

Tourism in the circular city – a study case of the museum circularity in Amsterdam

Master thesis



Note. "Installation view of the exhibition, "Sustainable Museum: Art and Environment," at the Museum of Contemporary Art Busan," courtesy of MOCA Busan, 2021, photograph, retrieved from <https://cimam.org/news-archive/exhibitions-explore-idea-of-sustainable-museum/>.

Arni Dewi Boronnia

5344328

a.arnidewiboronnia@students.uu.nl

Master of Spatial Planning

Faculty of Geoscience

Utrecht University

Preface

“We might not live for hundreds of years, but the products of our creativity can leave a legacy long after we are gone. The future belongs to those who can imagine it, design it and execute it. The future does not wait. The future can be designed and built today.”

– translation of the poem by Mohammed bin Rashid Al Maktoum that is written on the Museum of the Future in Dubai, United Arab Emirates.

My sincere gratitude goes to Prof. Niki Frantzeskaki, who oversaw my thesis. She provided me with ongoing constructive criticism as I wrote my thesis, which helped me through every stage of the process. I also appreciate all the interviewees who allowed me to take use of their precious time and contributed to this research by making it even more interesting. I would want to extend a particular thank you to all of my closest friends for their support and encouragement during my studies. Finally, I want to express my unending gratitude to my parents for their love, support, and unconditional love. Without you, I wouldn't be where I am now.

Key information

Abstracts

In the face of urban population growth and the heightened demand for tourism, urban areas confront multifaceted challenges beyond their foundational needs. The linear economic paradigm that supports the tourism industry, which dramatically worsens the environment, makes these problems worse. As a result, improving the tourism industry is essential to the viability of moving toward a circular economy. This study explores the possibilities of a continuous circular economy approach that has been incorporated into the city's policy framework since 2015 in order to address the ongoing over-tourism problem in Amsterdam. The study explores the impact of museums on Amsterdam's transition into a circular city, focusing on their crucial role in the tourism industry. Through a methodological compound of 7 semi-structured interviews and an analysis of 9 documents, data triangulation is ensured. The research is structured across three levels of circular economy transition: micro, meso, and macro levels. The adaptive responses of museums to Amsterdam's circular city strategy are examined at the micro level. Findings show that museums are moving toward sustainability and circular practices, driven by factors like energy efficiency and architectural constraints. A collaborative multi-stakeholder paradigm encompassing museums, suppliers, and governmental bodies is revealed by the second study question, which looks into the governance mechanisms of circularity inside museums. Within cultural institutions, this collaborative structure encourages extensive and environmentally responsible circular processes. Furthermore, the challenges and enablers for implementing circularity within museums functioning within the tourism sector are also being examined in this research. Challenges include limited financial resources, regulatory limitations, and awareness inadequacies. However, the inherent value attached to museums and the growing public demand for sustainability serve as powerful drivers for change. By highlighting museums' ability to be agents of sustainable change within the complex web of urban tourism and the circular city, this study emphasizes the necessity of preserving cultural legacy while reducing ecological effects.

Keywords: Circular city; tourism circularity, museums; museum circularity; Amsterdam

Table of contents

| | |
|--|----|
| Preface..... | 1 |
| Key information..... | 2 |
| Abstracts..... | 2 |
| Table of contents..... | 3 |
| Table list | 5 |
| Figure list | 5 |
| Abbreviation..... | 6 |
| 1. Introduction..... | 7 |
| 1.1. Research issues..... | 7 |
| 1.2. Knowledge gap | 7 |
| 1.3. Research objective and research questions..... | 8 |
| 1.4. Societal and scientific relevance | 8 |
| 2. Theoretical framework..... | 9 |
| 2.1. Tourism sector and museum..... | 9 |
| 2.1.1. Role of the museum in sustainability..... | 10 |
| 2.1.2. Museum and its stakeholder..... | 11 |
| 2.2. Circular city..... | 12 |
| 2.2.1. Governance of the circular city | 12 |
| 2.2.2. Tourism circularity..... | 13 |
| 2.2.3. Circularity of the museum..... | 15 |
| 2.2.4. Challenges and enablers of circular transition governance | 16 |
| 2.3. Conceptual framework..... | 17 |
| 3. Methods | 21 |
| 3.1. General research strategy | 21 |
| 3.2. Data collection..... | 21 |
| 3.3. Data analysis..... | 23 |
| 4. Findings..... | 25 |
| 4.1. Circular economy implementation in the museum | 25 |
| 4.1.1. General view of museums..... | 25 |
| 4.1.2. Best practices of circular economy implementation in museums in Amsterdam | 26 |
| 4.1.3. Conclusion of circular economy implementation in museum | 28 |
| 4.2. The governance of circular economy implementation in museums..... | 29 |
| 4.2.1. Stakeholder | 29 |

| | |
|---|----|
| 4.2.2. The nexus between museum circularity and Amsterdam’s circular city agenda | 34 |
| 4.2.3. Conclusion The governance of the circular museum | 36 |
| 4.3. Challenges and enablers of implementing circular economy in the museum as the catalyst of Amsterdam’s circular city agenda | 36 |
| 4.3.1. Challenges | 37 |
| 4.3.2. Enablers | 39 |
| 4.3.3. Conclusion of challenges and enablers | 42 |
| 5. Discussion | 44 |
| 5.1. Theoretical contributions | 44 |
| 5.2. Practical implications..... | 46 |
| 5.3. Limitations of the research..... | 47 |
| 5.4. Suggestions for further research | 47 |
| 6. Conclusion | 49 |
| References..... | 50 |
| Appendixes | 58 |
| Appendix A: Questions for governmental bodies | 58 |
| Appendix B: Questions for museums | 59 |
| Appendix C: Questions for suppliers | 60 |
| Appendix D: The nexus between museum circularity and Amsterdam’s circular city agenda | 61 |

Table list

| | |
|--|----|
| Table 1: Challenges and enablers of circular city transition..... | 17 |
| Table 2: Literature to answer every sub-questions..... | 18 |
| Table 3: Overview of expert interviewees | 22 |
| Table 4: Overview of official documents and reports | 23 |
| Table 5: Challenges of implementing circularity in museums as part of the tourism sector..... | 39 |
| Table 6: Enablers of implementing circularity in museums as part of the tourism sector | 42 |
| Table 7: Challenges and enablers of implementing circularity in museums as part of the tourism sector..... | 42 |

Figure list

| | |
|---|----|
| Figure 1: Conceptual framework..... | 20 |
| Figure 2: Overview of the scope of interviewees..... | 22 |
| Figure 3: Stakeholder map | 30 |
| Figure 4: Sustainability and circularity initiative in museum map | 35 |

Abbreviation

| | | |
|------|---|--|
| CE | = | Circular economy |
| RCE | = | Rijksdienst voor het Cultureel Erfgoed |
| RWS | = | Rijkswaterstaat |
| RVO | = | Rijksdienst voor Ondernemend Nederland |
| VANG | = | Van Afval Naar Grondstof |
| AMA | = | Amsterdam Metropolitan Area |
| BIZ | = | Bedrijveninvesteringszone |

1. Introduction

1.1. Research issues

Many urban regions nowadays must deal with a growing population as well as an increase in the need for or expectation of tourism activities in the city, in addition to the requirements of life. Due to the seasonality of tourism, the distinctiveness of the business, and the fact that tourists produce waste, tourist cities have serious problems with waste prevention and management. The tourism sector largely contributes to environmental deterioration as a result of its structure, which is built on a linear economic model, making it essential to the shift to a circular economy.

Amsterdam is a prime example of a city that struggles with issues related to overcrowding and nuisance brought on by tourists. With the constant growth in the number of tourists, the Dutch capital city of Amsterdam has grown to be a popular travel destination. Amsterdam's over-tourism is already a significant problem, and as a result of its ongoing issues with the city's yearly visitor population growth, the city has reached a breaking point. In the light of employing the concept of circularity to reduce the environmental degradation impact, Amsterdam has already a promising setup by being the first city in the world to formally examine the advantages of a circular economy since 2015. However, there are no direct circularity directives for the tourism sector that derive from the current circular strategy of Amsterdam.

1.2. Knowledge gap

Although the idea of a circular economy is widely understood, Kaszás et al. (2022) noted that only a few solutions are presently being used in tourism practice. The majority of circular tourism studies concentrate on adopting the circular economy model on the supply side, which primarily aims to reduce waste and pollutants from the tourism sector (Sørensen & Bærenholdt, 2020; Sørensen et al., 2020; Manniche et al., 2017; Pamfilie et al., 2018). In contrast, there is less study on the demand side relating visitor awareness of circular tourism as a support for the implementation of a more sustainable tourism industry (Bosone & Nocca, 2022). Sustainable food production and consumption in hotels, restaurants, and cafes within urban tourism settings also have been specifically studied as part of research on the demand side of circularity in the tourism sector (Camilleri, 2021). Regarding destination management, there has been research exploring the expansion of the tourism system within a circular economy from an organizational angle (Vargas-Sánchez, 2019). Additionally, the utilization of Kate Raworth's Doughnut Economy viewpoint (Hartman & Heslinga, 2022) has also been investigated. The Doughnut Economy model, introduced by Kate Raworth in 2017, presents a visual framework for sustainable development. This framework takes the form of a doughnut and integrates the notions of planetary limits with those of social considerations (Raworth, 2017).

The scientific literature lacks a place-based case study on this relatively new idea of tourism circularity. There is also currently no literature discussed about the role of museums in the circular city strategy, especially in Amsterdam although there are some numbers of papers that examine the role of museums in general to sustainability (McGhie, 2020; Pop et al., 2019; Rosa-Jiménez et al., 2023). Museums, as part of cultural tourism, are reported as one of the eight streams within the gaps of the current research trends in the literature on circular economy and tourism (Rodríguez et al., 2020). In the light of circular economy transition, meso and macro-level studies in tourism are scarce. Therefore some recommendations have been made (Martinez-Cabrera & Lopez-del-Pino, 2021; Rudan et al., 2021) for a multi-stakeholder approach, network-level studies, and additional destination-level research involving a variety of stakeholders, such as destination managers, local governments, and the local community.

1.3. Research objective and research questions

Departing from the state-of-the-art and knowledge gap, this research aims to find out the role of museums as part of the tourism sector in Amsterdam's circular city transition. It does so by addressing the following main research question:

How do museums as part of the tourism sector play a role in Amsterdam's circular city transition?

This research will focus on museums as one of the main tourists attraction in Amsterdam which ranks fourth after accommodation, food, and shopping where tourists spend most of their money when traveling to the city (Van Loon & Rouwendal, 2017). Besides, museums are also cited by UNFCCC (2020) as one of a number of communication methods to raise public awareness of climate change.

Sub-research questions:

1. How do museums transform in regard to the circular city strategy target?
2. How the circularity at the museum is currently governed?
3. What are the challenges and enablers of implementing circularity in museums as part of tourism sector?

1.4. Societal and scientific relevance

Amsterdam has suffered from the problem of over-tourism and has the possible remedy on account of the ongoing circular economy strategy embedded in its policy. The Dutch capital of Amsterdam has become a popular tourist destination. Hospers (2019) mentioned that in 2005 the city counted 11 million visitors, and in 2017 about 18 million. Projections warned that without corrective policy action, visitor numbers might even grow to 30 million in 2025.

In 2019, the *Nederlands Bureau voor Toerisme & Congressen* (NBTC) published a document called *Perspectief 2030*, a new vision for the destination of the Netherlands. They formulated five strategic priorities on which they will focus during the development towards 2030. One of the strategic priorities is sustainability which specifically mentions the circular use of raw materials. This tourism sustainability strategy is also in line with recently adopted policy at the EU level. After the Ninth Environment for Europe Ministerial Conference, organized by the United Nations Economic Commission for Europe, there is a recent agreement on accelerating the shift towards a circular tourism economy, while at the same time reducing waste and ensuring the sector meets its climate action responsibilities (World Tourism Organization, 2022).

2. Theoretical framework

2.1. Tourism sector and museum

Tourism is one of the largest industries in the world due to its ability to provide an immense number of job opportunities and generate high profits for a destination. This means that while we build and develop cities, we must take tourism growth into account to give the sector a chance to expand and become a new source of revenue for the economy. In addition to the necessities of life, many urban areas nowadays must deal with a growing population and an increase in the need for or expectation of tourism activities in the city (Giriwati et al., 2013).

Ashworth (1995) explains that urban tourism contributes to two significant general categories of tourism, referred to as "special interest" and "place-specific." He further described that special-interest tourism is the pursuit of interests when on vacation, which are very certainly also pursued when not on vacation. People on vacation just display the same interest in the city's offerings that they do when they are not traveling, thus these urban tourists are not engaging in any peculiar or unusually compulsive holiday behavior that can be explained in terms of tourism. Ashworth's definition of place-specific tourism, which can be made up of a variety of widely defined cultural features, structures, and atmospheres, is in the interim where the tourism appeal is the sense of the place itself. Although all tourism takes place someplace, and all locations have distinctive qualities, this type of tourism particularly leverages these distinctive qualities as the tourism product rather than the general attributes of a location.

In the realm of urban tourism, museums have long been regarded as educational and cultural establishments. However, in response to societal changes, museums have recognized their increasing economic significance and their potential to contribute value to their communities by drawing cultural tourists. The rising demand for cultural tourism has led to museums assuming pivotal roles within the cultural tourism industry, leading to a heightened emphasis on their leisure-oriented aspects. Consequently, museums are now actively collaborating with the tourism sector through various means, such as forming partnerships with other cultural institutions, leisure venues, and local festivals. This collaborative approach highlights museums as cultural products that have the capacity to attract tourists, prompting a need for further investigation into the economic impact of museum clusters on cultural tourism (Stephen, 2001).

Urban tourism is closely connected to the significant role that larger or "superstar" museums play as both essential amenities for residents and powerful magnets for attracting large crowds of tourists (Frey, 1998). The competitive nature of museums within a city and their formation of cultural clusters further enhance the overall attractiveness of the urban landscape, contributing to a mutually beneficial relationship between cities and museums (Mommaas, 2000). These cultural clusters, operating under a hybrid form of cultural governance, benefit from public policy justifications, stimulating place marketing, entrepreneurial approaches to culture, innovation, and cultural diversity (Mommaas, 2000). The physical agglomeration of businesses within these clusters, including museums, offers advantages such as reduced transaction costs, accelerated circulation of capital and information, and strengthened social solidarity (Scott, 2000; Amin & Graham, 1997). Collaboration between sectors, exemplified by museums and galleries, fosters cost savings, economies of scale and scope, synergies, and revenue enhancement (Austin, 2000). By virtue of their concentration, museums can collaborate more effectively within a "museum cluster," allowing for more efficient marketing and positioning both individually and collectively, benefiting both the institutions and the city as a whole (Van Aalst & Boogaarts, 2002). As a strategic tool for local economic development, museum clusters facilitate higher competitiveness, new market opportunities, and innovation (Tien, 2010). Hence, cities and museums share a mutually

beneficial relationship, with museums becoming symbols of the city and catalysts for economic growth, enticing tourists to explore other cultural and historic sites (Gustaffson & Ijla, 2017).

Cities have a significant impact on museums due to the concentration of activity and energy they contain as well as the breadth of their influence, so the functions of city museums must adapt to the surroundings because urban planning and museums are fields that frequently overlap (Grewcock, 2006). Through a more effective, formal collaboration, museums of cities could significantly contribute to innovative, inclusive, and sustainable urban planning and place-making. This kind of active involvement in the planning process may also enable museums to interact with communities on issues that are important to them on a new level, thereby expanding their reach to new audiences (Grewcock, 2006).

According to Giriwati et al. (2013), to establish sustainable urban tourism, one must take into account and adapt to market circumstances, demographic shifts, and political challenges. Despite the immense challenges, they think that urban tourism planning may significantly contribute to the mix of public and private initiatives aimed at sustainability. They also think that providing a unique visitor experience with tourism amenities while minimizing environmental impact is another important aspect of urban design for urban tourism.

Establishing sustainable urban tourism, which involves providing a unique visitor experience with tourism amenities while minimizing environmental impact, is therefore an important aspect for both museums and cities. Museums can play a role in this by contributing to sustainable urban planning and collaborating with communities to address important issues. By actively participating in the planning process and incorporating sustainable practices, museums can attract visitors interested in experiencing a city's cultural and historic offerings while promoting responsible tourism.

2.1.1. Role of the museum in sustainability

Museums play a crucial role in supporting sustainability, which is not just an end goal to be achieved but a continuous journey that requires constant reinforcement of values and approaches (Sutter & Worts, 2005). Sustainable practices encompass social, economic, environmental, and cultural aspects, making it essential for museums to consider all these dimensions simultaneously (Pietro et al., 2014). The conservation of cultural heritage within museums, while a significant aspect of their mission, can pose challenges in terms of resource consumption, especially in maintaining optimal environmental conditions (Weintraub, Martin, & Cocks, 2012).

To address these challenges, museums are actively seeking innovative ways to be more sustainable. By collaborating with energy experts, environmental consultants, and sustainable technology providers, they can find solutions to reduce their environmental impact without compromising the preservation of valuable artifacts (Paehlke, 1999). These connections enable museums to adopt sustainable practices, minimize energy consumption, and ensure the long-term conservation of cultural heritage for future generations. Furthermore, museums use their influence to raise awareness about sustainability issues through exhibitions, educational programs, and community engagement, inspiring positive change and collective efforts toward a sustainable future. Thus, museums act as champions of sustainability, fostering a balanced approach that aligns with the interconnected pillars of economic, social, environmental, and cultural well-being (Worts, 2006).

2.1.2. Museum and its stakeholder

Museum has six fundamental functions as listed by Lord (2012a): collecting, documentation, preservation, research, display, and interpretation. They wrote that a museum's statement of purpose outlines its functions in connection to its designated discipline, geographical scope, and time period while also describing the audience that these functions are intended to reach. Moreover, because museums are essentially social institutions, which not only serve the public, they virtually never fulfill their goals alone but nearly always in collaboration with many other academic and cultural organizations within their community, nation, and worldwide. Lord (2012b) believes that the relationships between the museum and this network of organizations at all levels can have a direct impact on its space and facility requirements. Furthermore, they also listed that there are at least eight major groups of people, organizations, or institutions that museums must involve in order to complete a successful building project and operate well after opening:

- Individuals and communities
- Government at all levels
- Foundations
- Educational institutions
- Other museums, and museum associations
- Special-interest organizations
- The tourism industry
- The private sector

The collaborative nature of museums, as emphasized by Lord (2012b), plays a vital role in sustainability efforts. By working with various organizations, including governments, foundations, educational institutions, and the private sector, museums can leverage collective expertise, resources, and networks to implement sustainable initiatives, secure funding for sustainability projects, and drive community engagement.

Overall, museums have the potential to become sustainability leaders by integrating sustainable practices across their functions, collaborating with diverse stakeholders, and promoting environmental consciousness through their exhibitions and educational programs. An exemplar of embedding sustainability within the museums as part of the arts and culture domain can be observed in England through the collaborative efforts between the Art Council England and Julie's Bicycle (Domingues, Mazhar, & Bull, 2023). As the foremost funding source for the nation's arts and cultural organizations, the Art Council England introduced a groundbreaking Environmental Program in partnership with Julie's Bicycle, a nonprofit dedicated to environmental reporting for these sectors (Arts Council England, 2020a). Launched in 2012, this program integrates environmental reporting, policies, and actionable plans into funding agreements for Arts Council Organizations. To secure the Art Council England funding, arts and cultural entities are now required to detail their carbon emissions across diverse segments such as venues, offices, tours, productions, and outdoor events. To facilitate this, Julie's Bicycle developed the 'Creative Green Tools', enabling these organizations to input data and calculate emissions while also offering guidance on mitigating environmental impacts, particularly within the built environment (Domingues, Mazhar, & Bull, 2023). The Art Council England's 2020–2030 strategy places significant emphasis on 'environmental responsibility', acknowledging the paramount challenge of the 'climate crisis and environmental degradation' (Arts Council England, 2020b).

