festivals, with the end goal of advancing the sustainability or circularity of the event, industry or wider circularity transition.

Introduction to example case- Semilla Sanitation

The main circular solution used as an example in this research are the water treatment toilet units by Semilla Sanitation (Semilla). Semilla began around 2014 as a spinout project of the MELiSSA space research consortium of the European Space Agency, which is advancing the circularity transition both in space and on Earth by developing closed loop space technology for Earth-based systems (Semilla Sanitation, n.d.). Targeting the basic human rights systems of clean water and sanitation, the Semilla Sanitation module was first conceived with the intention of providing relief in disaster areas and refugee camps. They developed a toilet and washing module that uses advanced space technology to treat urine, gray and black water, turning them into clean water, fertilizer and compost which can then be used and sold. By providing this durable unit to remote places and disaster areas, waste and emissions can not only be reduced and humanitarian needs addressed, but they can be turned into financial opportunities to develop and sustain the communities in those areas, making it socially, environmentally and financially sustainable. This solution has been tried and tested in GDCF festivals through their partnership with Innofest, which means they have already engaged in a DBS process. Although they have not been fully scaled-up yet, they have had successes and failures in the process which this study can learn from. The characteristics which make it a transition experiment, the analysis of their DBS trajectory, and the main challenges and lessons learned will be discussed in the Results later on.

2. Literature Review

A literature review is the first step in a research project, in order to become aware of what the academic community already knows about the subject, to identify knowledge gaps, and to define background information and definitions that are important for readers to understand. This section will therefore review existing academic literature on the main three themes related to the subject of this research: urban sustainability transitions; the role of festivals as spaces of (urban) experimentation; and circular solutions from festivals. It will conclude with a subsection to clarify important terms and concepts used throughout this thesis.

2.1. Urban sustainability transitions

Urbanization is one of the biggest global trends of recent decades, and it brings along with it grand challenges to sustain the livelihoods of urban populations across the globe. With an estimated 56.5% of the world population in 2021 (UN DESA, 2019), cities find themselves having to satisfy increasing demand for energy, food, water, shelter, waste management, healthcare, education, and other basic services. In trying to keep up with these provisions, urban centers generate the largest proportion of environmental impacts worldwide, being responsible for almost 75 % of total resource consumption (Madlener & Sunak, 2011) and the primary source of GHG emissions (Grimm et al., 2008). Due to the complex social networks, diversity of needs, and the sheer magnitude of cities, sustainability problems can be found in almost all socio-technological systems needed to make cities function (Loorbach & Shiroyama, 2016). While the degree of intensity and specifics of these vary in different cities and regions of the world, urban sustainability problems tend to fall into 4 main dimensions: environmental, economic, social and institutional (Michalina et al., 2021). Some of the most pressing are environmental problems that threaten humanity's ability to live and function safely on Earth, as defined by Rockström et al.'s (2009) planetary boundaries, which we have already crossed in terms of climate change, biodiversity loss, and the nitrogen cycle. These problems very much embody and lead to the three main drivers for transitions- tension, stress and pressure (de Haan & Rotmans, 2011). With the majority of the people in the world currently experiencing the effects of urban sustainability problems, it is imperative that new ways of thinking and acting are developed and solutions scaled-up to mitigate these effects.

Thankfully, societal searches for solutions towards sustainable livelihoods are already underway, referred to as sustainability *transitions* because they will require radical, deep or transformational changes to complex societal systems (Loorbach, 2010). De Haan (2018) explores different approaches in transition theory which range from functional to more place-based perspectives, finding that there has been a contemporary 'urban turn' in transition research and highlighting the importance of interconnectivity to place-based transitions. Since cities are characterized by many and often interrelated functional systems, have clear geographical and political boundaries, and sustain complex networks of actors, they offer the perfect arena in which to study transitions (Loorbach & Shiroyama, 2016). Through their constellations of social actors, institutions, and systems, cities have a unique position of being both the place of origin of sustainability problems and the drivers of solutions, which means they can also play an important role in accelerating transitions, as facilitators for sustainability innovations (Geels et al. 2011). Recognizing their importance, the UN has created SDG 11: 'Sustainable cities and communities', and specifies resource efficiency and waste management as critical to improving urban sustainability (United Nations, n.d.).

Therefore, this research situates this transition within the urban environment, focusing on urban sustainability transitions (later to be refined into urban circularity transitions).

The CE offers a systemic framework to rethink the linear economic system that has brought us to this point, by bringing sustainability considerations into the entire lifecycle of products, from design to end-of-life (Ellen MacArthur Foundation, 2013). Operationalized by the so-called R-imperatives- refuse, reduce, resell/reuse, repair, refurbish, remanufacture, repurpose/rethink, recycle, recover, remine- it reformulates production systems by closing loops between each of the stages so that the value of products and raw materials can be maximized, waste and pollution can be eliminated, and nature regenerated (Reike et al., 2018). These concepts have gained popularity in the past decade, with circularity emerging as an alternative approach to the 'throwaway economy' that offers promising solutions to urban sustainability problems. In fact, cities all over the world have introduced initiatives such as *eco-cities*, *circular cities*, and *zero-waste cities* (Dong et el. 2021). These initiatives go hand-in-hand with Green Deals, or climate pacts, through which national and municipal governments have begun introducing sustainability into their core development values and implementing circular strategies. The municipality of Amsterdam is one of the pioneers in Europe, launching a Circular City strategy in 2016 (Circle Economy, 2016), an extension of national sustainability policies being rolled out in the Netherlands since 2011. To reach their ambitious goal for the Netherlands to become fully circular by 2050, they have initiated industry-specific Green Deals to further circularity in different industries (Green Deals, n.d.). GDCF is one of these programs, which aims to connect key stakeholders, develop shared visions and share knowledge and best practices in order to leverage the influence the festival industry can contribute to circularity transitions in cities. Why the festival industry would be a good setting to advance such transitions in urban spaces will be explored below.

2.2. Festivals as spaces of experimentation

Large-scale events, like music festivals, are one of the fastest growing industries of the cultural economy throughout the world (Gration at al., 2011). Festivals bring large amounts of economic resources to a region, like job creation and financial inflow, and can create social benefits, like developing local pride or tourism destinations (Dodds et al., 2020). On the other hand, it has been proven that events can also have huge negative socio-ecological impacts on their environment. Laing and Frost (2010) depict different operational environmental concerns of festivals, such as: congestion, transportation, waste, energy use, delivery miles for food and supplies. Since festivals by definition amass large quantities of people in a limited space and time, they generate these impacts at massive proportions, through mass production, mass consumption, and mass disposal, which are identified by Uwasu (2011) as major challenges to global sustainability. In this respect, similarities begin to arise between the needs and challenges of festivals and those of cities, especially within sustainability transitions.

Festivals have been equated to temporary mini-societies that have to cover the same basic needs for their people (Arnback & Härtel, 2022). These needs align with the main themes addressed by GDCF- energy, food and drinks, plastics, resource efficiency, travel and transportation, and water-, which have been deliberately structured around the main principles of the CE. Like cities, festivals should focus on functioning within their local carrying capacities, regulating patterns of consumption, and restoring resources in order to achieve circularity (Williams, 2019). Nonetheless, Williams (2019) problematizes

current circular approaches to urban resource management, claiming that they fail to recognize the complex ecosystems and consumption practices present in cities, and overlook the need for adaptive infrastructure to truly solve urban challenges. Browne et al.'s study on water climate adaptation in UK festivals (2019) highlights the value of the flexibility and adaptability present at temporary festival spaces, both in terms of infrastructure and of social practices. Following these arguments, it can be contemplated that festivals offer the perfect setting for urban circularity experiments, as they face similar challenges and levels of complexity, but can act as a sort of stepping stone to tackle them in a smaller and more controlled scale, with more flexible social and physical structures (Arnback & Härtel, 2022).

The role of festivals as testing grounds for circular climate-neutral models for organizing cities and societies has already been explored by practitioners working in the festival industry, and in the past few years it has gotten the attention of governance actors engaged with the sustainability transition (ADE Green, 2022). Although academic research has not covered it specifically in this transition context, festivals as testing grounds have been studied in the fields of: media arts (Huisman & van Mechelen, 2019); innovative architecture and design (Liuti & Bessabava, 2017); and even as grounds for demographic social experimentation for future societies (Quental, 2019). Within the more relevant field of music festivals, Browne et al. (2019) recast the camping music festival as a 'rehearsal for change' in their analysis of water use practices, emphasizing the ideal circumstances these events present to examine adaptive capabilities in the practices of festival attendees. Fellow scholars have concluded that music festival spaces have the potential to act as *cultural laboratories* (Jaimangal-Jones et al., 2010), even identifying them as *niche experiments* (Caniglia et al., 2017) in alternative ways of living. Building on these bases, this thesis hopes to make the connection between practitioners and academics in exploring the role of festivals as testing grounds for urban circularity experiments.

Other arguments to support these claims refer to the potential influence festivals have on their environment- on both the production (supplier) and consumption (visitors) sides. Scholars have studied the multidimensional spaces that get created at festivals, or *festivalscapes*, finding they have strong effects on visitors' attitudes and behaviors (Yang et al., 2011). This power of influencing behavior is due to the unique temporary nature of festivals, which take place in a predefined time and space where cultural norms can be temporarily suspended and social experimentation can occur (Hottle et al., 2015); and to the subconscious connection festivals create between learning and good experiences, which is enhanced by the shared positive psychological status of festival attendees (Webster & McKay, 2016). Links between festival attendance and learning have also been established in relation to environmental behavior in China by Yan et al. (2021), who found significant impacts on the environmental attitudes of festival attendees, although they point out that this should be supported by explicit efforts of festival organizers to engage their visitors in their sustainability-related systems and communications. Simultaneously, de Vrieze et al. (2022) highlight the importance of consumption practices in realizing circular cities, as social practices can reinforce social realities and lifestyles, but therefore also have the potential to change them. Given their ability to influence citizen's consumption patterns, festivals can therefore be seen as strong tools for accelerating urban sustainability transitions.

On the production side of this equation, arguments have been made regarding the ability of festivals to act as catalysts for urban supply-chains. One of the founding scholars on festival studies, Getz (2010) established the role of these events as catalysts for other forms of development in tourism. This mainly refers to the economic resources that these events bring to a region, evidently due to the vast number of

visitors they attract, but also to the revenue and business relationships they generate through sourcing their operational necessities from local suppliers. In transition theory, it is understood that niches are prime spaces of experimentation due to their ability to foster learning processes and social networks towards innovation (Foxon et al., 2010). Festivals, as niches, can therefore have a huge role in developing transition pathways by influencing local supply-chains and user-producer relationships. These relationships become increasingly relevant within the concept of circular supply-chains. As Franchina et al. (2021) warrant, integrating circular principles into supply-chains can and is in fact necessary to progress toward more circular cities, and they recognize this can be achieved through everyday industry practices and the harnessing of smart technologies and innovation.

Having laid out the main theoretical rationales for considering festivals as prime opportunities for urban experimentation- given their temporality and flexibility, shared needs with cities, and the power to impact both suppliers and consumers in urban environments- this thesis will zoom in even further. The following subsection will establish how circular solutions, born and developed within the festival contexts, can provide an even more beneficial scale of experimentation to explore the potential of festivals in advancing urban circularity transitions.

2.3. Circular solutions

Given their huge socio-environmental impacts, and as a response to growing societal environmental awareness, many festivals are trying to integrate sustainability into their operations, especially ones in open spaces (Mair & Laing, 2012). Since the early 2010s, academics have been noticing an industry trend of these mega-events becoming "avenues for green practices, such as lower environmental impacts on nature, efficient energy and resource usage, the application of innovative green technologies and so forth" (Yan et al., 2021, p. 3). Zero-waste principles in festival operations have been increasingly adopted around the world, driven by various business and ethical sustainability-related concerns (Jaimangal-Jones et al., 2010); principles which go hand-in-hand with the foundations of the CE and would support circularity transitions. To this end, a plethora of grass-roots initiatives and practical circular solutions have been developed by different actors within the industry (A Greener Festival, 2012).

Perhaps due to the complex and fragmented nature of the industry and the uncertainty inherent to innovation, unfortunately, these solutions have been hard to consolidate. Comprehensive practitioner research centralizing circular solutions in festivals globally is lacking, although national and regional organizations have attempted to assemble and share information on solutions that have been tried and tested for other organizers aiming to create circular festivals (Circular Festivals, n.d.-b). As Dodds et al. (2020) highlight, a large obstacle to achieving true sustainability is the need for more knowledge regarding standard sustainability initiatives in the festival industry. A brief overview of academic literature published around these subjects help to contextualize this claim, and understand why more scholarly attention on circular practices is necessary to develop and scale them up to achieve lasting change in the circularity transition.

In the broader academic field of event studies, environmental sustainability as a whole has not been very thoroughly discussed (Arcodia et al., 2012), with Riungu et al. (2018) pointing out that only 16.5% of the total event-related publications between 2005 and 2015 centered on sustainability. In the more relevant field of festival research, Mensah et al.'s (2022) more up-to-date bibliometric study reveals that the most

important cluster of co-occurring keywords and co-citations covered the subjects of festival impacts, sustainability, and management. This indicates a step in the right direction towards the field of study of this thesis, although sustainable or circular practices are not mentioned in the review. This more specific subject of circular practices in events has received scant academic attention, although a few bibliometric reviews have approached the subject from different backgrounds. Celuch (2021) examines the development of innovations in information and communication technologies in events, concluding that although technological innovations are readily adopted by event organizers, they often fail to be purposefully connected to sustainable strategies which help foster sustainable event practices. wh explore the research on sustainable entrepreneurship and innovation in sport events, finding that sports mega-events garner the most attention regarding sustainability, similarly to the festival industry. They also specify that there is a lack of research in terms of the development of solutions, stating that research that explains how to organize sports events sustainably through sustainable innovations is still needed. A particular knowledge gap has thus been identified, as to the author's knowledge no academic studies have yet addressed the management of circular solutions or innovations, in festivals, with the end goal of advancing the sustainability or circularity of the event, industry or wider circularity transition.

The academic community has, however, recognized the value of studying circular practices as experiments in festival settings. In a paper about water-consumption practices camping music festivals, Browne et al. (2019) posit that these events are "sites of already existing sustainability experimentation" (p. 22), as their flexibility and temporary conditions make them prime spaces for alternative practices to arise and develop, in their case about reduced water usage. They highlight the heuristic learning potential that can come from studying these existing socio-environmental practices through dynamic social practice approaches, as they represent the adaptive capacity of the actual population better than staged experiments would and are less resource-intensive. The study concludes with a strong call for sustainability scholars and policy makers to learn from these existing experiments to make more informed decisions about shared sustainability futures and the infrastructural transitions they entail; a call this thesis hopes to follow. Even from a purely theoretical perspective, festival practices offer a valuable setting on which to test sustainable solutions. With the wider aim of reducing food waste in China, Li et al. (2022) carried out a conceptual study to design an improved supply-chain model for festival food production. Although the model must be empirically tested to confirm its results, the conditions of the festival food supply system- which are similar but simpler and more controllable than those of a city- allowed the authors to make concrete policy recommendations to tackle the environmental impact of food waste country-wide. The benefits of studying circular festival practices thus becoming clear, the next logical question becomes: how can circular festival practices be considered experiments?

This understanding of existing practices and deliberate solutions (projects) as experiments comes from a few of their inherent characteristics and those of their festival setting. To see projects as experiments, temporal and spatial boundaries must first be defined (van Bueren & Broekhans, 2013). Festivals have a predefined duration, usually one to a few days, and might have editions repeating once a year or more often. The experimental projects will share this temporary nature, which will in turn also prescribe contextual temporal dynamics that define how best to manage the project (Jones & Lichtenstein, 2009). Furthermore, the repetitive editions of the festivals give the projects a chance to evaluate, learn and improve from each testing round, something characteristic to experiments (Caniglia et al., 2017). Festivals take place over a predefined physical space, usually bounded by gates or entry barriers, which means that the projects have a controlled place of study and a measurable reach on the festival visitors as

the population. Following Caniglia et al.'s typology of experiments in sustainability science (2017) according to the amount of control they have over the interventions being addressed and over systemic and contextual factors, festival practices would fall somewhere between Type 5- transition experiments and Type 6- strategic niche experiments. Festival projects can be described as *niche experiments* because the organizers and visitors trigger the experimental interventions themselves, and so they become relevant spaces of observation for social scientists (Browne et al., 2019). As previously mentioned, niches can be spaces to create transition pathways, and so, when deliberately steered and supported by social learning processes, festival projects can also be considered *transition experiments* (Foxon et al., 2010). Still on Caniglia et al. 's typology (2017), deliberate festival solutions might also span to include Type 4- innovation experiments, when studied from the perspective of the innovator or owner of the solution. Although the type of experiment can be framed and justified in different ways, there are enough compelling academic arguments to justify the characterization of festival practices and solutions as social experiments. The Theoretical Framework will continue by laying out the conditions why this thesis considers circular solutions from festivals as transition experiments in the urban circularity transition.

2.4. Important terms

It is important to clarify key terms and concepts used throughout this thesis, to establish common ground and so that readers might understand the choices and distinctions made by the author. This subsection will lay out these important terms and will mention some relevant academic debates that have and continue to shape the ideological bases surrounding this project.

Circularity vs. sustainability

To begin any investigation into sustainability, one must first define what the term *sustainability* means in the context. Zifkos (2015) delves into this question in his article problematizing the "sustainable festival phenomenon". In a review of the discourse of sustainability in festivals, he finds a lack of certainty of when the term *sustainable festiva*l emerged, although A Greener Festival started popularizing the term around 2006. He identifies three main approaches in the understanding of the term. Primarily, it is used in a very ecocentric manner: Mair and Laing's (2012) exploration of *green* festival performance involves mainly pro-environmental management practice; Laing and Frost (2010) define a *sustainable event* as incorporating environmentally friendly policies and practices into its management and operations; Todd (2017) suggests it is about cleaning up and doing less harm to the natural environment. Zifkos' study (2015) continued with an empirical analysis of 71 festivals that were found to be sustainable, which presented some interesting results. Most of these festivals were located in Europe and North America, 64% had a section dedicated to sustainability on their website, and the majority interpreted sustainability as a concern solely related to the natural environment. Following this vein of thought, the most popular use of *sustainability* refers to environmental responsibility.

Another approach identified a more classical use of *sustainability* as the ability of a festival to maintain itself, or keep going over time (Zifkos, 2015). This represents a financial reality that festivals, as commercial businesses, have to face, which was brought up a lot during practitioner interviews conducted for this thesis. This usage of financial sustainability was more common in earlier discourse, however, as it has been increasingly transforming into a third approach. More and more festivals are aiming not just to

maintain themselves, but to actually become institutions or hallmarks of the community by fulfilling social, cultural, economic and environmental roles that people value (Getz & Andersson, 2008). This has spurred the development of the Triple Bottom Line business model, which implies that social justice, economic prosperity and environmental quality are the key elements to corporate performance (Elkington, 1998). The increasing adoption of this business model in the industry points to it being a more holistic representation of the needs of festival and event organizers worldwide, to whom *sustainability* encompasses diverse environmental, social and financial factors and priorities.

The previous subsections have covered the main principles of the CE and explained how it is understood as a solution towards achieving sustainability in our society. Although this author doesn't claim to know why the term *circularity* has been utilized in GDCF or in similar policy bodies, it is important for the reader to understand why it has been selected for this thesis. The reliance of the CE on closed-loop systems seeks a maximization of the value of products and raw materials (Reike et al., 2018), which represents an alignment with the financial priorities that businesses and people are subject to. Ultimately, these closed-loop systems also aim for waste and pollution to be eliminated, which clearly points to the environmental goals of the CE to reduce consumption of natural resources and regenerate nature (Ellen MacArthur Foundation, 2013). In this context, the concept of *circularity* therefore offers the most comprehensive definition of both of the classical uses of *sustainability* (environmental and financial). GDCF reflects this reasoning even in their main themes of work, as when they address the concept of garbage and waste, they call it *resource efficiency* instead. Using this kind of language can be very powerful, as it reformulates how people think about waste, from something to be discarded to a place where value can be generated and capitalized. This thinking also resonates with the main example used in this thesis, Semilla Sanitation, a circular solution which seeks to turn human waste into value-generating resources, evident in the names they play with for their solution- "Pee to tea", "Waste to taste" and "*Van plas naar grass*", amongst others (Nijhuis Industries, 2018). Due to the recurrence of this kind of thinking about waste and value-maximization in the project, and to its encompassing of various types of sustainability, this thesis has chosen to use the term *circularity* when referring to sustainability-related themes. It should no longer be used interchangeably from here on out, but in case of any confusion, this subsection aims to clarify its intended definition.

Solutions vs. innovations

In the development of the project, confusion quickly arose when deciding what to call the units of observation to be studied. They have so far been called: circular practices, innovations, solutions or even projects; terms which all worked to some extent, but which turned out to have some problems as the author tried to find an all-encompassing word for what they represent.

Innovations was a very common term in practitioner jargon regarding this topic, for example, this is the basis of the Innofest organization which specializes in piloting and testing innovative solutions for festivals. Although it seemed promising at first, this label was also found to be too limiting. An integral part of *innovation* is novelty, whether that be in the form of new products, renewed services, new ways of doing, basically any process or outcome that has not been done before (Crossan & Apaydin, 2010). Although this is a proven process to generate out-of-the-box ideas and solutions, thus still relevant to this project, practical problems arose when using the criteria of *newness* to identify festival solutions to study and develop in the realm of GDCF (when elaborating the so-called "Long-list of innovations"). By

limiting the focus to only *new* solutions- a condition which in itself is quite subjective, since every person seems to have their own opinion about what it means or how much time it entails- many promising solutions were left out, because they had already existed for a few years, were no longer start-ups, or were too scaled-up. This last condition was found to be the most problematic, as what this thesis seeks is in fact to focus on solutions that have been developed further than their initial testing phase, the hypothesis being that this is where they can begin to truly make a difference in the transition. A common practitioner concern identified in the interviews is that this industry infatuation with novel innovations might be spreading resources too thin and impeding the scale-up processes that need to take place to achieve real progress, which further led the author to not select the term *innovation* as the unit of analysis.

