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Making cities and the built environment more sustainable and circular (Circular Cities and Society)

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“An endless number of green buildings doesn’t make a sustainable city”

Jan Gehl

“All the cities of the world are going to expand. We need to have a better understanding of what makes good urban habitat for homo sapiens. We have an obligation to make the new places more livable, more sustainable, more healthy. We have the tools.”

Jan Gehl

Acknowledgment

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Thanks to my colleagues and professors of my bachelor and master's degree, who taught and guided me throughout these years and who contributed with all their knowledge in teaching new professionals to work for a better future.

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Preface

The following thesis is the culmination of seven years dedicated to my bachelor's in Architecture and master's degree program in Territorial, Urban, Environmental and Landscape Planning. Having different contexts of education such as Colombia in the Pontificia Universidad Javeriana and Italy in the Politecnico di Torino, the complete experience was full of all kinds of knowledge, different social, urban, and even climatic context that contributed in a positive way the development of the master and the thesis.

The development of the thesis encouraged me to think about sustainability in a wider way, to have a bigger perspective about cities, urbanization processes and everything that need urgently to be taken into account for a more sustainable and long- term livable environment.

This thesis aims to contribute everyone who is interested in the sustainable development of cities and to encourage urban planners (students, academics, and developers) to lead cities and urbanization processes into a more sustainable system that can guarantee a safe and responsible way to inhabit Earth, our home.

Abstract - EN

Circular Cities are urban systems that aims to drive the transition toward sustainable development through the inclusion of circular economy, urban regeneration, ecological transition, and circular society principles. The transition processes is developed according to a set of requirements and steps in order to achieve a circular system and the goals included in the 2030 Agenda (United Nations, 2015) , the Paris Agreement (United Nations, 2015) and the European Green Deal (European Commission, 2019).

Participation is a key concept to support the transition toward a circular city. Therefore, the engagement of stakeholders and citizens should be included in tools and strategies developed by cities, regions, and countries.

This thesis aims at analyzing different planning tools used to support the transition toward circular cities and to investigate how participation approaches are included in the process. Firstly, the literature review of circular cities and transition case studies was made in order to have a full perspective of what circular cities are and which cities, regions or countries can be considered best practices of the transition process. Afterwards, the analysis focused on two advanced cases studies to identify and analyze the inclusion of participation approaches in detail to create a guideline handbook to support future urban policymakers in the design of the transition path toward a circular city and the inclusion of participation approaches.

The participation approaches are very important in order to fulfill the transition processes, it involves all stakeholders to work into a better future and a more sustainable environment. This is very important for future practices, not only into circular cities but in all kinds of development of cities. This thesis aims to create a framework for policymakers, decision makers and knowledge institutions to encourage a high participatory approach in all future urban developments towards sustainable cities.

Keywords: circular cities, urban regeneration, ecological transition, participation, circular economies.

Abstract - IT

Le Città Circolari (circular cities) sono sistemi urbani che hanno l'obiettivo di guidare la transizione verso lo sviluppo urbano sostenibile attraverso l'inclusione dei principi dell'economia circolare, della rigenerazione urbana, della transizione ecologica e della società circolare. I processi di transizione che portano alle città circolari richiedono una serie di requisiti e step metodologici per raggiungere un sistema circolare e gli obiettivi inclusi nell'Agenda 2030 (United Nations, 2015) , nell'accordo di Parigi sul clima (United Nations, 2015) e nell'European Green Deal (European Commission, 2019).

La partecipazione è un concetto chiave per supportare la transizione verso una città circolare. Di conseguenza, il coinvolgimento degli stakeholder e dei cittadini deve essere incluso negli strumenti e nelle strategie sviluppate da città, regioni e paesi.