2.2. Circular city

Linear resource management has lost its relevance as cities move toward sustainability. Cities interrupt biogeochemical biological cycles by linearly extracting resources from the environment for use in the city and then discarding them elsewhere (Goldstein & Rasmussen, 2018). Sariatli (2017, p.31) states that “The intrinsic mechanics of the linear economy, by relying on the wasteful take–make–dispose of flow, is detrimental to the environment, cannot supply the growing populace of our planet with essential services [...]”. Cities around the world are dealing with a number of serious problems, including resource depletion, population growth, climate change, and environmental deterioration (Atanasova et al., 2021). Currently, cities use between 60 and 80 percent of all natural resources. They produce 50% of the world's rubbish and 75% of its greenhouse gas emissions (Williams, 2019). The UN projects that by 2050, urban regions will be home to 68% of the world's population and that the urban footprint would have tripled (UN, 2018). The three primary reasons affecting this are the increase in urban population, increased income, longer distances traveled by goods (including food), and the amount of rubbish generated in cities (Williams, 2019).

The European Circular Cities Declaration (2020) defined a circular city as “[...] one that promotes the transition from a linear to a circular economy in an integrated way across all its functions in collaboration with citizens, businesses, and the research community. This means in practice fostering business models and economic behavior which decouple resource use from economic activity by maintaining the value and utility of products, components, materials, and nutrients for as long as possible to close material loops and minimize harmful resource use and waste generation. Through this transition, cities seek to improve human well-being, reduce emissions, protect and enhance biodiversity, and promote social justice, in line with the Sustainable Development Goals (SDGs).

Circularity has emerged as a key paradigm in addressing the challenges posed by resource depletion, population growth, climate change, and environmental degradation. Circular cities promote a transition from a linear to a circular economy, aiming to decouple resource use from economic activity, minimize waste generation, and foster sustainable practices across all city functions. This approach can also be integrated into tourism and museum practices, promoting sustainable practices and enhancing their role in preserving cultural and natural heritage while minimizing their ecological footprint. Overall, embracing circularity is essential to achieving a more sustainable and resilient future.

2.2.1. Governance of the circular city

In the pursuit of circularity goals in a city, it is evident that a multi-actor approach is essential for achieving sustainable consumption and production. Vergragt et al. (2016) emphasize that no single entity can drive the transition alone, and it requires collaboration between grassroots innovations, government programs, responsible corporations, informed consumers, and scientific advancements. The challenge lies in expanding sustainability discussions beyond academic circles to engage urban planners, businesses, educators, NGOs, and individuals in cities to create a meaningful impact. Sustainable development is seen as an ongoing process of societal change, encompassing ecological integrity, intergenerational justice, and responsibility (Frantzeskaki, Loorbach, & Meadowcroft, 2012). Such an inclusive and collaborative approach is crucial to drive positive change toward a more circular and sustainable urban environment for the benefit of present and future generations.

Circular entrepreneurship and innovation can act as catalysts for disruptive systemic transitions, as noted by Bauwens et al. (2021) and Cullen & De Angelis (2020). Emphasizing bottom-up innovation, learning, and serendipity can accelerate the emergence of circular ventures, thereby facilitating the transition toward a circular economy (Bauwens et al., 2021; Gibb, 1996; Mazzucato, 2018). The motivation and

entrepreneurial identity of founders are also crucial determinants shaping the creation and growth of circular entrepreneurial ventures (Basco et al., 2019; Staniewski & Awruk, 2019).

To foster a transition towards sustainability, current top-down governance must embrace a more open, experimental, and frontrunner-oriented approach. As highlighted by Frantzeskaki, Loorbach, and Meadowcroft (2012), supporting sustainable development demands the adoption of innovative policy instruments, scaling up successful experiments, institutional changes, and the nurturing of political coalitions that prioritize societal innovation and progress. Achieving successful circular economy initiatives further requires a balanced integration of both bottom-up and top-down strategies for implementation and evaluation, as emphasized by Winans, Kendall, and Deng (2017). Essential policy instruments like subsidies and tax incentives, along with clear objectives and iterative evaluation processes, play a crucial role in the effectiveness of such initiatives. Collaboration and coordination among diverse stakeholders, including policymakers, industries, and citizens, become paramount to ensure the success of circular city governance and the realization of circularity objectives in the long run.

2.2.2. Tourism circularity

Due to both its economic significance and its detrimental effects on the environment, the tourism sector is an essential sector to research. According to Martínez-Cabrera and López-del-Pino (2021), the tourism sector significantly contributes to environmental deterioration because of its linear economic model-based structure. According to Obersteiner et al. (2021), tourist cities face significant issues with regard to waste prevention and management because of the seasonality of tourism, the uniqueness of the tourism industry, and the fact that tourists are waste producers. According to their research, during the peak travel season, visitor waste production may exceed that of the local populace, depending on the ratio of tourists to permanent residents.

Rodríguez et al. (2020) brought attention to the paradox that, although being one of the most polluting industries due to its high energy and water consumption, food waste, traffic issues, and CO₂ emissions, only a small number of references were found mentioning pollution in circular tourism. In light of the multiplier effect and extensive supply chain that tourism has, Vargas-Sánchez (2018) asserted that the tourism sector is crucial to the transition of the economy to a circular economy.

While all social actors are involved in the transition to the circular economy, it can be observed that circular economy literature (Ghisellini et al., 2016; Kirchherr et al., 2017; Merli et al., 2018) frequently takes into account three distinct levels of implementation and research: micro (products, companies, and consumers), meso (supply chains), and macro level (city, regions, nation, governments). The implementation of a circular economy, particularly in the tourism industry, necessitates the development of new interactive relationships with stakeholders in the local community and visitors as well as creative business models, supply chains, and technology (Manniche et al., 2021). The circular economy encompasses technology advancements in addition to modifications to laws, networks, infrastructures, and consumer cultures since it encompasses much more than just the recycling and reuse of materials and resources (Florido et al., 2019).

At the micro level, Arayal (2020) observed that the circular economy transformation will not be possible until personnel in the tourism sector become more aware of the required behavioral adjustments. Sorin and Einarsson (2020), who highlight that the first step in the circular transformation is to research and raise knowledge of the circular economy—that is, its fundamental ideas, practices, and potential for value creation—support this claim. Hence, it is important to urge those working in the tourism industry to implement the many circular economy principles and to educate them on how to effectively move

toward a circular economy (Arayal, 2020; Jaroszewska et al., 2019; Martinez-Cabrera & Lopez-del-Pino, 2021).

At the meso level of circular economy transition in the tourism sector, Renfors (2022) observed that incorporating local players and boosting cooperation within the local supply chain to promote CE solutions is deemed highly relevant. It is advised to set up supply chain sub-circles for recycling or reusing items, involving the neighborhood, securing various purchases from the neighborhood, and enhancing the neighborhood, particularly in the hotel and restaurant industry (Khodaiji and Christopoulou, 2020). In addition, Camilleri (2021) believes that restaurant owners ought to be interested in buying fresh products from nearby farmers, bakers, and butchers to develop tight ties with neighborhood suppliers and use just-in-time purchasing strategies to ensure they have access to fresh goods.

At the macro level, researchers (Rodriguez-Anton & Alonso-Almeida, 2019; Vatansever et al., 2021) appear to have agreed with the notion that the local and national governments play a crucial role in guiding the tourism sector toward a circular economy and facilitating the transition. Top-down government support, such as sufficient and faster legal and regulatory frameworks, is viewed as a way to accelerate progress (Rudan et al., 2021; Schumann, 2020). Objectives of policy initiatives could include easing administrative constraints of bureaucracy (Falcone, 2019), promoting the implementation of circular practices (Cornejo-Cortega & Chavez Dagostino, 2020), and financing economic investments of tourism enterprises adopting circular economy practices and providing them with tax discounts (Khan et al., 2021).

On the other hand, regarding tourism destinations carrying capacity and managing tourism congestion, the term "over-tourism" has become a prevalent term in academic and policy-making discussions. The idea of over-tourism and the related process of touristification arose from the observation of rapid changes in urban spaces, functions, and meanings, along with negative reactions from residents towards tourism in various municipalities worldwide over the last few decades (Milano, 2017; García-Hernández, de la Calle-Vaquero, & Yubero, 2017; Russo, 2002; Koens, Postma, & Papp, 2018; Del Romero Renau, 2018; Sequera & Nofre, 2018; Jover & Diaz-Parra, 2019; Capocchi et al., 2019). To address over-tourism, the concept of tourism "degrowth" has gained increasing support. Degrowth is the reduction of energy and resource flows in an economy to a sustainable level, aiming to avoid drawing down natural capital (Kallis et al., 2018; Kallis, 2011; Kallis, Kerschner, & Martinez-Alier, 2012). It is not solely about economic contraction, but rather finding a better balance between resource use and supply. Degrowth serves as a political slogan with theoretical implications, challenging the idea of growthism (Daly, 2013; Latouche, 2009). In the context of tourism, degrowth implies a voluntary transition to building destinations and local economies with minimal exploitation of resources, controlled consumption and production, and environmentally harmonious technological development (Andriotis, 2018). This concept promotes community-based responsible tourism and opposes mass tourism, suggesting a quantitative downsizing of consumption and production patterns where necessary. A potential contribution to sustainability and degrowth in tourism comes from the concept of demarketing (Hall, 2014; Canavan, 2013; Çakar & Uzut, 2020; Ballantine, 2021; Hall, Lundmark, & Zhang, 2021; Korstanje & George, 2021; Prideaux & Pabel, 2021). Demarketing focuses on achieving a better balance between supply and demand and may have relevance in the pursuit of sustainable tourism practices.

The tourism sector holds significant economic importance but also poses harmful effects on the environment, making it essential to research and address the industry's impact. The linear economic model-based structure of tourism contributes to environmental degradation, particularly evident in waste management issues faced by tourist cities. Transitioning to a circular economy is vital for achieving sustainable tourism and circular city goals, necessitating behavioral adjustments, collaboration within local supply chains, and government support. Moreover, the concept of "degrowth" has gained support

as a means to address over-tourism and promote responsible tourism practices, emphasizing a qualitative downsizing of consumption and production patterns where necessary. To achieve sustainable tourism, museums, as key players in the industry, can actively embrace circularity and inspire visitors to adopt circular practices, thus playing a crucial role in promoting a sustainable future for tourism.

2.2.3. Circularity of the museum

The opening of a museum has a beneficial impact on tourist numbers since museums are the pinnacle of cultural tourism and one of the most important assets (Wojtowicz-Jankowska, 2017; Carey et al, 2013). Museums were mentioned as one of several means of communicating with the public to increase knowledge of climate change; museums were also mentioned as places that may encourage public engagement, providing chances for the public to participate in policymaking and for various sectors to collaborate and discuss climate change solutions (UNFCCC, 2020). Di Pietro et al (2014) stated that in order to become sustainable, museums must concurrently take into account the economic, social, environmental, and cultural settings which these components might be thought of as the four pillars of sustainability. When the four spheres, or pillars, are in equilibrium, the highest level of sustainability is realized (Worts, 2006).

The International Council of Museums (1996), however, has emphasized the necessity for the integration between the opposing demands of conservation and tourism marketing, leading to the development of an international concept of "museum"—a dynamic location with a variety of responsibilities that complicate the environmental conservation of heritage. This idea is confirmed by Lucchi (2016), who noted the emergence of additional activities and places in museums related to marketing, communication, education, and tourist entertainment (such as conference rooms, laboratories, bookshops, libraries, play areas, cafés, restaurants, and shops), in addition to the conventional roles of research, conservation, display, management, and storage.

The achievement of the proper balance between a number of complex and frequently incompatible environmental parameters becomes a necessity because damage could result in the progressive loss of tangible and intangible artifacts with regard to physical properties, significance, economic value, and social-educational role (Lucchi, 2018). Hence, there is a need for rigorous management of light, air temperature, relative humidity, and pollutants for reducing losses and assuring long-term control of indoor conditions that result in high energy consumption in order to conserve the collections and building as well as maintain a specific comfort level for tourist visitation and cultural learning (Wirilander, 2012; Lucchi, 2016; Ferdyn-Grygierek, 2014; Luciani, 2013; Padfield et al., 2007; Blades et al., 2000; Cassar, 2013).

The opening of a museum has a positive impact on tourist numbers, particularly in the context of urban tourism, as museums are significant attractions for exploring the cultural aspects of cities. They also play a crucial role in increasing public understanding of climate change and encouraging public engagement, allowing for collaboration and discussions on climate solutions. Achieving sustainability in museums involves considering economic, social, environmental, and cultural aspects. The International Council of Museums (1996) emphasizes the integration of conservation and tourism marketing, recognizing the multifaceted responsibilities of museums that can complicate environmental preservation. As museums evolve to include various activities and facilities, it is important to carefully manage environmental factors to protect artifacts, conserve energy, and provide a pleasant experience for visitors.

As museums strive for greater sustainability, the adoption of circularity emerges as a promising approach. Since museums today also have an important contribution to the economy in the tourism

sector, museums can be seen as profit-oriented corporate entities in this sector in addition to their role as cultural institutions. Research by Walker et al. (2022) reveals that companies of all sizes and industries recognize the potential of a circular economy in contributing positively to sustainability. This relationship between circular economy and sustainability is further supported by the notion that circular economy and sustainability are closely connected, forming a subset relationship where economic and environmental issues are emphasized, and efforts to incorporate social and consumption-based issues remain ongoing (Schöggel, Stumpf, & Baumgartner, 2020). However, Schroeder, Anggraeni, & Weber (2019) see the circular economy as a "means to an end" or a "toolbox," rather than an end goal itself, aligning with the perspective that circularity is a practical pathway to achieve sustainability.

In the context of museums, the incorporation of circular economy practices presents a dual opportunity in the realm of entrepreneurship, which can be categorized into two distinct strategies: opportunity-based and necessity-based. The former involves entrepreneurs proactively identifying and capitalizing on innovative business ideas to drive positive change and foster sustainability within their operations. This approach is driven by motivation and a quest for innovation, leading to increased technological progress and fostering a productive form of entrepreneurship (Mrozewski & Kratzer 2017; Nicotra et al. 2018). On the other hand, necessity-based entrepreneurship emerges when individuals are compelled to start their own businesses due to circumstances like unemployment or job dissatisfaction (Caliendo and Kritikos 2010). Amidst these approaches, research by He et al. (2020) confirms the positive impact of opportunity-based entrepreneurship on environmental sustainability. The distinction between these two entrepreneurship strategies highlights the diverse avenues through which museums can become key players in promoting sustainability while also addressing broader environmental and societal challenges.

2.2.4. Challenges and enablers of circular transition governance

In the scientific literature, little to no attention has been paid to circularity implementation within museums as part of the tourism sector in a circular city transition. This means that the literature available on associated challenges within circular economy implementation remains on a broader scope, like the circular city as a whole.

However, given the role of museums in conservation, various barriers to the shift to sustainable conservation have been identified. According to Kampasakali et al. (2021), these barriers include the availability of new products on the market, the dissemination of relevant information within the conservation community, the time required for testing and evaluating their efficacy, and the incorporation of newly developed protocols into daily laboratory practice.

Another practical example of the incorporation of the circular economy within the museum is from the City of Paris (2021), which recently produced a practical guide document about expanding the circular economy in Parisian cultural spaces and institutions in 2021. The three main pillars of the circular economy in the cultural sector, as indicated in this document, are waste management, public demand and behavior, and cultural actors' offers. In addition, the publication contains 9 recommendations on how to address the issues of the circular economy in the cultural sector. These guides include certification, management, awareness programs, contracts and purchasing, catering, trash management, construction and buildings, reuse, and research and planning.

In the literature, four main categories are listed, namely financial, policy, technical, and awareness challenges. To facilitate a better circular economy implementation process, the previously mentioned challenges need to be overcome. In the scientific literature, enablers are mentioned that have the potential to solve challenges. Table 1 shows an overview of the most prominent challenges and enablers

named in the literature. The challenges and enablers listed, serve as an example of what challenges and enablers might look like but do not represent the actual challenges and enablers for museums in the tourism sector.

Table 1: Challenges and enablers of circular city transition

| Categories | Challenges | Enablers |
|-------------------|---|---|
| Financial | <ul style="list-style-type: none"> - Insufficient secondary materials market demand - Insufficient funding for circular economy initiatives - High investment costs - Business actors' vested interests. - Environmental costs are not accounted for in product prices. | <ul style="list-style-type: none"> - Applying circular criteria to public procurement - Providing funds and supportive environments for innovation Identifying external sources of funding - Data economy |
| Policy | <ul style="list-style-type: none"> - Taxes and subsidies that promote the usage of resources - Fragmented administration - Inadequate legislation and rules - Lack of long-term planning | <ul style="list-style-type: none"> - Developing a long-term, comprehensive vision - Identifying barriers to circularity and addressing them - Involving non-municipal stakeholders and fostering collaboration among them - Promoting coordination between municipal departments - Networking with other cities to exchange information or advocate for reform |
| Technical | <ul style="list-style-type: none"> - Technology lock-in - Need for additional innovation/technology - The linear design of products - Limited ability to separate biological from technical nutrients | <ul style="list-style-type: none"> - Applying circular principles in urban planning - Supporting ICT solution |
| Awareness | <ul style="list-style-type: none"> - Existing linear ways of thinking - Lack of consumer awareness and demand - Data availability issues - The ambiguity surrounding the notion of circular economy - Lack of performance metrics - Limited perspective on circular economy | <ul style="list-style-type: none"> - Using a local analysis of the situation as the foundation for a strategy - Continually reviewing and monitoring circular initiatives - Educating stakeholders about the circular economy |

Sources: Campbell-Johnston et al., 2019; Montenegro Navarro & Jonker, 2018; Williams, 2019; World Economic Forum, 2018; Climate-KIC & C40 Cities, 2018; Prendeville et al., 2018; Bačová et al., 2016; Ellen MacArthur Foundation, 2019; European Investment Bank, Byström, 2018; Su et al., 2013; European Investment Bank, 2018; Russell et al., 2019.

2.3. Conceptual framework

Combining the current insights on circular cities and museums in the tourism sector, the conclusion can be drawn that there is still a lack of information on how circularity can be implemented in individual

museums within circular cities. Especially how the implementation of circularity in the tourism sector is currently governed within circular cities as a part of the transition strategy. Museums have to undergo the same transition, but with the additional challenge of preserving social and cultural values, the circular transition remains in its infancy. The initial scientific research of circular cities has been applied in practice in the form of strategies, but social, institutional, economic, and technical challenges arise when applying these strategies to museums within the tourism sector. Therefore, this research tried to identify the possibilities for integrating museums as part of the tourism sector within a circular city strategy with the previous theories in mind. A categorized literature overview is made available in Table 2 which explains specific topics and published literature that are being used as theoretical frameworks to answer each sub-research question in this research.