It is worth noting, however, that an alternative and more appropriate use of the term came up during the research: *systemic innovation*. Although its meaning is also contested, it usually refers to a method of analysis of the wider systems in which an innovation process occurs, recognizing how policies, governance actors and the path of development themselves affect the success of the innovation (Midgley & Lindhult, 2021). This term brings value to and is therefore used throughout this project, since it encompasses solutions that use existing technologies or products, applied it in new ways, to solve existing problems. This is the focus that this thesis aspires for, and is probably one of the reasons why this kind of innovation is referred to as a "game-changer for sustainability" transitions (Midgley & Lindhult, 2021, p.6). It brings value to transitions through its concern with understanding the systems which develop and adopt innovative solutions, rather than focusing only on isolated solutions. Therefore, the concept of systemic innovation becomes a recurring theme throughout this research project and has greatly helped shape the theoretical framework employed, as will be explained further on.

The term found most appropriate is thus *solutions.* The value of this term lies in the simplicity of its definition; it refers to an answer to a specific problem, without constraining this to a particular time, place, format or anything else that might limit whether or not it is worthy of attention. Solutions can come from new technologies, creative processes, or existing ideas that are in use or that may have been overlooked; it is a category that includes all of the terms considered above and excludes nothing based on superfluous characteristics. It is useful for this thesis as it broadens the scope of the search for answers, increasing the potential of the scaling-up process for the transition. Furthermore, it aligns with the "demand-driven matchmaking" process employed by the GDCF and the innovation department of the Amsterdam municipality, which entails a search for solutions that can solve specific operational problems related to sustainability. Thus the author settled on *solutions* as the term to describe the unit of analysis of this thesis, with the intended use and definitions specified in this subsection.

The paradoxes of sustainability- "sustainable development" and the "sustainable festival"

The term *sustainable development* has been at the center of academic debates since the 1970s. Robinson (2004) criticizes *sustainable development* as too vague and intrinsically hypocritical, since it has enabled actors to give it different definitions based on their own agendas. Hopwood et al. (2005) point out that the concept is often used by large organizations, like the EU, to maintain the status quo when it comes to environmental regulations. Both scholars make a clear distinction between the globally-oriented *sustainable development* and *sustainability*, which is proposed as a more integrated and localized approach to the concept (Robinson, 2004). The term has also been critiqued as an oxymoron, calling into

question whether or not sustainability can actually be achieved while pursuing the unbounded economic growth characterized by the word *development*.

In the realm of sustainable festivals, there is clear academic support of how they can contribute to the UN's *sustainable development* goals. Cuoto et al. (2021) conducted a review of pre-COVID festival and event literature which concludes a dual responsibility and potential of events. The responsibility lies in the physical hosting of events and festivals, which should be done in a pro-environmental manner through circular systems. The potential lies in the ability of events to act as a platform for sustainable innovations and for education towards sustainability for event attendees. Once this becomes a natural part of the event planning and delivery process, research affirms that the industry can contribute to SDGs 3, 4, 6, 8, 9, 12, 13 and 17 of the UN (Cuoto et al., 2021). However, it is important to note that the concept of a *sustainable festival* has also been questioned and criticized as an oxymoron. Zifkos (2015) states that no matter the intention of festivals to clean up after themselves "they are actually driving people towards great amounts of consumption" (p.14) and are therefore inherently unsustainable. He talks about the attraction or marketing potential of the term, and offers a fair warning which has been very relevant throughout the development of this thesis, to beware of overly positive sustainability thinking and to be critical of greenwashing in festival organizations. Voicing the same conclusion of most scholars in festival literature, as reviewed by Cuoto et al. (2021), however, he proposes that holistic sustainability should involve giving back to the broader festival context, encouraging positive change in its attendees, and should encompass social, economic, environmental, and symbolic systems, which are all intertwined.

This leads to the use of the word *transition* in this thesis, which follows the societal movement towards circular systems of the same name. Hopwood et al., (2005) developed a classification methodology to map the sustainable development debate based on actors' views on the environment and socio-economic concerns, describing them as believing in *status quo, reform,* or *transformation*. The European Union, initiator of the Green Deals in Europe, has been identified as supporting the *status quo*- where a need for change is recognized, but current societal structures and power relations are considered the proper means to obtain it, and economic growth, trade and market development are seen as part of the solution. On the other extreme, the supporters of *transformations* believe that current socio-economic and power structures are the very causes of the socio-environmental crisis, so more fundamental transformations in justice, equity, inclusion of marginalized groups, and the nature-society divide are needed to overcome it. In the middle of this spectrum lie the *reformers*- who believe that shifts within the present socio-economic structures are needed, and governmental reforms and regulations, information, knowledge, and technological innovation are key to achieving change. This category would be the most comparable to *transition*, as used in Transition Management (TM) theory and in this thesis. Based on this classification, the belief in circular solutions to accelerate the urban circularity transition of the GDCF organization could best be described as evidence of a *reformist* perspective. This view aligns with their belief in the urban circularity *transition*, and thus explains why the term is used in this thesis. However, given its relatively limited power to influence the broader systems of urban societies, the criticism that circular solutions merely act as a band-aid in the status quo, while there is real need for larger systemic and infrastructure changes to achieve real circularity, can be brought up. That perspective challenges reformist thinking by claiming that there is a need for a more transformational approach to societal change (noting that this is easy to proclaim in theory, but is not without its practical obstacles). Although the intentions of GDCF and their member festival organizations, and the actions achieved by promoting circular initiatives

are undoubtedly good, this debate calls to question whether or not the strategies being employed, and the ideals behind them, are strong enough to achieve the desired results of sustainable urban living.

With these paradoxes fresh in mind, this thesis has attempted to navigate the treacherous waters of sustainability-related efforts in the face of corporate structures and business priorities. In the real world it becomes very difficult to separate theory from practice, cause from effect, and to identify true motivations behind organizational actions. The author has done her best to try to keep an objective view throughout the study, to take everything with a pinch of salt and view it through the semi-critical frames exposed in this subsection. However, a conscious decision was taken to focus on the positive effects of the efforts in question, to keep an optimistic view of the actors and the progress achieved, mainly for the sake of mental sanity and to keep believing that solutions to the daunting problems of climate change can be possible when managed correctly. Hopefully this thesis will support this optimistic hypothesis.

3. Theoretical Framework

In the effort of gaining a holistic understanding of the arena of circular solutions from festivals in the urban circularity transition, this research project borrowed fundamental principles from several theoretical perspectives. This section will explain each of these main conceptual approaches and how they are integrated into this thesis. The main framework employed, called the "Deepening, Broadening and Scaling up Framework for Steering Transition Experiments" of van den Bosch and Rotmans (2008), will be explained in further detail, to establish the theoretical bases upon which the project is structured.

3.1. Innovations systems approach

The innovation systems approach is a critical tool to understanding transitions, as it facilitates a holistic overview of knowledge and innovation processes. An inclination towards systemic innovation leads this project to view innovation as the search for and development of technologies (new or existing) and their implementation into a new context (Dantas, 2008). The approach works under two main principles of innovation: that it comes from an interactive process between many actors- including companies, governance, academic and research institutes- who have different knowledge and expertise and need to combine it; and that it does not follow a linear path from research through development to production and launch, but it is more characterized by continuous feedback loops between the different stages. An innovation system would therefore refer to the broad network of organizations involved in the creation, diffusion and use of knowledge, a critical part of innovation, as well as the organizations that support those processes. Studying these systems as a whole can be useful for transition researchers and policymakers, as it addresses the complex processes of knowledge creation, distribution and use, and their effects, in order to best foster innovation in a given context (Dahesh et al., 2020).

Over the past two decades, this perspective has been applied in all sorts of research fields, and has evolved into diverse approaches. In policy circles, it has been endorsed by several international organizations, including the Organization for Economic Co-Operation and Development, the World Bank, and various UN agencies (Dantas, 2008). In academia, environmental studies are one of its main patron disciplines, with hundreds of scholars employing this approach to analyze sustainability transitions; although usually borrowing concepts from TM and socio-technical systems perspectives (Dahesh et al., 2020**)**. Bringing it even closer to home, the innovation systems approach has already been used in the context of a GDCF festival, in Hjalager's (2009) study of cultural tourism innovation systems at Roskilde Festival. This network-oriented analysis was able to situate the festival in its web of stakeholders and identify key relationships, to address the potential for development it has stimulated through cultural spin-offs, and to make concrete policy recommendations to the event organizers. Evidenced by these studies, this approach allows for some interesting findings in both contexts of festivals and sustainability transitions.

It would be relevant to employ an innovations systems perspective in this thesis due to a few key characteristics of both the project and the approach. The innovation systems approach can be applied to innovation processes occurring at different levels of the economy from supra-national to sectoral scales (Dantas, 2008). Such a holistic view of the arena is necessary because this research project does not focus on one single festival, one single solution, or even one single city or country. Its scope of research is the

system of testing, developing and scaling-up of circular solutions used by GDCF, which is in itself an inter-organizational coalition made up of many different actors from different locations around Europe. Furthermore, it is recognized that many innovations come from local initiatives, which need to be supported in systems of innovation that go beyond national borders or traditional sectors (Hjalager, 2009). Here the network-oriented analysis and the collaborative nature of this approach continues to align with this thesis, as interorganizational actors, like GDCF, play an important role in the system and in maintaining and improving processes of innovation.

As a consortium, the role of the GDCF facilitating team, composed of sustainability and transition consultants and led by the Dutch Ministry of Infrastructure and Water Management, is to create and maintain platforms for discussion and collaboration between their diverse stakeholders. Hamann and April (2013) would therefore term them a *collaborative intermediary organization* (CIO). This theoretical concept is another argument for why this thesis requires an innovation system approach, as it allows for localized and fragmented scales of analysis, while highlighting the networks of personal relationships between participants, which is recognized as a fundamental for governance processes in sustainability transitions (Lawhon & Murphy, 2012). Upon examination, it is not uncommon to find these types of organizations in the festival industry: Innofest is a CIO concentrated on the testing and deepening process to advance innovation; GROENN is a CIO founded by major event organizers and the municipality of Groningen to inspire other events in that region to become more sustainable; while GDCF engages more with processes of connecting, networking, and knowledge sharing in order to advance shared visions for the industry at large. The potential of CIOs has been highlighted in transition studies, as "they can contribute to instigating and to some extent implementing long-term, systemic changes in the socio-ecological trajectories of urban areas" (Hamann & April, 2013, p.19).

In spite of its widespread popularity, the innovation systems approach is not uncontested. Critics claim that while this approach might be useful for improving innovation capabilities of individual firms in a corporate environment, they are less suited for the strategic challenges of transforming wider urban systems of innovation, production and consumption (Weber & Rohracher, 2012). Even in its ability to analyze systems at different levels (Dantas, 2008), this approach borrows founding concepts from Geels' Multi-Level Perspective (MLP) (2002). Weber and Rohracher's (2012) call for an integration of this approach to other perspectives more suited to the long-term challenges of sustainability crises and transitions, such as the MLP, Strategic Niche Management and TM. Following that call, the innovation systems approach will not be the main framework used for this thesis, but this perspective does serve as the conceptual base through which this thesis is approached. The research problem, methodology and research design have been framed in terms of innovation systems thinking, and during the discussion, and innovation systems analysis of the GDCF context will be attempted to draw generalizable conclusions.

3.2. Multi-level perspective

Since its introduction in 2002, Geels' MLP has been a milestone framework used to study long-term processes of transformative change (Weber & Rohracher, 2012). It is advantageous in its identification of several layers at which practices in society occur, namely: niches, regimes, and landscapes. A *niche* can be described as a societal subsystem which has a unique constellation of culture, practices, and structure; the *regime* would represent the dominant culture, practices, and structures in particular contexts of

society; and the *landscape* refers to broader societal patterns, values, or ideologies which cannot be directly influenced and where changes take place very slowly, even over decades (for this reason, the landscape-level is out of scope of this project) (Geels, 2002). Given the small-scale focus of this thesis on experimentation through individual circular solutions, the niche-level is of particular importance. Although they are less powerful than a regime (de Haan & Rotmans, 2011), the localized nature of niches enables experimentation with practices that deviate from the regime, as niches provide space for learning processes to occur and to build up the social networks that support innovation, like supply-chains and user–producer relationships (Foxon et al., 2010).

For this study, the MLP's definition of socio-technical transitions as changes which occur from niche to regime-levels in society, is particularly useful. The working assumption is that transitions are cemented when alternative practices scale-up from experimentation in niches to the regime-level (van den Bosch & Rotmans, 2008), as in the dynamic interaction between these levels is where transition pathways arise (Browne et al., 2019). However, it is also recognized that transition dynamics largely takes place in between the niche and regime levels, hence Rotmans and Loorbach propose an additional category to the MLP: the niche-regime level (2010). A niche-regime has higher stability, power and influence than a niche, so it is better positioned to challenge the power of the regime. Transition pathways can therefore be divided into a two-step process, from 'niche to niche-regime' and 'niche-regime to regime', through which changes at the niche level scale-up to the regime.

The notions of transitions in relation to the MLP are relevant to this thesis for several reasons. The niche-regime identification comes from an analysis of the Dutch Knowledge Network on System Innovations and Transitions (KSI) methodologies, the main geographical context where this study takes place; therefore some of the landscape characteristics in the theory are shared by the stakeholders in this study. The MLP complements complex systems perspectives, which are the backbone to this thesis, as it allows for both a focus on individual experiments at the niche-level, and broader context analysis on the niche-regime and regime-level. Finally, it has already been successfully applied in related studies (Kemp & van den Bosch, 2006), and its notions serve as the theoretical base for the main DBS framework used, which will be explained below.

3.3. Transition management theories

TM is a relatively new governance approach, characterized by its integrative character, its recognition of complexity in governance systems, and its guiding principle of sustainable development (Loorbach, 2007). It is a wider domain in which many theories have their bases, amongst them: the Transition Arena (TA) model, the TM cycle, governance experimentation theories, and the DBS framework selected for this thesis. The main rationales of TM which contribute to the understanding of the DBS framework and how they can be distinguished into the GDCF context will be explored below, followed by an exploration of why experimentation and transition experiments are useful in transitions.

Loorbach has made important contributions to TM, firstly by developing a model for TAs, understood as deliberately designed spaces for networks of stakeholders to engage in collective processes of understanding, learning, visioning, and experimenting towards societal transition challenges (Loorbach, 2007). TAs can act as policy niches, only if supported by powerful regime-level actors, and should involve long-term thinking for problem- and goal-searching, front-runners, and systemic innovation.

Another of Loorbach's contributions is the TM Cycle (visualized in Figure 1), a cyclical process model that integrates TM instruments into four phases, which can occur iteratively and at strategic, tactical, operational, and reflexive levels (Loorbach, 2010).

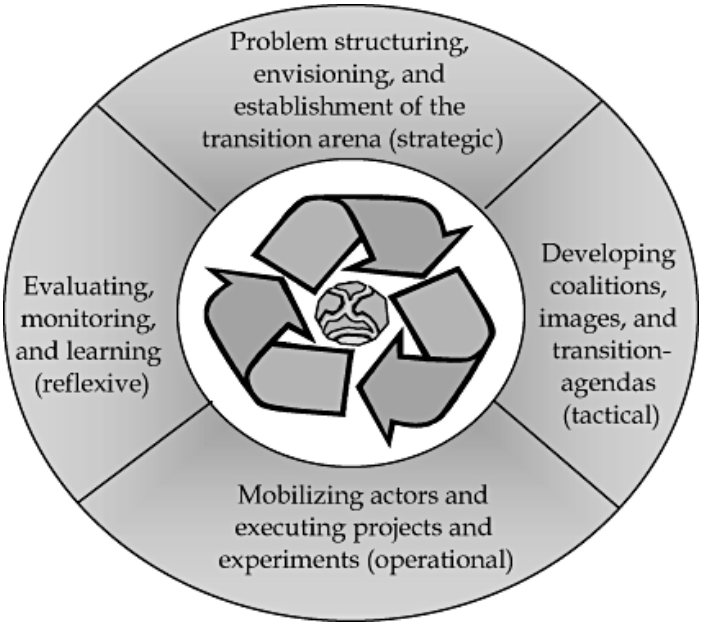

Figure 1. The Transition Management Cycle (taken from Loorbach, 2010)

This study is situated in the third phase, which highlights the implementation of projects and experiments related to the transition. Experimentation, particularly in terms of exploring new ways of governance, is one of the main characteristics of TM, and it is one of the main ways it contributes to sustainable development (Frantzeskaki et al., 2012). This approach has been previously used in the field of urban climate change experiments, where it was found to be useful to collectively imagine different futures (Edwards & Bulkeley, 2018); and it has inspired the development of a specific approach for urban transition labs, which calls for adaptations to the TM model to suit each context (Nevens & Roorda, 2014). For this reason, and having established why it's useful to experiment in transitions, this study will zoom even further into the transition experiment branch of TM, which will be explained below.

3.4. Transition experiments

Transition experiments are a popular instrument used by governance and researchers to advance sustainability transitions in many fields. The term refers to practical, small-scale experiments that have significant potential to contribute to a transition (Rotmans, 2005). Although it has been used in different ways by different fields of research, like Strategic Niche Management or TM theory, van den Bosch and Rotmans (2008) give a more precise definition of a transition experiment as "an innovation project with a societal challenge as a starting point for learning aimed at contributing to a transition" (p.13). In this definition, three key criteria are identified which determine if an experiment can have a potential contribution towards a transition: they must have the aim to solve a societal challenge at heart (here called a *societal transition goal*), they must be *innovative*, and they must contribute to the transition through *learning*.

- **Societal transition goal-** *Societal challenges* refer to complex, persistent and wicked societal problems, where the solutions are not clear or easy to reach and the effects of them can be very uncertain and hard to measure (Rittel & Webber, 1973). With a societal transition goal as a starting point, an experiment is created with the ambition to solve such problems and should keep that as its main driver for development.
- **Innovation-** Innovation in this case would refer to anything perceived as new, whether that be a completely new technology, product or service, or simply a new way to implement existing technologies in new ways or new sectors to solve existing problems (previously distinguished as *systemic innovation*) (Midgley & Lindhult, 2021). Innovation can allow an experiment to break free from mainstream ways of doing and create novel and possibly more efficient solutions.
- **(Social) learning-** The way in which the experiment contributes to the transition would be by allowing space and mechanisms for the system to learn (referred to as *social learning*), not only to perfect the solution but also in order to keep improving the process of finding that solution (Kemp & van den Bosch, 2006). Since societal problems are by definition complex and ever-changing, a mix of these three characteristics is essential to advance transitions towards the solutions to these wicked problems.

Transition experiments are beneficial to transitions because they can be used by policy-makers to test new innovations and alternative practices, and see if they have the potential to make it to the mainstream (Frantzeskaki et al., 2012). Because they provide a safe space for collective exploring and learning, they contribute to niche development (van den Bosch & Rotmans, 2008); which in turn creates new opportunities for learning, since they can inspire new circular experiments within the network of stakeholders they have connected, and in other collaborations with future partners (Kooter et al., 2021). In fact, the biggest benefit of transition experiments is that they don't necessarily aim to find ultimate solutions for complex societal problems, but they can explore and improve transition paths towards sustainable futures, and represent the first small steps towards them (Kemp & van den Bosch, 2006).

Innovation projects can be considered prime real-world examples of transition experiments, and this has already been explored in academia, based on two main characteristics of projects. Studies of circular construction projects have identified their potential to act as portals for mainstreaming niche innovations, due to their temporality- they are temporary spaces which must be very flexible and where strong social relationships are formed (Kooter et al., 2021); and they are arenas where processes of mutual adaptation between niche and regime can take place- by testing the innovation within the niche and evaluating their potential to be adopted into the regime (van Bueren & Broekhans, 2013). As links between projects at festivals and learning at personal, group and inter-cultural levels have already been proven, the consideration of innovative festival practices as transition experiments is also academically backed (Yan et al., 2021). Thus, this research considers the implementation of circular solutions from festivals as transition experiments to study their contributions towards urban circularity transitions.

3.5. DBS framework

This thesis finally adopts van den Bosch and Rotmans' "Deepening, Broadening and Scaling up Framework for Steering Transition Experiments" (2008) as its main conceptual framework. The framework adds to sustainability transition literature by linking the MLP's conception of transitions as

changes from niches through niche-regimes to regimes, and TM instruments, situated in the third phase of the TM Cycle, which emphasizes experimentation and the mobilization of transition networks. Building on those bases, it furthers the theoretical understanding of how small-scale experiments can influence sustainability transitions. By taking individual transition experiments as the scope of analysis, the framework places the experiments as the arenas in which potential contributions are occurring. Studying the deepening, broadening and scaling-up (DBS) trajectory of specific experiments allows for a more focused analysis, where instead of trying to tackle an overwhelmingly complex society-wide problem which is inconceivably interlinked and fail, one can bound it into a scale that is manageable. This allows for a better understanding of the context- the geographic, political and social conditions that might affect the experiment in question, and to apply complicated theory into a practical, real-world example, and thus learn from its mistakes or successes. This framework was selected for this research project because it offers a good mix of theoretical perspectives, which have all been developed and previously applied in the Netherlands (where this research mostly takes place), and because it is designed for practitioners, so it connects its theoretical approach with practice-oriented management guidelines for project managers to increase the contribution of experiments to transitions. Both parts of the framework will be briefly explained below.

Deepening, broadening and scaling-up

To understand how experiments contribute to transitions, the framework studies three change mechanisms of transitions- deepening, broadening, and scaling-up (visualized in Figure 2), and it explores the conditions necessary for transitions to occur.