L'obiettivo di questa tesi è analizzare diversi strumenti di pianificazione utilizzati per supportare la transizione verso una città circolare e identificare e analizzare come sono integrati gli approcci partecipativi. In primo luogo, è stata effettuata literature review sui temi delle città circolari e sui casi studio virtuosi di transizione al fine d'avere una panoramica completa di cosa sono le città circolari e quali città, regioni o paesi stanno sviluppando il processo di transizione. Successivamente, l'analisi si è concentrata su due casi di studio virtuosi per identificare e analizzare l'inclusione degli approcci partecipativi in modo dettagliato al fine di creare un manuale di linee guida per supportare i futuri decisori politici nella progettazione di percorsi di transizione verso una città circolare attraverso l'adozione di un approccio partecipativo.

Gli approcci partecipativi sono molto importanti per realizzare i processi di transizione, in quanto coinvolgono tutte le parti interessate a lavorare per un futuro migliore e un ambiente più sostenibile. Questo è molto importante per le pratiche future, non solo nelle città circolari ma in tutti i tipi di sviluppo urbano. Questa tesi ha come obiettivo creare un quadro per i decisori politici e istituzionali per incoraggiare un approccio altamente partecipativo in tutti i futuri sviluppi urbani verso le città sostenibili.

Parole chiave: citta circolari, rigenerazione urbana. Transizione ecologica, partecipazione, economie circolare

List of Acronyms

CC: Circular City

CE: Circular Economy

CS: Circular Society

ET: Ecological Transition

UR: Urban Regeneration

PT: Participation Tool

SME: Small and Medium Enterprises

PS: Public Sector

BS: Business Sector

KI: Knowledge Institutions

C: Citizens

NGO: Non-governmental Organization

LA: Legal Actors

O: Others

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Chapter 1 – Introduction

1.1 Introduction of the thesis

This master thesis takes as a central topic Circular Cities focusing on social well-being and urban regeneration to support stakeholders in a more participatory approach to urban planning tools. The policies and strategies for a sustainable development including the social urban regeneration is the base of the decision-making approach that this thesis aims to analyze, compare, and discuss in a critical and methodological way to create a guideline handbook of recommendations for students and research in circular cities participation approaches in the transition process.

The aim of this research is to investigate the principle concepts of circular cities such as circular economy, urban regeneration, ecological transition, and circular society and understand them in a methodological way. The thesis aims to identify, analyze, and compare existing planning tools implementing participatory approaches for the transition toward a circular city. Taking into account concepts that are connected and relevant to “circular cities”. The purpose of the literature review is to expand the knowledge of what makes cities circular in every aspect and how to analyze each of those aspects in an urban development process.

Furthermore, the development of the thesis is based on the analysis of the European case studies of transition to circular cities, such as Amsterdam, Paris, Brussels, Porto, and Sweden focusing on the implemented planning tool leading to “Circular Cities” and highlighting the private and public participation of stakeholders and the proposed participation approaches for stakeholders’ involvement to have a critical point of view, discussion, and comparison.

For the participation approach, many variables are taken into account, as for example the types of stakeholders (private and public) and the channel of involvements. The private stakeholders include citizens, companies and NGOs. While the public ones are the decision-makers and the policymakers, this means that the analysis is held in both perspectives to fulfill the purpose of the planning tool completely. On the other hand, the participation approach aims to identify all the communication channels implemented to approach the stakeholders, platforms, initiatives, etc.

The result of the thesis is the development of a guideline handbook with recommendations gathered from different case studies' best practices for a practical use for students and researchers to analyze the participation approach of planning tools leading to circular cities. This guideline has the main purpose of inform and present future developers or people interested in the development of circular cities the best practices of participation approaches in the transition process of circular cities. Taking into account that all transition processes need planning tools and actions to achieve the circularity, this guideline seeks to direct the decision-making process of planning tools in a more participatory way.

Finally, this thesis aims to contribute to the development of circular cities around the European Union and the rest of world following the UN-Sustainable Development Goals established for 2030.