Table 2: Literature to answer every sub-questions

| | Literature | Research questions |
|---|---|---|
| Museum as media on communicating sustainability | UNFCCC, 2020. | SRQ 1: How do museums transform in regard to the circular city strategy target? |
| Museum sustainability aspects/pillars | Di Pietro et al (2014); Worts, 2006. | |
| Sustainability of the indoor climate within museums | Wirilander, 2012; Lucchi, 2016; Ferdyn-Grygierek, 2014; Luciani, 2013; Padfield et al., 2007; Blades et al., 2000; Cassar, 2013. | |
| Sustainability integration into the museum | The International Council of Museums (1996); Lucchi (2016). | |
| Museum cluster | Mommaas, 2000; Scott, 2000; Amin & Graham, 1997; Austin, 2000; Van Aalst & Boogaarts, 2002; Tien, 2010; Gustaffson & Ijla, 2017. | SRQ 2: How the circularity at the museum is currently governed? |
| Museum, tourism, and the relationship with the city | Giriwati et al., 2013; Ashworth, 1995; Gustaffson and Ijla, 2017; Grewcock, 2006 Wojtowicz-Jankowska, 2017; Carey et al, 2013. | |
| Museum stakeholder | Lord, 2012a; Lord, 2012b; Domingues, Mazhar, & Bull, 2023. | |
| Circular city | The European Circular Cities Declaration, 2020. | |
| Level circular city transition | Ghisellini et al., 2016; Kirchherr et al., 2017; Merli et al., 2018. | |
| Circular city governance | Vergragt et al. (2016); Frantzeskaki, Loorbach, & Meadowcroft, 2012; Bauwens et al. (2021); Cullen & De Angelis (2020); Gibb, (1996); Mazzucato, 2018; Basco et al., (2019); Staniewski & Awruk, 2019); Winans, Kendall, and Deng (2017). | |

| | | |
|--|---|---|
| Tourism degrowth | Milano, 2017; García-Hernández, de la Calle-Vaquero, & Yubero, 2017; Russo, 2002; Koens, Postma, & Papp, 2018; Del Romero Renau, 2018; Sequera & Nofre, 2018; Jover & Diaz-Parra, 2019; Capocchi et al., 2019; Kallis et al., 2018; Kallis, 2011; Kallis, Kerschner, & Martinez-Alier, 2012; Daly, 2013; Latouche, 2009; Andriotis, 2018; Hall, 2014; Canavan, 2013; Çakar & Uzut, 2020; Ballantine, 2021; Hall, Lundmark, & Zhang, 2021; Korstanje & George, 2021; Prideaux & Pabel, 2021. | |
| Tourism sector within circular city transition | Vargas-Sánchez, 2018; Manniche et al., 2021; Florido et al., 2019. | |
| The tourism sector in transition-level micro | Arayal, 2020; Sorin and Einarsson, 2020; Jaroszewska et al., 2019; Martinez-Cabrera & Lopez-del-Pino, 2021 – tourism, micro; personnel training – educating about CE. | SRQ 3: What are the challenges and enablers of implementing circularity in museums as part of the tourism sector? |
| The tourism sector in transition level meso | Renfors, 2022; Khodaiji and Christopoulou, 2020, Camilleri, 2021. | |
| The tourism sector in transition level macro | Rodriguez-Anton & Alonso-Almeida, 2019; Vatansever et al., 2021; Rudan et al., 2021; Schumann, 2020; Cornejo-Cortega & Chavez Dagostino, 2020 Khan et al., 2021. | |
| Challenges and enablers of the circular city | Campbell-Johnston et al., 2019; Montenegro Navarro & Jonker, 2018; Williams, 2019; World Economic Forum, 2018; Climate-KIC & C40 Cities, 2018; Prendeville et al., 2018; Bačová et al., 2016; Ellen MacArthur Foundation, 2019; European Investment Bank, 2018; Su et al., 2013; European Investment Bank, 2018; Russell et al., 2019. | |

Hereby, the circular transition strategies on a micro- and meso-level are assessed in practice, and macro-level forces challenge and enable the circular implementation process. Figure 1 combines all concepts mentioned, and is used to structure the data collection. It is investigated how the different levels operate in the circular implementation process of museums within the tourism sector.

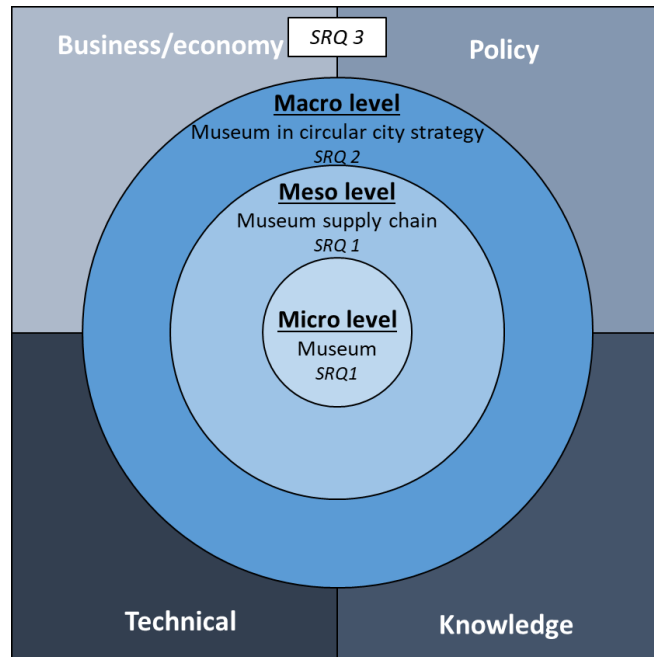


Figure 1: Conceptual framework

The research topic on the contribution of museums to circular cities is considered novel as there is currently limited research discussing this aspect. While circular cities have garnered attention, the specific role of museums, particularly within the tourism sector, in promoting circularity remains unexplored. By investigating this gap, the research can provide new insights and contribute to circular city research by shedding light on the potential contributions of museums to sustainable tourism practices within the circular city framework. The findings may inform urban planning, cultural heritage preservation, and sustainable practices within both the museum sector and the broader tourism industry, offering valuable input to the development of circular cities.

3. Methods

3.1. General research strategy

This exploratory research is conducted using a qualitative approach to achieve its goal of finding out the role of museums as part of the tourism sector in Amsterdam's transition to a circular city. The unit analysis of this research will be the implementation of circular economy in the museum and the governance around it which is based on the three levels of circular economy transition (micro, meso, and macro level). The micro scope of this research will focus on 2 of the most visited museums in Amsterdam: the Van Gogh Museum and the Hermitage Museum. A broad scope is also needed to get an overview of the current implementation of the circular economy strategy and to see the interrelation between stakeholders as well as identify the challenges and enablers of the transition at each level.

3.2. Data collection

Qualitative approaches, such as in-depth interviews, are employed in this study because they are related to constructivism, interpretivism, and critical realism and have as their primary application the acquisition of an "understanding" of context-dependent variables and realities (Shackleton et al., 2022). Therefore, the primary data will be gathered through semi-structured in-depth interviews with experts from institutions or organizations involved with Amsterdam's circular city strategy as well as its tourism sector. The sample of this research will be determined using two kinds of sampling methods: purposive and snowball sampling. Through purposive sampling, the prospect interviewees are intentionally selected according to the needs of the study, because they can tell a lot about the issues and information that is important to the research (Boeije, 2010; Coyne, 1997).

The semi-structured expert interview was held with several key informants from the museums in Amsterdam, governmental bodies, and tourism and museum organization which were involved in the creation and application of Amsterdam's circular city strategy as well as planning and promoting the museum as part of Amsterdam's tourism sector. Choosing expert interviews allowed us to make the distinction between common findings and those unique to particular cases, which enhanced generalizability and external validity.

The semi-structured expert interviews were held with 2 museum staff from 2 museums, 2 museums' suppliers, 1 representative from a neighborhood/community initiative, 2 governmental bodies representatives, and 1 art fund organization representative. Table 3 provides an overview of the expert interviewees. Each interviewee is given a code to allow referencing throughout the thesis. A total of 38 people were contacted, whereby 7 were eventually interviewed, as others either did not respond or refused to participate.

This research focuses on 2 of the most visited museums in Amsterdam: the Van Gogh Museum and the Hermitage Museum. Based on the attraction monitor report of Amsterdam Metropolitan Region (MRA) in 2021, Van Gogh Museum ranked as the second most-visited museum in 2020, while Hermitage Museum ranked as the eighth most-visited museum. These museums are chosen not only based on the large number of visitors but also because of their determination in implementing sustainability as well as circularity within their institution. A neighborhood/community initiative called De Plantage where a couple of museums are working together with sustainability projects with other businesses also being observed. The 2 governmental bodies that are being interviewed are the Municipality of Amsterdam and the Netherlands Cultural Heritage Agency.

Table 3: Overview of expert interviewees

| Identifier | Type expert interviewee | Function interviewee |
|------------|--------------------------------|--|
| I1 | Museum staff | Advisor real estate and facility |
| I2 | Museum staff | Deputy director and head of communication, education & marketing |
| I3 | Museum supplier | Founder and managing director |
| I4 | Museum supplier and consultant | Sustainability manager and consultant |
| I5 | Community | Sustainability program manager |
| I6 | Government | Policy advisor sustainability |
| I7 | Government | Senior researcher |
| I8 | Art fund organization | Head of visual arts and heritage |

The scope of interviewees presented here encompasses a broad and intricate range of stakeholders deeply connected in the preservation, promotion, and tourism dimensions of cultural heritage especially museums within Amsterdam. This comprehensive spectrum spans from the national level, where the Netherlands Cultural Heritage Agency provides a panoramic perspective on overarching strategies, to more localized entities including the Municipality of Amsterdam, the Amsterdam Fund for the Arts, and the community-driven Collective circular initiative - De Plantage, reflecting a grassroots commitment to sustainable practices within the context of a circular city. Delving further into the structural underpinnings, MuseumGoed and Fiction Factory occupy the supply chain sphere, diligently ensuring the preservation and maintenance of the physical artifacts and spaces that intertwine with the city's heritage narrative. Lastly, the narrative culminates with the Van Gogh Museum and Hermitage Museum, revered institutions that not only preserve heritage but also enhance Amsterdam's tourism landscape, beckoning visitors to explore its artistic and historical treasures. This intricate interplay, showcasing varied contributors across levels, resonates as a dynamic tapestry weaving together cultural preservation, local involvement, and tourism enhancement, illustrated in the accompanying Figure 2.

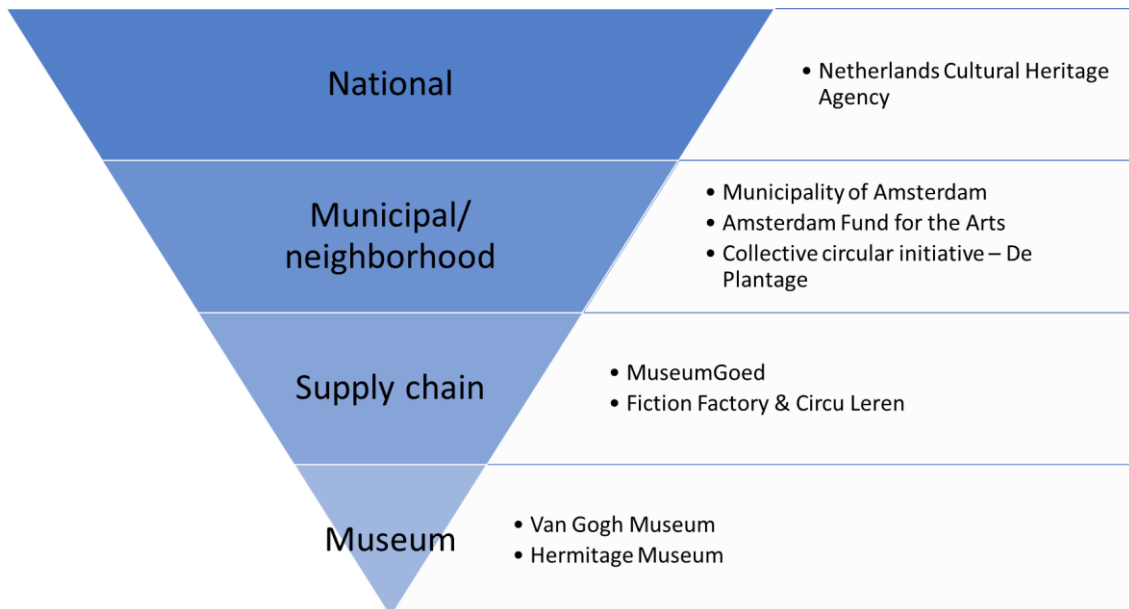


Figure 2: Overview of the scope of interviewees

An interview guide was made to structure the interviews. The interview guides were operationalized based on aiming to obtain information on the key concepts mentioned in the theory section. The effectiveness of the interview guide was evaluated and adjusted if necessary after the interviews. Therefore three types The sampling was taken until saturation is reached in the sense when similar statements were made among experts and no new findings arose. The interviews were conducted in person or online through Microsoft Teams and Google Meet between June 2023 and August 2023. The interviews were conducted in English with a duration of around 45 to 60 minutes. For each interview, informed consent is used. If no oral permission is granted for the recording of the interviews, extensive notes will be made. The names of the respondents are left out due to privacy reasons.

In addition to the interview, this study utilizes written materials as inputs. These materials consist of official documents about the circular economy objectives and strategies in Amsterdam, specifically in the circular city and museum context. A total of nine documents have been included as data in the research as can be seen in Table 4.

Table 4: Overview of official documents and reports

| Name of the official documents and reports | Publisher |
|--|--|
| Amsterdam Circular 2020-2025 Public version | Municipality of Amsterdam |
| The vision of tourism in Amsterdam 2035 | Municipality of Amsterdam |
| The power of arts and culture: Outline arts and culture 2021-2024 (De kracht van kunst en cultuur: Hoofdlijnen kunst en cultuur 2021-2024) | Municipality of Amsterdam |
| The Arts plan 2021-2024 (Het Kunstenplan 2021-2024) | Municipality of Amsterdam |
| Around the silence: Advice in preparation for Amsterdam Arts Plan 2021-2024 (Om de stilte heen: Advies ter voorbereiding van het Amsterdamse Kunstenplan 2021-2024) | Amsterdam Kunstraad |
| VANG Outdoors - From Waste to Resource in the Cultural Sector (VANG Buitenshuis – Van Afval Naar Grondstoffen in de Cultuursector) | Rijkswaterstaat |
| Zero Waste Expedition Culture: on track - From Waste To Resource in the Cultural Sector (Zero Waste Expeditie Cultuur: op koers – Van Afval Naar Grondstoffen in de Cultuursector) | Rijkswaterstaat |
| Sustainability in the Cultural Sector Edition 2022 - quantitative part (Duurzaamheid in de Culturele sector editie 2022 – kwantitatief deel) | Boekmanstichting en Bureau 8080 |
| Museum numbers 2021 (Museumcijfers 2021) | Dutch Museums Association (Museumvereniging) |

3.3. Data analysis

The analysis is based on the inductive approach of the three levels of circular economy transition which focused on identifying patterns, the interaction between stakeholders and changes among these patterns and interactions. To answer sub-research question 1, within the 2 observed museums, a cross-case analysis is conducted to find the pattern of museum performance practicing circular economy.

Boeije (2010) explained that qualitative analysis is the act of segmenting data into relevant categories and naming the categories with codes while simultaneously generating the categories from the data. A theoretical understanding of the case will be generated through the categories reassembling phase. In general, qualitative analysis can be carried out through three strategies: categorizing, connecting, and memos and displays (Maxwell, 2005). The main strategy for categorizing is coding. The goal of coding is to “fracture” (Strauss, 1987) the data and rearrange it into categories that facilitate comparison between things in the same category and between categories (Maxwell, 2005). However, before raw data can be categorized, they must be adequately and systematically managed, and the first step of data management is data transcribing. The data from each interviewee is transcribed separately using a transcription tool named ATLAS.ti software to create quotations based on the interview recording.

Using the result from ATLAS.ti, open coding was conducted to contribute to further different techniques of coding. In this part, the quotes will be broken down into a few parts to examine the relations and find the similarities and differences by giving them labels or codes. From this point, categorizing strategy can be started through data segmenting. Segmenting the quotes into a group based on their common values of properties based on the information from the experts. The groups are being labeled differently from the previous label and code to avoid confusion on further analysis. On data segmenting, sub-groups from the previous codes can also create and related to several categories. From the data analysis, some proper themes were derived that served as the basis for the results section.

To address the second sub-research question, the data processing phase involves conducting stakeholder mapping and analysis. The goal is to identify and analyze the stakeholders currently involved in the implementation of the circular economy in the museum. This mapping and analysis primarily focus on the meso- and macro-level aspects of the circular economy transition, as the micro-level has already been discussed in the previous section. Additionally, this part includes an exploration of the connection between museum circularity and Amsterdam's circular city agenda. To address the third sub-research question, interview coding was employed to extract the challenges and facilitators associated with implementing the circular economy in the museum.

4. Findings

4.1. Circular economy implementation in the museum

4.1.1. General view of museums

4.1.1.1. *Museums in The Netherlands*

Museums, being part of the culture, sports, and recreation sectors, are considered an integral part of the tourism industry. Alongside other businesses such as accommodations, dining establishments, travel agencies, and passenger air transport, museums contribute to the overall tourism sector. However, it is important to note that while museums are included in the tourism sector; their management and funding primarily fall under the cultural sector. This distinction arises from the significant role that museums play in preserving historical treasures and introducing new generations to the past. Consequently, museums hold immense value in the realms of art, history, and science.

In the Netherlands, museums can be categorized into two groups based on their receipt of government subsidies. The majority of museums receive financial support from the government, while a smaller percentage of museums operate without such subsidies. According to Museumvereniging, before the COVID-19 pandemic, museum income was derived from government subsidies and their sources. Within their income, ticket sales and private funds accounted for approximately half of the total, followed by revenue generated through various activities, catering and merchandise sales, gifts, and sponsorships. During the pandemic, all businesses in the Netherlands, including museums, received corona support funds from the government to sustain their operations during the lockdown period and in the face of stringent travel restrictions.

Museumvereniging also reveals that staff and housing costs, including energy expenses and depreciation, represent the two largest components of museums' operational expenses. Other operational costs and exhibition expenses follow suit. These findings shed light on the financial aspects of museum operations, highlighting the significant investments required to maintain and operate these cultural institutions effectively.

4.1.1.2. *Museums in Amsterdam*

Amsterdam boasts a wide array of public attractions, encompassing diverse domains such as art, culture, entertainment, and nature recreation. These attractions are varied, catering to both international tourists seeking renowned establishments and residents seeking recreational activities. Predominantly concentrated in the city center, museums constitute the largest category of attractions, while those pertaining to entertainment, sports, and nature recreation are dispersed throughout the entire city.

Within the Netherlands, there are a total of 631 museums, with 125 museums situated in the province of Noord-Holland. This concentration signifies Noord-Holland as the region with the highest number of museums and subsequently the highest frequency of museum visits. Among the museums in the Amsterdam region, the ones garnering the highest visitation rates are particularly noteworthy. The five largest museums in Amsterdam collectively attract over 1.7 million visits, accounting for 15% of the total museum visits in the Netherlands.

In the year 2020, museum visits by foreign tourists witnessed a steeper decline compared to domestic visits. Consequently, the proportion of total visits originating from abroad in 2021 is projected to be merely 12%, in stark contrast to the 28% observed in 2015. Notably, the Rijksmuseum, Van Gogh Museum, Anne Frank House, Stedelijk Museum, Eye Filmmuseum, NEMO Science Museum, Amsterdam

Museum, and Hermitage Museum emerged as the top 10 most frequented museums within the Amsterdam Metropolitan Region (MRA) in 2020.

4.1.2. Best practices of circular economy implementation in museums in Amsterdam

4.1.2.1. *Van Gogh Museum*

The Van Gogh Museum is currently focused on improving its current system to obtain a new BREEAM-NL certificate this year. The museum already holds a 'BREEAM-NL In-Use sustainability certificate and has recently been rated as 'Very Good' in terms of its building, administration, and use. The museum recognizes that sustainability has become an increasingly important topic in the museum industry. They believe that the exhibitions, which occur every quarter and require significant materials and energy for production, can be an opportunity to promote a shift in behavior and thinking towards a more circular approach. The museum aims to operate in a more ecologically friendly manner by installing solar panels and reducing its CO2 footprint. These ambitions are outlined in their environmental policy, and they also publish an annual report on their website.

Currently, the Van Gogh Museum is collaborating with LG to replace all the lights in the museum with LED lighting. They are also partnering with DHL to offset the CO2 emissions from their business travel and the transportation of packages from the museum shop. They extend this CO2 compensation to their energy, gas, and electricity purchases as well. The museum actively participates in a local foundation dedicated to planting seeds, and in collaboration with Sligro, they reuse coffee waste to grow mushrooms. The museum shop also works with sustainable and circular brands such as Mud Jeans and Fairtrade. In terms of waste management, they work together with Renewi which helps them with the plan to reduce and recycle waste as well as writing a quarterly report about it. They also encourage their suppliers, such as SPIE, to adopt more sustainable practices in terms of energy, consumption, and materials, which are incorporated into contractual agreements. In addition to their internal efforts, the Van Gogh Museum engages in communication and collaboration with other cultural institutions, particularly those within the Business Improvement Zone (BIZ) Museumkwartier, such as the Rijksmuseum and the Stedelijk Museum.

In the coming years, the Van Gogh Museum plans to work with the circular consultant PHI Factory, who will assist them in becoming more circular and educate the museum's employees about sustainability and circularity. Currently, there is a group within the organization called the "Green-fluency" or green think-tank group, comprising team leaders who periodically come together to brainstorm green solutions and implement them through their respective teams.

4.1.2.2. *Hermitage Museum*

In the heart of Amsterdam's De Plantage neighborhood lies the Hermitage Museum. Originally established as an annex of the renowned Hermitage Museum in Saint Petersburg, Russia, the Hermitage Amsterdam annually showcases select treasures from its Russian counterpart's vast collection. The Hermitage Museum stands out as one of the few museums in the city that operates without government subsidies. Instead, it has set its sights on a grand ambition—to become a beacon of sustainability in the cultural sector.