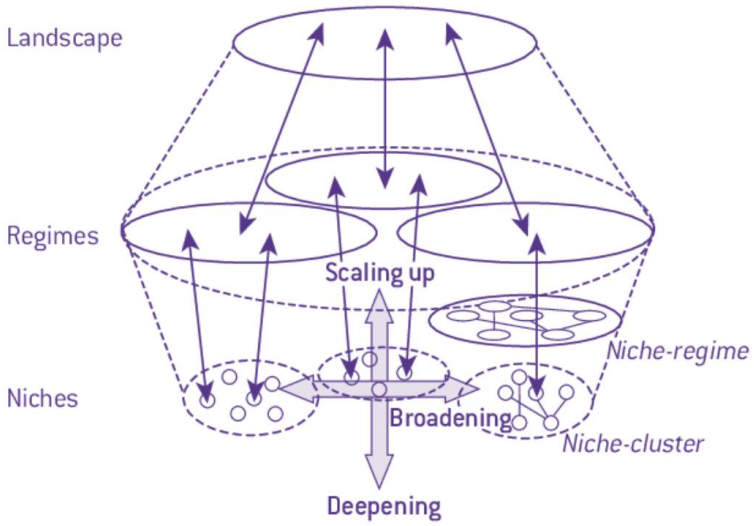

Figure 2. Deepening, Broadening & Scaling-up transition experiments in niches in relation to Multi-Level Perspective (taken from van den Bosch and Rotmans, 2008)

- **Deepening-** Deepening refers to the learning process through which innovators can learn as much as possible about a transition experiment within a specific context. This should take place in niches separate from the regime and iteratively over time, to ensure that the experiment is effective and that lessons learned are applied to drive further progress toward sustainability goals.

- **Broadening-** Broadening is defined as repeating a transition experiment in different contexts and linking it to other functions or industries. The goal is to make the experiment more inclusive and adaptive, making it more relevant to engage a larger community of actors.
- **Scaling-up-** Scaling-up is the process of embedding a transition experiment from niches to mainstream practices in the regime (or niche-regime). It refers to the application of practices (ways of thinking, doing, legislation, institutions, etc) from the experiment to a larger scale, to drive transformative change by making sustainable solutions more mainstream and accessible.

Key stakeholders and niche-related conditions for the success of transition experiments

The framework recognizes that transitions are so complex that no individual is able to fully control a transition process from top-down. Therefore, examples of stakeholders that could play key roles in the scaling-up processes are identified and three niche-related conditions for the success of transition experiments in which they could act are derived:

1. Alignment within the niche - connecting actors that can align vision are key
2. A high level of power of the niche that locally exceeds the power of the regime - (locally) powerful actors (like governments, protocols and standards setters, policy makers, etc.) can increase the power of niches
3. Alignment of the niche and the mainstream environment or regime; mainstream actors with power and visions (such as sustainability organizations, front-runners in a sector or policy domain, large business directors, etc.) can help stimulate adoption of niche practices into mainstream practices

Steering

In the second part of their DBS framework for transition experiments, Van den Bosch and Rotmans (2008) address the conditions necessary for experiments to contribute to transitions and how managers can support this process. Expanding on a transitioning method developed by the Dutch KSI, they translate different TM theories into practical strategies that managers can use to steer experiments through the deepening and broadening trajectory, to the scaling-up phase. Differentiating between process (more practical criteria, related to conventional successful project management) and substance characteristics (concerning the quality of the solution being discussed), they identify the 6 main challenges in managing transition experiments. The management guidelines they propose for practitioners to address those challenges are described in Table 1 below. Summarizing, actions under the deepening dimension target learning processes, those under broadening cover processes of interaction to the broader context (different functions and/or settings), and those under scaling-up address processes of embedding the experiment to higher levels (from niche to regime) to increase its impacts. Like cyclical innovation processes, the 3 dimensions are non-sequential since learning, interacting and embedding can happen simultaneously. Although these strategies were created to increase the transition potential of diverse transition experiments, it is important to keep in mind that they are very context dependent. Using the strategies as guidelines, rather than strict instructions, managers can analyze their specific context, always considering timing and being aware of barriers and opportunities they can take advantage of to create more concrete and SMART actions that can maximize the contribution of their experiments in their TAs..

Steering dimensions Success criteria	DEEPENING Actions aimed at learning as much as possible from the experiment in the specific context	BROADENING Actions aimed at repeating the experiment in other contexts or connecting to other functions and domains	SCALING UP Actions aimed at embedding the experiment in dominant ways of thinking, doing and organizing
PROCESS			
Room in budget and planning	- allocating resources (time, money, knowledge, etc.) to an open search and learning process	- allocating resources to interaction with other domains and partners	- allocating resources to (early) involvement of key actors at a strategic level
Space in the process	- building in space for reflection on and adjustment of the vision and learning goals	- building in space for reflection on the connection to the broader context	- building in strategic reflection on barriers and opportunities in dominant ways of thinking, doing and organizing
Quality of learning process	- organizing a broad, reflexive and social learning process	- focusing the learning process on how experiments can reinforce each other	- focusing the learning process on how learning experiences can be embedded in dominant ways of thinking, doing and organizing
Supportive incentives / assessment mechanisms	- developing supportive incentives / assessment mechanisms that increase the quality of learning	- developing supportive incentives / assessment mechanisms that stimulate interaction with other domains and partners	- developing supportive incentives / assessment mechanisms that stimulate feeding back results to key actors at a strategic level
Competences of project participants	- selecting project participants with an open mind and willingness to learn	- selecting project participants that are able to look outside the borders of their discipline and are strong 'connectors'	- selecting project participants that are able to communicate and 'anchor' project results at a strategic level

Strategic management	- the management guarantees that project results are related to the societal challenge	- the management guarantees the interaction with other domains and partners	- the management guarantees connection to key actors and developments at strategic level
SUBSTANCE			
Connection to societal challenge	- connecting project goals explicitly to societal (transition-) goals	- cooperating with partners and developing new partnerships to realize shared societal goals	- adapting to sense of urgency with regard to societal challenge
Sustainability vision / future perspective	- project participants share a long term sustainability vision	- developing an overarching sustainability vision to provide guidance to different experiments	- drawing attention to the sustainability vision at a strategic level
System analysis (dominant culture, practices, structure in sector)	- project participants share perspective on dominant ways of thinking, doing and organizing in the sector (from which the experiment deviates)	- identifying similar experiments and potential new partners, application domains and functions	- identifying key actors with power and willingness to influence dominant culture, practices and structure
Learning goals / desired changes (innovation)	- formulating explicit learning goals with regard to desired (interrelated) changes in culture, practices and structures	- repeating the experiment in other contexts and experimenting with new functions is part of the learning goals	- anticipating and learning about barriers and opportunities in dominant culture, practices and structures is part of the learning goals
Intended results	- distinguishing results in generic and context specific	- sharing results with other experiments and potential application domains	- stimulating structural (regime) support and resources for results

Table 1. Management guidelines for transition experiments (from van den Bosch and Rotmans, 2008)

4. Methodology

The methodology followed in this thesis will be explained in this section. The researcher's research philosophy will be introduced, followed by a description of the research design, data collection and data analysis methods. A conclusion will highlight the measures employed to ensure validity and relevance throughout the thesis.

4.1. Research philosophy

From the onset of any research project, ontological and epistemological considerations of the researcher play a role in shaping the research that is undertaken; in order to make this project as transparent and scientifically valid as possible, these will be described. In this project, the researcher follows the ontological position of critical realism, which believes that one reality exists but it can never be perfectly understood because of the complexity of human nature, although broad critical examination can come as close as possible (Moon & Blackman, 2014). A constructionist epistemology is followed, assuming that knowledge and meaning are created by the subject's interaction with the object, and considers how cultural, historical and social context can affect how individuals construct different meanings of the same phenomenon (Moon & Blackman, 2014). These perspectives align with the innovation systems approach followed, which recognizes that the complexity of societal systems can only be understood when studied holistically and exhaustively, and emphasizes the role of interactions in social networks towards their evolution (Dahesh et al., 2020).

This research project aims to understand the phenomenon of scaling-up circular solutions, and as such, follows the main theoretical perspective of interpretivism, which believes that realities in social sciences are culturally and historically contextual (Moon & Blackman, 2014). This can be traced to the researcher's interpretivist focus on studying individual cases to make conclusions; in this project, individual solutions are studied and result in semi-generalizations, which aim to make recommendations but are only applicable to this specific GDCF context. The researcher is further aligned with hermeneutics, a branch of interpretivism prevalent in the social sciences that assumes that social behavior is driven by knowledge, discourse and practices (Creswell & Poth, 2018). This is evidenced by this study's focus on circular solutions or practices at festivals to understand a wider phenomenon.

This thesis engages in exploratory research, as the goal is to explore the main aspects of a phenomenon in a context that has not been studied before (George, 2023), as the previously laid-out knowledge gap confirms. The study aims to get a 'lay of the land' in the context of GDCF and can be described as applied research, as it also aims to improve the group's practical techniques and procedures to enhance their contributions to transitions (McCombes, 2023). Parting from its interpretivist research philosophy, the research mostly follows an inductive reasoning approach, as it moves from specific observations to broader generalizations (Streefkerk, 2023). However, a limitation of an inductive approach is that conclusions drawn from this method can never be fully proven, nor is this the aim of the study. Therefore, it also applies some aspects of an abductive approach, balancing observations and known theory to reach conclusions; this allows for more holistic theories to be developed, and is one of the benefits of the Gioia methodology (Gioia et al., 2013) which is used in the multi-method operationalization and data analysis, which will be further explained below.

4.2. Design of research project

The research question will be addressed using a qualitative multi-method research design, where primary and secondary data will be analyzed according to the innovation systems approach & the DBS framework. A multi-method approach is one of the characteristics of living lab networks and has been used in sustainability transition studies for social innovation before (Ruijsink & Smith, 2016), so it was found to be appropriate for this research context which is characterized by complexity and social networks. Firstly, a literature review was carried out, based on secondary data from desk research, to delve into the research problem and identify the direction of the research. Secondly, a DBS analysis of a concrete transition experiment (Semilla Sanitation) was undertaken, based on content analysis from desk research and primary data collected through interviews. This example case was selected, based on theoretical criteria that will be explained below, to illustrate the mapping of a DBS trajectory, but it was not designed as a case study as the idea was not to go so in-depth into one case, rather to inspire some generalizable conclusions for the GDCF context. Finally, an innovation systems analysis of the broader context of GDCF was attempted, based on content analysis from desk research and primary data collected through interviews and participatory observation, in order to understand how GDCF has been contributing to the transition so far and to shape practical recommendations for improvement. Figure 3 visualizes the research design based on these three phases, which took place from February until December 2023.

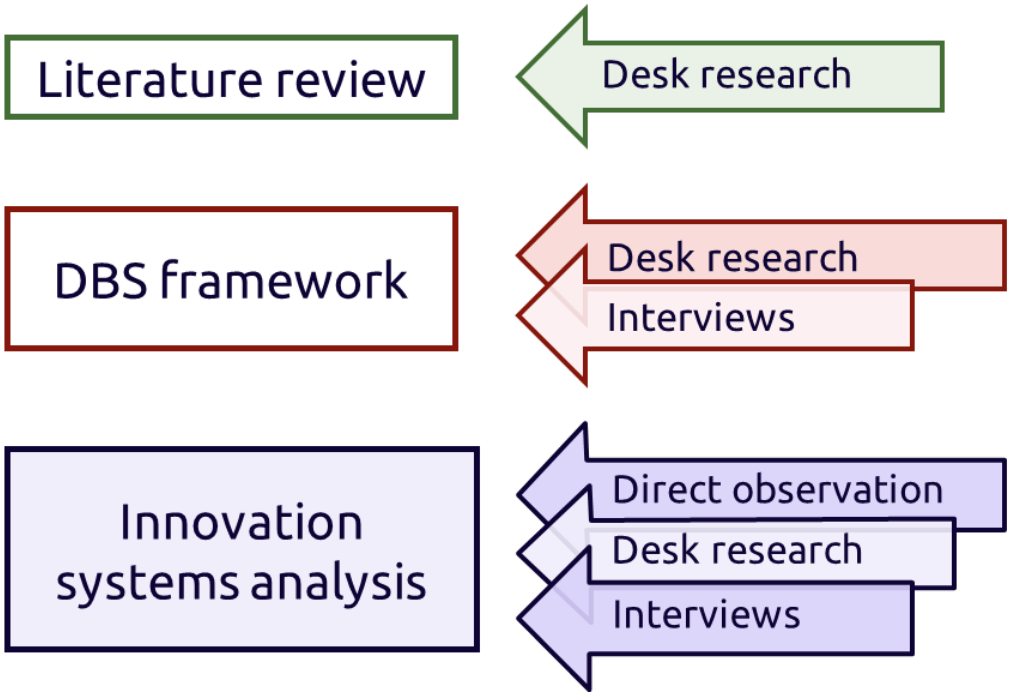

Figure 3. Research design based on the phases of literature review, DBS framework analysis and innovation systems analysis, including the research methods employed for each

4.3. Data collection

To collect data, the researcher employed three main methods: desk research, direct observation, and interviews. Different methods were combined to gather a large body of qualitative data from different sources, which ensures triangulation and enables a holistic systems analysis (van Thiel, 2014). The methods and the rationales behind using them will be explained below.

Desk research

Desk research was conducted by gathering secondary data from external and internal documents, such as: online articles and websites, GDCF presentations, and other documents shared by interviewees, in particular, the "Festivals Innovation Long-list" (explained in the Discussion). A structured approach to collect external data was employed, by developing a list of initial topics to be explored to guide the research, which got refined as it went along (Moore, 2006). The authority and reliability of the material collected was carefully monitored, relying on relevant sources from government, research and knowledge institutes, or affiliated organizations when possible (Moore, 2006). The data was then used to map existing academic knowledge for the literature review, to identify circular solutions and their DBS trajectories, and to understand the main actions, policies and progress of different actors for the GDCF system analysis. Desk research uses existing resources, so it is considered a low-cost and effective technique (Rahman et al., 2014), which aligns with the scope of this project. This method is also useful for inductive studies, as it allows researchers to get acquainted with the subject (van Thiel, 2014), which is why it was selected for the first phase of this study.

Direct observation

For a more in-depth analysis, primary data was collected through unstructured observations from GDCF working group meetings (which took place weekly in April), and from site visits to three GDCF festivals. Notes were carefully recorded and then transcribed and analyzed, in order to gain a better understanding of GDCF as a CIO, to identify main stakeholders and their roles in the group, and to begin to uncover main themes, patterns, and behaviors at festivals. Observational research is a good method to systematically observe and collect information about natural behavior, and it was chosen for the second phase of this study as the goal was to obtain a snapshot of specific characteristics of a particular group or setting (Price et al., 2016), in this case GDCF. Although the researcher did participate in these meetings and visits, and her presence was announced to the subjects, the interaction between researcher and subject was kept to a minimum to maintain objectivity, so it is considered direct rather than participatory observation (Trochim, n.d). Nonetheless, there is always a strong risk of bias in observational research, although gathering data from different sources and methods is a good way to minimize it (Stake, 1995).

Interviews

After getting an initial overview of the GDCF context from secondary research, the direction of the research and data that was still necessary became evident. To gather this primary data, eleven expert interviews were conducted to a purposeful sample of facilitators, sustainability consultants, festival organizers, innovators (or owners of solutions), and municipalities that are involved with GDCF

(specified in Table 2 below). A semi-structured interview protocol was followed, providing the interviewer with a certain structure and the main topics to be addressed, but allowing for some flexibility in adapting to the course of each interview while maintaining the natural flow of conversation (Hermanowicz, 2002). Interview guides were created for each interview, based on scientific literature and the identified data required from each expert. All interview questions were open-ended to gain as much insights as possible directly from the sources (Bell et al., 2022), and the interviews were recorded and transcribed for further analysis through coding, which will be described below. Interview guides and transcripts have not been included in the Appendix for brevity, but are available on request.

Role	Name	Organization
Innovators	Peter Scheer	Semilla Sanitation
	Linda Vermaat	Innofest
Festivals	Rob van Wegen	ESNS
	Kees Lamers	MOJO Events
Open-city events	Hanna Winters	SAIL Amsterdam
	Tessa Groenen	Vierdaagse Feesten
Municipalities	Mark Stoevelaar	Gemeente Amsterdam- Innovation team
	Helen Harland	Manchester- Zero Carbon team
Sustainability consultants	Tijl Couzij	Lab Vlieland & ITGWO
Facilitators	Laura van de Voort	GDCF & Green Events
	Alzira Schaap & Christiaan Elings	GDCF & RHDHV

Table 2. Detailed information of interviews conducted to various members involved with GDCF

4.4. Data analysis

This thesis follows an inductive approach to analyzing primary data, by performing a desk-research analysis on external and internal documents and on the notes from the direct observation and by coding the data collected from the interviews; and an abductive approach to developing and presenting results based on the data collected and existing secondary data from academic literature. The operationalization of both types of data analysis processes will be described below, with more details on how final conclusions and recommendations were developed.

Desk research analysis

To analyze notes from the direct observation and literature and documents from the desk research, a desk research analysis method was followed. This method is so widely applied that there is not one clear framework describing how to perform a qualitative analysis, which is subjective in nature, although to ensure replicability, the researcher aimed to make the analysis process as systematic as possible (Rahman et al., 2014). Data gathered from relevant sources was carefully written down into different documents according to subjects (such as steering strategies, main needs of actors, trajectories of solutions, etc.). It was then grouped by themes and the different data was compared and mutually verified. Information that was still missing was identified and brought up in the interviews with experts. When all necessary data was compiled, the themes were connected to the sub-questions that they might contribute towards answering and patterns were identified. These patterns were analyzed through the relevant theoretical frameworks, which shaped the final conclusions and recommendations.

Coding process

In order to ensure academic reliability of the primary data collected, the 'Gioia methodology' (Gioia et al., 2013) was used to code and analyze the content of the interviews. The first stage of the methodology involves creating a coding structure made up of first-order (informant centered) codes and second-order (theory centered) themes and aggregate dimensions. The coding structure was initially developed from academic literature- Michalina et al.'s (2021) list of thematic categories from the fifty most relevant global frameworks, key concepts from the DBS framework and the main themes employed by GDCF. Using the data analysis software Atlas.ti, the interviews were transcribed and went through a first round of open coding for first-order concepts, with new codes being added to the structure as new concepts were mentioned by the interviewees. To maximize reliability during this iterative coding process, a second round of open-coding was performed on all the interviews, ensuring that the code definitions were coherent and that codes added later on would be included. Next came a process of axial coding, where critical reasoning was applied to review the first-order concepts and refine them into related second-order themes. For example, if codes were only mentioned in one interview then they were either merged or deleted, as they were considered irrelevant since the aim was to identify patterns, not individual experiences. The codes were reworked this way until perceived as saturated, when the code definitions were holistic and all themes deemed relevant to the analysis. Finally, links between second-order themes were identified and these were grouped into aggregate dimensions, a process known as selective coding. The final coding structure resulted in 54 second-order themes divided into 11 aggregate dimensions, which can be found in Appendix A.

Following the Gioia methodology, an inductive grounded theoretical model was used to analyze each theme after coding. The codes were looked up on Atlas.ti and the quotes that they were grounded in were collected. Any irrelevant quotes were filtered out using critical reasoning; for example, in the successful solutions analysis, the characteristic of 'Representative' was removed because it came from quotes that talked about all pilots, not successful solutions, so it was out of the relevant scope. Summaries were drafted, which enabled the identification of trends and patterns in the data. This constant comparison of data over time and across interviewees allowed the researcher to draw up evidence-based conclusions about this specific context, based on direct observations from the data collected (Magnani & Gioia, 2023). The final phase of the methodology comprises the presentation of the study's findings in an evidence-

based report, which this thesis will do in the Results, structured around the second-order themes and aggregate dimensions, frequently referring to the interviewees' first-order quotes. In the following Discussion and Conclusion sections a more abductive approach, balancing the observed data with existing theory and literature, will be used to answer the research questions.

4.5. Trustworthiness of the research

Validity and reliability are key characteristics of sound scientific research; validity referring to the accuracy of a study's findings, and reliability concerning the consistency of the researcher's approach (Cresswell & Poth, 2018). In the social sciences, however, these can be seen as contested terms due to their quantitative nature; thus Rose and Johnson's construct of *trustworthiness* (2020), which includes considerations of traditional reliability and validity but also takes into account qualitative research techniques and considers the researcher's ontological and epistemological perspectives, is better suited to judge the quality of this research.

A qualitative study of this inductive/abductive nature has certain challenges which must first be recognized to establish trustworthiness. In this project, for example, no single analytical framework could be applied to all the different sources from the desk research, nor was it relevant to code all the sources with the same structure as the interviews, so the researcher had to employ a subjective method of analysis. Nonetheless, reliability was ensured by describing in-depth the processes followed, so they are replicable by different researchers and across different projects (Cresswell & Poth, 2018). Similarly, the use of semi-structured interviews makes it difficult to prove consistency, as they each had different formats according to the role of interviewees and each conversation led in different directions. However, by employing set procedures for the set-up of the interviews, the note-taking, and the transcription and coding, data processes were streamlined and made as consistent as possible (Yin, 2012). The validity of the findings is further supported by incorporating interview quotes as illustrative descriptions of the conclusions, which is in line with constructivist and interpretivist approaches applied (Stake, 1995). It can also be argued that the involvement of the researcher in the group for an extended period of time makes it difficult to achieve objectivity during the study. Conversely, prolonged engagement has been found to increase the validity of qualitative research, as it allows the researcher to get a holistic view of the context (Rose & Johnson, 2020), which is key for system analyses. By recognizing their existing bias and the study's limitations, the researcher attempts to limit subjectivity stemming from their participation and establish trustworthiness in the research.

Triangulation is a technique adopted in social sciences to measure validity of results, by locating unknown study objects in a metaphorical space, relying on two or more known points (Mertens & Hesse-Biber, 2012); in this study, triangulation was pursued through a variety of tactics. Methodological choices were made based on previous living lab studies, like Stuckrath and Rosales Carreón's (2021) which offers a schematic representation (Figure 4 below) where this research project with GDCF can be visually positioned between Academia and Business.

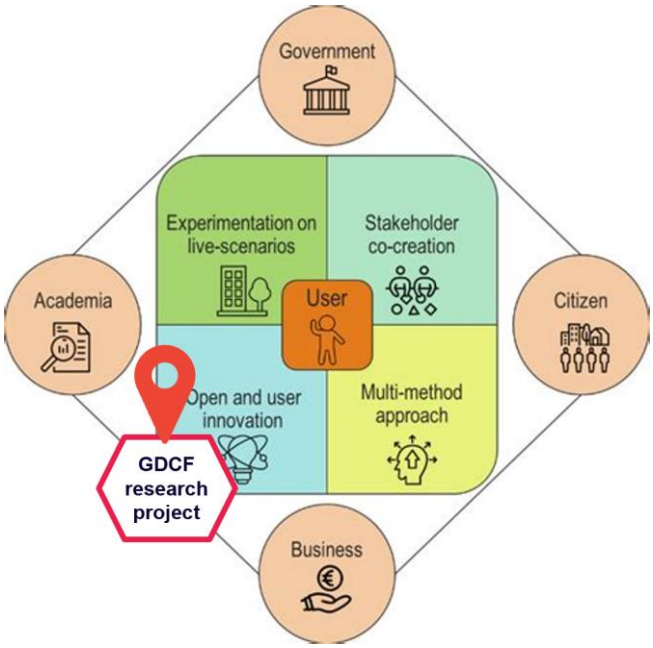

Figure 4. This GDCF research project situated in a schematic representation of living lab studies (adapted from Stuckrath & Rosales Carreón, 2021)

These studies offer precedence for using a mixed-methods approach, which also ensures triangulation and robustness in the processing of data (van Thiel, 2014). They also support this study's choice to gather information from diverse stakeholders, which aids triangulation by involving multiple perspectives, helping guarantee the accuracy of the data collected and representative and ethical concerns of the research (Mertens & Hesse-Biber, 2012). Following the clearly structured Gioia methodology for data analysis and performing two rounds of coding triangulates the analysis, limiting the researcher's bias in the interpretation of results (Magnani & Gioia, 2023). Finally, the research process was constantly revised with the thesis supervisor and peer reviews, engaging in peer debriefing practices which contribute to the resonance of the research (Rose & Johnson, 2020). Preliminary results were consulted with the internship mentors to triangulate them in the real-world context, and most of the findings were corroborated by previous studies, as will be made evident below, ensuring their academic validity.

5. Results

This section will present the outcomes from the interviews with practitioners from the GDCF context- from festival organizers, large-scale event sustainability coordinators, to governance actors and transition experts. The aim is to explore current practitioner insights related to the research question, so it will be structured into subsections according to each of the sub-questions. Following aforestated theory, the aptness of festivals (and open-city events) as TAs will first be investigated, zooming into the potential of circular solutions towards transitions. Finally, after justifying Semilla as an example case, the DBS framework will be applied to it, providing concrete lessons that can be learned from evaluating its DBS trajectory and steering behaviors from a circular solution in the festival industry.

5.1. Potential of festivals as spaces of experimentation

The main theoretical rationales for considering festivals as prime opportunities for urban experimentation have previously been laid out as: their adaptive infrastructure due to their temporality and flexibility; shared needs with cities; and the power to impact both suppliers and consumers in urban environments. Practitioners largely agree, and their real-world experience with this subject leads to more interesting insights to support them. Figure 5 displays a word cloud with the most frequently mentioned words under the Festivals code group (a threshold of 5 was applied to focus on the most repeated constructs). It visually represents the main arguments supporting festivals as spaces of experimentation, which Tijl Couzij nicely sums up into three categories:

> "Festivals are good for three things:
> - As laboratories, to test and learn
> - As mini-cities, catalyzing for circularity in urban systems
> - As stages, inspiring other actors to engage in circularity"

Figure 5. Word cloud of most recurring words in the code group: Festivals (developed with Atlas.ti)

Festivals as laboratories

Festivals are considered great laboratories because: they are temporary settings with adaptable infrastructure; and they foster flexibility in behavior of staff and visitors; so they are great testing grounds for solutions to gather real-world feedback.

Theory has covered how temporality leads to flexibility, and the interviewees supported this to be true in the festival industry. They point out that the short planning time of these events allows them to be more innovative than other industries with more complicated governance structures, and it also forces them to be more creative because they need to find solutions quickly, which can lead to out-of-the-box solutions like the grid-power project in Manchester. Theory has also addressed the need for infrastructural adaptiveness for society to reach circular resource management, a popular argument brought up by practitioners as the benefits of festivals. As Linda Vermaat says: "the layout in itself is also the perfect place where things can be tested", referring in particular to the energy and water infrastructures which tend to be external at festivals, so they are "much more accessible" for experimentation than in cities that have these systems built underground. Furthermore, festivals are built-up again every year which means they have few long-term investments and solid infrastructure, which financially, physically and organizationally enables innovation with every edition.

The ability of festivals to influence people's behavior has been highlighted by theory, and it is beneficial as this is one of the main challenges identified by practitioners for sustainability and innovation. Usual ways of doing things, the search for efficiency, and comfort are big obstacles for the adoption of circular solutions, which is why Peter Scheer identifies the need of changing people's attitude for the adoption of circular systems, in Semillla's case towards reusing wastewater. Festivals can achieve this because, in general, people at festivals are super flexible; practitioners say visitors are more open to trying new things (possibly due to good moods, a temporary break from reality, or value-based social pressure), and staff are also used to last minute changes, which is critical for innovation. Furthermore, festivals offer a fun and positive atmosphere for visitors to try circular solutions in, which creates subconscious links that help generate intrinsic sustainability motivation. Tijl Couzij attests that "the biggest influence of festivals is that they make the connection between having a good time and making the more sustainable choices. [That is necessary] if you want people to change their behavior towards more sustainable behavior."

Festivals are further considered laboratories by practitioners due to their intense but realistic conditions which create a great testing grounds for solutions to gather real-world feedback in real time, which have been compared to living labs. The case of Greener, further explained in the Discussion, exemplifies the huge role festivals can play in testing innovations, making them "real-world proof", and popularizing them and making a market for them in broader society. Moreover, the benefits these events offer are not only limited to festival solutions, as Rob van Wegen says: "There are a lot of innovations that are not [designed] for festivals, but they can still use the festival as a testing place to get feedback to improve." In fact, much of the success of Semilla comes from having embraced festivals as testing labs, where they "can mimic in a temporary situation exactly what we will soon encounter in reality in a refugee camp" (Innofest & Visser, F., 2020, p.39).

Festivals as catalysts

Festivals are considered mini-cities with the same basic needs and suppliers; so they can help test and improve systemic innovations, setting up the transition to existing city systems; and they can catalyze change in city-wide supply-chains through their influence on and existing relationships with suppliers.

Like theory has shown, festivals can be considered mini-cities because they have to fulfill the same basic needs for their visitors as cities do for their citizens (summarized in GDCF's 6 main themes). Practitioners highlight that festivals face the same challenges as cities, but magnified because they are concentrated in thousands of people in a small space and a short time. This compels festival organizers to look for solutions for their daily operations, which can be adopted to also solve city problems. Furthermore, festivals are intertwined in the same supply-chains that also supply cities, from energy and water providers, to large food and beverage suppliers like Heineken. This means that they can influence these supply-chains to act more sustainably and even stimulate the adoption of successful solutions, which will be explored in the following arguments. As Tijl Couzij states:

> "Festivals, because they're like micro cities, have an influence in a lot of supply-chains that run the rest of the economy. They basically have their tentacles in all these different sectors which are the sectors that also supply these services for the rest of society [...] If we as festivals start asking for sustainable alternatives and they start having to figure out how to do it for us they can then also do it for the rest of society."

Practitioners continuously mention that successful solutions lie in systemic innovations, and they proclaim that festivals are the perfect setting to test them, because solutions have to merge with existing systems and infrastructure. They help bridge the gap between research to real-world applications; using the example of Hydrotreated Vegetable Oil (HVO) fuel (explained in detail in the Discussion), practitioners demonstrate how testing at festivals can take a solution "from a report to a working system in reality" and make it "real-world proof" (Tijl Couzij). Pilots with large-scale suppliers, like the climate-neutral beer pilot Into the Great Wide Open festival (ITGWO) developed within Heineken, show that it's possible to implement circular solutions into existing supply systems. This sets up the transition to circularity in existing city systems, because, according to Linda Vermaat: "If it can work for a festival, it can also work for a city. Maybe it can also work for a country, a region, etc."

Theory has established the power of circular projects to consolidate supply-chains, and the influence festivals can have on suppliers. Practitioners concur that this influence is due mainly to the huge audiences festivals have, which gives them large buying power but above all generates huge marketing and PR value for suppliers. GDCF is trying to consolidate the festival industry in order to harness this leverage on shared supply-chains, since they recognize that front-runners like them have a catalyst function within a transition by starting to ask the market for sustainable alternatives. Like ITGWO did with Heineken, if festivals influence large suppliers to develop successful circular pilots, suppliers can then use those new processes to implement the solutions in cities. Large-scale transitions simply won't work unless the market supports them, however, and here GDCF practitioners say they have the responsibility or challenge to make the transition attractive to suppliers. Festivals can thus use their long-standing relationships with suppliers to engage them and pave the way together, creating shared sustainability visions, goals and long-term strategies that will help catalyze the transition into broader society.

Festivals as stages

Festivals can act as stages or platforms for circularity because: they have a huge reach, in terms of audience, media coverage, and supply-chain; so they can showcase solutions that work; and so the festival industry itself can act as a front-runner in the circularity transition, inspiring similar movements throughout different sectors in society.

As large-scale events, festivals can gather thousands of people- between visitors, staff, and influential artists- giving them a huge audience which is rare to find in other types of events or private companies. Practitioners point out they also tend to have a big reach within national and international media, and well-established partnerships with suppliers that are beneficial because of their marketing and PR potential. This makes festivals huge stages from which to tell stories. Theory has outlined how festivals can influence the behavior of their audiences, and practitioners agree that this can be capitalized on by municipalities and transition experts to communicate circularity messages to large audiences, helping to advance circularity transitions in their cities.

The huge reach of festivals also allows them to showcase successful solutions, showing what is already possible to make urban systems more circular. Practitioners gave examples of how this helps inspire others to implement the solutions, accelerating their adoption into society: Vierdaagsefeesten launched a soft-cup recycling system that inspired other local events, to the point that it was promoted by the municipality to be widespread in the region; Eurosonic Noorderslag's (ESNS) hard cup pilot inspired one of their largest venues to adopt it permanently; and the use of HVO fuel for generators, which was first showcased at festivals, quickly inspired other industries to adopt the systemic innovation, bringing it into the mainstream. Festivals further have the ability to show their visitors that solutions do exist and let them try them, battling the hopelessness that practitioners highlighted and giving back hope that solutions to climate change are possible. As Tijl Couzij expresses: "We want to tell the story on that stage, we want to show [visitors] a new normal, what is possible, the best cases, [...] and we want to make them experience it."

Finally, the festival industry itself can use its stage to act as a front-runner in the circularity transition. Practitioners recognize that because of the characteristics and arguments mentioned above, they have the ability and responsibility to push the bar on circularity. They point to GDCF festivals as innovators of the circularity bell-curve, inspiring early adapters and trying to influence the early majority, which they deem necessary to achieve real change. With the support of governments and the engagement of the public and the market, these festivals aim to inspire similar movements towards the circularity transition in different sectors in society. Rob van Wegen voices these goals: "Our impact can be massive because the municipality now understands that we have a role to play, they can use us in the transition."

5.2. Open-city events as stepping-stones

GDCF examples

Another well recognized phenomenon in the sustainable events field is the recognition of open-city events (large-scale events which take place within cities and are open to the public, as they are not fenced or

bounded) as key grounds to advance circularity transitions. To understand the particularities and potential of open-city events, two examples from the GDCF context will be presented: SAIL and the Olympic Games. SAIL Amsterdam (SAIL) is a sailing event where sailing fleets and tall ships from all over the world gather in the port of Amsterdam for a five-day exposition (SAIL Amsterdam, n.d.). It has been happening every five years since 1975, and is now the largest nautical event in the world and largest freely-accessible event in the Netherlands, attracting over two million visitors. The 10th edition will take place in 2025, celebrating 50 years of SAIL and the 750th anniversary of the city Amsterdam, so it is an especially relevant event for the city. SAIL is not yet an official member of GDCF, but they are actively involved in the meetings and workshops the group hosts, and are benefiting from knowledge sharing networks and acting as a host to circular solutions that work with GDCF. The Olympic Games is a worldwide sports competition that has taken place every four years since 1896. In 2024 they will take place in Paris and it will be the biggest event ever organized in France, with over 9.7 millions visitors expected **(Paris 2024, 2023)**. They are not directly involved with GDCF yet, but contacts with the Paris municipality are being actively pursued to collaborate with them, and there is already an initiative to implement Dutch solutions, some which work with GDCF, in the event (*Missie Sport naar Parijs*). Both are prime examples of events that not only take place in and are open to the city's public, but take over and have immense power over the city. The main arguments of how these can be used as stepping-stones for scaling-up circularity transitions from festivals to cities will use examples from these two events.

Applied theory

The Amsterdam Innovation team has identified the potential of these sort of events, and has in fact made it a key part of their Innovation Cycle (*Innovatie Estafette* in Dutch), a methodology through which they aim to make the city more resilient and climate-neutral by scaling-up socially relevant innovations in an iterative manner, from 2023 until 2025 (Stoevelaar, 2023a). This practical methodology (visible in Figure 6 below) highlights the importance of open-city events as spaces to advance circularity in both cities and the events industry, by offering the perfect setting to test and develop innovations, and the municipality supports this by providing tools and resources to scale them up.

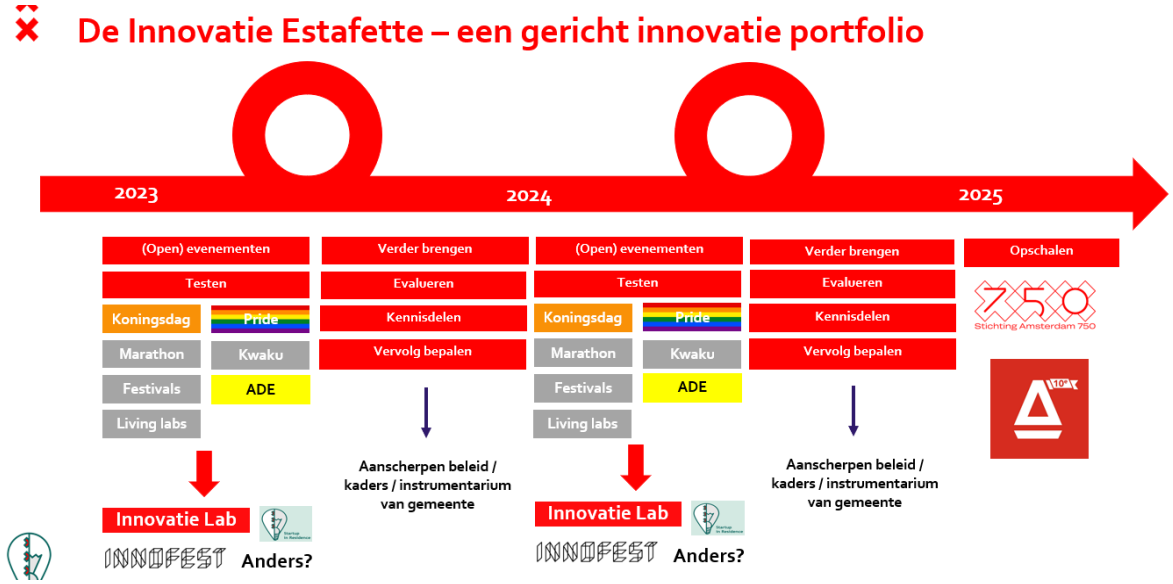

Figure 6. Amsterdam's Innovation Cycle (Stoevelaar, 2023b)

The Innovation Cycle proposes to first test at events that take place in the city of Amsterdam- like Pride, King's Day, ADE, Kwaku, the marathon, other festivals and living labs- to develop them to be implemented in SAIL, in order to be further scaled-up into the city's infrastructure after 2025. The particularities of SAIL as a large-scale open-city events will be discussed below, but it is first relevant to establish whether or not transition theory would agree with this use of open-city events as stepping-stones for innovations between smaller festivals and cities.

Situated in MLP theory, as was previously explained, festivals can be seen as *niches*, where experimentation alternative to mainstream practices is taking place through innovative circular solutions, and cities can be seen as the *regime*, large-scale systems which perpetuate mainstream and usual ways of doing things. The gap between these two levels has long been identified as a challenge towards transitions (which can also be seen in practice in the festival industry where many innovations stay at the festival scale and fail to make larger impacts) and scholars argue that much of the transition dynamics takes place in between the niche and regime levels (Rotmans & Loorbach, 2010). The concept of having a step in between niches and regimes, proposed as *niche-regimes*, has therefore already been considered. Due to their larger size and their situation at a higher-level, closer to the regime, niche-regimes have more influence over regime-level practices, and so they enable a two-step process for cementing practices which facilitates transitions (Grin et al., 2011). The DBS framework also recognizes the importance of niche-regimes, pointing out that scaling-up happens in gradual steps through which initially small practices from niches can grow to wider systemic changes (van den Bosch and Rotmans, 2008). With this theoretical backing of the concept of using stepping-stones in transitions, why open-city events can be considered niche-regimes will be explored below, based on the interviews with practitioners.

Potential of open-city events as stepping-stones towards transitions

Open-city events can improve relationships with municipalities

One of the biggest strengths of open-city events is that they require and lead to stronger connections with their local municipalities. They tend to have better relationships with municipalities than independent festivals because they are locally embedded into the city. Since the events generate business and employment for the wider urban environment, they are intrinsically interlinked with local businesses, networks and communities. They must ensure they share values and visions with local stakeholders, which means they require constant collaboration with municipalities in order to operate. Both SAIL and the Vierdaagsefeesten highlight that the alignment with respective municipalities, particularly in terms of sustainability, is what made their collaborations so successful. The benefits of maintaining a good relationship are both ways however, as cities can improve their image through open-city events. The cities of Nijmegen, Paris and Amsterdam all recognize this potential: Vierdaagsefeesten is a key part of the city's image and attracts millions of first-time visitors every year; the Olympic Games are seen as an opportunity to make Paris "the centre of the world" and "go down in history"; and Amsterdam is not shy about using SAIL as a showcase for the city. Events can invest in and capitalize on these relationships to further their circularity agendas, as SAIL does brilliantly: "They really want to use SAIL as a platform to show Amsterdam and to put it in the on the map, so it is very important for the city that SAIL is sustainable" (Hanna Winters).

Open-city events have even more similar needs to cities

Since they take place within and throughout the city, open-city events are more directly intertwined with city systems, and have to face the same challenges that arise from these. Since they are open to the city's public, they also have to provide for the same functional needs of citizens. While this is also true at closed festivals, these provisions are at a much smaller scale than that of cities, which makes it relatively easier to implement solutions. Open-city events offer a unique setting between the two extremes to perfect the large-scale implementation of solutions, since they attract huge amount of visitors that are more similar to massive city populations, but these shared needs and challenges are concentrated within a smaller area than a city and a limited time frame, so variables are relatively easier to control. In fact, after their first conversation with the Amsterdam municipality, SAIL decided to develop their sustainability program directly with the city, since they realized that "[their] challenges were so similar, because the amount of people that come to SAIL puts pressure on the city that actually zooms in on the challenges that the city has" (Hanna Winters).

Open-city events can change the infrastructure of a city

Open-city events can use their unique positioning to influence broader city infrastructure. They rely on existing infrastructure to service their visitors but they also have the funds and opportunities to improve them, evidenced by the Olympic Games venue concept in which Paris' iconic landmarks are being transformed into sporting arenas. It is harder to define scopes at open-city events, since there are no strict boundaries of where the city ends and where the event begins, so there is confusion regarding who is responsible for emissions and socio-environmental impacts. Fortunately, that leads more and more organizers of these events to take more ownership of the solutions; spurred by positive relationships with their municipalities, they strive to find solutions that won't only solve operational problems for them, but also improve the city's infrastructure. The sustainability manager of ESNS, which is a semi-open event that takes place all around Groningen, declares:

"I'm just searching together with the municipality: How can we change things that actually benefit throughout the year, throughout the system? It's already happening in the city, so how can we further align with society, instead of just fixing our small problem?" (Rob van Wegen)

Furthermore, open-city events can act as catalysts by broadening solutions and sustainability visions into other city industries. In ESNS, to continue the example, they also consider the hotels where artists and visitors are staying in the scope of their influence, and they try to influence the city's hotel industry by monitoring and making sustainability demands from their hotel providers. The bigger the events, the stronger the influence they can have on other suppliers in urban society.

Open-city events can influence citizens and act as showcases for sustainability

It has been proven how festivals can influence their visitors' behavior by creating subconscious connections to sustainable choices. The same atmospheres of fun and excitement get created at open-city events, and because they are so linked to city identities, the positive behavioral effects they create can be longer-lasting. The Olympic Games state clear ambitions of "leaving a legacy", they want the event to help sport values become a key part of the lives of the citizens of Paris and to champion sustainability. They are doing so by embodying sustainability values in the organization of the event and communications, recognizing the potential open-city events to showcase sustainable and circular practices to their massive audiences. Fortunately, this is a trend that is becoming increasingly popular as the event

industry, and society in general, recognizes the responsibility it has to further the transition towards more sustainable urban systems.

> "One of the bigger goals of this sustainability project for us is indeed to have an impact on the entire event business and to actually bring that together, and therefore also we want to work with the Green Deal because we want them to be able to use SAIL as a showcase for everything that they've learned and for all the knowledge and expertise." (Hanna Winters)

5.3. Circular solutions as transition experiments

Potential of circular solutions towards transitions

The history of circular festival solutions in academia has been presented in the literature review, and the characteristics of transition experiments were laid out in the theoretical framework. Insights collected during the interviews will now be explored, in order to discover the potential practitioners perceive circular solutions can have towards transitions. Figure 7 displays a word cloud for the Solutions code group (a threshold of 5 was applied to focus on the most repeated constructs), which visualizes the main characteristics and benefits practitioners perceive circular solutions offer.