Since 2015, the Hermitage Museum has forged a remarkable partnership with the Hortus Botanicus, a neighboring institution, under the project named 'Tussen Kunst en Kas' or 'Between Art and Cheese.' This innovative collaboration connects both buildings through a sophisticated heat and cold storage system known as 'warmtekoude-opslag' (WKO). The concept is brilliant: the Hermitage Museum exports its

excess heat to the Hortus Botanicus while receiving cold in return. To achieve this, a double transmission line was ingeniously installed beneath the pavement of the Nieuwe Herengracht, covering a distance of approximately 425 meters. Through this collaboration, the Hermitage Museum optimizes its buffered heat surplus, avoiding wasteful practices like flaring, while the Hortus Botanicus reduces its reliance on gas for central heating boilers. Additionally, the Hermitage Museum benefits from the Hortus' cold supply, resulting in reduced electricity consumption for cooling purposes.

This sustainable initiative of energy recycling brings multiple advantages. The Hermitage Museum avoids a substantial one-time investment of around 250,000 euros in dry coolers that would release heat into the outside air. Moreover, it saves approximately 21,300 euros annually in cooling costs. On the other hand, the Hortus Botanicus benefits from a one-time saving of 30,000 euros by eliminating the need to replace central heating boilers. The Hermitage's structural heat supply allows the Hortus to install smaller boilers, leading to a remarkable 35% reduction in annual gas consumption. To ensure the Hermitage's CHP heat reaches the Hortus' greenhouses, the operator of the transmission lines must invest in an electric heat pump at the Hortus. Recognizing the exceptional efforts towards sustainability, the Hermitage Amsterdam and Hortus Botanicus were awarded the prestigious Sustainable Heritage Award in 2016 by the province of North Holland.

The Hermitage Museum's commitment to sustainability extended to its infrastructure as well. In 2019, the museum installed over 300 solar panels, a groundbreaking move in the Dutch museum landscape. These panels generated more than 80,000 kWh of sustainable electricity in their first year, equivalent to the energy consumption of approximately 30 households. This milestone made the Hermitage Museum the first national monument museum in the Netherlands to embrace solar power, leading the way for other cultural institutions to follow suit.

While the Hermitage Amsterdam had previously kept a distance from political developments in Russia, on March 3, 2022, the museum took a momentous step and severed ties with the State Hermitage Museum. As an independent institution operating without subsidies, the Hermitage Amsterdam bid farewell to its ongoing exhibition. This marked the beginning of a new era as the museum unveiled its plans to rebrand itself as the H'art Museum on September 1. Although the H'art Museum does not possess its collection, it will establish close collaborations with renowned institutions such as the British Museum, Centre Pompidou, and the Smithsonian American Art Museum, promising exciting exhibitions and cultural exchanges.

Amidst its sustainable initiatives and changes, the Hermitage Museum continued to foster collaboration within the De Plantage neighborhood. Working alongside seventeen other cultural institutions, including NEMO and Royal Theater Carré, the Hermitage Museum participated in waste management efforts. Through an effective arrangement and support from the Municipality of Amsterdam, waste from museums and theaters was collected by energy-efficient boats and transported via waterways to a central point. This approach eliminated the need for forty-five garbage truck trips each week, promoting sustainability and reducing the environmental impact of cultural institutions.

Besides that, the Hermitage Museum also organized some events such as the farmer market in their courtyard specifically targeting Dutch visitors. This is in line with Amsterdam's tourism vision that wants to reduce the density of tourists (especially international tourists) in the middle of the city. This also happens to be in line with the visitors to the Hermitage Museum, which mostly come from local Dutch tourists. But with a rebranding imminent, the museum is also anticipating a spike in international visitors, although they do not expect the numbers to surpass those of the museums in the Museumskwartier such as Rijksmuseum, Van Gogh Museum, and Stedelijk Museum.

4.1.2.3. Community initiative: De Plantage Amsterdam

De Plantage, located in the heart of Amsterdam, is a verdant sanctuary that was once adorned with flourishing gardens and stately country houses. The abundance of parks and majestic tree-lined boulevards that grace the area bear eloquent testimony to its rich history. The community of De Plantage is committed to upholding its vibrancy by making diligent efforts to preserve the environment and promote sustainable living and working practices.

Initially established in the 1990s as a collaborative initiative between cultural institutions, such as museums and theaters, as well as the esteemed city zoo ARTIS and the Hortus Botanicus, De Plantage primarily aimed to bolster city marketing efforts. However, over time, the theme of sustainability gained increasing relevance and importance within the neighborhood. It was around 2014 that concerted efforts were undertaken to enhance the neighborhood's sustainability. In early 2017, De Plantage expanded its scope to include participation from a broader range of businesses beyond cultural institutions, such as hotels, restaurants, schools, and the residents and employees of the area. Presently, De Plantage boasts an impressive membership of approximately 75 diverse entities, including 14 museums. Notably, one of their noteworthy early achievements was the successful realization of the 'Tussen Kunst en Kas' project, a collaborative endeavor between the Hermitage Museum and the Hortus Botanicus, which ingeniously integrated thermal energy storage.

The dedicated team at De Plantage diligently oversees projects daily, ensuring that participants reap their benefits while diligently promoting the neighborhood and its associated endeavors. They strike a delicate balance between the quality of life (*leefbaarheid*) and the lively atmosphere (*levendigheid*) within the neighborhood. This is accomplished through fostering collaboration within the network of stakeholders, enabling the exchange of information, knowledge, and experiences among the 20 cultural institutions, which attract an impressive annual footfall of 4.5 million visitors, as well as the 50 companies and organizations involved. Moreover, De Plantage assumes the role of a valuable discussion partner for the Municipality of Amsterdam. Together with specialists, they strive to devise sustainable solutions that not only benefit their esteemed members but also contribute to the overall betterment of the neighborhood. Notable initiatives include joint energy purchasing projects, sustainable waste processing, and transport, as well as enhanced efficiency in transportation, logistics, and procurement practices.

In essence, De Plantage stands as a shining example of a community that embraces sustainability and champions the preservation of its environment. With its origins as a cooperative endeavor between cultural institutions and its subsequent expansion to include a diverse range of businesses and stakeholders, De Plantage has evolved into a thriving network that thrives on collaboration. Through their collective efforts, De Plantage paves the way for a more sustainable future, offering valuable insights and sustainable solutions that serve as a testament to their unwavering commitment to the well-being of their members and the broader neighborhood at large.

4.1.3. Conclusion of circular economy implementation in museum

Museums, as an integral part of the tourism industry, hold significant value within the culture, sports, and recreation sectors. It is important to acknowledge that while museums are categorized under the tourism sector, their management and funding primarily fall within the cultural sector.

In the Netherlands, the type of museums can be classified into two categories: subsidized and non-subsidized. Subsidized museums receive a considerable portion of their income from the government, whereas non-subsidized museums rely mainly on sponsors and partners for funding. However, it's worth

noting that certain exhibitions or projects in non-subsidized museums may still receive government funding. When it comes to visitors, museums can be distinguished based on the country of origin of their visitors. Some museums, like the Van Gogh Museum, attract a significant number of international tourists, while others, like the Hermitage Museum, primarily cater to Dutch visitors.

The motivation for museums to pursue sustainability lies in the high energy bills they incur exacerbated by the architectural constraints of many heritage buildings in which museums are located. The Hermitage Museum, for instance, has demonstrated a strong commitment to becoming the most sustainable cultural institution through initiatives such as their energy recycle heat and cold storage system project, installation of solar panels, and involvement in collective waste management. On the other hand, the Van Gogh Museum employs different approaches, such as meeting the sustainable building indicator by BREEAM-NL, offsetting CO2 emissions, and collaborating with partners and suppliers to improve their sustainability performance.

In terms of implementing circular economy practices, museums often organize exhibitions on a quarterly basis. While the overall costs of organizing exhibitions may not be substantial, the amount of waste generated, including the transportation of art pieces, can be significant. To address this issue, some museums have begun adopting circularity principles by utilizing used or rented exhibition materials like panels, vitrines, and other resources.

Recognizing that sustainability and circular economy initiatives require collaboration, museums often work together with other institutions, particularly fellow museums, to share their approaches and promote sustainability within their respective institutions. For example, the Van Gogh Museum collaborates with other museums in the Museumkwartier, while the Hermitage Museum partners with neighboring museums in De Plantage neighborhood.

4.2. The governance of circular economy implementation in museums

4.2.1. Stakeholder

The governance of circular economy implementation in museums in Amsterdam can be seen using three levels of circular economy transition – micro level, meso level, and macro level as can be seen in the stakeholder map in Figure 3. The micro level is the museums themselves which were already discussed in the previous part. The next one is the meso level which consists of museums' suppliers, consultants, and the community. The macro level consists mainly of governmental bodies, ranging from the city level such as the municipality of Amsterdam, Amsterdam & Partner, Amsterdam Kunstraad, as well as the national level such as RCE, Rijkswaterstaat, and RVO.

In Amsterdam, the governance of circular economy implementation in museums can be observed through three distinct levels of circular economy transition. At the micro level, we delve into the inner workings of the museums themselves, which were previously discussed in detail. Moving to the meso level, we encounter the museums' suppliers, consultants, and the surrounding community. This level encompasses the collaborative efforts and interactions between these entities to foster circular practices.

Finally, the macro level encompasses the broader governmental bodies involved in shaping the sustainability and circular economy landscape. At the city level, entities such as the municipality of Amsterdam, Amsterdam & Partner, Het Amsterdams Fonds voor de Kunst (AFK) or Amsterdam Fund for the Arts, and Amsterdamse Kunstraad or Amsterdam Art Council play significant roles. Additionally, at the national level, we have institutions like Rijksdienst voor het Cultureel Erfgoed (RCE) or Netherlands Cultural Heritage Agency, Rijkswaterstaat, and Rijksdienst voor Ondernemend Nederland (RVO) or

Netherlands Enterprise Agency driving the circular economy agenda forward. Together, these three levels form a comprehensive framework for the governance of circular economy implementation in Amsterdam's museums.

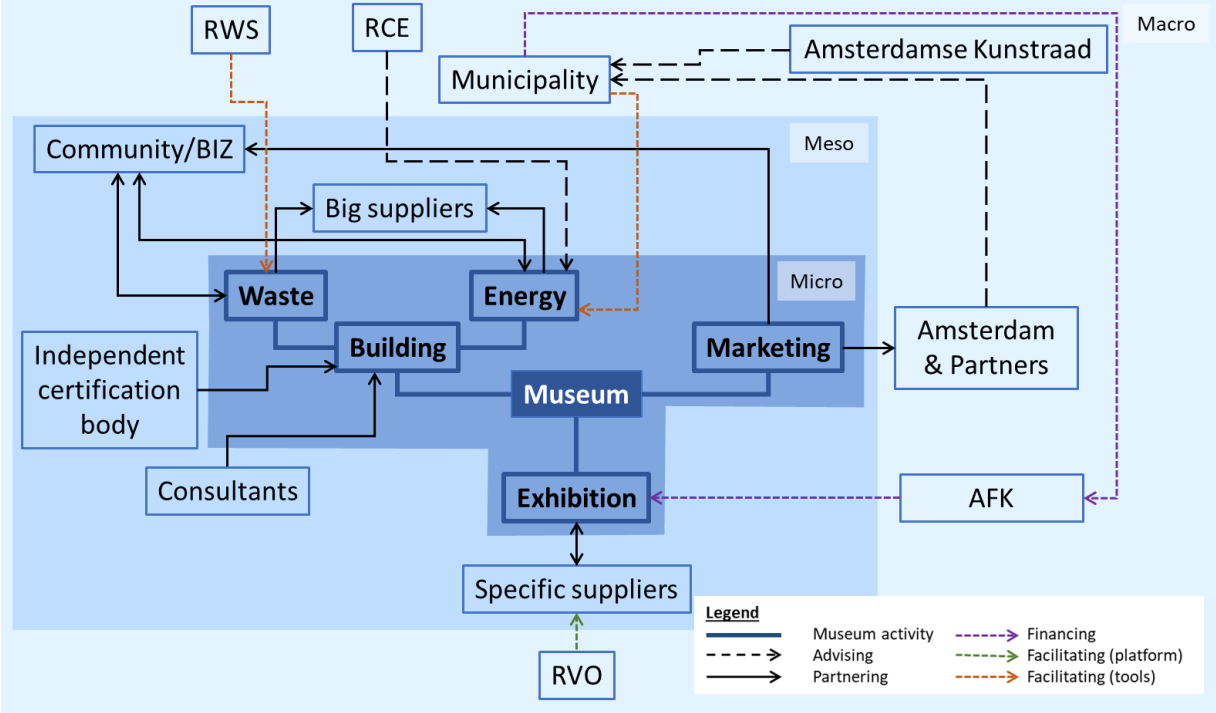


Figure 3: Stakeholder map

4.2.1.1. Meso level

At the meso level of the circular transition, collaborations extend beyond the boundaries of individual museum institutions, encompassing supplier partnerships, inter-museum collaborations, and collaborations with sustainable and circular consultants.

In terms of suppliers, museums have recognized the significance of working with suppliers who prioritize sustainability and circularity. These suppliers can be categorized into two groups: small-scale/specific suppliers and big-scale suppliers.

Small-scale/specific suppliers, such as MuseumGoed (a platform for exhibition material sharing), Fiction Factory (a sustainable construction studio), and OPERA Amsterdam (a design agency), play a vital role in facilitating museums' sustainability efforts. They offer services that enable museums to become more sustainable and circular. For example, these suppliers provide rental exhibition materials or construct exhibitions using sustainable materials. By partnering with such suppliers, museums can reduce their environmental footprint and promote a circular approach to exhibition production.

On the other hand, big-scale suppliers like Renewi and Milieu Service Nederland cater to the broader needs of museums. These suppliers provide comprehensive sustainability solutions, assisting museums in addressing larger-scale challenges. Through their expertise and services, big-scale suppliers support museums in implementing sustainable waste management systems, energy-efficient practices, and sustainable procurement strategies.

In addition to supplier collaborations, museums also engage in collaborations with other museums and institutions to foster a collective approach to sustainability. These collaborations transcend initial marketing objectives and facilitate the sharing of sustainability approaches and practices.

One notable example is the collaboration within the Museumkwartier, consisting of the Rijksmuseum, Van Gogh Museum, and Stedelijk Museum. These museums actively exchange information, particularly in their pursuit of the BREEAM-NL certification. By sharing insights and experiences, they enhance their sustainability practices and contribute to setting higher sustainability standards within the industry.

Similarly, in the neighborhood of De Plantage, a collaborative initiative among 14 museums, including the Hermitage Museum, focuses on sustainable projects related to waste management, energy consumption, and sustainable product purchasing. Through joint efforts, these museums create a collective impact and drive sustainability within the local community.

Consultants such as Circu Leren, Bureau 8080, and PHI-factory are actively involved in working with museums to improve their sustainability practices. These consultants bring their knowledge and experience to the table, assisting museums in developing and implementing sustainable strategies and initiatives. The existence and the prestige of getting sustainable building certifications such as BREEAM-NL by the Dutch Green Building Council and GreenKey also help museums maneuver to become more sustainable.

Collaborations at the meso level between museums, suppliers, and other institutions showcase a concerted effort to promote sustainability and circularity in the museum sector. By partnering with suppliers that prioritize sustainable practices and engaging in inter-museum collaborations, museums are able to share resources, knowledge, and expertise, collectively advancing their sustainability goals and creating a more sustainable future for the industry.

4.2.1.2. Macro level

4.2.1.2.1. City level

The city of Amsterdam has taken significant steps towards implementing a circular economy in the tourism sector. This initiative involves a collaborative effort between 22 hotels, the city, and their suppliers to identify and implement measures aimed at reducing food waste and unnecessary material consumption. Additionally, prominent festivals such as Amsterdam Dance Event and DGTL have long been leaders in waste separation and circular operations. As a result, the municipality has recently introduced a sustainable events policy, requiring festivals to demonstrate their sustainability in order to obtain permits by 2020.

The Amsterdam Art Council, known as the Amsterdamse Kunstraad, serves as an autonomous advisory body for the city of Amsterdam. Its role involves providing valuable insights into artistic expressions, and guiding the direction and strategies of art establishments. In its capacity as an art policy advisor, the council evaluates the interplay among artistic disciplines, facility levels, funding, and accessibility. Every four years, it prepares the Amsterdam Culture Outlook (Amsterdamse Cultuurverkenning), a comprehensive assessment of the cultural landscape encompassing both subsidized and non-subsidized sectors. This report aids the financial framework outlined in the municipality's Art and Culture Plan (Hoofdlijnen), along with its substantive policies and cultural objectives. The Arts Plan (Het Kunstplan) further refines these outlines, detailing the art and cultural institutions supported by the Amsterdam Basic Infrastructure (Amsterdam BIS) and the four-year funding beneficiaries from the Amsterdam Fund for the Arts (Amsterdams Fonds voor de Kunst/AFK).

The AFK functions as Amsterdam's cultural fund, supporting diverse art forms citywide. They provide multi-year subsidies and one-off funding through the Arts Plan 2021-2024 for the city's art policies. While the AFK's four-year grant scheme does not mention sustainability, the Arts Plan includes a dedicated section addressing sustainable cultural property. This chapter highlights current sustainability performance, particularly in energy, within arts and cultural organizations, utilizing the Sustainable Cultural Buildings project. The interview underscores the grant scheme's current focus on aiding post-pandemic recovery and fostering diversity and inclusion. Interviewee I7 emphasized: *'What we do is we still have a focus on diversity and inclusion. And we try to, we're trying, we're still working on that, but changing the scheme a bit in which all the effects of Corona can be taken into account. So those are the focuses on not changing too much, take into account Corona and steady on with diversity and inclusion.'* Additionally, the interviewee also stated that the focus on sustainability has recently gained more prominence through exhibitions, aligning with the intended purpose of the grant scheme. Interviewee I7 mentioned: *'And this theme recently has been happening more and more than a couple of years ago then. Climate is one of the main topics and climate and sustainability. And the other one is affordable housing and art events. It's also an important topic. Affordable housing and art events. How it's connecting. It's about, I don't know, the critique of the current situation of affordable housing. We've had an organization that did a whole parade through the city and made all kinds of visuals that connected. So it was, you know, half activism, half art.'*

Continuing the thread of museum sustainability, the government has also placed a significant emphasis on sustainability within the museum sector starting in 2017. The Amsterdam Metropolitan Area, the Province of North Holland, and De Groene Grachten have joined forces to develop the Groen Menukaart for Museums and Performing Arts in collaboration with various cultural institutions. As part of the Duurzame Cultuurpanden or Sustainable Cultural Buildings project, a sustainability scan was conducted for 20 municipal cultural buildings between 2017 and 2019. This scan assessed factors such as CO2 emissions, energy and water consumption, waste transport, and more, resulting in energy recommendations and plans for implementation and maintenance. Some institutions have already made the switch to green electricity or installed solar panels. Furthermore, financial support for sustainability scans and measures, coupled with knowledge exchange and regional collaboration, is crucial for scaling up and accelerating sustainability in the cultural sector.

The municipality of Amsterdam has also adopted a strong stance on transforming the tourism sector into a sustainable visitor economy. Their vision includes a focus on improving quality of life, addressing nuisances and over-tourism, and controlling the number of overnight stays. By embracing a polycentric city model, promoting responsible entrepreneurship, and fostering regional collaboration, the municipality aims to engage tourist attractions in relocating their activities to urban centers outside of Amsterdam. This strategy will help distribute visitors more evenly across the city and position Amsterdam as a whole on regional, national, and international levels. To achieve this, close collaboration with regional partners in the Amsterdam Metropolitan Area will be vital, along with ensuring good accessibility to these alternative locations through public transportation. Playing a pivotal role in this vision, the agency Amsterdam & Partners, operating as a public-private foundation dedicated to enhancing the reputation of the Amsterdam Metropolitan Area and city marketing, has outlined a comprehensive advisory plan for the municipality. Central to this plan is a holistic recovery strategy, underscored by its focus on the social, ecological, and economic dimensions of revitalizing tourism. The overarching goal is to craft a harmonious urban landscape that accommodates the needs of residents, the functioning of local businesses, and the enriching experience of visitors, all while aligning seamlessly with the municipality's vision for sustainable growth.

4.2.1.2.2. National level

The Netherlands Cultural Heritage Agency has addressed the pressing need to make museums more sustainable in response to the significant energy costs. To tackle this issue, they have published guidelines known as the *Klimaatverklaring voor erfgoedorganisaties* or Climate declaration for heritage organizations. These guidelines provide a foundation for improving indoor climate conditions and reducing energy consumption. The unique aspect of the agency's approach lies in its emphasis on providing guidance rather than imposing rigid regulations. This approach stems from the lack of specific laws governing preventive conservation and collection. As a result, museums have more freedom in making decisions related to sustainability and circularity while operating within this framework.

In the realm of waste management within the museum sector, the Netherlands has taken proactive steps to revolutionize current practices and foster a circular economy. This initiative is spearheaded by Rijkswaterstaat's *Verkenning Van Afval Naar Grondstof* (VANG) program, which aims to transform waste management in cultural institutions. A noteworthy component of this program is the Zero Waste Expedition Culture (ZWEC), which was launched in 2018 and unites thirteen prominent cultural organizations committed to minimizing waste generation. These institutions serve as trailblazers, setting an inspiring example for the entire cultural sector.

To facilitate the implementation of ZWEC and encourage waste reduction, Bureau 8080 plays a vital role. They collaborate with organizations, government entities, and waste management experts to ensure a comprehensive and coordinated approach. By engaging cultural institutions, Bureau 8080 assists in the reduction of waste through various initiatives.

Building upon the invaluable experience and success garnered from ZWEC, the development of an online tool known as the Zero Waste Expedition Culture further enhances waste management practices. This user-friendly tool comprises eight modules that provide guidance to cultural institutions on waste prevention and separation practices. It serves as an invaluable resource for all cultural organizations striving to enhance their waste management methods and contribute to the establishment of a circular economy.

Another important involvement from the national government of the Netherlands is through the groundbreaking moonshot project under Rijkdienst voor Ondernemend (RVO) or Netherlands Enterprise Agency called Circular Exhibitions that was launched in 2022. Supported by the *Versnellingshuis Nederland Circulair*, this project aims to revolutionize exhibition design with a strong emphasis on circularity and sustainability. The Circular Exhibitions moonshot project brings together a consortium of key stakeholders, including Fiction Factory (a construction studio), MuseumGoed (a platform for material sharing), OPERA Amsterdam (a design agency), Circu Leren (a consultancy for circular interior design), and Bureau 8080 (a sustainability consultancy and project management agency). Their goal is to develop a new tendering system for exhibition design that integrates circular principles throughout the entire process.

4.2.1.3. Conclusion stakeholder

In conclusion, the governance of circular economy implementation in museums in Amsterdam operates at three distinct levels: micro, meso, and macro. Among the stakeholders, four forms of involvement can be identified: advising, partnering, financing, and facilitating. The facilitating form of involvement is further categorized into establishing platforms and providing tools.

At the micro level, museums themselves embrace sustainable practices generally within the operation of their facility, including waste and energy management. The circular approaches were also demonstrated

during the exhibition's production, expanding on the standard waste management procedure. Moving to the meso level, collaborations between museums, suppliers, and consultants play a crucial role in advancing sustainability efforts. These collaborations involve partnerships with sustainable suppliers, inter-museum collaborations for knowledge sharing, and engagements with consultants to develop and implement sustainable strategies.

At the macro level, the government at the city and national levels, along with independent bodies such as city marketing and cultural funds institutions, drive the circular economy agenda forward. The municipality of Amsterdam plays a significant role in the implementation of circular practices in museums within the tourism sector by funding museum exhibitions through AFK and offering tools to help museums sustain their property while actively seeking advice from Amsterdamse Kunstraad and Amsterdam & Partners. Nevertheless, national government participation has also occurred in the form of facilitation and advice. The Netherlands Cultural Heritage Agency actively supports museums by offering advice and directives for enhancing energy sustainability in the buildings of museums. Additionally, programs like the Zero Waste Expedition Culture from Rijkswaterstaat have provided waste reduction tools for museums, while the RVO-led Circular Exhibitions moonshot project has built a platform for circular exhibition design. Together, these multi-level efforts form a comprehensive framework for the governance of circular economy implementation in Amsterdam's museums, contributing to a more sustainable future for the industry.

4.2.2. The nexus between museum circularity and Amsterdam's circular city agenda

The municipality of Amsterdam has taken a proactive stance toward shaping a circular economy, with a focus on three key value chains: Food & Organic Waste Streams, Consumer Goods, and the Built Environment. These value chains were chosen due to their economic significance to the city, their impact on ecology and climate, and the potential for Amsterdam to influence positive change within them. In order to drive progress, the city has outlined a set of ambitions and corresponding courses of action, totaling nine ambitions and 32 specific steps.

Within the tourism sector, a notable example of sector collaboration is the Koplopergroep Circulaire Hotels (Circular Hotels Frontrunner Group). Comprised of 22 leading hotels, this network works in conjunction with the City and its suppliers to identify and implement measures aimed at reducing food waste and unnecessary material consumption. The group has made commendable choices such as opting for organic or recycled cotton for their linen, replacing breakfast buffets with à la carte menus to prevent overflowing plates, and utilizing soaps made from collected coffee grounds or orange peels in their bathrooms. The success of this frontrunner group has led to its evolution into an independent organization known as the Green Hotel Club.

Recognizing the social benefits of museums, the municipality of Amsterdam has also acknowledged its significant role in the circular transition. Museums not only directly impact the use of primary raw materials but also play a vital role in the daily lives of many residents. By focusing on museums, the municipality believes that residents can become more actively involved in the circular economy. The implementation of circular practices within museums has already proven beneficial and has the potential to further support the prioritized value chains of Amsterdam. A total of 11 courses of action have been identified, spread across six ambitions, to drive circularity within the museum sector can be seen in Appendix D.

The recognition of museums as crucial players in the circular transition highlights the municipality's understanding of the social and economic benefits they bring to both residents and tourists. By

integrating circularity into museums, Amsterdam aims to engage visitors in sustainable practices while supporting the overarching goals of the city's circular economy agenda. This holistic approach ensures that tourism, along with other sectors, actively contributes to a more environmentally conscious and prosperous Amsterdam.

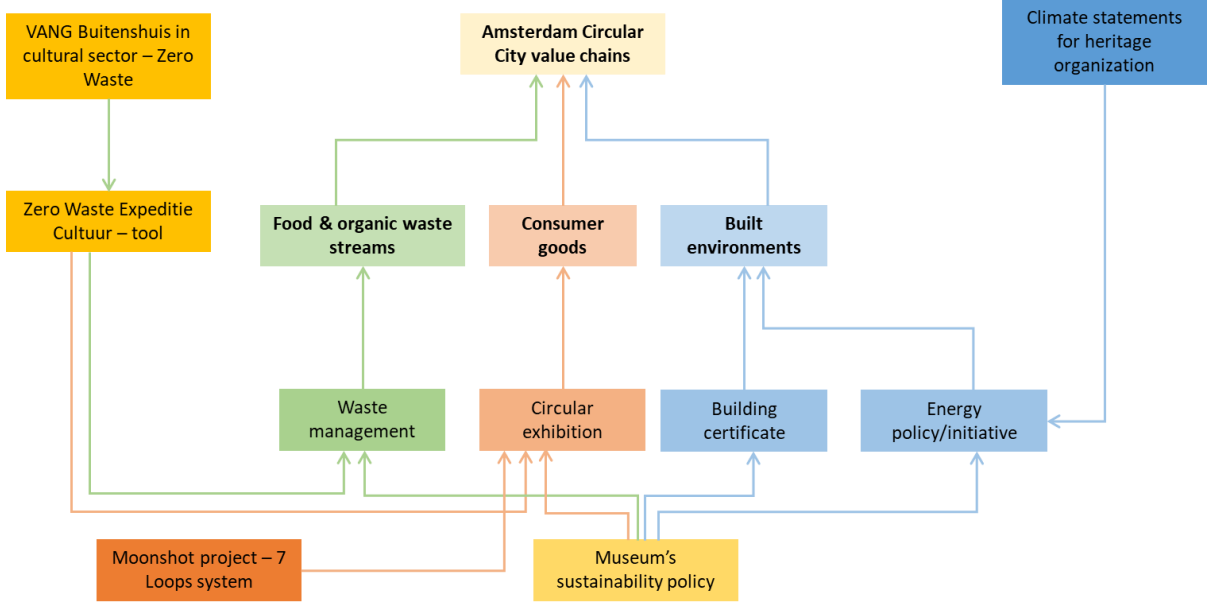


Figure 4: Sustainability and circularity initiative in museum map

The circular initiatives in Amsterdam's museums strongly support various actions within the Consumer Goods value chain as can be seen in Figure 4 and Appendix D. These initiatives, including the popular circular exhibitions, are backed by suppliers such as MuseumGoed and Fiction Factory, who actively encourage museums to embrace circular practices. These suppliers are also facilitated by RVO through the moonshot project. By shifting away from linear approaches and making circularity a standard requirement, they aim to achieve 100% circularity in exhibitions by 2050. The project encourages sustainable practices such as virtual couriering, material sharing, and eco-friendly construction. By reimagining the exhibition design process, they aim to reduce waste, minimize carbon emissions, and promote resource efficiency. This project has resulted in the development of the 7-Loops system which is based on the butterfly diagram of the Ellen Macarthur Foundation that has been adapted to the context of circular exhibition construction.

Additionally, waste separation within museums and initiatives like reusing coffee grounds by the Van Gogh Museum and the neighborhood initiative De Plantage contribute to the Food and organic waste streams value chain. De Plantage goes further by involving residents in compost making. The Van Gogh Museum's pursuit of building certification from BREEAM-NL provides a starting point and custom knowledge for museums to adopt circular practices. Furthermore, the Hermitage Museum and Hortus Botanicus's connection of a thermal energy store supports the closure of the loop.

At a national level, circularity in museums is also supported by guidelines such as the Climate declaration for heritage organizations, Managing indoor climate risks, and Energiebesparende maatregelen musea (Energy-saving measures for museums) introduced by the Netherlands Cultural Heritage Agency, as well as the VANG in the Cultural Sector program led by Rijkswaterstaat. The government acknowledges the significance of sustainability in the sector and offers guidance on indoor climate and energy consumption through the Netherlands Cultural Heritage Agency's guidelines. These measures align with Amsterdam's

circular value chain priority in the Built Environment, fostering joint knowledge and creating a "circular toolbox" for the city. Furthermore, by following the 5 R steps (Refuse – Reduce – Reuse – Recycle – Rot), the VANG program supports Amsterdam's priority value chain in Consumer Goods.

4.2.2.1. Conclusion nexus between museum circularity and circular city Amsterdam

In conclusion, the municipality of Amsterdam has taken proactive measures to shape a circular economy, with a focus on key value chains such as Food & Organic Waste Streams, Consumer Goods, and the Built Environment. By prioritizing these sectors, Amsterdam aims to make a positive impact on the city's economy, ecology, and climate while influencing broader change. The integration of circular practices within museums is a notable example of sector collaboration, as museums play a crucial role in the daily lives of residents and have significant potential to engage visitors in sustainable practices. Amsterdam has identified specific actions to drive circularity within the museum sector, contributing to the prioritized value chains. These initiatives align with the municipality's understanding of the social and economic benefits that museums bring to both residents and tourists. By incorporating circularity into museums, Amsterdam not only promotes sustainable practices but also supports the overarching goals of its circular economy agenda. The efforts to implement circular practices in museums are further bolstered by collaborations with suppliers and programs initiated at a national level, demonstrating a comprehensive approach to creating a more environmentally conscious and prosperous city.

4.2.3. Conclusion The governance of the circular museum

In conclusion, the circular initiatives in Amsterdam's museums operate within the broader context of the city's circular economy agenda. The municipality of Amsterdam recognizes the significant role of museums in driving sustainability and circularity, not only in terms of resource consumption but also as influential platforms for engaging residents and tourists in sustainable practices. By integrating circularity into museums, Amsterdam aims to create a more environmentally conscious and prosperous city. The collaboration between museums, suppliers, and the government demonstrates a multi-stakeholder approach to governance, where museums actively adopt circular practices, suppliers provide sustainable solutions, and the government facilitates and supports the transition towards a circular economy.

The initiatives within Amsterdam's museums align with the prioritized value chains identified by the city, including Food & Organic Waste Streams and Consumer Goods. Museums actively participate in waste separation, the reuse of materials, and the adoption of sustainable procurement strategies. Suppliers, such as MuseumGoed and Fiction Factory, play a crucial role in providing services and materials that enable museums to embrace circular practices. At the national level, government programs and guidelines further support circularity in museums, addressing issues such as indoor climate conditions, energy consumption, and waste management. These initiatives create a collaborative ecosystem where museums, suppliers, and the government work together to promote sustainability and circularity, ensuring a comprehensive approach to the governance of circular economy implementation in Amsterdam's museums.

4.3. Challenges and enablers of implementing circular economy in the museum as the catalyst of Amsterdam's circular city agenda

As museums in Amsterdam strive to align themselves with the city's circular economy agenda, they encounter a unique set of challenges and enablers. The transition from a linear, resource-intensive model to a circular one not only presents opportunities for museums to contribute to the circular city

vision but also necessitates careful navigation of the complexities involved. In this subchapter, we delve into the key challenges faced by museums in Amsterdam as they implement circular economy principles and explore how they can actively contribute to the city's broader circular ambitions while preserving and showcasing cultural heritage. The challenges and enablers themselves are not interconnected.

4.3.1. Challenges

Challenge 1: Lack of availability of financial resources. The lack of available financial resources for circular economy initiatives in museums poses a significant challenge. In the Netherlands, museums are primarily funded by the government, alongside their own generated income. Funding is typically obtained through applications to art and cultural funds organizations. However, there is currently no obligation for museums to prioritize sustainability or circular economy practices, nor is there a requirement to report on such efforts. Interviewee I3 explained: *'The ministry and the Mondriaan Fond are supportive, they are interested. But they cannot change the situation. So the government can only address this issue in their talks and meetings and papers and publications. And for the rest, it's up to the sector themselves to do it.'*

On the other hand, according to the arts fund organization, the absence of the sustainability requirement in funding applications is based on their effort to accommodate arts and cultural organizations as much as possible. Interviewee I8 said: *'There is no specific regulation that asks for sustainability because it is in general about your vision, about how you run your organization. And sustainability may be a part of that, but it doesn't have to be. And the main reason for that is that, what are two reasons? We don't want to extend the amount of rules and regulations that a plan needs to have in it because it's regulation or regulation or regulation and we want to somehow also keep some open space for the organization. So that's one. And the other one is that this set of criteria and the scheme, this regeling, is the same for all the organizations that apply. So a big museum or a small organization, which is, for instance, making art, making performances, needs to fit in that scheme, needs to be able to make a plan according to that scheme. And of course, you evaluate all the different organizations in a different way. You can't say that there is a fixed result that they have to achieve or something. You can say, okay, this is the goal of the organization, this is the size of the organization, so the plans are according to their size and their goal, which means that if someone is very sustainable or, you know, for a museum, you can say, well, that's natural. For a very small organization, you can say that's excellent. So it, you know, we have organizations that are run by, for instance, two people. And of course, they do get not as much money as a big museum, but the difference between organizations is very, very big. And we try to accommodate them all.'*

Consequently, museums with higher own income and sponsors have a greater ability to invest in and adopt sustainable practices, while others face limitations in implementing circular economy initiatives. As interviewee I3 further mentioned: *'So what we have is a situation where museums have no incentive to be more sustainable. And they are used to building exhibitions as they have done for the past 100 years. As soon as the Amsterdam Fund for the Arts or the Mondrian would say: Yes, we will look at your application for funding this project, but we are also going to judge the sustainability of that project. Then suddenly, like 20 years ago in Julie's Bicycle in London, the phone will start ringing. Without that stimulus from the government, there is of course still now demand for more sustainability from the public and the press and et cetera.'*

Challenge 2: No specific law or regulation about implementing sustainability and/or circularity in museums. Currently, there is no specific law or regulation in place regarding the implementation of sustainability and circularity in museums. Interviewee I7 explained: *'There is no heritage law stating that museums in the Netherlands should have a acclimate like, so and so. There's the only law regarding*

preventive conservation and collections is for archives. So there's an archive law. And the rest is all kind of nice to have'. In addition to the lack of pressure from art and cultural funding organizations, there is no legislation mandating sustainable practices in museums. Consequently, any steps taken by the government in this regard are limited to providing advice and guidance rather than enforceable requirements.

Challenge 3: Difficult to make changes due to the nature of museums. Making changes in museums poses a significant challenge due to their nature. Managing energy consumption, for instance, is difficult as many museums are located in heritage buildings, resulting in high energy expenses. Interviewee I2 explained: *'It's a building from the 15th century and it's an old church, so it's big windows. Which is sustainability much more difficult because it's a monument, and there are a lot of regulations. And that comes from the government, city, and nation. And everybody has a problem with the buildings because the buildings were never meant for being sustainable. Never, ever, ever. That's only since a few years a topic. That was never the issue. And the only museums who now start with completely new buildings have the advantage of being a front runner again. But all of them are lagging. All of them.'* Exhibitions become complex when borrowed artifacts come with diverse climate specifications, requiring a delicate balance between showcasing exhibits and maintaining optimal environments. Designing storage facilities that meet conservation requirements is urgent while remaining accessible is an ongoing challenge. Implementing effective monitoring systems for climate conditions and energy consumption is also challenging, especially in museums with multiple HVAC systems. Moreover, museums often adhere to traditional practices, making it difficult to introduce changes to their linear approach to exhibitions and overall operations.

Challenge 4: Lack of awareness. There is a lack of awareness among many museum institutions regarding the transition to becoming more sustainable and circular. The concepts of sustainability and circularity are still difficult for many to understand fully. Without specific laws or requirements tied to funding, the decision to adopt sustainable and circular practices rests with individual museums. As a result, without a broader understanding of the benefits and importance of sustainability, many museums may not prioritize or actively pursue these initiatives. As interviewee I6 said: *'Because there are a lot of enterprises that are dependent on the tourism industry. It's really important. Also of course not only the restaurants and the hotels. But also the touristic museums. And so they need to cooperate for that. So that's important. But also it's of course important that if you look at holistic. Because of that so many enterprises are involved. We have now also an action plan for approaching a lot of businesses. To help them, to support them to become more circular. Because circular is still a difficult concept. Many organizations are only a bit aware that it is necessary. That it's not sustainable to be linear instead of circular. There need to be alternatives. But they lack a lot of knowledge still. Some needs to support them to give them knowledge. To motivate them to change. So that they will use other raw materials. That they will buy different food. Different all kinds of things. There's also in our action plan on circular economy. There will also be actions about supporting the businesses to become more circular.'*

In the realm of fostering sustainable and circular economy initiatives within museums in the Netherlands, several critical challenges encompass financial, policy, technical, and awareness aspects, as indicated in the table provided below. Financially, the reliance on government funding and self-generated income, as depicted in the table, underscores the divide between museums with the means to invest in sustainable practices and those constrained by financial limitations. The absence of dedicated policies or regulations concerning sustainability and circularity, as illustrated in Table 5, hampers progress, leaving museums to navigate these uncharted waters without a clear roadmap. On a technical front, as outlined in the table, the intricate nature of museum spaces, often housed in heritage buildings, poses obstacles to implementing energy-efficient solutions and accommodating climate-specific artifacts. Lastly, a pervasive

lack of awareness and knowledge about the significance and methodologies of sustainable practices, as indicated in the table, impedes proactive adoption, as museums grapple with the challenge of aligning their traditional operational approaches with modern eco-conscious paradigms. Overcoming these challenges necessitates concerted efforts across all categories, as presented in the table, to foster a more cohesive and effective path toward a greener museum landscape.