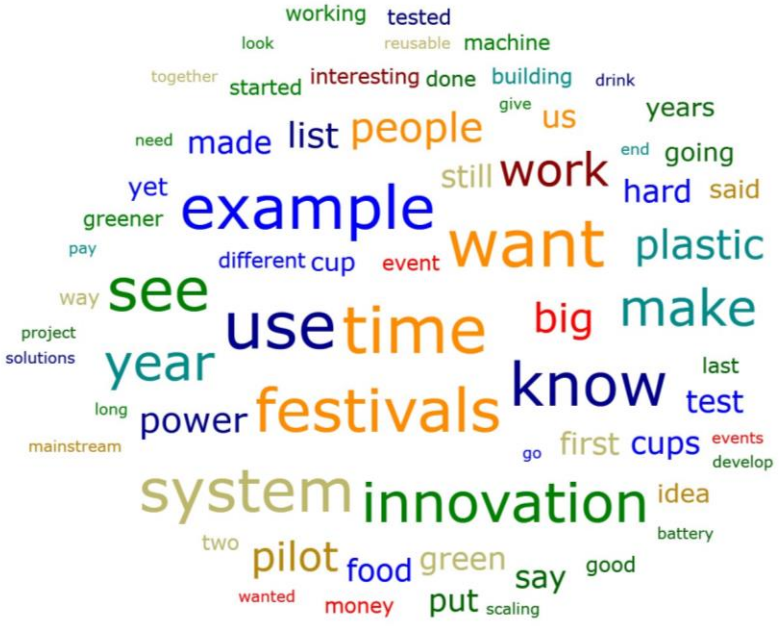

Figure 7. Word cloud of most recurring words in the code group: Solutions (developed with Atlas.ti)

Among trends that were pinpointed from the interviews, the themes that most festivals are implementing solutions on were food and drinks, because they are the simplest to implement, and energy, which coincides with the attention this sector is receiving in wider society following national and regional energy transitions. Transportation and travel, which is the hardest to control and regulate since it depends on visitors and falls out of the perceived scope of many festivals, is the theme least focused on. Generally, solutions perceived to be successful displayed systemic innovation, using technologies and opportunities

that already exist to solve practical operational needs of festivals, and practitioners highlight how these can often be replicated and adapted to solve city needs. Regulations were found to be very important in the implementation of solutions; examples were given that show they can be big obstacles (like Semilla's end-of-waste legislation), catalysts for their adoption (like Amsterdam's 2018 non-renewable energy prohibition for Greener battery) or offer financial and infrastructural support (like Manchester's grid-power project).

From the perspective of festivals as implementors, it seems that initial pilots are not perceived to add much practical value for festivals, as enabling testing takes time and money investments from the hosts, and if they are kept small-scale, they don't significantly impact their sustainability performance. Therefore cost and logistics are something they consider when selecting solutions, many prefering to implement solutions that are further developed and have proven they can handle enough capacity and grow consistently. However, knowledge-sharing platforms like GDCF play a big role in spreading the word of these "tried and tested" solutions amongst member festivals, and practitioners have faith that movements like this will quickly accelerate the circularity transition in the industry. Another benefit they identify is the potential solutions have to influence large suppliers; running circular pilots with large-scale suppliers can show that it's possible to implement circular solutions into existing supply structures, and can inspire other companies to demand similar circular procurement processes from suppliers, stimulating the adoption of circular solutions in society. Of the climate-neutral beer pilot with Heineken, Tij Couzij reports: "I think we changed a little bit of thinking within their organization [...] Now we have basically proven that it's possible with the existing equipment, and I'm trying to get other festivals to start asking the same question."

Overall, practitioners agree that there has been enough experimentation, now it's time to invest in solutions that work and scale them up. Reflecting the urgency the rest of society is experiencing, Kees Lamers expresses: "The time for playing is sort of over, and we need to put all our time and money into creating or buying into real solutions for large". They propose that circular solutions that can be implemented now should be actively supported, even if they are only systemic innovations that work with existing technologies and conditions, as they will bring us closer to the transition, even if it is through small steps. There is faith in focusing and promoting specific solutions as a way to a circular industry (and society), but some point out that there can also be a danger to relying solely on "beautiful examples". They emphasize that to really learn from solutions, seeing that they are possible is not enough, the process they have gone through (or their DBS trajectory) must be properly analyzed and understood; and that solutions are only valuable to transitions if they are scalable. To put these recommendations into practice, such an analysis will be performed on the main example of this thesis below.

Semilla Sanitation as a transition experiment

To apply the DBS framework to the example of Semilla, it must first be established if it fits the criteria for transition experiments previously explained. Although after engaging in their DBS trajectory they have developed into different areas and made their business model a little more robust, the company was born with a clear societal transition goal in mind. This can be evidenced by their tenacious mission statement:

> "By 2030, everyone should have access to clean drinking water and hygienic sanitation. This is the crux of the UN's sixth [SDG]. It is especially important since access to clean water is a prerequisite for achieving other SDGs, according to Geeta Rao Gupta, Executive Director of UNICEF. Semilla helps meet that goal, module by module." (Semilla Sanitation, n.d.)

They view themselves as providers of clean water, sanitation, and income opportunities for communities in need, and have been deepening and broadening through testing in festivals and other industries as a means to this end. In the Netherlands, they have connections to water boards in the regions where they work, and they share a higher social ambition to redesign the country's water waste treatment system to recapture value from waste. This shows they have circularity as one of their main principles, clearly reflected in their business model, which functions around *reusing* water for flushing and irrigation, *reducing* costs, water usage, diseases, and pollution, and *recovering* waste into irrigation water, fertilizers, and compost (Semilla Sanitation, n.d.). These core beliefs, as well as their emphasis on spreading CE principles through innovation, research and outreach programs, points to a recognition of their role in accelerating the circularity transition in the areas and industries where they work.

Their use of space technology for Earth-based systems is a perfect example of how Semilla embraces innovation pathways to find solutions to help further the transition. In fact, their modules are the definition of systemic innovation which is characteristic of transition experiments, by applying existing space technology to an innovative Earth-based setting to solve existing and persistent social challenges. This penchant for innovation is present since their origin thanks to their parent company, SEMiLLA IPstar, who declares innovation as one of the four core principles in their mission statement (SEMiLLA IPStar, n.d.). Working as a research partner, business developer and connector of knowledge and stakeholders, the consortium supports the development of innovative companies, products and solutions that share its principles. With this sort of innovation hub and through their outreach programs, they spread awareness of the CE and support the adoption of circular solutions in the market, and it is through these channels that Semilla was born.

The development trajectory of Semilla will show how the innovators have embraced learning in every step of the project. Their conception was itself a result of learning from closed-loop water treatment space technology, taking what worked and adapting the concept to a module that would function on Earth and serve many more people than six astronauts. When they had a working prototype and began testing with Innofest, a company which facilitates innovation testing at festivals in the Netherlands, they followed the reliable Innofest Method. This methodology reads like a loop of evaluating, testing, preparation and expert checking, and Semilla employed many of their methods throughout their two years of testing: MVP (Minimum Viable Product), A/B Test, Stress test, Try-out, Observation, Expert review, User Interview amongst others (Visser & Innofest, 2020). Treating the festivals as living labs and having the chance to repeat tests at some locations in consecutive years gave them the chance to learn from their mistakes and improve the technology to their current needs. This was a dual learning opportunity, as their experience as innovators also taught Innofest valuable lessons about the process of testing and developing itself, thus enabling a wider *social learning*. Now in its more stable development phase next to Nijhuis Saur Industries (Nijhuis), Semilla continues to embrace learning as a method to keep improving their technology and product offering to ensure business sustainability in the short run, and to achieve their ultimate goal of supplying refugee camps and disaster areas in the long run. With these three important criteria met, this study can safely consider this solution as a transition experiment in the rural and urban

water circularity transitions, at least in the Netherlands, Ghana and Uganda, where they have worked so far.

5.4. DBS trajectory applied to Semilla Sanitation

In order to understand how the DBS framework can be useful for GDCF and cities in the context of circular festivals, it will be applied to the circular solution introduced above, Semilla. All past projects that Semilla has done were analyzed and mapped; Figure 8 shows a visualization of Semilla's DBS trajectory. Future projects were also included (outlined in yellow), specifically in the realm of scaling-up, the long-term stage in which the solution finds itself now. The arrows (designated in different colors according to the phases) are of particular interest in this analysis, as there is a lot to learn from Semilla's experience as they deepened in festivals, broadened to different industries, and attempted to scale-up. The summary and analysis of their DBS trajectory and steering practices will be discussed below (a table with more details about each experiment can be found in Appendix B).

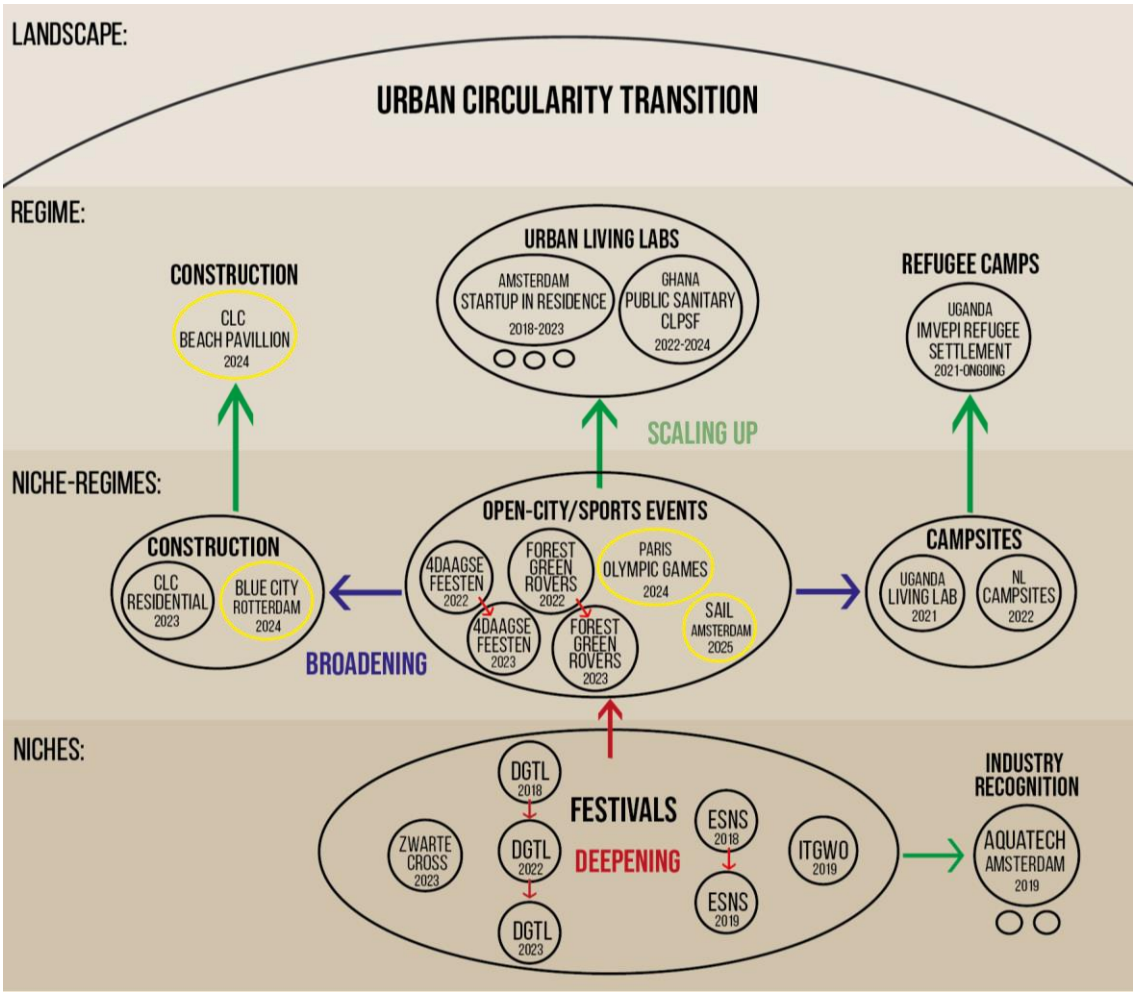

Figure 8. Visualization of the DBS framework applied to Semilla Sanitation (adapted from van den Bosch and Rotmans, 2008)

Through Innofest, Semilla was able to start testing at festivals to improve their technology, eventually coming up with four different systems (based on water color treatment- yellow, gray, black water) that can be adapted to each client's needs. The first few pilots were the most valuable, because they could recognize and learn from problems with the testing process itself- in ESNS they were located outside the bars and venues where people could use real toilets, so they didn't get many people to use the prototype, something they fixed in further editions. Furthermore, they were able to receive feedback from partners as well as users- in DGTL festival (DGTL) 2018 the Red Cross could see the solution in action and helped them identify logistical issues they might have when implementing it in refugee camps- it was too big and too expensive. This feedback led them to develop the separate systems and to simplify the infrastructure. After deepening at festivals for a couple of years, they broadened into open-city and sports events, testing their hand at handling different capacities and different demographics of users. They were able to refine their business model, identifying new markets for their product, now made up of three target industries- construction (buildings), events (festivals), & humanitarian (refugee camps). Through this research project they have begun a process of stepping-stone scaling-up to the larger upcoming GDCF open-city events- they have just signed contracts for SAIL 2025 (through demand-driven matchmaking); and have been put it contact with the Olympic Games organization through the *Missie Sports naar Parijs* program, but they are finding it hard to navigate the complicated tendering process. Learning from their previous experiments, they are also ready to scale-up to campsites and urban buildings with more permanent infrastructure. They have been testing this scaling-up process through living labs at the Imvepi refugee settlement in Uganda since 2021, and are being supported by municipalities to further develop urban projects in the Netherlands (several projects with Amsterdam's Startup in Residence program) and in Ghana (installing closed-loop public sanitary facilities in Nkawnkaw, through the Netherlands Enterprise Agency (RVO)). In this way, a long trajectory of innovation, testing and learning has allowed them to begin addressing their original humanitarian goals and take steps towards tackling the urban water circularity transition.

Unfortunately, the process of scaling-up remains complex and is a daunting task for an innovator alone. Certain challenges need to be addressed and this must be supported by different governance actors throughout the arena. For Semilla's scale-up into the city of Amsterdam, these concrete challenges are:

- Capacity in terms of physical ability to treat large amounts of water, investment & staff- they still only handle side-streams at big festivals, but are not the main sanitation provider.
- Physical infrastructure- They want to focus on the water treatment systems, but need someone to provide the actual urinals.
- Contracts- Nijhuis are ready to be their provider of the infrastructure, but they need fixed contracts (from festivals and other customers) for the coming years to make sure the investments are worth it.
- Legal- Current non-circular regulations forbid turning waste into usable products (like compost, fertilizers & clean water), but they are currently working to get this approved through a circular chain research grant from the Dutch government, supported by DGTL.

5.5. Steering applied to Semilla Sanitation

To understand how these management guidelines can be put in practice, the case of Semilla will be analyzed. This solution has a particularity which makes it a bit more complicated but more realistic, since, like most companies in the real world, they didn't consciously start off as a transition experiment, although they fit the categories to consider it one. As such, they have not been strategically steered by an external manager, but have rather organically been moving through their DBS trajectory and, deliberately or not, engaged in some of the steering strategies described by van den Bosch and Rotmans (2008). By retrospectively analyzing their actions, successes and failures can be identified and lessons can be drawn on how to further the transition potential of the Semilla Sanitation experiment. Footnotes with more details about their steering practices can be found in Appendix C.

In terms of the more concrete process criteria, Semilla seems to have leadership that organically engage in the recommended strategies, but struggle with formalized processes. Since their launch, they have been very open to **learning and testing** through the Innofest methodology[1]. They have guaranteed the adaptability of their solution through broadening and interacting with other domains and partners, which has made them discover new target markets. They have been able to raise resources by relying and investing in various **partnerships**[2], working hard to strengthen relationships with key government and industry actors who can help them at key strategic levels[3]. They have actively sought spaces which offer them opportunities to make new **connections**, in their field of water treatment systems[4], in the GDCF network, and with markets abroad[5]. On the other hand, they seem to struggle with formalized processes, which would indicate that their DBS trajectory has not been strategically designed or managed. In terms of **experimentation, s**ome experiments are abandoned after one edition of an event or seem disconnected from each other; they should work on having better follow-up for individual experiments and develop a long-term strategy to build on past experiments and connect them to each other. Semilla's **internal assessment mechanisms** and their **strategic learning goals** also seem to be lacking, or no information is posted publicly about it; this would be a great point to focus on improving moving forwards.

Regarding the more conceptual substance criteria, Semilla has shown clarity in their sustainability vision and a strong connection to their societal challenge, but seems to be less aware of their strategic learning goals and system analysis. They have never lost the redline with their **societal challenge** of refugee camps, as they have kept working on their living labs and projects outside of the Netherlands. By connecting the SDG to their mission statement, they ensure internal and external transparency for their **sustainability vision** and strategically connect to the global water circularity transition. However, the urgency of scaling-up in disaster relief areas seems to be getting lost to the **business reality** of making a young company become financially stable. Like many start-ups, they often find themselves too preoccupied with dealing with bureaucracy, networking and financing[6] to focus on the technology behind their solution and on making the impact they envision. They also seem to be lacking a thorough **system analysis** in the contexts of refugee camps in Uganda, urban sanitation in Amsterdam, and festivals in the GDCF context; they don't seem aware of other experiments[7] in the sector from which they could learn from to foresee unexpected obstacles[8]. They need to prioritize **systems analysis as a learning goal,** as this will help them better understand barriers and opportunities in their current and future contexts.

Their contributions to their circularity transition can be evaluated by their **engagement to regime practices**, where they excel at using their partnerships to realize shared goals[9]. Semilla was recently able to advise the municipality on circularity regulations for city-wide public toilets[10] which sets up the support needed for the transition to urban water circularity to take place, not only stimulating results for their own company, but to improve the transition in all of Amsterdam (and inspiring other municipalities). They could further contribute by more actively **sharing results** and lessons from their experimentation, which seem to stay **very internal** at the moment; in a partnership with GDCF, they would have an opportunity to strategically share their results and learn from the group's accumulated knowledge, which is recommended to advance their transition in new contexts.

Overall, Semilla has made great strides engaging in the deepening and broadening dimensions, and has begun a tentative exploration into scaling-up, but they have failed to do so with deliberation and purpose. Their boldness in searching for the right partners, taking advantage of opportunities, and asking for help is undoubtedly what has led them to be considered a successful example in the arena of circular solutions from music festivals. They have been really open to experimenting and learning, and should remain active in pursuing connections with actors that can help them on their development trajectory. They could benefit from these partnerships to get a better systems understanding of the new contexts they are experimenting in, which would allow them to more proactively take advantage or prepare for opportunities and obstacles as they arise. This would also enable them to identify the support they need to pursue a strategic scaling-up strategy, which should allow them to achieve financial stability without losing the societal transition goal that drives them.

6. Discussion

6.1. Innovation System Analysis of GDCF context

Through the Joint Scale-Up Project, GDCF recognizes the importance of scaling-up solutions, like Semilla, to advance transitions to achieve lasting change. Rob van Wegen says it best:

> "We want to make things scalable and show things to the world because [...] it's not about the examples, it's about that you can transform it and you can multiply it."

To facilitate this process, it is imperative to map and understand their specific scale-up ecosystem, which will be attempted through a thorough system analysis of GDCF below. This will be structured following van den Bosch and Rotman's (2008) framework, where the DBS trajectories within the group will be defined, steering behaviors will be evaluated, and finally highlighting the roles of individual actors in the process.

6.1.1. DBS trajectory within GDCF

In order to make this framework applicable to the facilitators of the GDCF group, for them to identify at which phase their solutions are at and to learn from their trajectory, it is important to understand what DBS means within GDCF. In this context, the scaling-up process looks somewhat different to that presented in the DBS framework, with the different phases defined as:

- **Deepening**- the process of repeated testing and learning from experiments in individual festivals; this usually covers pilot programs or those who are still engaged with improving the technical aspects of their product; Innofest is a key partner and CIO to guide solutions through this phase.
- **Broadening**- when a solution expands from one festival to another or when it is implemented in other types of events or industries; this continues to further the resilience of the solution by testing it in different contexts; GDCF can be a key actor in connecting the innovators to external actors to make this change, particularly in the jump from festivals to open-city events.
- **Scaling-up**- the process of a solution being adopted at higher-impact levels than individual festivals; when solution is a staple in the festival industry, meaning that all organizers can easily replicate it, it would be considered fully scaled-up; large-scale suppliers and municipalities are key actors in this phase, since their adoption of particular solutions or practices can facilitate their implementations into larger-scale supply networks.

6.1.2. Steering within GDCF

Using Van den Bosch & Rotman's (2008) steering guidelines to analyze successful solutions in the GDCF context, patterns of steering behaviors of GDCF as a facilitator can be identified (summarized in Table 3). The analysis below will shape recommendations for this group to continue supporting and scaling-up solutions.

Steering successes:	Steering failures:
• **Connecting** • **Knowledge sharing** • **Visioning** • **Visibility** • Promoting **relationships with municipalities** • Embeddedness in **local context** while maintaining **autonomy for experimentation**	• Formalizing **learning mechanisms** • **Engaging** their members Offer organizational support • Involving key **stakeholders** 'Innovation tables' • Balancing the **business reality** Offer financial & practical support to potential solutions

Table 3. Summary of steering successes and failures of GDCF

Steering successes of GDCF

Transition scholars have identified capabilities of successful CIOs: connecting, knowledge sharing, learning, visioning, visibility, embeddedness in local context, embedded autonomy, and organizational stability (Hodson & Marvin, 2010; Hamman & April, 2013); many of which GDCF already engages in successfully. In order to evaluate how the steering practices of GDCF can contribute to urban transitions, it is thus useful to explore how they have performed in their role as a connecting CIO from the perspective of the circular-solutions-as-experiments. These capabilities will be discussed in detail below, with the theory and real-life examples backed by the findings from the interviews and desk research conducted in this study.