Table 5: Challenges of implementing circularity in museums as part of the tourism sector

| Categories | Challenges | Description |
|------------|--|---|
| Financial | Challenge 1: Lack of financial resources | Limited funding hampers circular economy efforts. Museums rely on government and self-generated income, often from art funds, but sustainability isn't mandatory. Museums with higher incomes can adopt sustainability, while others struggle. |
| Policy | Challenge 2: Absence of laws/regulations | No specific laws/regulations for sustainability in museums. Government advice lacks enforceable mandates. |
| Technical | Challenge 3: Implementing changes is tough | Museum nature complicates changes. Heritage buildings mean high energy costs. Exhibits struggle with varying climate needs. Storage balancing conservation and accessibility is tricky. Monitoring climate/energy is hard, especially with complex HVAC systems. Traditional practices hinder shifts. |
| Awareness | Challenge 4: Lack of awareness | Museums are unaware of sustainability's importance. Without funding-linked rules, individual museums decide. Limited understanding hinders the prioritization of sustainable practices. |

4.3.2. Enablers

Enabler 1: Museums' financial condition. The financial condition of museums plays a crucial role in their ability to become more sustainable and circular. Museums with stable financial resources, including significant government funding and additional income from sponsors or own-generated revenue, have greater opportunities to invest in sustainable practices. They can allocate funds for energy-efficient infrastructure, implement recycling and waste reduction initiatives, and adopt sustainable exhibition and preservation methods. The financial stability allows these museums to prioritize sustainability and circularity, demonstrating a commitment to environmental responsibility and serving as examples for others in the industry. Interviewee I1 explained: *'We get a lot of revenue from already only our tickets and we are subsidized. So, we have the possibility. So already from this part, there are a lot of things possible that we can achieve. But of course, the partnerships also help with that. We also have a partnership with Postcode Loterij. And they also give some kind of budget every year that we can spend on things that are important for their environmental goals.'*

Enabler 2: Information that circularity is profitable. Informing museums that circularity is profitable can be a powerful strategy to attract their interest and encourage their adoption of circular practices. By highlighting the potential economic benefits, such as cost savings through resource optimization, increased efficiency, and revenue generation from circular business models, museums can be motivated to prioritize circularity. Demonstrating how circular approaches can lead to financial gains and long-term sustainability can be a persuasive argument for museums to embrace circular practices and integrate them into their operations. This is supported by the statement from interviewee I5 about their strategy within the community initiative De Plantage *'Because people always say that like sustainability is more expensive, so what we try to do, and I think we get it done, is in every theme in our sustainability*

program, we try to prove that it's not more expensive, that it's, to put it stronger, that if you can do your job right, like a reduction in your waste, your garbage, that it will be profitable for you.'

Enabler 3: Collaboration with multiple stakeholders. Collaboration among multiple stakeholders, including other museums, businesses, suppliers, and government entities, is vital to the success of implementing sustainability and circularity. By working together, these stakeholders can share knowledge, resources, and best practices, fostering innovation and creating a more supportive environment for sustainable initiatives. As interviewee I5 has stated: *'We are a community, so we try to make a lot of impact together. When you have a big museum or whatever, they have a whole team and they can do that. But if they come together with another team of another organization, that's even smarter with some area, in some areas, then you don't have to figure it out yourself. And at the same time, we as the network managers we as well try of course to get smart solutions for all those, a lot of challenges in the sustainability area.'*

Therefore, collaborative efforts can lead to the development of shared infrastructure, such as recycling or waste management systems, and the establishment of industry-wide standards for sustainable practices. Interviewee I5 has also added: *'And of course, every individual organization, it can be a hotel or a restaurant, but also museums, et cetera, have their challenges and strategies for energy. But if you work together, sometimes we can get a better result. And in our case is that we buy green energy together. And because we do it together with 18 participants in that project, we have a lot of volume we talk about, and we have a party, energy services, who organizes that for us. They are very capable of buying at the right moment, the right gas and electricity and so on. So, they are helping us to get a very sharp price. So, the participants in this energy project have the advantage because they are part of the collective. And you can negotiate a better price.'* Additionally, government support and policies can provide incentives and regulatory frameworks that encourage sustainable and circular approaches, further enhancing the impact of collective efforts.

Enabler 4: Exploring the use of technology by working together with schools and universities. Achieving sustainability and circularity in museums can be facilitated by exploring the use of technology and establishing collaborations with schools and universities. Leveraging technological advancements, such as digital platforms for virtual exhibitions and interactive experiences, can reduce the reliance on physical resources and enable more sustainable practices. By partnering with educational institutions, museums can tap into the expertise and innovative ideas of students and researchers, fostering a culture of sustainability and circularity. Interviewee I7 has shared: *'Let's say the building physical climate installation kind of work and then you have one university where students are trained as building physicist, that's Eindhoven so we used to do many projects with them. So you also all students, you know, them quite well and they also get to work in the fields and sometimes you keep contact with.'* These collaborations can lead to the development of new technologies, conservation methods, and sustainable design solutions, enriching the museum experience while minimizing environmental impact. As interviewee I3 stated: *'And that's why I'm also very glad to work with for instance the art schools and the Academie van Bouwkunst. Having a bunch of students make 3D files of everything that we have. So digitalizing. These are the future people in those positions.'*

Enabler 5: Analyzing the current conditions as a basis for developing a strategy. Analyzing the current conditions of the museum serves as a crucial foundation for developing a strategy to implement sustainability and circularity. By assessing existing resources, infrastructure, and operational practices, museums can identify areas where they can create the most significant impact. This analysis allows them to prioritize actions that align with their available resources and address the most pressing sustainability challenges. It enables museums to leverage their strengths, such as unique collections or exhibition spaces, to drive meaningful change. By focusing on the areas that can yield the greatest results,

museums can develop targeted strategies that maximize their sustainability efforts and contribute to a more circular and environmentally conscious institution. Such an example has been shared by interviewee I4: *'So there's a lot of willingness. Yes, we want to. And it's sort of like urgent and need, but also a lot of frustration in how do we do this? So with consultancy, I know I always do a workshop with them to sort of put down their mission or vision on this circularity and sustainability or collect what they already have. And then I stimulate them to play with the new sort of like set of rules that they also set out, like on budget, on planning, and all these things that come together. And I just sort of ask, what you really would like and then sort of like also demand from designer and builder to sort of like supply say how does this work and how can we do better at the end? Then you sort of like start growing with each other. So sort of, hey, let's say we only want to build with local materials. Or we only want 50 percent. We want to only build with used materials or used materials from our museum. So if you put this down and possibilities, then and say also like an openness into playing with these sort of like demands. And always keep it as sort of like, you know, like in every meeting you have, you also talk about money. But I think in every meeting you should also talk about, hey, how are we with our goals? And some things work, and things don't. And so this is what I tell them. If things get really hard and sort of intense, but sometimes it does. I always use the Pareto rule saying, hey, we always look at the biggest stuff. Look at the biggest material that you're using right now and then maybe change that for the better because you can create a better impact. With just 80 percent impact. So these kinds of things to sort of like create a positive vibe and that and that you're not doing this alone. You should and then sort of like putting down on a vision also to start up collaboration with design and build teams. Then the match can happen.'*

Enabler 6: Museums hold moral values which leads to a public demand to be more sustainable. Museums hold significant moral value, which has led to a growing public demand for them to be more sustainable. As trusted institutions that preserve and showcase cultural and historical artifacts, museums are seen as custodians of our collective heritage. This moral responsibility extends to environmental stewardship. The public recognizes that museums have a unique opportunity to set an example and contribute to a sustainable future. Interviewee I2 explained: *'The museum sector is sometimes overseen as an important player. And we are. Museums are art, often it's about morality. Art is very often about a better world. Ideals and a better future. So artists are very often about a better world and they have ideals and save the world, etc. So they should also include this. You cannot be in a museum and do exhibitions about what we did. For instance, Martin Luther King and Gandhi, and Mandela. And then not tackle the topic of sustainability. That's not possible. Museums have to pick this up. Museums have to act. Museums very often claim that they are for understanding, for connectivity between people, cultures, whatever. Countries, religions. And that's morality. Sustainability is also morality. So they have to act.'* Therefore, there is a growing expectation for museums to prioritize sustainability in their operations, exhibitions, and preservation efforts. This public demand serves as a driving force for museums to embrace sustainability and align their practices with the values and expectations of their visitors and communities.

In conclusion, the pursuit of sustainability and circularity in museums necessitates a comprehensive approach facilitated by a range of enablers, which can be categorized into financial, policy, technical, and awareness dimensions, as illustrated in the accompanying Table 6. Museums endowed with stable financial resources are better positioned to invest in sustainable practices, setting a precedent for the industry. Informing museums about the profitability of circularity can incentivize the integration of such practices into their operations. Collaborative efforts among stakeholders foster innovation and shared standards, while leveraging technology through collaborations with educational institutions can lead to groundbreaking solutions. Analyzing current conditions provides a strategic foundation for impactful change. Moreover, the moral imperative tied to museums as custodians of heritage drives public demand for sustainability. Together, these enablers and their interconnectedness, as demonstrated in the table, pave the way for museums to transcend their role as cultural repositories, embracing their responsibility to champion environmental preservation and contribute to a more sustainable future.

Table 6: Enablers of implementing circularity in museums as part of the tourism sector

| Category | Enablers | Description |
|-----------|---|---|
| Financial | Enabler 1: Museums' financial condition | Stable financial resources enable museums to invest in sustainable practices such as energy-efficient infrastructure, recycling, and sustainable preservation, setting an example for the industry. |
| | Enabler 2: Profitable circularity information | Museums are motivated to adopt circular practices when informed about potential economic benefits, like resource savings and revenue generation. |
| Policy | Enabler 3: Collaboration among stakeholders | Stakeholder collaboration supports sharing resources, best practices, and standardizing sustainability efforts. Government support further boosts impact. |
| Technical | Enabler 4: Tech collaboration with education | Leveraging technology and partnering with schools/universities advances sustainability via digital exhibits and innovative solutions. |
| | Enabler 5: Strategy from the current analysis | Museums analyze resources and practices to focus on impactful changes, leveraging strengths for sustainability strategies. |
| Awareness | Enabler 6: Moral value driving demand | Museums, seen as cultural custodians, face growing public demand to demonstrate sustainability and environmental responsibility. |

4.3.3. Conclusion of challenges and enablers

In summary, the challenges and enablers associated with the implementation of circular practices within museums can be categorized into four distinct areas: financial, policy, technical, and awareness, as illustrated in Table 7.

Table 7: Challenges and enablers of implementing circularity in museums as part of the tourism sector

| Category | Challenges | Enablers |
|-----------|--|---|
| Financial | Challenge 1: Lack of financial resources | Enabler 1: Museums' financial condition |
| | | Enabler 2: Profitable circularity information |
| Policy | Challenge 2: Absence of laws/Regulations | Enabler 3: Collaboration among stakeholders |
| Technical | Challenge 3: Implementing changes is tough | Enabler 4: Tech collaboration with education |
| | | Enabler 5: Strategy from the current analysis |
| Awareness | Challenge 4: Lack of awareness | Enabler 6: Moral value driving demand |

The lack of available financial resources, the absence of specific laws or regulations, the challenges inherent to the nature of museums, and the lack of awareness pose significant obstacles to implementing sustainability and circularity in museums. However, several enabling factors can support and drive the adoption of sustainable practices. The financial condition of museums, with stable resources, can empower them to invest in sustainable infrastructure and initiatives. Informing museums about the profitability of circularity can incentivize their adoption of sustainable practices. Collaboration among multiple stakeholders, including other museums, businesses, suppliers, and government entities, can foster innovation and create a supportive environment for sustainability efforts. Exploring the use of

technology through partnerships with schools and universities can drive sustainable innovation. Analyzing current conditions provides a basis for targeted strategies that maximize impact. Lastly, the moral value attributed to museums and the growing public demand for sustainability can serve as powerful motivators for change. By leveraging these enabling factors, museums can overcome challenges and work towards becoming more sustainable and circular, preserving our cultural heritage while minimizing environmental impact.

5. Discussion

5.1. Theoretical contributions

The implementation of the circular economy in museums is a concept that is still in its infancy, with limited literature available on the subject. While the circular economy has gained attention and recognition as a sustainable approach across various industries, its application within the museum sector remains relatively unexplored. However, the potential theoretical contributions of implementing a circular economy in museums are significant and warrant further exploration.

The circular economy is a framework that seeks to minimize waste and maximize the value derived from resources by keeping materials and products in use for as long as possible. It promotes the principles of recycling, reusing, and reducing to create a closed-loop system where materials are continuously cycled back into the economy. In the context of museums, the implementation of a circular economy approach could lead to several theoretical contributions.

This study offers three significant contributions. Firstly, it reveals that the incorporation of circularity in museums is driven by opportunities arising after the emergence of sustainability concerns, particularly regarding energy usage. Secondly, it demonstrates that collaboration among museums, facilitated through clustering, can enhance the sustainability endeavors of these institutions. Lastly, the research highlights that the adoption of circularity in museums originates from grassroots efforts and initiatives.

The research on the incorporation of circularity in museums reveals a noteworthy finding driven by the emergence of sustainability concerns. Sustainability in energy and building to save money takes precedence, followed by circularity, which primarily relates to the museum's annual exhibition. The gradual adoption of circular practices is attributed to the traditional nature of museums. This key finding also addresses the first sub-research question on how museums transform concerning the circular city strategy target. As Schroeder, Anggraeni, & Weber (2019) highlighted, museums view circular economy implementation as a means to achieve their end goals, considering it a practical pathway towards sustainability rather than a standalone objective. The incorporation of circularity is found to be motivated by the aim to save expenses and represents opportunity-driven entrepreneurship. On the other hand, the need to become sustainable due to rising energy prices is viewed as a necessity-driven reason since energy expenditure constitutes a significant portion of a museum's budget. In line with this, museums proactively identify their current condition and capitalize on innovative ideas to foster sustainability within their operations. The studies conducted by Mrozewski and Kratzer (2017) and Nicotra et al. (2018) confirm that this approach is driven by motivation and a quest for innovation, leading to increased technological progress and a productive form of entrepreneurship. As He et al. (2020) suggested, such opportunity-based entrepreneurship positively impacts environmental sustainability. Hence, the incorporation of circularity in museums not only addresses sustainability concerns but also promotes innovation and efficiency through entrepreneurial practices driven by opportunities.

In this research, the second key finding highlights the importance of collaboration among museums, facilitated through clustering, to enhance the sustainability endeavors of these institutions. By forming museum clusters like the BIZ Museumkwartier or De Plantage neighborhood, museums gain greater opportunities to exchange knowledge and collectively implement sustainability initiatives. This finding addresses the sub-research questions on the current governance of circularity in museums and the enablers for implementing circularity within the tourism sector. The research aligns with De Graaf, Boter, and Rouwendal's (2009) assertion that museums within a city may compete with or strengthen each other by forming local clusters. The two exemplary museums observed in this study are part of such a cluster, which was initially motivated by more efficient marketing and attracting tourists, benefiting both

the institutions and the city as a whole, as mentioned by Van Aalst and Boogaarts (2002). Furthermore, the advantages of museum clusters extend beyond marketing, offering reduced transaction costs, accelerated circulation of capital and information, new market opportunities, innovation, and strengthened social solidarity, as highlighted by researchers such as Scott (2000), Amin & Graham (1997), and Austin (2000). Building on this, this research emphasizes that museum cluster collaboration not only fosters these advantages but also supports sustainability and circularity initiatives among members through knowledge-sharing and collective projects.

The third key finding of this study on circularity in museums in Amsterdam reveals that the adoption of circular practices within the museum sector can be traced back to grassroots efforts and initiatives. These circular initiatives have emerged from the bottom-up, with active involvement from various stakeholders at both the micro and meso levels. While museums and other cultural institutions have played a crucial role in driving this transition, the government has also taken steps to facilitate circularity through the creation of platforms and guidelines. This finding sheds light on how the governance of circularity in museums is currently evolving. As Vergragt et al. (2016) emphasize, no single entity can achieve this transition in isolation, underscoring the need for collaboration among grassroots innovations, government programs, responsible corporations, informed consumers, and scientific advancements. Notably, museum suppliers, who often double as circular entrepreneurs, have been instrumental in promoting circularity, particularly through circular practices in museum exhibitions. This aligns with the observations of Bauwens et al. (2021) and Cullen & De Angelis (2020), who stress that circular entrepreneurship and innovation can act as catalysts for systemic transitions with disruptive potential.

Moreover, this research highlights that museums themselves feel a responsibility to set an example as sustainable institutions, given their prominent position in society as places of learning and cultural preservation. This sentiment aligns with the views of the UNFCCC (2020), which emphasizes the role of museums in communicating with the public to increase awareness of climate change and sustainability. Museums also offer opportunities for public engagement, enabling participation in policymaking and fostering collaboration among various sectors to develop climate change solutions (UNFCCC, 2020).

In conclusion, the adoption of circularity in Amsterdam's museums has been driven by bottom-up efforts and collaborations among stakeholders at different levels. This transition towards circular practices exemplifies the significance of collaborative efforts between diverse actors, as no single entity can lead the change alone. Moreover, museum suppliers' active role in promoting circularity through innovative practices demonstrates the potential of circular entrepreneurship as a catalyst for transformative systemic transitions. Ultimately, museums' commitment to sustainability reflects their role as influential platforms for communicating and fostering public engagement on crucial issues such as climate change and environmental sustainability.

While the literature on the implementation of the circular economy in museums is currently limited, these theoretical contributions provide a foundation for further exploration and research. By embracing the circular economy principles, museums can contribute to a more sustainable future, preserve cultural heritage, engage with their communities, and inspire visitors to adopt sustainable practices in their own lives. Further studies and practical implementations in this field would enrich our understanding and enable museums to lead the way in circular thinking within the cultural sector.

5.2. Practical implications

The practical implications of implementing a circular economy in museums are numerous and encompass various aspects of museum operations. While the specific approaches and strategies may vary depending on the museum's size, collections, and context, the following practical implications are commonly associated with the implementation of a circular economy.

This research yields two significant implications that hold practical value. Firstly, the successful implementation of circularity in museums faces its most significant hurdle in the lack of government legislation and insufficient pressure for funding from the museum sector. Secondly, the close relationship between museums and tourism is evident, but the challenge lies in the fact that museum funding is typically categorized under the cultural sector, leading to a lack of clear connection between sustainability efforts in museums and the broader tourism vision.

The research on the practical implications of implementing circularity in museums reveals a crucial obstacle: the lack of government legislation and insufficient funding pressure from the museum sector. This dearth of sustainability laws and financial backing for sustainability performance proves to be the primary barrier, as it is the individuals knowledgeable about sustainability and circularity, along with the museum's financial state, that act as the main drivers. This significant finding also sheds light on the enablers of circularity implementation in museums within the tourism sector. Winans, Kendall, & Deng (2017) emphasize the importance of effective policy instruments like subsidies and tax incentives when governments have clear objectives and iterative evaluation processes. In the absence of a suitable evaluation framework and adequate support from the industry and community, circular economy initiatives risk becoming unsustainable in the long run (Sources: Winans, Kendall, & Deng, 2017). Interviewee I6 said: *'I think there needs to be some fundamental changes in the system. Before most of the companies will take action. And I think that's especially about taxes. Raw materials and other materials will be more expensive. And that labor will be more cheap. That will differ because then you look different about your business model. These things, these indicators will change. And also I think there needs some regulations. Has to be changed so that you can think in circles, in reusing. It's still a lot of barriers on legal barriers that make it difficult. It's still the phase in which the frontrunners and the motivated companies are taking action. But most of them, because they don't feel the necessity and the urgency of changing.'*

The second key finding highlights a crucial aspect of the relationship between museums and tourism, emphasizing their close interlinkage. However, a significant challenge emerges from the categorization of museum funding under the cultural sector, causing a lack of clear connection between sustainability efforts in museums and the broader vision of tourism. As a consequence, museums are often perceived merely as objects or attractions for tourism rather than active contributors to sustainability goals. This hurdle is compounded by the pivotal role played by individuals possessing knowledge about sustainability and circularity, as well as the financial condition of the museums. In society, there exists a prevailing perception that sustainability and circularity are obligatory measures essential to mitigate the impact of climate change. Unfortunately, the need for an integrative approach among each sector is often overlooked, leading to resistance to change (Gonzalez-Arcos, 2021). Overcoming this barrier demands a comprehensive understanding of the interconnectedness between museums and tourism and the imperative to foster collaborative efforts to achieve sustainable practices for the benefit of both sectors and the broader environment.

Overall, the practical implications of implementing a circular economy in museums involve a shift towards sustainable resource management, collaboration with stakeholders, educational engagement, and economic benefits. By embracing circular practices, museums can become role models for sustainability, contributing to the global transition to a more circular and resource-efficient society.

5.3. Limitations of the research

The purpose of this study was to investigate the influence of museums on Amsterdam's transformation into a circular city, with a particular emphasis on their significant contribution to the travel and tourism sector. Although there is still a lot of ground to cover, this is mostly because it is a relatively new topic and because all the stakeholders engaged are still making progress. This study's two weaknesses include its limited relevance to small museums and the contextual differences between institutions.

The research's limited relevance to small museums is its first drawback. Like in this study, research on the implementation of a circular economy frequently tends to concentrate on sizable, well-funded organizations that draw a sizable number of visitors. Small museums, which could have fewer holdings, fewer resources, and fewer visitors, confront particular difficulties when implementing circular practices. It's possible that smaller institutions will not be able to immediately use or afford certain techniques and approaches that work for major museums.

Contextual differences make up the second limitation. Every museum works in a distinct environment that is shaped by elements including location, collection type, and audience demographics. Circular practice implementation necessitates adapting strategies to match these unique circumstances. As a result, no one marketing plan works for all kinds of museums. Small museums may encounter more difficulties as a result of their unique conditions and limited resources, whereas large museums may have more resources and flexibility to adapt to different environments. Therefore, while implementing circular economy methods at museums, it is crucial to take context-specific constraints and opportunities into account.

5.4. Suggestions for further research

This study emphasizes four key areas for further research on how to apply the circular economy in museums and other tourist sites. First, it's crucial to investigate various museum types and tourist attractions. Future studies can broaden the scope to include small and medium-sized museums, historic sites, cultural institutions, and other tourist attractions, even if the majority of the current literature focuses exclusively on large museums. Understanding the individual difficulties, opportunities, and tactics that may be used in each situation will be possible by looking at how the circular economy concepts can be applied to various contexts.

Secondly, using material flow analysis and life cycle assessment (LCA). Conducting Life Cycle Assessments (LCAs) might be useful to acquire a thorough understanding of the real material movement within museums and tourist attractions. LCAs examine the environmental impact of a system or product throughout the course of its entire life cycle, from the extraction of raw materials to disposal. When applied to museums and tourist attractions, LCA approaches can be used to pinpoint problem areas, calculate the environmental advantages of circular practices, and direct decision-making toward more sustainable options.

Third, collaborate with more stakeholders. It is essential to broaden the range of stakeholders involved in circular economy efforts. Beyond artists, local communities, and suppliers, future studies can concentrate on identifying and involving a greater variety of stakeholders. This might comprise academic institutions, governmental bodies, NGOs, business associations, and other pertinent institutions. Studying how various stakeholders fit into the implementation of circular practices can reveal important insights and promote cross-sector collaboration.

Fourth, research based on case studies and best practices. The collection and analysis of successful case studies from museums and other tourist destinations that have adopted circular practices will offer useful insights and serve as an inspiration for others. Research can highlight successful programs, initiatives, and tactics, emphasizing the positive effects on the environment, society, and the economy. These case studies can be a useful tool for policymakers, practitioners, and decision-makers as they design and put into practice circular economy ideas.

6. Conclusion

This research aimed to find out the role of museums as part of the tourism sector in Amsterdam's circular city transition. As a rarely discussed topic of focus, the implementation of circularity in Amsterdam's museums is not only important in terms of supporting the city's circular ambitions but also complicated by their strategic position in both the tourism and cultural sectors, which in turn involves a wide range of stakeholders and policy engagement. By analyzing qualitative data from semi-structured expert interviews and document analysis, the main research question 'How do museums as part of the tourism sector play a role in Amsterdam's circular city transition?' could be answered as follows:

To understand the current role of museums in a circular city transition, three elements must be known. First, how museums transform in regard to Amsterdam's circular city strategy target. Museums in the Netherlands play a crucial role in the tourism industry, holding significant cultural value. They can be categorized as subsidized or non-subsidized, with funding sources varying accordingly. *Motivated by the high energy costs and architectural constraints of heritage buildings, museums are increasingly pursuing sustainability and circular practices.* Collaborative efforts between museums and other institutions further support their sustainability initiatives, allowing for knowledge sharing and collective projects.

Second, to gain a deeper understanding of the circularity implementation surrounding the museum, it is essential to explore the current governing framework. This involves investigating key stakeholders and their connection to Amsterdam's circular city agenda. The city's museums are actively engaged in the circular economy, promoting waste reduction, material reuse, and sustainable procurement. *Through collaboration between museums, suppliers, and the government, a multi-stakeholder approach ensures comprehensive and environmentally conscious circular practices within cultural institutions.* These initiatives align with prioritized value chains and contribute to a collaborative ecosystem aimed at fostering a more sustainable and prosperous Amsterdam.

At last, to progress in the journey towards sustainable practices in museums, especially within the context of the tourism sector, it is crucial to understand both the challenges and enablers of implementing circularity. *Limited financial resources, the absence of specific regulations, and a lack of awareness create significant hurdles for sustainability and circularity in museums.* Nevertheless, there are encouraging aspects such as museums with stable financial resources being able to invest in sustainable initiatives, making museums aware of the profitability of circular practices, collaboration with various stakeholders fostering innovation, technology partnerships with educational institutions driving sustainable innovation, targeted strategies based on current conditions, and the increasing public demand for sustainability. Lastly, *the moral value attached to museums and the growing public demand for sustainability can serve as powerful motivators for positive change, ensuring that cultural heritage is preserved while minimizing the environmental impact.*

To sum up the entire study and underscore its utmost importance, this conclusion highlights the role of museums in Amsterdam's circular city transition. It attempts to make a significant contribution to implementing circularity within the often-neglected sector of tourism and culture. Notably, this research thoroughly considers the viewpoints of all stakeholders involved. With unwavering optimism, it is fervently anticipated that the results of this research will provide invaluable insights to steer stakeholders, the tourism and culture sector, and the esteemed City of Amsterdam in their resolute pursuit of achieving the circularity target together.

References

- Amin, A., & Graham, S. (1997). The ordinary city. *Transactions of the institute of British geographers*, 22(4), 411-429.
- Andriotis, K. (2018). Limits to growth, social movements and the main principles of degrowth-inspired travelling. In *Degrowth in tourism : conceptual, theoretical and philosophical issues* (pp. 108). CABI.
- Aryal, 2020 - Aryal, C. (2020). Exploring circularity: A review to assess the opportunities and challenges to close loop in Nepali tourism industry. *Journal of Tourism & Adventure*, 3(1), 142-158.
- Arts Council England. (2020a). Sustaining great art and culture: environmental report 2018/19.
- Arts Council England. (2020b). Let's Create. *Arts Council England*.
- Ashworth, G. (2009). Questioning the urban in urban tourism. In *Enhancing the city* (pp. 207-220). Springer, Dordrecht.
- Atanasova, N., Castellar, J.A., Pineda-Martos, R. et al. Nature-Based Solutions and Circularity in Cities. *Circ.Econ.Sust.* 1, 319–332 (2021). <https://doi.org/10.1007/s43615-021-00024-1>.
- Austin, J. E. (2010). The collaboration challenge: How nonprofits and businesses succeed through strategic alliances. John Wiley & Sons.
- Bačová, M., Böhme, K., Guitton, M., van Herwijnen, M., Kállay, T., Koutsomarkou, J., Magazzù, I., O'Loughlin, E., & Rok, A. (2016). Pathways to a circular economy in cities and regions: a policy brief addressed to policy makers from European cities and regions. *ESPON, Iteleg*.
- Ballantine, P.W. (2021). Domestic tourism as a degrowth strategy. In Hall, C.M., Lundmark, L., Zhang, J.J. (Eds.), *Tourism and Degrowth: New Perspectives on Tourism Entrepreneurship, Destinations and Policy* (pp. 187–202). Routledge: Abingdon, UK.
- Boeije, H. (2010). *Analysis in Qualitative Research*. London: Sage Publications Ltd.
- Blades, N., Oreszczyn, T., Cassar, M., & Bordass, W. (2000). *Guidelines on pollution control in museum buildings*. Museums Association.
- Bosone, M., & Nocca, F. (2022). Human Circular Tourism as the Tourism of Tomorrow: The Role of Travellers in Achieving a More Sustainable and Circular Tourism. *Sustainability*, 14(19), 12218.
- Çakar, K., & Uzut, İ. (2020). Exploring the stakeholder's role in sustainable degrowth within the context of tourist destination governance: the case of Istanbul, Turkey. *Journal of Travel & Tourism Marketing*, 37(8-9), 917-932.
- Caliendo, M., & Kritikos, A. S. (2010). Start-ups by the unemployed: characteristics, survival and direct employment effects. *Small Business Economics*, 35(1), 71-92.
- Camilleri, M. A. (2021). Sustainable production and consumption of food. Mise-en-place circular economy policies and waste management practices in tourism cities. *Sustainability*, 13(17), 9986.
- Campbell-Johnston, K., ten Cate, J., Elfering-Petrovic, M., & Gupta, J. (2019). City level circular transitions: Barriers and limits in Amsterdam, Utrecht and The Hague. *Journal of Cleaner Production*, 235, 1232-1239.
- Canavan, B. (2014). Sustainable tourism: development, decline and de-growth. Management issues from the Isle of Man. *Journal of Sustainable Tourism*, 22(1), 127-147.

- Capocchi, A., Vallone, C., Pierotti, M., & Amaduzzi, A. (2019). Overtourism: A literature review to assess implications and future perspectives. *Sustainability*, 11(12), 3303.
- Carey, S., Davidson, L., & Sahli, M. (2013). Capital city museums and tourism flows: An empirical study of the museum of New Zealand Te Papa Tongarewa. *International Journal of Tourism Research*, 15(6), 554-569.
- Cassar, M. (2013). *Environmental management: Guidelines for museums and galleries*. Routledge.
- City of Paris. (2021). Developing the circular economy in parisian cultural spaces and institutions: Practical guides. In <https://www.paris.fr/>. Retrieved April 6, 2023, from <https://cdn.paris.fr/paris/2021/02/09/c40e13e8138b3687e2fda2ea033350e6.pdf>
- Climate-KIC, E. I. T. (2019). Municipality-led circular economy case studies. Available at: <https://apo.org.au/sites/default/files/resource-files/2019-01/apo-nid219941.pdf>.
- Cornejo-Ortega, J. L., & Chavez Dagostino, R. M. (2020). The tourism sector in puerto vallarta: An approximation from the circular economy. *Sustainability*, 12(11), 4442.
- Coyne, I. T. (1997). Sampling in qualitative research. Purposeful and theoretical sampling; Merging or clear boundaries? *Journal of Advanced Nursing*, 26(3), 623-630.
- Cuomo, F., Ravazzi, S., Savini, F., & Bertolini, L. (2020). Transformative urban living labs: Towards a circular economy in Amsterdam and Turin. *Sustainability*, 12(18), 7651.
- Daly, H. (2013). A further critique of growth economics. *Ecological economics*, 88, 20-24.
- del Romero Renau, L. (2018). Touristification, sharing economies and the new geography of urban conflicts. *Urban science*, 2(4), 104.
- Di Pietro, L., Guglielmetti Mugion, R., Renzi, M. F., & Toni, M. (2014). An audience-centric approach for museums sustainability. *Sustainability*, 6(9), 5745-5762.
- Domingues, A. R., Mazhar, M. U., & Bull, R. (2023). Environmental performance measurement in arts and cultural organisations: Exploring factors influencing organisational changes. *Journal of Environmental Management*, 326, 116731.
- Ellen MacArthur Foundation. (2019). *City governments and their role in enabling a circular economy transition: An overview of urban policy lever*. Retrieved on December 21, 2022 from https://static1.squarespace.com/static/5d950bfaae137b5f0cbd75f5/t/5edad5766a3831601b6a5c91/1591399819575/CE-in-Cities_Policy-Levers_Mar19.pdf.
- European Circular Cities Declaration. (2020). European Circular Cities Declaration, Putting Circular Economy into Practice. Retrieved on December 21, 2022, from https://circularcitiesdeclaration.eu/fileadmin/user_upload/Images/Pages/Images/Circular_City_Declaration/CircularCities_Declaration_SupportDocument_noprintmarks.pdf.
- European Investment Bank, Byström, J. (2018). The 15 circular steps for cities, European Investment Bank. <https://data.europa.eu/doi/10.2867/39283>.
- Falcone, P. M. (2019). Tourism-based circular economy in Salento (South Italy): A SWOT-ANP analysis. *Social Sciences*, 8(7), 216.
- Ferdyn-Grygierek, J. (2014). Indoor environment quality in the museum building and its effect on heating and cooling demand. *Energy and Buildings*, 85, 32-44.

- Florida, C., Jacob, M., & Payeras, M. (2019). How to carry out the transition towards a more circular tourist activity in the hotel sector. The role of innovation. *Administrative Sciences*, 9(2), 47.
- Frantzeskaki, N., Loorbach, D., & Meadowcroft, J. (2012). Governing societal transitions to sustainability. *International journal of sustainable development*, 15(1-2), 19-36.
- Frey, B. S. (1998). Superstar museums: An economic analysis. *Journal of cultural economics*, 22, 113-125.
- García-Hernández, M., De la Calle-Vaquero, M., & Yubero, C. (2017). Cultural heritage and urban tourism: Historic city centres under pressure. *Sustainability*, 9(8), 1346.
- Ghisellini, P., Cialani, C., & Ulgiati, S. (2016). A review on circular economy: the expected transition to a balanced interplay of environmental and economic systems. *Journal of Cleaner production*, 114, 11-32.
- Giriwati, N., Homma, R., & Iki, K. (2013). Urban tourism: Designing a tourism space in a city context for social sustainability. *The Sustainable City VIII (2 Volume Set): Urban Regeneration and Sustainability*, 179, 1165.
- Goldstein, B. & Rasmussen, F.N. (2018). LCA of Buildings and the Built Environment. In: Hauschild, M., Rosenbaum, R., Olsen, S. (eds) *Life cycle assessment*. Springer, Cham. https://doi.org/10.1007/978-3-319-56475-3_28.
- Gonzalez-Arcos, C., Joubert, A. M., Scaraboto, D., Guesalaga, R., & Sandberg, J. (2021). "How do I carry all this now?" Understanding consumer resistance to sustainability interventions. *Journal of Marketing*, 85(3), 44-61.
- Grewcock, D. (2006). Museums of cities and urban futures: new approaches to urban planning and the opportunities for museums of cities. *Museum International*, 58(3), 32-42.
- Gustafsson, C., & Ijla, A. (2017). Museums—A catalyst for sustainable economic development in Sweden. *International Journal of Innovative Development & Policy Studies*, 5(2), 1-14.
- Hall, C. M. (2014). *Tourism and social marketing*. Routledge.
- Hall, C. M., Lundmark, L., & Zhang, J. J. (2021). Degrowth and tourism. *New perspectives on tourism entrepreneurship, destinations and policy*.
- Hartman, S., & Heslinga, J. H. (2022). The Doughnut Destination: applying Kate Raworth's Doughnut Economy perspective to rethink tourism destination management. *Journal of Tourism Futures*, (ahead-of-print).
- He, J., Nazari, M., Zhang, Y., & Cai, N. (2020). Opportunity-based entrepreneurship and environmental quality of sustainable development: A resource and institutional perspective. *Journal of Cleaner Production*, 256, 120390.
- Hospers, G. J. (2019). Overtourism in European cities: From challenges to coping strategies. In CESifo Forum (Vol. 20, No. 03, pp. 20-24). München: ifo Institut—Leibniz-Institut für Wirtschaftsforschung an der Universität München.
- International Council of Museums. (1996). *ICOM Statutes: Code of Professional Ethics*. ICOM.
- Jansen-Verbeke, M. (1986). Inner-city tourism: Resources, tourists and promoters. *Annals of Tourism Research*, 13(1): 79-100.

- Jaroszevska et al., 2019 - Jaroszevska, M., Chaja, P., & Dziadkiewicz, A. (2019). Sustainable energy management: Are tourism SMEs in Poland ready for circular economy solutions. *International Journal of Sustainable Energy Planning and Management*, 24, 75-84.
- Jover, J., & Díaz-Parra, I. (2020). Gentrification, transnational gentrification and touristification in Seville, Spain. *Urban Studies*, 57(15), 3044-3059.
- Kallis, G. (2011). In defence of degrowth. *Ecological economics*, 70(5), 873-880.
- Kallis, G., Kerschner, C., & Martinez-Alier, J. (2012). The economics of degrowth. *Ecological economics*, 84, 172-180.
- Kallis, G., Kostakis, V., Lange, S., Muraca, B., Paulson, S., & Schmelzer, M. (2018). Research on degrowth. *Annual Review of Environment and Resources*, 43, 291-316.
- Kampasakali, E., Fardi, T., Pavlidou, E., & Christofilos, D. (2021). Towards sustainable museum conservation practices: A study on the surface cleaning of contemporary art and design objects with the use of biodegradable agents. *Heritage*, 4(3), 2023-2043.
- Kaszás, N., Keller, K., & Birkner, Z. (2022). Understanding circularity in tourism. *Society and Economy*, 44(1), 65-82. DOI: <https://doi.org/10.1556/204.2021.00025>.
- Khan, O., Marrucci, L., Daddi, T., & Bellini, N. (2021). Adoption of circular economy and environmental certifications: Perceptions of tourism SMEs. *Journal of Management & Sustainability*, 11(1), 218-231.
- Khodaiji, J. D., & Christopoulou, D. (2020). Sustainable development and the circular economy in Greece: Case examples from Costa Navarino and Grecotel. *Worldwide Hospitality and Tourism Themes*, 12(5), 609-621.
- Kirchherr, J., Reike, D., & Hekkert, M. (2017). Conceptualizing the circular economy: An analysis of 114 definitions. *Resources, Conservation and Recycling*, 127, 221-232.
- Koens, K., Postma, A., & Papp, B. (2018). Is overtourism overused? Understanding the impact of tourism in a city context. *Sustainability*, 10(12), 4384.
- Korstanje, M., George, B. (2021). Demarketing overtourism. In Seraphin, H., Yallop, A.C. (Eds.), *Overtourism and Tourism Education: A Strategy for Sustainable tourism Futures* (pp. 81–95). Routledge: Abingdon, UK.
- Latouche, S. (2009). Farewell to growth Cambridge: Polity.
- Lenzen, M., Sun, Y. Y., Faturay, F., Ting, Y. P., Geschke, A., & Malik, A. (2018). The carbon footprint of global tourism. *Nature climate change*, 8(6), 522-528.
- Lord, G.D. (2012a). Institutional evolution. In Lord, B., Lord, G. D., & Martin, L. (Eds.), *Manual of museum planning: Sustainable space, facilities, and operations* (pp. 41-44). Rowman Altamira.
- Lord, G.D. (2012b). Museums in service to society. In Lord, B., Lord, G. D., & Martin, L. (Eds.), *Manual of museum planning: Sustainable space, facilities, and operations* (pp. 47-60). Rowman Altamira.
- Lucchi, E. (2016). Simplified assessment method for environmental and energy quality in museum buildings. *Energy and Buildings*, 117, 216-229.
- Lucchi, E. (2018). Review of preventive conservation in museum buildings. *Journal of Cultural Heritage*, 29, 180-193.