Connecting

The facilitating team of GDCF excels in developing and sustaining networks and platforms for communication between their members. They currently host (bi)monthly thematic group meetings, quarterly working groups, and a few larger conferences throughout the year (like ADE Green or ESNS), where they bring together festival organizers, municipality representatives, and innovators to develop shared visions, share knowledge and mediate between different key stakeholders to further the circularity transition in the events sector.

Knowledge sharing

They have realized that connecting and maintaining social networks are crucial for developing niche experiments, because if "an active network is no longer present, a trajectory dies out and experiences and lessons can be lost" (Kemp & van den Bosch, 2006, p.32). This is why, in addition to their working groups and meetings, they provide a year-round online database of case studies, monitoring tools and information about projects and solutions in order to stimulate knowledge sharing, one of the pillars of GDCF. Most of the members recognize knowledge sharing and networking as the biggest benefits of being involved in GDCF, especially for the implementation of pilots to solve operational problems at

events. This has even extended beyond the industry, as the GDCF network has already motivated cities to share and replicate solutions, like Manchester's grid-power pilot which was inspired by the Amsterdam model from a panel the municipalities were on together.

Learning

Learning is in the DNA of GDCF, as evidenced by their identification as a Living Learning Network (van den Berg & Schaap, 2023). This approach creates an organizational culture that prioritizes learning and adaptability to changing circumstances. They have used this emphasis on learning to develop different tools for others to replicate and begin their circularity journey, such as the monitoring tool or the 'Event Template', based on their experiences with Nijmegen 'Green Capital' and RHDHV. They motivate the members to learn from each other through their active networks and knowledge sharing. However, the organization doesn't seem to have formalized learning mechanisms for the individual circularity experiments they are carrying out, which is a point they could work on to increase the contribution of the experiments towards the transitions.

Visioning

The leadership of GDCF, as well as those of the organization's members, display certain skills that are characteristic of successful CIOs. They are aware of the importance of systems thinking, evident in their understanding of the broader context of festivals and how important they find it to involve actors from different spheres of governance, as only together can large societal problems be solved. They are comfortable with complexity and ambiguity, as explained above in the organization's affinity for learning and ability to adapt; and have been able to successfully frame operational conflicts from events, and even the crisis of climate change in cities, as an opportunity towards innovation. Relevant to all of these characteristics is the ability to create and communicate one shared vision.

Transition theory constantly highlights how crucial visions are: problem framing is phase one of Loorbach's TM Cycle (2010); Hodson and Marvin's framework for purposive urban transitions (2010), emphasizes the need to develop a shared vision and the need for intermediary organizations ensuring action towards it; Kemp and van den Bosch's management guidelines (2006) specify CIOs can help broaden transition experiments by continuously linking them back to their long-term sustainability vision, connecting them to other experiments with similar societal transition goals, and ensuring that the vision and definitions are clear, scalable and shared by the group of front-runners. This is something that GDCF excels in. Their first steps in the thematic groups were to develop clear definitions that everyone shares and to decide on concrete goals and next steps collectively, ensuring that all the members have a clear understanding of the vision and priorities of the organization. They are aware that all stakeholders in the network must share the overarching vision- from festivals to municipalities, as was pointed out by several GDCF open-city events in recognizing that their success was due to them sharing the sustainability "DNA of the city" (Tessa Groenen). They also encourage their members to work on their own individual visions and strategies within their teams, providing *canvases* and *roadmaps* as tools to structurally align and guide their sustainability actions. Inspiring the intrinsic sustainability ambitions of their members has also proven to help GDCF communicate the big picture that drives the consortium- promoting circularity transitions in Europe from the festivals and events industry.

> "I'm starting to focus less on getting my own festival sustainable, but focusing more on the impact we can have on things that are bigger than us." (Rob van Wegen)

Visibility

Visibility is key to enhancing the influence of CIOs, and GDCF has been successful in bringing immense visibility to circularity efforts in the festival industry. Conferences like ADE Green serve as great platforms to showcase their accomplishments and convey their ambitions, receiving international media attention and a significant fraction of the 400,000 attendees of Amsterdam Dance Event (ADE) each year (Green Events, 2023). Their strong links to governance organizations like the EU, national and municipal governments, particularly cities like Amsterdam who want to be "front-runners in the field of circularity" (Mark Stoevelaar), solidify their public image. In this way, GDCF acts like a sustainability champion in the circularity transition, bringing visibility to the issues and actions needed.

GDCF members also contribute to the CIO's reputation, as they are front-runners in circularity themselves. This is beneficial to the transition, since they have intrinsic motivation and more resources available for experimentation and developing innovation, which helps push the curve of adoption of circular solutions. The group's visibility is enough to create social pressure to push some large players in the industry to join GDCF and begin thinking and acting towards their circularity goals, as MOJO Events (MOJO) rationalizes: "You rather talk with importance within important networks instead of them talking about you or without you" (Kees Lamers). Visibility has also been found to be vital to inspire others to act towards sustainability, both within and outside the member organizations, as Rob van Wegen nicely portrays:

> "If I walk around [the festival], I have a cap on that says SUSTAINABILITY. So people think about sustainability when they see me, so they take it into their own work. Because 'Hey, there's Rob from sustainability… What am I doing right now? Is there anything sustainable about this?' So even just walking by sometimes, it gives ideas." **]**

Embeddedness in local context

CIOs need to be embedded within the local context to develop good connections with governance and strengthen their influence on the transition. In GDCF this is hard to pinpoint since they don't only work in one place or localized context, but they are constantly encouraging the development of good relationships with key actors, particularly advocating for the potential of festival's relationships with municipalities. A good example of how they prioritize this is their work in Amsterdam, where they collaborate with all kinds of governmental representatives (Amsterdam municipality, *Rijkswaterstraat*), innovation (Amsterdam Innovation team, Innofest) and transition experts (Royal Haskoning strategy & management consultants), and large industry partners (SAIL, ADE, DGTL, etc), which has resulted in an increased ability to scale-up solutions and launch city-wide experiments (like Semilla's Startup in Residence living labs, and their upcoming project with SAIL). Furthermore, the open-city events already present in the GDCF network are another great platform that confirms the importance of being locally embedded to be able to develop a circularity agenda, as the organizers of the Vierdaagsefeesten in Nijmegen highlight:

> "If you are not as a festival organization in the DNA of the city it's also more difficult to connect. We are in different networks locally, we participate in, we are connected with the local

entrepreneurs who organize, like all local bars and restaurants are connected to us. So naturally, we are connected and really linked to the city." (Tessa Groenen)

Embedded autonomy

Critics highlight that CIOs shouldn't be too dependent on the context, however, as this can limit them to existing industry-regime practices and hinder innovation processes (Geels, 2005); in order to achieve transformational rather than merely incremental innovation, GDCF needs to develop a space for experimentation that is free from the rigidity of governmental regulations. This has already emerged as an obstacle to scaling-up for Semilla Sanitation, with the end-of-waste regulation prohibiting them to commercialize their by-products of fertilizer, compost, and clean water. GDCF actors have nonetheless been successful in helping Semilla solve this setback: Innofest by creating a pilot environment, where the regulations do allow them to work with these byproducts for the sake of innovation; and DGTL by supporting them with the RVO's Circular Chain subsidy for research to overcome this end-of-waste regulatory status. Furthermore, the Amsterdam Innovation team has an ongoing *CircuLaw* project, which aims to identify current policies and regulations that are obstacles to scaling-up circular innovations and how to get around them to advance the transition to a circular city (Amsterdam Innovation team, n.d.). By fostering relationships with these key actors, GDCF is creating safe space for innovative niches to explore alternative pathways and hopefully scale them up to regime level, accelerating the circularity transition.

Organizational stability

Finally, their link to the Dutch Ministry of Infrastructure and Water Management ensures the CIO's long-term organizational stability and financial support, and their focus on improving relationships between festivals and municipalities shows they value these governance relations. Furthermore, they are constantly encouraging members to develop strong relationships with their municipalities to be able to increase their impact on the cities' circularity transitions (developing the relationships further than simply dealing with permits and regulations). Good examples of the collaboration between festivals and municipalities that have resulted from these efforts are: Vierdaagsefeesten and Nijmegen city; ESNS and GROENN and Groningen city; SAIL and Amsterdam city; Body and Soul festival and Dublin city; We Love Green festival and Paris city; Roskilde festival and Copenhagen city; Shambala and the Welsh and UK governments (developed the Green Events code).

Steering failures of GDCF

It is evident that GDCF is on the right track to contribute to the urban circularity transition, as an intermediary organization who succeeds in the above-mentioned capabilities. Their fast growth since the deal was signed in 2019 attests that their successes are not just theoretical, but resonate in practice with the to more than thirty member festival organizations. However, the interviews and the analysis also identified aspects in which they have not performed so well, namely: formalizing learning mechanisms, engaging their members, involving key stakeholders, and Balancing business realities. These challenges will be discussed in more detail below and some initial recommendations will be given to overcome these, in order to best support the scaling-up process for circular solutions in the context of GDCF.

Formalizing learning mechanisms

Learning is a key characteristic of the GDCF network, being open to experimentation and knowledge sharing, and they constantly engage with it as a means to stimulate innovation. However, when it comes to individual experiments, such as the pilots they organized with Innofest at Lowlands festival, this study found that they have no formalized learning mechanisms in place. The findings from the interview reflect this as well, although all the members seemed to be aware of the importance of learning from past experiments, nobody was sure how this learning process was taking place, usually only aware that a report had been written up but not if anything further was done with it. Open-city events seem to be a little bit more aware or better at engaging with formalized learning processes (for example, the extensive evaluation and report the Vierdaagsefeesten developed on their circular cup system in Nijmegen), but this seems to come more from the initiative of the municipalities that support them. Therefore, GDCF would benefit from developing a more formalized learning methodology, so that all its members and its partners can have a more clear and effective way of learning and take the most out of the deepening phase of transition experiments. Innofest has a very good learning methodology described in their 'Innofest Whitepaper' (Innofest & Visser, 2021); although it is only for the initial testing phase, GDCF might find inspiration in it to develop their own for later stages in the scaling-up process.

Another way learning mechanisms can be improved is through the iteration and repetition of experiments over time. Festivals offer a unique opportunity to do this, since they usually have several editions, occurring yearly or even more often. However, the research found that many experiments are abandoned after only one edition, so solutions many times stay in the pilot stage. That means that the festivals are not benefitting from what they learned about working with the solution, and the solutions are not being able to use those lessons to improve performance in future editions. As MOJO expressed, the fact that they have to look for new solutions to solve their operational problems every edition is also demotivating some member festivals from continuing to invest time and money into this experimentation for innovation. GDCF should therefore plan in more continuous experimentation (in several editions) and develop follow-up mechanisms to make the most out of the experimentation process. SAIL, inspired by the innovation cycle of the Amsterdam Innovation team, further recognizes the importance of repetition and evaluation for scaling-up festival innovations towards cities:

> "In the past it was indeed like, we run it once and then we see how it works and then for the next edition, we will try to look at it again. But now, we really want to incorporate the evaluation and iteration of the innovations in the event, to work on that with our partners and to develop the innovations before the next edition of the event already. Also, to have a deep evaluation afterwards, together with the municipality of Amsterdam, to see how we can actually implement the innovations afterwards in the city." (Hanna Winters)

Engaging their members

One of the main challenges identified by GDCF facilitators is the engagement of their members. Although there are some front-runners who take the lead in this network, they have struggled so far with keeping the majority of the festivals active in the meetings. They recognize that there are different levels of engagement, and see festivals being more involved as long as the scope is more relevant to their own operations. First is internal sustainability, where luckily most festivals are very engaged to become circular themselves. Engagement within the GDCF community is a little bit sparser, with only about one third of members active in efforts to make the festival industry more sustainable. Finally, engagement

with the scaling-up of solutions to cities is where they struggle the most, since only a few front-runners (like ESNS, Shambala, DGTL and ITGWO) have the capacity and the personal interest to advance the transition beyond the festival industry. Particularly regarding the implementation of circular solutions, there is difficulty in passing from thoughts and words to actions, such as initiating pilots and continuing to implement tried and tested solutions in further editions.

This research found that resources for change are a major barrier to engagement, as many festivals (about two thirds of GDCF members) struggle to find time, staff and money to dedicate to sustainability within the organization. In fact, a characteristic of the front-runners in the group is that they have dedicated sustainability teams or sustainability managers who have the time, headspace, and intrinsic motivation to lead their circularity efforts. Aware of these structural challenges, GDCF has adapted some of the tools they offer their members in order to make them easier to use for those who are struggling with limited resources. For example, seeing that most festivals weren't filling in the Roadmap Canvas tools developed with ESNS to help organize their sustainability strategies, they created adapted mini-canvases that take less time to fill out. These were more successful, which shows that GDCF understands the needs and challenges of their members and is making the right kinds of moves towards helping them overcome them, and should continue these in the future. However, the group must also develop stronger support measures for the member festivals to have the space and resources to improve their sustainability actions. These could be, for example: creating a role within the GDCF facilitating team with the sole focus of supporting the festivals with staff and time to organize their strategies in the beginning of the year; or launching a monetary fund intended to support the implementation of circular solutions at festivals that might not be able to afford it themselves. In this way, GDCF would be fostering an environment of collaboration with and active involvement of the festivals themselves in creating their circular futures; the importance of which has been nicely highlighted by Rob van Wegen: "Tell me and I'll forget, teach me and I'll remember, involve me and I will learn."

Involving key stakeholders

Although GDCF is great at creating space for their members to communicate, share visions and strategize together, they have so far excluded outside actors from these spaces. Of course, they do have connections to different actors to external stakeholders in the urban circularity transition, as has been shown before, and have even begun to invite certain innovators to thematic meetings to present their circular solutions. However, they can greatly benefit from capitalizing on their connections by more actively involving suppliers, innovators, and municipalities within the group as GDCF members. The Amsterdam Innovation team advocates for the inclusion of all stakeholders in the identification of main challenges, priorities, and the collaborative development of circularity strategies, as this creates shared visions throughout the whole supply-chain and sets up the key actors to work together. They are testing this methodology at SAIL, bringing the different stakeholders together around so-called 'innovation tables', which GDCF might do well to imitate:

> "We're trying to set up sort of innovation tables where [...] it's really trying to get the main stakeholders [...] around the table: So it's us; with the events that we're testing with, we share knowledge about what we have been testing and what we're doing; but then also, for example, related to mobility, we're trying to get the NS involved; [...] the RAI arena and the big venues; [...] and then SAIL, for example, and other open events. So we are really trying to see: 'what are

> the things that you have been testing, and what are the [...] issues that you face, and then how can we cooperate and share knowledge and really see how we can work on the on the topic together?'" (Mark Stoevelaar)

There are definitely opportunities that GDCF is missing out on by not currently inviting these stakeholders into the group. It is widely recognized that large-scale urban changes can only come when supported and pushed forward by the largest actors in a supply-chain. Unfortunately, in their urban circularity transition, GDCF has identified that "[suppliers] are hardly engaged in the process of the Green Deal, but they are engaged with the festivals" (Christiaan Elings). One of the unique aspects of the festival industry are the long-standing relationships between large-scale suppliers and events that recur over the years, yet it seems that these relationships are not being capitalized on by GDCF. By incorporating large-scale suppliers, like Heineken, into the consortium directly instead of indirectly through their work with member festivals, they will allow them to participate in the development of goals and visions, empower and educate their sustainability motivation, and even more practical, it will allow GDCF to hold these powerful stakeholders accountable and demand more action towards the transition. On the other end of the supply-chain lies another missed opportunity, in the entrepreneurial drive of innovators and owners of circular solutions. Innovators must have the passion to push their solutions up to the mainstream against an array of challenges; the founder of Innofest agrees that resilience is one of the most important characteristics of successful innovators:

> "[The success of start-ups] has to do with how good is the founder at attracting talents, how good is the founder at attracting finances, and how good is the founder at keeping their heads up themselves[...] The ability of bouncing back, of selling your story to the media, to marketing, for example [...] this can only be done if you have a certain belief in yourself, but also if you can pitch your story well." (Linda Vermaat)

This resilience is also vital in scaling-up actions towards the circularity transition, so GDCF facilitators should try to harness this human capital within their group. Bringing innovators in as members and making them active partners in the Joint Scale-up Project can therefore: help cement partnerships with the innovators; foster communication between all stakeholders, which helps identify challenges and opportunities, and speeds up the process of scaling-up; and allow GDCF to channel innovators' existing entrepreneurial energy towards their shared goals. Overall, involving and engaging different stakeholders into the group will let GDCF shorten the supply-chain and channel existing capabilities to further their transition, so they should extend the invitation to all the champions in their network.

Balancing business realities

Finally, there is a real divide between developing promising sustainability visions and putting them into practice, specifically in terms of (infra)structural and financial support- here termed *'business reality'*. In today's capitalism-based market, business reality is something that binds all stakeholders- from municipalities bound by their budgets for circularity policies, to festivals concerned with financial survival from year to year and open-city events struggling to turn a profit, and especially for hustling innovators who need investments to grow their new businesses. Although GDCF are good at visioning, like many CIOs they struggle with identifying and addressing implementation issues that impede scaling-up niche solutions. They should therefore improve their support mechanisms and offer more practical and

economic aid so the innovators can achieve financial sustainability and focus on scaling-up processes. This support is of course contingent to each case, but in the example of Semilla, whose main challenge was found to be securing investments to grow their infrastructure, this support could be as simple as helping them secure contracts with GDCF festivals so that their partner finalizes the investment:

> "If we could have contracts for three or five years, then we will build the systems and we will supply, we will operate, we will maintain. But there should be a contract there for the long-term because [...] the money has to come back, of course, after investment, because otherwise it will not run. So we need contracts for more festivals." (Peter Scheer)

Having this simple structural support will allow Semilla to scale-up their operations and be able to service larger events, with more capacity. This safety will allow them to worry less about their performance in the events sector, a target market added solely for business survival, and give them the funds and energy to advance their scaling-up to refugee camps, their original target.

Another common concern is funding; as several event organizers express, implementing solutions takes a big initial investment, particularly when it concerns innovative solutions that have not hit economies-of-scale yet. This is a challenge for festivals, which have short-term thinking because of their lack of long-term investments and the urgency of surviving financially after every edition; and a bigger challenge for open-city events, who have no income from ticket sales and are under even more pressure to be profitable. The lack of appropriate funding therefore hinders innovation, as the financial bottom-line takes priority over sustainability. A fund for implementing pilots and more established circular solutions at GDCF festivals would also help tackle this obstacle. Supporting and balancing the business realities of their stakeholders will thus allow them all to focus on scaling-up solutions, a necessary step to advancing the transition, which a good facilitator should enable: "You need to facilitate, to throw some money at these supplier companies or these festivals that want to make the step early. That's how you make the market go faster, by making the necessary investments" (Tijl Couzij).

6.1.3. Roles of actors

Having evaluated how the consortium has performed as a facilitator of DBS processes, the next step is to identify what the roles of individual actors are in the context of this circularity transition. Figure 9 visualizes these roles in respect to the DBS phases. Their main responsibilities, challenges and some recommendations will be outlined below to extract lessons on how these types of actors can further these transitions (exception Innofest, which is exclusively limited to the context of Dutch festivals and thus not-generalisable).

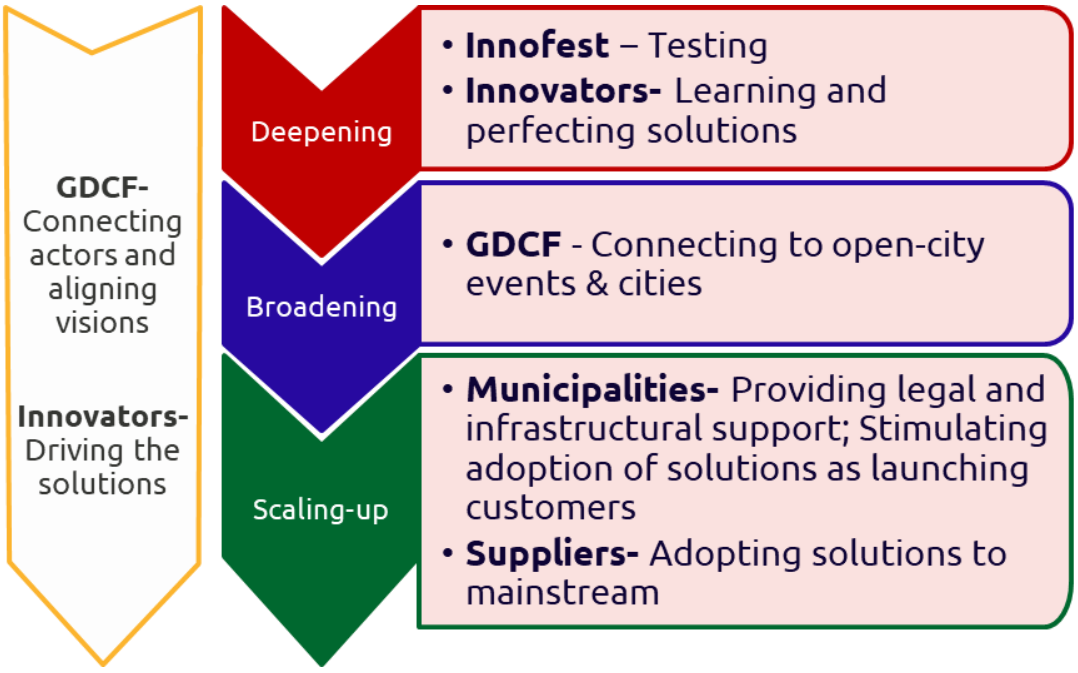

Figure 9. Main actors and the roles they should take in the GDCF scaling-up process

Innovators

As has been mentioned, passion, entrepreneurial drive and resilience are key characteristics of innovators and owners of successful circular solutions. Given the complex structures and social networks in cities, they are also vital in scaling-up these solutions in urban contexts. Although they are the smallest and relatively least powerful actors in the scaling-up process, innovators are the ones with the most personal stake and the most to gain from its success. Therefore, innovators have the responsibility, or rather the need, to be the ones to take on the role of drivers of the development of their solutions throughout the whole DBS process. However, one of the main challenges to scaling-up has been identified as an ownership/leadership imbalance; where people pushing the solutions (ownership) are not the people in contact with those who can help (leadership). This is another reason why the personal traits and soft skills of innovators, which contribute to successful collaborations with all other actors in the process, are key.

Innovators can take on a more active role during the deepening process, where they are responsible for utilizing lessons from the experiments to perfect their solutions. As this relates to more technical and operational aspects, which innovators are usually experts at, they tend to prefer and excel at this phase, like the CEO of Semilla has expressed, while struggling with the networking which is further out of their element. Keeping energies high throughout these diverse phases can be a challenge, so a recommendation is to involve innovators more actively into overseeing roles that allow them to better understand the process (through direct involvement in CIOs or investment-ready programs), which can help them foster the right connections and channel their drive to accelerate the scaling-up of successful solutions.

GDCF consortium

The extensive evaluation above has established the main strengths of GDCF as a facilitator and connector. They have been quite successful in furthering circularity within the festival industry, but have been somewhat excluding the ‘outside world’ from their efforts. The integration of the whole arena is vital to

developing shared visions throughout the supply-chain and carrying them out, however, as it enables van den Bosch and Rotmans' (2008) first niche-related condition for success: alignment within the niche. Therefore, the first recommendation is to welcome external actors into GDCF. Currently only festivals and the Dutch government are official members, but they should extend this invitation to innovators, large suppliers, other CIOs (like Innofest and investment-ready programs), and municipalities (specifically the innovation departments). They have already attempted to include them in some meetings and conferences, but this research proposes that a more direct approach can benefit the consortium by bringing in outside knowledge, improving engagement amongst its members and increasing external visibility. The GDCF team recognizes the potential of capitalizing on its role as connector:

> "[The festivals] are trying to invent the wheel themselves, but what we are now trying to do is that they look a bit broader also outside. [We are trying] to bring in the outside world, because there it will happen- there's the knowledge, there's the innovation. It's not within the festivals [...] Our ambition is that those thematic groups will go a bit more outside and make those connections in the coming year." (Christiaan Elings)

To maximize the effectiveness of their connection-building, the second recommendation for GDCF is to create a role in the facilitator team specifically dedicated to the Joint Scale-up Project. This human capital can help engage members and external actors, motivating them to implement circular solutions and providing the strategic organizational support they need. At the same time, this person can become an expert on the solutions being implemented in the GDCF network, in charge of carrying out demand-driven matchmaking and working hand in hand with other actors to scale-up the most promising solutions. This role would essentially be the applied continuation of this research project, working towards the realization of the potential contributions of festival solutions towards urban circularity transitions.

Municipalities

Governments are major actors in any sustainability-related challenge and, in the arena of urban circularity, municipalities have the best overview and influence over local supply networks, as they control regulations, permits, and have working connections to market actors. They can be the powerful actors needed for van den Bosch and Rotmans' (2008) second niche-related condition for success: increasing the power of niches that locally exceeds the power of the regime. GDCF has long recognized the importance of developing good relationships between local event organizers and municipalities, and encourages its members to cultivate these relationships. Many municipalities have created environmental criteria for specific industries, like Amsterdam's 'Guidelines for Sustainable Events 2020' or the UK's 'Green Event Codes'; they vary in their strictness, but are a good way to influence procurement chains and guide businesses towards sustainability. Some of the more proactive municipalities have realized that simply providing circular infrastructure can organically make events and other city-dwellers act more sustainably; Manchester excels at identifying and working towards these opportunities, like they have in their grid-power pilot: "We're particularly trying to focus on and help make the power situation better. So looking at how we can improve grid-power access so that it enables people to use less generators" (Helen Harland).

It was found that when municipalities have circular visions and policies which align with those of solutions, the scaling-up process goes much easier; Amsterdam is a great example, self-identifying as a

"doughnut city" with ambitious circularity goals, expressed in the first task of the agenda of the Amsterdam Metropolitan Area, and it has already made moves towards testing and scaling-up circular innovations in urban living labs. This relates to one of municipalities' most powerful instruments: policies and regulations. Regulations can act as barriers to innovation but, like in the case of GROENN which began as a response to strict regulations on single-use plastic the municipality imposed on the events industry in Groningen, they can also be turned into opportunities for collaboration. Amsterdam recognizes the importance of managing regulations, and has started a program called *CircuLaw* to identify and adapt existing policies that are obstacles to present-day circularity, like the end-of-waste status currently limiting Semilla Sanitation. Another big challenge is the issue of miscommunication with the municipality. Festivals find it very hard to connect to the right people in the municipality to pursue circularity solutions, since each solution falls under different departments (per theme), but because they are events they automatically get rerouted to the permit department, who knows nothing about circularity efforts or investment-ready programs in other sectors. Internal miscommunication is also a problem, as municipalities can have thousands of staff members siloed into different departments, who are usually bad at communicating with each other; this confusion creates a lack of accountability for circularity projects within the municipality. This doesn't mean municipalities are oblivious to those needs, since many investment-ready programs for scaling-up solutions already exist, like the Startup in Residence program in Amsterdam. However, the complicated bureaucratic structures make it hard for innovators to get connected to existing programs that could help scale-up their solutions. Finally, since municipalities have access to substantial public funds, they also have the possibility to be those who stimulate the scaling-up, acting as huge *launching customers*. As Manchester recognizes, sustainable procurement is both the most efficient way a city can reach sustainability for themselves, but it also has the potential to boost the adoption of circular solutions down the supply-chain.

Thus far, municipalities have acted more as administrators and controllers of negative behavior, rather than enablers of positive actions. Learning from these strengths and weaknesses, some recommendations can be made to maximize their influence in the role they should be taking: supporter of scaling-up processes. Their main focus should be to connect innovators and owners of solutions to investment-ready programs, many of which already exist and are managed by municipalities or large private funds. Creating dedicated teams charged with identifying and helping scale-up circular solutions in different industries would provide the human capital necessary to advance these connections; Manchester has done this with the Zero Carbon team, and Amsterdam with the Amsterdam Innovation team. Furthermore, having a dedicated circular program manager would clarify to outside parties who the right person to contact is, and they could be charged with delegating to the correct actors within the municipality. On more practical terms, municipalities should prioritize providing circular infrastructure which can be adapted to facilitate different kinds of circular solutions, enabling other industry and civil society actors to adopt solutions with lower implementation barriers. They should also review existing regulations and make sure that their policy arenas allow for innovation and circularity principles to achieve their transition goals. Governments more broadly should act as 'launching customers' to finance and stimulate the adoption of solutions further down in the supply-chain.

Suppliers

Finally, transitions require the collaboration of all stakeholders in a supply-chain, over which large commercial suppliers have the most direct power. They are in charge of creating the functional systems

and products required to run cities, and can choose how to do it- relying on old fossil-fuel-based processes or engaging with more sustainable and circular methods. This power, however, also comes with responsibility; particularly in the festival industry, where organizers have no infrastructure of their own but rent it from suppliers, they currently carry most of the burden to act sustainably. This generates pressure on suppliers, but can also be seen as an opportunity, since existing supplier relationships from the festival industry have the potential to catalyze change in the city's supply network. Suppliers are thus key actors that are capable of translating niche practices to mainstream practices, fulfilling van den Bosch and Rotmans' (2008) third niche-related condition for success: alignment of the niche and the mainstream environment or regime.

Due to suppliers' position of power over their own operations, GDCF festivals find it hard to control suppliers. That can be positive, when suppliers have intrinsic sustainability motivations that align with the festivals'; such as the food vendors in Music Meeting festival who launched their own initiative to recycle cutlery at their food truck. Unfortunately, it can also be a big challenge because many suppliers lack intrinsic motivation and only consider sustainability as a response to consumer demands. As ITGWO experienced with Heineken in their pilot for climate-neutral beer, in large companies in particular, it is hard to align internal visions throughout complicated staffing structures. so accountability over sustainable projects is hazy and greenwashing is commonplace. Engagement of suppliers in existing sustainability strategies of festivals is another challenge, as ESNS experiences when trying to engage their venues (suppliers) through sustainability questionnaires, but they struggle to even get responses. Furthermore, large suppliers are a big source of funding for many festivals (close to 15% of the budget in some cases) which can make individual festivals feel relatively powerless to demand change. However, this access to funds also presents an opportunity for large suppliers to launch or finance circular experiments themselves; Vierdaagsefeesten tries to foster supplier's ownership of these by linking them to specific sustainability targets and raising dedicated sustainability budgets from suppliers for sustainability-related pilots during their event. This benefits suppliers as well, capitalizing on the huge marketing value of festivals to improve their public image as proactive allies of circularity transitions.

The involvement of suppliers in the visioning and strategizing phase will further contribute to stimulate their intrinsic sustainability motivations and make them more aware of their role in the transitions. They can then turn from their current role, reactive to government regulations and consumer demands, to their new role as proactive adopters of circular solutions. Following the example of governments as launching customers, they should adopt innovations developed by the solutions into their practices, advancing their scaling-up into the mainstream (regime) through their extensive supply networks.

6.2. Lessons from other successful solutions

This research aims to support GDCF's Joint Scale-up Project by developing a clear understanding of the supply-side of urban circularity transitions. The analysis from the DBS framework thus far is completely contextual, so in order to be able to make some generalizations that could apply to a broader context, it is useful to look at conclusions that can be taken from other examples. In this arena, there have been several solutions that are already considered scaled-up by practitioners, from which we can learn a few lessons. Reusable cups, mobile batteries like Greener, and HVO fuel are some "successful solutions" (Tijl Couzij)

considered staples in the sustainable festival industry, which will be discussed below. Lessons that might be learned from *unsuccessful* solutions will also be explored.

Reusable cups

Reusable cups might be the first example that comes to mind when thinking of a circular solution, as it has been made visible by the sheer amount of festivals to implement it. This refers to the usage of hard reusable plastic cups instead of disposable soft cups, reducing plastic waste and therefore the negative environmental impacts of festivals, taking into account the emissions emitted in the creation and disposal of the disposable alternatives. This might be the most widespread solution in the festival industry, having been adopted as a standard practice by event industries worldwide. It is also increasingly common in urban hospitality institutions like schools, offices, food courts, cafés and restaurants at large, especially in places that outlaw single-use plastics, like the Netherlands recently has. In Manchester, the Zero Carbon team tasked with advancing circularity in the city have implemented a project to reduce single-use plastics and deliver sustainable events (Manchester City Council, n.d.). Under the Sustainable Procurement plan of Manchester's sustainability strategy, they have scaled-up the solution directly into the city's mainstream systems. Reusing some city-branded reusable cups from the Christmas markets that sat unused during the year, the city offers them free of cost for all kinds of events around Manchester to use, minimizing in turn the city's emissions and consumption of single-use plastic. This initiative was inspired by Shambala festival, another *sustainability champion*, and showcases how mutually beneficial a collaboration between municipalities and sustainability-minded event organizations can be. Although this initiative does have some practical challenges, such as the initial investment cost or organizing washing facilities on temporary events, this would be considered a case of a completely scaled-up solution in the GDCF context, where scaling-up would be understood as: the stage at which all festivals can easily replicate a system or solution to implement it themselves, cementing widespread circular practices.

Greener (mobile battery)

Greener is a green-powered mobile battery solution that was born in the festival industry in 2018. They tested and perfected the technology in the festival industry with Innofest, and have since broadened and become common-place in many other industries like construction, recreational and sports events, offshore, grid services, temporary EV charging solutions and more. In fact, in 2021 they became the worldwide market leader in their niche, with their fleet of batteries and their unique control and monitoring software making them "truly scalable" (Akkerman, 2021). This is a particularly interesting example which showcases the potential of deepening in festivals, through pilots which the company used to test their unique software and peak-shaving technology to make them "real-world proof" (Tijl Couzij)**;** and broadening processes, which the company capitalized on very rapidly making strong links with the construction industry. It also proves how important collaborating with governments can be; the success of Greener was in a large part because it coincided with regulations from the Amsterdam municipality which required all events to use renewable energy by 2020. This drove the adoption of the mobile battery within the events industry, which allowed it to develop their solution in this innovative environment and finally make emission-free mobile power a reality in places that might not have ever taken that leap. They have now started scaling-up by partnering with large renewable energy companies, and going forward they are focusing on flexible energy storage to accelerate the energy transition in the Netherlands even further.

HVO fuel in generators

A different type of solution that has become popular within the festival industry is the use of HVO fuel for generators and energy provision. HVO is a second-generation biofuel that can be produced without fossil resources by processing renewable waste lipids, and it can be used in any diesel engine, reducing greenhouse emissions by up to 80% (Morgenstern, 2021). This technology was not developed in the festival industry, but festivals have been instrumental to its mainstream adoption in temporary energy provision, since they were amongst the first to experiment replacing regular diesel with HVO biofuel in generators in 2017 (Clift, 2022). It has since been gaining traction as a solution towards circular energy in all kinds of temporary contexts, like construction and transportation, accelerated in the UK by a ban on 'red' diesel in 2022. Although it is not the end-solution for the energy transition, it is accessible, affordable (in some places subsidized), and easy-to-implement into existing (diesel) systems in the festival industry and beyond, which makes it an attractive immediate solution for many organizations. This example highlights the importance of systemic innovation with a reminder that many technological solutions already exist, they just have to be applied in creative ways to solve operational problems. It also showcases how festivals can make them more accessible for the rest of society through deepening and being key early-adopters of circular solutions.

Uppact- Lessons from non-successful solutions

As is common with innovation and transition paths, for every successful solution in the GDCF context, there are many more which have failed, in this case, to become scaled-up. These non-successful examples can still teach valuable lessons, however, so GDCF would do well to study them as part of their learning mechanisms. One such example is Uppact, a circular solution which aims to recycle all plastic and textile waste, of which about 70% are currently incinerated in standard waste processing systems, through their innovative 'UnWastor' machine which simplifies the sorting and transformation process, making it more efficient and turning previously 'unrecyclable' plastic and textile waste into new materials and recyclable products (Uppact, 2023). The technology they developed can be adapted to many different uses due to its flexible input & output options, and they have already broadened to work with maritime plastic waste, hospital waste, and other sources of mixed waste. They tested with Innofest as a solution to camping waste at Lowlands 2022, and the festival was thrilled with their performance, wanting to implement them again at Lowlands 2023. Unfortunately, Uppact was unable to service them again, recognizing their limitation to growth as machinery capacity, since they only have one large machine in northern Netherlands. Although they are now working to create a smaller machine which could also be taken to events or permanently installed in urban recycling systems in order to continue their growth, this case highlights the risks related to working with brand-new innovations and start-ups. Sometimes solutions are just not ready to be scaled-up, and from the perspective of the festivals, who agree to host pilots in the hopes of finding long-term operational solutions, this makes it seem like a waste of their investment. CIOs like GDCF and Innofest can work hard at motivating festivals to participate in the deepening and broadening phases to stimulate innovation, but when solutions themselves don't have the ability to follow-up, this can demotivate them from participating in such projects in the future. Therefore, it is important for this context to be a little more selective in terms of which solutions this scaling-up process is directed at.

6.2.1. Characteristics of scalable solutions

In order to assess and select the most promising solutions, a profile of scalable solutions has been developed, taking an abductive approach based on the previous analysis of GDCF solutions, coding from the interviews, and theory on the characteristics of transition experiments from the DBS framework. For solutions in the context of GDCF to have the potential to be successful in the scaling-up process and therefore to be able to contribute towards circularity transitions (here termed 'transition potential'), five key characteristics have been identified (summarized in Table 4).

Characteristics of scalable solutions:
1. Operational
2. Adaptability
3. Innovative
4. Business reality
5. Societal vision

Table 4. Summary of characteristics of scalable solutions

Operational

Solutions must be relevant and useful to the host organization (whether that be a festival, open-city event, or the city itself) in order to be implemented; they need to be able to solve operational problems, be compatible with existing systems, and be ready to increase their capacity as the solutions grow, given that practitioners found this to be the main obstacles for implementation.

Adaptability

Solutions must be adaptable to the specific contexts where they are implemented and to evolution over time; in transformative governance research, Visseren-Hamakers et al. (2021) agree that adaptation and flexibility enable learning, experimentation, reflexivity, monitoring and feedback, all imperative criteria for transition experiments.

Innovation

Solutions must embrace (systemic) innovation to solve existing problems; taking advantage of experimenting in niches makes it possible to break free from mainstream ways of doing and create novel and possibly more efficient solutions, which can then scale-up to influence regime-level practices.

Business reality

Solutions must prioritize and enable the financial needs of host organizations in our market-driven society, to whom balancing each facet of the triple bottom line is equally as important; practitioners are usually unable to invest in those who fail to recognize their existing business realities (due to high costs,

unsustainable business models, or lack of practicality). Innovators must also have, or be ready to rapidly raise, the investments and infrastructure necessary to scale-up their capacity.

Societal vision

Solutions must have clear visions of and connections to the societal challenges they want to contribute to in order to advance those transitions; this is what sets transition experiments apart from regular market-driven companies, and their ability to keep that as their main driver for development largely defines their transition potential to achieve lasting change.

This application of existing theoretical and practitioner knowledge on the specific context of GDCF aims to let the consortium identify which solutions have more potential to achieve their transformational goals. It is therefore recommended that they focus their efforts to scale-up those that they deem the most likely to succeed. More specific recommendations on how to operationalize these characteristics will be covered in the Conclusion below. Having identified internal factors of the solutions that might define their scaling-up success, it is also important to look at the external conditions that best enable this process.

6.2.2. Conditions necessary for scaling-up

It is beneficial for GDCF to understand the external conditions that facilitate scaling-up processes between solutions and host organizations, in order for them to identify and foster them within their own ecosystem. Using the same abductive approach and sources, three main conditions have been identified (summarized in Table 5), which will be discussed in more depth below.

Conditions necessary for scaling-up:	
1.	**Alignment between the solution and the host organization** Values & visions Intrinsic sustainability motivations
2.	**Financial and organizational support** Solutions need investments to grow Host organizations need resources (staff, time & budget) to implement solutions
3.	**Regulatory support for innovators** Policies that promote innovation & sustainability Connections to local governments & investment-ready programs

Table 5. Conditions necessary for scaling-up

Alignment between the solution and host organization

When the values and visions of both stakeholders align, their individual actions are directed towards the same goals, so the likelihood of success of their shared strategies is augmented. As previously mentioned,

theory consistently signals visioning as the first step towards advancing transitions; practitioners in the GDCF context support this, evident by the fact that Amsterdam and Manchester, both cities which have circularity as one of their core values, have been successful in scaling-up circular initiatives. Intrinsic sustainability motivation from both the innovators and host organizations has also been found to be vital to successful scaling-up of sustainability-related solutions, because leadership that intrinsically believes in sustainability and pushes the solutions forward is necessary for successful start-ups, but also for organizations who manage to successfully work sustainability into their systems.

Financial and organizational support

Organizations on both sides are bound by business realities, so financial and organizational support is critical for the successful implementation of solutions. Innovators need financial investments to grow their businesses; they can either come from governments (through subsidies or having municipalities as launching customers), sustainability- or innovation-related investment-ready funds, or (as has been highlighted by the case of Semilla) can be facilitated by market players through contracts which help them raise money from investors. On the side of the host organizations, they need organizational resources to be able to implement solutions; staff, time and budgets mentioned as the biggest obstacles by practitioners. In fact, most front-runners studied in this project come from organizations that have the resources available to make change happen, based on which having a staff member purely dedicated to sustainability can be suggested as a solution to these obstacles. On a positive note, this demand for financial and organizational support is expected to diminish, as solutions get more affordable and easier to implement as they scale-up.

Regulatory support for innovators

Support from powerful government structures and a regulatory environment conducive to circular innovations are key for small-scale innovators and their solutions to achieve scalability. Previous examples illustrate how regulations can either make or break new solutions that are trying to scale-up, and how partnerships with governments to evaluate and adapt anti-circularity regulations can contribute to that process. Miscommunication with and within municipalities, however, has been found to be one of the biggest obstacles, particularly around circularity since “the CE is not really owned by one department” **[Mark, 6.7]**, having a circularity team in the municipality (with a dedicated circularity budget) has been suggested to facilitate this. Another internal challenge is that innovation policies tend to be very divided by regions, which silos and limits resources dedicated to supporting upcoming innovations. Practitioners recognize that scalable change will only be achieved if regions come together and call for policy-related collaboration at national and international (European) levels. Finally, innovators consistently struggle with trying to push their solutions through complicated bureaucratic networks over which they have very little understanding, connections or influence. In order to solve this ownership/leadership imbalance, governments should take a more active approach in simplifying these support pathways and connecting innovators to innovation- and investment-ready programs that already exist.

6.3. Demand-driven matchmaking

Having identified that the transition will come about by scaling-up circular solutions, their characteristics, external conditions necessary, and the role of key actors in the process, the last step is to specify how exactly this can be done. There is a real-world need to connect solutions to challenges, and this can be achieved through demand-driven matchmaking. The Amsterdam Innovation team follows this methodology in their Innovation Cycle:

> "With our innovation programs we're really trying to look for challenges that are demand-based. So we look for challenges that are indicated by our colleagues, collect them in the same place, and then from there we send them out to the market [...] Then the market players that can say "okay, I think I've got a solution for this' and they can apply. So that's how we try to stimulate it." (Mark Stoevelaar)

In order to perform this demand-driven matchmaking process in the context of circular festivals and cities, for the proposed Joint Scale-up Project, the following steps have been identified as necessary:

1. Develop an inventory of circular solutions available from festivals → supply
2. Collect a short-list of challenges of host organizations (cities or open-city events) → demand
3. Selecting and scaling-up promising solutions → matchmaking between supply and demand

Supply

The first step is to inventorise and understand the supply side, meaning circular solutions. GDCF has already attempted to do so in the "Festivals Innovation Long-list" developed by Lab Vlieland (LV) in 2023. This long-list gathers details about all innovations implemented at GDCF member festivals, including a description of the company, which problem it solves, when and at which festivals it was trialed in, the LV score (which is meant to show the transformation potential of solutions, for the festival sector and for broader society), the Technology Readiness Level, and finally the SDG it is connected to. The long-list is a great first attempt at mapping the supply, but after discussing with the consultants, a few points of improvement both on the list and on the process were identified (concrete recommendations on how to do it are included in the Recommendations section below). The areas that require attention are particularly around the development of the LV score, which has been developed without a scientific operationalization method, something this research can contribute with, and the frequency with which this list needs to be updated.