- Luciani, A. (2013). Historical climates and conservation environments: Historical perspectives on climate control strategies within museums and heritage buildings. Politecnico di Milano: Milan.
- Manniche, J., Larsen, K. T., & Broegaard, R. B. (2021). The circular economy in tourism: transition perspectives for business and research. *Scandinavian Journal of Hospitality and Tourism*, 21(3), 247-264.
- Manniche, J., Topsø Larsen, K., Brandt Broegaard, R., & Holland, E. (2017). Destination: A circular tourism economy. *A Handbook for Transitioning toward a Circular Economy within the Tourism and Hospitality Sectors in the South Baltic Region*. Centre for Regional & Tourism Research (CRT): Denmark.
- Martínez-Cabrera, J., & López-del-Pino, F. (2021). The 10 most crucial circular economy challenge patterns in tourism and the effects of covid-19. *Sustainability*, 13(9), 4940.
- Maxwell, J. A. (2005). *Qualitative research design: An interactive approach* (2nd ed.). Thousand Oaks, CA: Sage.
- McGhie, H. (2020). Evolving climate change policy and museums. *Museum Management and Curatorship*, 35(6), 653-662.
- Merli, R., Preziosi, M., & Acampora, A. (2018). How do scholars approach the circular economy? A systematic literature review. *Journal of cleaner production*, 178, 703-722.
- Midžić Kurtagić, S. (2018, May). Circular economy in tourism in South East Europe. In *Conference on Circular Economy in tourism in South East Europe*, 8 May 2018, Ljubljana, Slovenia. Accessed 11 August, 2023
<https://downloads.unido.org/ot/13/16/13165892/Paper%20Circular%20Economy%20in%20Tourism%20SEE.PDF>.
- Milano, C. (2017). Overtourism and Tourismphobia: Global trends and local contexts. Barcelona: *Ostelea School of Tourism & Hospitality*, 1-44.
- Mommaas, H. (2000, September). Cultural clusters and the post industrial city: remapping urban cultural governance. In *Conference Cultural Change and Urban Contexts*, Manchester, September (pp. 8-10).
- Montenegro Navarro, N., & Jonker, J. (2018). Circular City Governance—An Explorative Research Study into Current Barriers and Governance Practices in Circular City Transitions in Europe. *European Urban Agenda Circular Economy: Luxembourg*.
- Mrożewski, M., & Kratzer, J. (2017). Entrepreneurship and country-level innovation: Investigating the role of entrepreneurial opportunities. *The Journal of Technology Transfer*, 42, 1125-1142.
- NBTC (2019), *Perspectief 2030: Bestemming Nederland*, NBTC, Den Haag.
- Nicotra, M., Romano, M., Del Giudice, M., & Schillaci, C. E. (2018). The causal relation between entrepreneurial ecosystem and productive entrepreneurship: A measurement framework. *The Journal of Technology Transfer*, 43, 640-673.
- Obersteiner, G., Gollnow, S., & Eriksson, M. (2021). Carbon footprint reduction potential of waste management strategies in tourism. *Environmental Development*, 39, 100617.
- Padfield, T., Borchersen, K., & Christensen, M. C. (2007). *Museum microclimates: abstracts of posters at the Copenhagen conference, 19-23 November 2007*.

- Paehlke, R. (1999). Towards defining, measuring and achieving sustainability: tools and strategies for environmental valuation. *Sustainability and the Social Sciences*, 245-263. Zed Books. Distributed in the USA by St. Martin's Press.
- Pamfilie, R., Firoiu, D., Croitoru, A. G., & Ionescu, G. H. I. (2018). Circular economy—A new direction for the sustainability of the hotel industry in Romania. *Amfiteatru Economic*, 20(48), 388-404.
- Pop, I. L., Borza, A., Buiga, A., Ighian, D., & Toader, R. (2019). Achieving cultural sustainability in museums: A step toward sustainable development. *Sustainability*, 11(4), 970.
- Prendeville, S., Cherim, E., & Bocken, N. (2018). Circular cities: Mapping six cities in transition. *Environmental Innovation and Societal Transitions*, 26, 171-194.
- Prideaux, B., Pabel, A. (2021). Degrowth as a strategy for adjusting to the adverse impacts of climate change in a nature-based destination. In Hall, C.M., Lundmark, L., Zhang, J.J., (Eds.), *Tourism and Degrowth: New Perspectives on Tourism Entrepreneurship, Destinations and Policy* (pp. 116–130). Routledge: Abingdon, UK.
- Raworth, K. (2017), *Doughnut Economics: Seven Ways to Think like a 21st-Century Economist*, Random House, London.
- Renfors (2022) - Renfors, S. M. (2022). Circular economy in tourism: Overview of recent developments in research. *Matkailututkimus*, 18(1), 47-63.
- Rodríguez, C., Florido, C., & Jacob, M. (2020). Circular Economy Contributions to the Tourism Sector: A Critical Literature Review. *Sustainability*, 12(11), 4338. MDPI AG. Retrieved from <http://dx.doi.org/10.3390/su12114338>.
- Rodríguez-Antón, J. M., & Alonso-Almeida, M. D. M. (2019). The circular economy strategy in hospitality: A multicase approach. *Sustainability*, 11(20), 5665. Retrieved from <http://dx.doi.org/10.3390/su11205665>.
- Rosa-Jiménez, C., Gutiérrez-Coronil, S., Márquez-Ballesteros, M. J., & García-Moreno, A. E. (2023). Relating Spatial Quality of Public Transportation and the Most Visited Museums: Revisiting Sustainable Mobility of Waterfronts and Historic Centers in International Cruise Destinations. *Sustainability*, 15(3), 2066. Retrieved from <https://doi.org/10.3390/su15032066>.
- Rudan, E., Nižić, M. K., & Grdić, Z. Š. (2021). Effect of circular economy on the sustainability of cultural tourism (Croatia). *Ekonomia i Środowisko-Economics and Environment*, 76(1), 19-19.
- Russell, M., de Winter, J., & van Eijk, F. (2019). Circular cities: Holland circular hotspot. Hoofddorp: Holland Circular Hotspot.
- Russo, A. P. (2002). The “vicious circle” of tourism development in heritage cities. *Annals of tourism research*, 29(1), 165-182.
- Sariatli, F. (2017). Linear economy versus circular economy: a comparative and analyzer study for optimization of economy for sustainability. *Visegrad Journal on Bioeconomy and Sustainable Development*, 6(1), 31-34.
- Schöggel, J. P., Stumpf, L., & Baumgartner, R. J. (2020). The narrative of sustainability and circular economy—A longitudinal review of two decades of research. *Resources, Conservation and Recycling*, 163, 105073.

- Schroeder, P., Anggraeni, K., & Weber, U. (2019). The relevance of circular economy practices to the sustainable development goals. *Journal of Industrial Ecology*, 23(1), 77-95.
- Schumann, F. R. (2020). Circular economy principles and small island tourism Guam's initiatives to transform from linear tourism to circular tourism. *Journal of Global Tourism Research*, 5(1), 13-20.
- Scott, A. J. (2000). The cultural economy of cities: Essays on the geography of image-producing industries. *The Cultural Economy of Cities*, 1-256.
- Sequera, J., & Nofre, J. (2018). Shaken, not stirred: New debates on touristification and the limits of gentrification. *City*, 22(5-6), 843-855.
- Shackleton, S., Bezerra, J. C., Cockburn, J., Reed, M. G., & Abu, R. (2021). Interviews and surveys. In *The Routledge Handbook of Research Methods for Social-Ecological Systems* (pp. 107-118). Routledge.
- Sørensen, F., & Bærenholdt, J. O. (2020). Tourist practices in the circular economy. *Annals of Tourism Research*, 85, 103027.
- Sørensen, F., Bærenholdt, J. O., & Greve, K. A. G. M. (2020). Circular economy tourist practices. *Current Issues in Tourism*, 23(22), 2762-2765.
- Sorin, F., & Einarsson, S. (2020). Circular economy in travel and tourism: A conceptual framework for a sustainable, Resilient and Future Proof Industry Transition. CE360 Alliance. Accessed 30 January, 2023. <https://circulareconomy.europa.eu/platform/sites/default/files/circular-economy-in-travel-and-tourism.pdf>
- Strauss, A. L. (1987). *Qualitative analysis for social scientists*. Cambridge University Press.
- Su, B., Heshmati, A., Geng, Y., & Yu, X. (2013). A review of the circular economy in China: moving from rhetoric to implementation. *Journal of Cleaner Production*, 42, 215-227.
- Sutter, G. C., & Worts, D. (2005). Negotiating a sustainable path: Museums and societal therapy. *Looking reality in the eye: Museums and social responsibility*, 129-151. University of Calgary Press.
- Tien, C. C. (2010). The formation and impact of museum clusters: Two case studies in Taiwan. *Museum Management and Curatorship*, 25(1), 69-85.
- UN World Urbanization Prospects. (2018). Available at: <https://esa.un.org/unpd/wup/Download/>.
- UNFCCC. (2020). Options and Ways for Future Work to Enhance the Implementation of Article 6 of the Convention and Article 12 of the Paris Agreement, following the review of the Doha work program: Note by the secretariat. Subsidiary Body for Implementation. The fifty-second session, Bonn, 4–12 October 2020, Item 14 of the provisional agenda, Review of the Doha work program on Article 6 of the Convention (FCCC/SBI/2020/INF.4). Accessed 30 January 2023. https://unfccc.int/sites/default/files/resource/sbi2020_inf4.pdf.
- Vargas-Sánchez, A. (2019). The new face of the tourism industry is under a circular economy. *Journal of Tourism Futures*, 7(2), 203-208.
- Van Aalst, I., & Boogaarts, I. (2002). From museum to mass entertainment: The evolution of the role of museums in cities. *European Urban and Regional Studies*, 9(3), 195-209.
- Vatansever, K., Akarsu, H., & Kazançoğlu, Y. (2021). Evaluation of Transition Barriers to Circular Economy: A Case from the Tourism Industry. *International Journal of Mathematical, Engineering and Management Sciences*, 6(3), 824.

- Walker, A. M., Opferkuch, K., Roos Lindgreen, E., Raggi, A., Simboli, A., Vermeulen, W. J., Caeiro, S. & Salomone, R. (2022). What is the relation between circular economy and sustainability? Answers from frontrunner companies engaged with circular economy practices. *Circular Economy and Sustainability*, 2(2), 731-758.
- Weintraub, S., Martin, L., & Cocks, J. (2012). Preventive conservation. In Lord, B., Lord, G. D., & Martin, L. (Eds.), *Manual of museum planning: Sustainable space, facilities, and operations* (pp. 305-350). Rowman Altamira.
- Williams, J. (2019). Circular cities. *Urban Studies*, 56(13), 2746-2762. Routledge, New York.
- Wirilander, H. (2012). Preventive conservation: A key method to ensure cultural heritage's authenticity and integrity in preservation process. *E-conservation Magazine*, 6(24).
- Wojtowicz-Jankowska, D. (2017). Museums of Gdansk-Tourism Products or Signs of Remembrance?. In *IOP Conference Series: Materials Science and Engineering* 245(4), 245 042010. IOP Publishing. Retrieved from <https://doi.org/10.1088/1757-899X/245/4/042010>.
- World Economic Forum. (2018). *Circular Economy in Cities: Evolving the Model for a Sustainable Urban Future*. Cologny, Switzerland: World Economic Forum.
- World Tourism Organization. (2022, September 15). Retrieved November 27, 2022, from <https://www.unwto.org/news/ministers-agree-to-advance-circularity-and-climate-action-in-pan-european-tourism>.
- Worts, D. (2006). Fostering a culture of sustainability. *Museums & social issues*, 1(2), 151-172.

Appendixes

Appendix A: Questions for governmental bodies

| |
|--|
| Description of own role within the sector |
| <ol style="list-style-type: none">1. What is your role within your institution?2. In your own words, how do you define circular economy?3. How familiar are you with circular economy and its implementation within museums? |
| Policies |
| <ol style="list-style-type: none">4. What specific policies or initiatives has your institution implemented to support or promote circularity within the museum as part of tourism sector? |
| Strategies and practices |
| <ol style="list-style-type: none">5. What role does your institution play in regulating and overseeing the circularity of the museum and tourism sector?6. How does your institution facilitate collaboration and coordination among stakeholders from different sectors to promote circularity within the museums and in the tourism industry?7. What mechanisms are in place to monitor and evaluate the effectiveness of circularity measures within museums and the tourism sector?8. How does your institution support and incentivize innovation and entrepreneurship in museums and the tourism sector while promoting circularity and sustainability? |
| Challenges & enablers |
| <ol style="list-style-type: none">9. What are some of the key challenges or barriers you have encountered when promoting circularity or sustainability within museums and the tourism sector? How have you addressed or overcome these challenges?10. In your experience, what are the main enablers or factors that contribute to the successful integration of circular practices or sustainability initiatives within the museums and the tourism sector?11. How do you measure the impact and effectiveness of circularity or sustainability initiatives within museums and the tourism sector, and how do you use this data to drive continuous improvement? |
| Future expectations |
| <ol style="list-style-type: none">12. Looking ahead, what future opportunities do you see for museums and the tourism sector to further integrate circularity, enhance sustainability, and contribute to the circular city targets?13. Considering Amsterdam's target of achieving a fully circular economy by 2050 and halving its use of raw materials by 2030, how does your institution view the role of museums and the tourism sector in contributing to these ambitious goals? |
| Closing |
| <ol style="list-style-type: none">14. Is there still anything you would like to add regarding circularity in the museum?15. Do you have any last questions in general?16. Can I contact you if I need some kind of clarification on the interview later on? If yes, how can I best contact you?17. Can you suggest a stakeholder that might be interested in having an interview with me about the topic that is indispensable for my research? |
| Thank you for your time and participation in my research. |

Appendix B: Questions for museums

Description of own role within the industry

1. What is your role within the museum?
2. In your own words, how do you define museum circularity or sustainability?
3. How familiar are you with circular economy and sustainability implementation within museums?

Strategies & practices

4. How does your museum institution incorporate circular (or sustainability) practices into its operations and exhibitions?
 - a. Since when your museum institution started with circularity (or sustainability) practices?
 - b. Can you provide examples of how your museum institution reduces waste or implements recycling systems?
 - c. What steps does your museum institution take to ensure energy efficiency and reduce its carbon footprint?
 - d. How does your museum institution approach sustainable sourcing and materials in its exhibitions and collections?
5. What specific initiatives or programs does your museum institution have in place to promote circularity or sustainability?
 - a. Can you describe any innovative or creative approaches your museum institution has taken to promote circularity?
 - b. What strategies or mechanisms have you put in place to ensure the long-term sustainability of circular practices within your museum institution?
 - c. How do you ensure that circular practices are integrated into the overall strategy and decision-making processes of your museum institution?
6. How does your museum institution encourage staff and volunteers to adopt circular practices in their day-to-day operations?
7. How does your museum institution educate visitors about circular practices and their importance?
8. Can you share any collaborative partnerships or projects your museum institution has undertaken to promote circularity?
 - a. How does your museum institution engage with the local community to foster circular practices?
 - b. How do you engage and collaborate with external partners, such as government agencies or sustainability-focused organizations, to enable and support circular practices?
 - c. How do you share the circularity (or sustainability) progress of your museum institution with other institutions, especially other cultural or museum institutions?
9. How do you measure the impact and success of your museum institution's circular initiatives?
 - a. How do you measure the return on investment or the value generated by implementing circular practices in your museum institution?

Challenges & enablers

10. What challenges or obstacles has your museum institution faced in implementing circular (or sustainability) practices, and how have you addressed them?
 - a. How do you navigate the potential financial constraints or additional costs associated with adopting circular practices in your museum institution?

- b. Can you share any success stories or examples of how overcoming specific challenges has resulted in positive outcomes for your museum institution's circular initiatives?
- 11. What opportunities or enablers, such as policy frameworks or technological advancements, have influenced your museum institution's ability to adopt and advance circular practices?
- 12. How do you ensure continuous learning and improvement in your museum institution's circular initiatives, and how do you adapt to new challenges and emerging best practices in this field?

Future expectations

- 13. How do you envision the role of circular practices evolving in the future within your museum institution?
 - a. What are your plans or aspirations for advancing circular practices within your museum institution?
 - b. How do you envision the integration of circular practices aligning with your museum institution's broader sustainability and social responsibility goals in the future?
- 14. Are there any specific areas or aspects of your museum institution's operations where you plan to further integrate circular practices in the coming years?

Closing

- 15. Is there still anything you would like to add regarding circularity in the museum?
- 16. Do you have any last questions in general?
- 17. Can I contact you if I need some kind of clarification on the interview later on? If yes, how can I best contact you?
- 18. Can you suggest a stakeholder that might be interested in having an interview with me about the topic that is indispensable for my research?

Thank you for your time and participation in my research.

Appendix C: Questions for suppliers

Description of own role within the industry

- 1. What is your role within the museum's circularity field?
- 2. What is your current understanding of circular economy?
- 3. In your own words, how do you define museum circularity?
- 4. What is your perspective on the importance of circularity within the museum sector? Why do you believe museums must embrace sustainable and circular practices?

Strategies & practices

- 5. Can you provide an overview of your company's mission and how it aims to facilitate sharing and reuse of exhibition materials within the museum sector?
- 6. How does your company engage with museums to understand their specific needs and tailor solutions accordingly?
- 7. What strategies does your company employ to ensure the quality of your service?
- 8. Are there any specific initiatives or partnerships your company has established to support museums in implementing circular strategies?
- 9. What support or resources does your company provide to museums in terms of documentation, guidelines, or best practices for implementing circular strategies?
- 10. Can you share any success stories or case studies of museums that have greatly benefited from your company's services in terms of circular implementation?

Communication and Collaboration

11. How does your company foster collaboration and communication among museums to encourage circularity implementation?
12. How does your company collaborate with municipal or governmental entities to promote and facilitate the implementation of a circular economy within the museum sector?

Challenges & enablers

13. In your experience, what are the common challenges faced by museums when transitioning to a circular economy approach? How does your company support them in overcoming these challenges?
14. Can you discuss any notable success stories or best practices from museums that have successfully implemented circular strategies? What were the key enablers for their success?

Future expectations

15. Looking ahead, what is your vision for the future of circularity within the museum sector? How do you hope to contribute to the advancement of sustainable and circular practices within your company and the broader industry?
16. How do you navigate the potential conflicts between preserving historical and culturally significant exhibition materials and embracing the principles of circularity/sustainability? How does your company help museums find a balance between these considerations?

Closing

17. Is there still anything you would like to add regarding circularity in the museum?
18. Do you have any last questions in general?
19. Can I contact you if I need some kind of clarification on the interview later on? If yes, how can I best contact you?
20. Can you suggest a stakeholder that might be interested in having an interview with me about the topic that is indispensable for my research?

Thank you for your time and participation in my research.

Appendix D: The nexus between museum circularity and Amsterdam's circular city agenda

| Value chain | Ambition | Course of action | Circular economy initiatives | Associated organization |
|----------------------------------|--|---|---|--|
| 3.4 Food & organic waste streams | (V3) High-quality processing of organic waste streams | (V3.3) The people of Amsterdam are made aware of the importance of separating waste for uncontaminated waste streams. | Waste separation at the museums | Van Gogh Museum Hermitage Museum |
| | | (V3.4) Amsterdam creates room and generates opportunities for reusing waste streams. | Recycling coffee ground | Van Gogh Museum De Plantage |
| | | | Composting | De Plantage |
| 3.5 Consumer goods | (C1) The City sets the right example by reducing its consumption | (C1.1) The City purchases fewer new products and instead adopts a policy of access over ownership. | Sustainable museum exhibition | MuseumGoed Fiction Factory |
| | | (C1.2) The City supports the development of new circular products and services | Sustainable museum exhibition Sustainable purchase program | MuseumGoed Fiction Factory De Plantage |
| | (C2) Caring for our natural resources | (C2.1) Working together for better products in Amsterdam. | Sustainable museum exhibition | MuseumGoed Fiction Factory |

| | | | | | |
|-----------------------|---|---|--|--|------------------|
| | together | (C2.2) Increased awareness of the need to consume less and share more. | Sustainable museum exhibition | MuseumGoed Fiction Factory | |
| | (C3) Amsterdam makes the most of discarded products | (C3.1) The City, businesses and knowledge institutions work together to extract value from discarded items. | Reusing museum exhibition material | MuseumGoed | |
| 3.6 Built environment | (G1) The transition to circular development requires a joint effort | (G1.4) Knowledge: joint knowledge as a starting point. | Sustainable building certification initiative with BREEAM-NL | Van Gogh | |
| | | | Climate declaration for heritage organizations, Managing indoor climate risks, and Energy-saving measures for museums guidelines | RCE | |
| | (G3) A circular approach to the existing city | (G3.1) Agreements on circular ambitions: invite extra-municipal parties to the table | Close collaboration with regional partners in the Amsterdam Metropolitan Area (AMA) | Municipality of Amsterdam AMA | |
| | | | (G3.2) Made-to-measure knowledge: the City provides targeted knowledge and data services | Sustainable building certification initiative with BREEAM-NL | Van Gogh |
| | | | | Climate declaration for heritage organizations, Managing indoor climate risks, and Energy-saving measures for museums guidelines | RCE |
| | | | (G3.4) Close the loop: retain as much as possible value. | Project 'Tussen Kunst en Kas' | Hermitage Museum |