Important note: Focus on solutions rather than innovations

Another big adjustment that this research finds important to note is the use of the word, and concept, *solutions* rather than *innovations*. The interviews identified a pressing concern, shared by critics of Ecological Modernization perspectives, that there is too much focus on innovation, only for innovation's sake. This is actually hurtful to scaling-up processes because it is spreading existing resources thin across too many new solutions, instead of focusing on tried and tested solutions that have high transformation potential. The definition of innovation differs from person to person, and this obsession on only new innovations mean that established solutions that work (like Seavents) are not included in the long-list because they have existed for a few years already, and so they are overlooked by GDCF members looking

for solutions to implement, hindering their possibility to continue scaling-up. Practitioners recognize that the solutions are out there, collective efforts just have to tap into them, therefore one main recommendation is to change the name (and focus) of the long-list to **"Festival Solution Long-list"**, and include established solutions at different stages of scaling-up, since these have the best chance of survival.

> "We don't have to come up with all kinds of new solutions anymore. It's nice, of course, to do pilots and all that stuff, but for the big steps, it's not necessary. We have everything, it's already there, it's just a question of accessibility, finding it basically." (Tijl Couzij)

Demand

The second part of the demand-driven matchmaking process is identifying challenges, which the Amsterdam Innovation team collects on "Challenges short-lists". Getting everyone from different departments in the municipality and the event organizers together to identify main innovation challenges related to events is key, because there is always more than one team working on a specific theme (for example, sustainable mobility can involve the teams of smart mobility, circularity, traffic maintenance, policy department, etc.). This can be done through the innovation tables proposed at SAIL, to motivate stakeholders to develop a shared and holistic understanding of the challenges and main themes to focus on (which also reflects innovation systems thinking). The collaboration between municipalities has also been highlighted as important, since they tend to share similar challenges (particularly amongst northern European cities), and this can lead the project to generalizable conclusions to further accelerate urban circularity transitions.

Matchmaking and scaling-up solutions

The final step of matchmaking between solutions and challenges of the host organizations, whether those be cities or open-city events, should be relatively straightforward once the other two steps have been set in place. This research project can illustrate how it would work in practice using the GDCF examples. The process for SAIL was already taking place, and they identified circular sanitation as one of their operational challenges. During interviews with SAIL, the example of Semilla was mentioned and suggested as a solution with high transition and scaling potential. Of course, the Amsterdam Innovation team was already familiar with Semilla, which contributed to its selection as a promising solution. It is a success to report that Semilla has recently signed on to be implemented at SAIL, contributing to their scaling-up, tackling circular sanitation at the open-city event and furthering the transition, and finally, proving that the methodology of demand-driven matchmaking works in practice.

Important note: Investment-ready programs

Another important point to note is that the phase following the selection and implementation of solutions is very important to their scaling-up, and this has been largely ignored in the GDCF context so far. In order to support the scaling-up processes after solutions are matched there should be a much stronger focus on investment-ready programs (such as Amsterdam's Startup In Residence). The lack of attention to these sorts of programs was noticeable from the interviews with practitioners, who also identified that although these programs might exist, it is very difficult for small-scale innovators to be aware or connected to them. The latest trend report of *Duurzame Dinsdag*, an initiative that aims to advance

sustainability in the Netherlands by informing policy-makers about the main trends and developments in the world of sustainable initiatives (Duurzame Dinsdag, n.d.), also highlights the need to work on fostering investment-ready support systems and connecting promising innovations. This will hopefully shape upcoming policies, but as a first step, it should definitely be the focus of GDCF moving forwards.

7. Conclusion

Blending theory and practitioner insights together, this research project has explored how the festival sector can contribute to circularity transitions in cities, by following the scaling-up process of circular solutions from festivals to cities. Why the festival industry is a good setting to advance such transitions in urban spaces was first discussed, due to their three functions for experimentation: as laboratories, due to their temporality and flexibility; as mini-cities with similar needs and challenges; and as stages for circularity, given the power they have over consumers and suppliers in urban environments. Festival practitioners and actors involved with GDCF know this already, but it has largely been ignored by academia, so this report hopes to contribute to this conversation by delivering a sort of academic proof which can be used by GDCF to bring some scientific validity to their future projects. Academic justifications of considering open-city events as stepping-stones from festivals to cities were also drafted, summarized as: their ability to improve relationships with municipalities through local embeddedness and the influence on a city's image; the similarities in their needs and challenges to those of cities, but concentrated in vast spaces and huge audiences; their ability to change the infrastructure of a city, catalyzing other urban systems; and their ability to influence citizens and showcase sustainable practices.

The scope was then zoomed in to individual circular solutions, highlighting the benefits of studying them as transition experiments through van den Bosch and Rotmans (2008) "Deepening, Broadening and Scaling up Framework for Steering Transition Experiments". The framework was applied to the cases of Semilla and other successful (and unsuccessful) solutions from GDCF (reusable cups, Greener, HVO fuel for generators, and Uppact), and lessons from their DBS trajectories were drawn. Five internal characteristics of scalable solutions were identified, for solutions to have transformation potential they must be: operational, adaptable, innovative, address their business reality, and have clear societal visions. External conditions necessary for scaling-up were also prescribed: alignment between the solution and the host organization, in terms of values, visions, and intrinsic sustainability motivations; financial and organizational support for both parties, as solutions need investments to grow and host organizations need resources (staff, time & budget) to implement solutions; and regulatory support for innovators, policies that promote innovation and sustainability, and strong connections to local municipalities and investment-ready programs.

Finally, an in-depth innovation system analysis of the broader GDCF context was performed. The group's function as a CIO was featured, and to operationalize the framework the DBS trajectories within GDCF were described, so facilitators can identify at which phase solutions are at and select the promising ones to scale-up. An evaluation of their steering practices found that GDCF excels at: connecting actors; sharing knowledge; creating shared visioning; bringing visibility to the efforts and challenges of the circular festival sector; promoting relationships with municipalities; and fostering embeddedness in local contexts, while maintaining autonomy for experimentation. Areas where GDCF can improve were identified as: formalizing their learning mechanisms; engaging their members, apart from the usual front-runners; offering organizational support, to both member festivals and solutions; involving key stakeholders, whether that be by inviting innovators and suppliers as members, or by hosting "innovation tables"; and balancing the business reality of solutions by offering them financial & practical support. To complete this system analysis, the main actors and the roles they should take in the GDCF scaling-up process were found to be: Innofest- as tester of solutions (facilitating deepening in festivals); innovators- as drivers of

solutions (throughout the whole process); the GDCF consortium- as a connector of actors (to align visions throughout the whole process and facilitate broadening to open-city events); municipalities- as supporters of scaling-up processes (through legal and infrastructural support) and launching customers of solutions; and suppliers- as adopters of solutions (scaling them up to the mainstream).

This research project has thus described how circular solutions from music festivals contribute to urban circularity transitions, through scaling-up to dominant city practices. The findings become more interesting as they advance the link between cities and the events sector, and they can indeed be generalized to different kinds of industries in the wider urban context. The importance of industry developing good relationships with municipalities has been made evident, not only to improve conditions for business themselves, but in order to facilitate scaling-up efforts in a strategic and streamlined way. The powerful role that municipalities can have, as actors with the power and willingness to influence regime-level practices and structures, highlights their responsibility to support scaling-up processes and act as launching customers of circular solutions throughout the whole economy. The demand-driven matchmaking methodology can be directly applied to solve city challenges, and the frameworks presented in this research could be applied to advance transitions experiments in urban environments. A recommended future study and logical next step to advance the urban circularity transition would be to launch and steer transition experiments in small and localized urban settings for example, with a circular neighborhood project that can test how circular solutions from music festivals perform at a higher city-level, thus advancing their scaling-up.

7.1. Practical recommendations

To support the theoretical findings of this research project, concrete recommendations that GDCF can follow in order to facilitate scaling-up processes will be offered. These recommendations should be generalizable for other CIOs to steer solutions towards scaling-up, thus finalizing this project's contribution to furthering urban circularity transitions. Concrete recommendations for GDCF are:

Actively support solutions to scale-up to open-city events

The theoretical and practical arguments for scaling-up solutions to open-city events as stepping-stones to cities are covered in the Results above. Concrete recommendations for how to do this will depend on the context of each solution, but this can be generally achieved through connecting and demand-driven matchmaking. In the example of Semilla Sanitation, scaling-up to each event can be concretely achieved by:

- **GDCF festivals**: Offer long-term contracts to expand their business within GDCF festivals (so they can get the investment needed from Nijhuis to supply the open-city events)
- **SAIL:**
    - Has already been matched through demand-driven matchmaking
    - Now they need to focus on facilitating the implementation and the learning mechanisms
- **Olympic Games:**
    - Follow-up on the connection made to the *Missie Sports naar Parijs* program
    - Develop the relationship with the Paris municipality to open up that avenue for development (of Semilla and other potential solutions)

Demand-driven matchmaking

The methodology for developing the demand-driven matchmaking has been described above. The concrete steps GDCF needs to do to successfully implement demand-driven matchmaking are:

1. Redo the "Festival Solutions Long-list" every year, after the festival season (before ADE Green, so they can also be shared at the conference)
    - Operationalize the LV score to reflect transition potential of the solutions (by assigning a score scale of 1-10 on each the characteristics of scalable solutions, with established definitions so it is less subjective, and averaging the score)
        - Operational [x/10]
        - Adaptability [x/10]
        - Innovation [x/10]
        - Business reality [x/10]
        - Societal vision [x/10]

        Average = LV score
2. Make a "Challenges short-list" to identify operational challenges of host organization (involving as many stakeholders as possible)
3. Match them to solutions (through informed demand-driven matchmaking)
4. Set in place an investment-ready support system to move the solutions through the development pipeline

Set in place an investment-ready support system

The importance of offering financial and organizational support to innovators, and of fostering their connections to investment-ready support systems has been highlighted above. In the upcoming Joint Scale-up Project, GDCF can support this by:

1. Creating a role dedicated to the Joint Scale-up Project in the GDCF facilitating team
2. Creating a GDCF fund for scaling-up circular solutions which have high LV scores, and work with these kinds of solutions on the Joint Scale-Up Project

7.2. Limitations and further studies

Part of the scientific process involves recognizing the limitations of the researcher, research project and findings. This thesis was bound by the complexity of urban circularity transitions, the limited time frame, and the available access to data. Furthermore, the mix of two different frameworks resulted in two distinct analyses on seemingly different scales- an individual circular solution and the broader context of GDCF. This might have affected the clarity of the structure of the thesis and has also divided the research time into these two distinct sections, but the researcher opted to include them both as it was her judgment that together they contribute to a more holistic analysis. The findings of these sorts of analyses are very contextually dependent, so can only offer rough outlines of how to do the scale-up process (similar to the

limitations recognized by the authors of the DBS framework). Therefore there is a need to point out that the recommendations developed above are only advice based on inductive secondary research and primary interviews with key actors, scientifically sound but by no means guaranteed for success.

Further studies can help advance this research area in academia, so the researcher would recommend empirical studies on the characteristics of successful solutions developed; they are so far merely a (grounded) theoretical proposal of which solutions are best suited to scale-up, but could benefit from real-life tests to confirm or adapt them. In the example that was used to apply the framework, a more forward-looking view could be taken, so future studies could evaluate whether Semilla has in fact had any effect on the urban water circularity transition (in Amsterdam), which could be done following the theory of structure, culture, and practices from the DBS framework.

As was mentioned in the Reflection, important considerations regarding ethics, environmental justice, and accountability in sustainability issues arose during the development of this project. However, these considerations were not addressed in the theoretical frameworks applied in this thesis, which can also be highlighted as a limitation on the model. Further studies regarding these subjects in the contexts of circular solutions and large-scale events would undoubtedly be beneficial to the industry and to social sciences. Finally, it feels important to point out the danger of "beautiful examples", that relying on circular solutions to solve wicked societal problems can be like putting a band-aid on an open wound. The researcher believes that there is a real need for larger systemic (and infrastructural) changes to achieve real circularity, but hopes that studies like this can help further the journey.

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9. Appendix

Appendix A. Coding structure

	Code groups	Code themes	Code definitions
	Aggregate dimensions	***Second-order themes***	***First-order concepts***
1	THEMES	Water and sanitation	Themes of GDCF- Water and sanitation
2		Energy	Themes of GDCF- Energy
3		Food & drinks	Themes of GDCF- Food & drinks
4		Plastics	Themes of GDCF- Plastics
5		Waste (Resource efficiency)	Themes of GDCF (added)- Waste (Resource efficiency)
6		Materials (Resource efficiency)	Themes of GDCF (added)- Materials (Resource efficiency)
7		Travel & transportation	Themes of GDCF- Travel & transportation
8	ECONOMIC	Resources for change	Sustainability budget; time; staff; headspace
9		Business reality	Profit; target markets; financial sustainability (to survive for next year's editions); financial efficiency (from circular solutions); cost of innovations
10		Funding	For the festivals/innovations to run; from ticket sales; government subsidies, sponsors; sometimes specifically related to sustainability projects
11	SOCIAL	Relevance	Relevance of the solutions to wider society; replicability of a solution in several different places/scales (re: climate justice)
12		Behaviour	Demographics of visitors & staff; behavior change challenges; current vs ideal habits; subconscious decision-making; flexibility to try new things;
13		Digitalization and safety	Themes of SAIL- Digitalization and safety
14		Ethics	Can all solutions be applied everywhere equally?; Priorities, capacities, and responsibilities are different throughout the globe (and Europe); neocolonialism; Climate justice

	Code groups	Code themes	Code definitions
	Aggregate dimensions	***Second-order themes***	***First-order concepts***
15	GOVERNANCE	Innovation policies	Research & development; subsidies & grants to stimulate innovation
16		Sustainability policies	Incentives; institutional support; related to funding for festivals to implement solutions; circularity DNA of government
17		Communication	Internal & external communication with the right people in the municipality
18		Contracts	With suppliers; as a tool to achieve change
19		Regulations	As a barrier to scaling-up; government-imposed; permits for events
20		Standards/guidelines	Set by governments to sectors (to enforce sustainability); developed by innovators through pilots
21	INNOVATION	Solutions	Pilots; innovations ; “beautiful examples”; solutions (even if they aren’t new or pilots)
22		Deepening	Learning mechanisms; development; testing & improving; lessons learned
23		Broadening	Related to open-city events (eg. SAIL, sports events); broadening to different industries
24		Scaling-up	To cities; to festival industry; institutionalization; capacity (of innovation) to handle large-scale implementation
25		Investment-ready programs	Guiding solutions through scaling-up (in municipality); connecting innovators to finance and management support
26		Criteria for selection	Of innovations to test; of solutions to implement
27		Technological / systemic	Innovations that use existing technologies in novel ways; technological capacity; flexibility of solution’s technology
28	TRANSITION	Transition	Transition paths; arguments for transition; value of festivals toward the transition
29		Societal ‘transition’ goal	A solution’s ambition to solve a persistent societal problem (here related to circularity)

	Code groups	Code themes	Code definitions
	Aggregate dimensions	***Second-order themes***	***First-order concepts***
30	STEERING	Connecting	Building a network; connecting with the right people
31		Engaging	Keeping actors engaged in process; teaching, not just showing; visibility of sustainability team within the organization; passing from thoughts and words to action (starting pilots and scaling-up)
32		Stakeholders	Relevant stakeholders; their involvement in processes; specific ones separated in ACTORS
33		Visions	Aligning visions of different stakeholders; longer-term strategies; intrinsic motivation; defining strategies and definitions
34		Collaborative intermediary organizations (CIO)	"intermediary organisations that create platforms for deliberation and collaboration between diverse stakeholders" (Hamann & April, 2013); Such as GDCF, Innofest, GROENN, Green Events
35		Knowledge sharing	Between festivals, sustainability managers, cities; stakeholders
36		Sustainability champions	Promoting sustainability in an organization; driving it outside the organization, in the sector, city, etc;
37		Front-runners	Promoting circularity ahead of the crowd; responsibility of those who can to set the example;
38		Demand-driven matchmaking	Demand-driven matchmaking process; connecting solutions to operational challenges
39	FESTIVALS	As testing grounds	Conditions necessary; why they are a good place to test; controlled environment; people's openness to trying new things;
40		As mini-city	Share same needs (themes): ability to influence city infrastructure; catalyst for change in city supplier network
41		Relationship with municipalities	Communication with municipality; a spectrum from permit-related to collaborating in projects; improving city's image through events; cities inspiring other cities
42		Huge reach	Huge audiences; media coverage; reputation; as an

	Code groups	Code themes	Code definitions
	Aggregate dimensions	***Second-order themes***	***First-order concepts***
			opportunity (to showcase) but also a challenge (volume of emissions)
43		Showcase	Innovation for PR; festivals as a platform for innovation; showcasing innovations so others then use them (helping to bring to the mainstream)
44	LOGISTICS	Scopes	Of what falls under their responsibility; of layout of organization; open vs. closed events
45		Data	Data collection; setting baselines; data analysis
46		Infrastructure	In cities, a barrier to scaling-up; of the innovation itself, being too bulky/complicated; physical capacity and flexibility of the innovation
47	WICKED PROBLEMS	Blurred ownership	Circularity is not just limited to one sector, so the ownership of problems, solutions and processes is blurred; it's not always clear who should drive (scale-up) a solution
48		Greenwashing	By big suppliers (like Heineken); by festivals using innovation; by government policies (that don't work in reality)
49		Climate change	CO^2 emmisions; the growing threat of climate change
50		COVID	Changes/disruptions in strategies; financial and logistical repercussions; Covid measures/restrictions
51	ACTORS	Innofest	Pilot/testing CIO
52		GDCF	Connecting CIO
53		Semilla Sanitation	Innovator
54		Suppliers	As important partners, stakeholders; the responsibility they have; big companies; the innovators themselves

Appendix B. In-depth table of Semilla Sanitation's DBS trajectory

Deepening	Broadening	Scaling-Up
Festivals ESNS (NL), 2018 (Black water) ESNS (NL), 2018 (Yellow water) DGTL (NL), 2018 (Yellow & Grey water) Into The Great Wide Open (NL), 2019 (Yellow & Grey water) DGTL (NL), 2022 (Black water) DGTL (NL), 2023 (Yellow water, Unisex urinals) Zwarte Cross (NL), 2023 (Grey water)	**Open city/sports events** Vierdaagse Feesten (NL), 2022 (Yellow water) Forest Green Rovers (UK), 2022 (Yellow water) Forest Green Rovers (UK), 2023 (Yellow water) VierDaagse Feesten (NL), 2023 (Unisex urinals) Olympic Games Paris (FR), 2024 SAIL Amsterdam (NL), 2024	**Urban living labs** Amsterdam Startup in Residence program (NL), 2018-2023 Closed-Loop Public Sanitary Facility (CLPSF) (Ghana), 2022-2024
Industry recognition Aquatech Amsterdam (NL), 2019 - GreenPee unit & "From Waste to Taste"	**Construction** Closed-Loop Concept (CLC) in residential areas (Silvolde NL), 2023 Blue City Rotterdam (NL), 2024	**Construction** CLC at beach pavilion (NL), 2024
	Campsites Campsites (NL), 2022 (Grey water) Living lab Imvepi refugee settlement (Uganda), 2021	**Refugee camps** Imvepi Refugee Settlement (Uganda) 2021-ongoing

Appendix C. Footnotes with details about Semilla Sanitation's steering practices

Footnotes:

1. In DGTL 2018, for example, they got feedback from the Red Cross, who identified some logistical problems in using their solution in refugee camps (the hub was too big and too expensive) and they were able to adapt their solution for their original social context.
2. Partnerships like Nijhuis, the municipality of Amsterdam (through the Startup in Residence program), and governments abroad through the network of the Dutch government[5].
3. They are working with DGTL and the RVO on a Circular Chain subsidy to help them overcome an end-of-waste regulatory status that is so far one of their main obstacles to scale-up.
4. They have been awarded industry recognition at Aquatech Amsterdam for their *GreenPee* solution, and met other important players at this fair
5. They explore markets abroad through the network of the Dutch government (for example, in Uganda through the Netherlands Water Partnership (NWP), in Ghana through the RVO and in Paris through the trade missions organized by the Dutch embassy *(Missie Sports naar Parijs)*).

6. They are currently trying to secure longer-term contracts from GDCF festivals so that Nijhuis will finance the physical infrastructure (toilets) necessary for Semilla to scale-up.
7. Other experiments like the Cinderella urine-treatment toilet project, which has also been taking place at the Marineterrein Living Lab in Amsterdam.
8. Their goal is a fully-circular 4-system solution that can adapt to any setting, but they inevitably require some changes in standard practices in order to use it, which has lead them to unexpected obstacles (for example, the unisex urinal, which requires women to stand while they pee, and not to throw any other waste into the toilet).
9. Partnerships like the Circular Refugee Camp consortium (a group of Dutch & Ugandan companies supported by the NWP, through which they make a part of the Imvepi project), and the Amsterdam Innovation team (which started in 2018 with the Startup in Residence program).
10. They were asked by the Amsterdam municipality to draw up a clause for contracts for public toilets that makes it possible to collect separate waste streams, with the idea that one day all these streams could be legally and systematically treated.