1.2 Background

The United Nations Department of Economic and Social Affairs reported on 2018 that 55% of the world's populations lives in urban areas. For 2050, this percentage will raise until 68% due to the speed process of urbanization the last years. As the UN addresses, the key for a successful development is having a sustainable urbanization (United Nations, 2015). Since the growth trends are exceeding the infrastructure of actual cities and resources, the 2030 Agenda of Sustainable Development gathers effort for a new urban development framework, such as the 17 Sustainable Development Goals, these goals aim to tackle a wide range of problematic that the Earth is facing right now (United Nations, 2015). This is a challenge in all cities since it includes all aspects of urbanization processes, housing, transportation, infrastructure, energy systems, education, health care, etc. The aim of the 2030 Agenda of Sustainable Development is to integrate policies that allow the improvement of economic, social, and environmental issues in urban and rural areas. (DESA, 2018)

The rapid growth of cities leads to systems of production and consumption that are ending with the natural resources and contributing to the pollution of the environments. (Doyon, 2019). These economic systems support the growth of cities by consuming finite natural resources and exceeding the limit since the industrial revolution. Bolger and Doyon in the article "Circular Cities: exploring local government strategies to facilitate a circular economy" in the European Planning Studies Journal, addressed the circular economic system as an alternative model that replaces the linear economy of take-make-dispose by promoting restoration, regeneration, and recycling.

Several definitions about circular cities can be found in literature, however this study is based on the definition of circular cities, as a system that aims to build environments more sustainable and circular. To achieve this goal, there must be a development of solutions that considers different aspects such as, circular economy, urban regeneration, ecological transition, and participatory approaches. (Williams, 2021)

A differentiating characteristic of the development of circular cities from other types of development is the participatory approaches in urban planning have been a solution for a more democratic way in the development processes of cities, and of course, the transition into circular cities. Participation methods have their own problematics and weaknesses that create a barrier between public and private stakeholders and the planning process. This

thesis aims to analyze those weaknesses in participation tools in order to give a feedback conclusion. (Tewdwr-Jones, 2017)

1.3 Problem Statement

Urban planning has been a term of multiple debates to give it a single meaning. According to Margo Huxley in the International Encyclopedia of Human Geography in 2019 and 2020, Urban planning encompasses the preparation of plans for and the regulation and management of towns, cities, and metropolitan regions. It is a science concerned in social, economic, and environmental aspects. Planning has a practical and theoretical framework focusing on normative processes that gives the possibility for a participatory democracy. (Margo Huxley, 2020)

After World War II, urban planning has played a very important role in cities (Agatino Rizzo, 2021), and nowadays even more due to the urgent challenges of our time, such as climate change. In the 1960s, British Planning history participation is “much more narrowly conceived as taking place within the centralized, national regulatory framework of land use and spatial planning making consultation a participatory tool” being the start of participation and involvement in urban planning. (Huxley, 2013).

Participation in urban planning has divergent understandings and uses since it currently focuses on policies, guidelines, and practices. (Huxley, 2013) The literature around the participation approach in urban planning allows to ensure that everyone’s voice concern is attended. In this scenario it is necessary the creation of platforms and spaces for this collaborative process. Participation in urban planning gives an opportunity for a more democratic, political, and social life based on equality.

A collaborative process in urban planning needs to consider all actors involved in urban transformation processes, better known as stakeholders. These actors, public or private, need to have a voice in the decisions that change their own territory to have a well-balanced system since they can influence and are influenced by urban transformations.

Urban Planning is a discipline that attempt to manage and determine competing uses for land, however the participation aspect in the urban planning has been a struggle over the years. The traditional policy development and decision-making processes are close just for

experts and not for the inhabitants. Fortunately, many local authorities have been transforming their planning processes into a more participative and active approach. (Münster, y otros, 2017)

The distance between urban planning theories and citizens relies on the fact that people do not understand very well the planning system, its technical vocabulary, and mechanisms. That is one of the possible reasons of why only a small portion of the inhabitants actively participate in urban transformation processes and decision-making. Over the last ten years, technology for participation has been embraced. Digital platforms such as websites, social media, remote attendance workshops and meetings (Münster, y otros, 2017) are the contrary of the traditional methods since they remove parts of the barriers of the planning processes and allow the use of more accessible methods for the public to shape their territories. (Tewdwr-Jones, 2017)

Over the years, the participation platforms have been changing in order to achieve a larger amount of people. Linked to the fact that every redevelopment of the participatory tools is aiming to be more user-friendly and easier to understand, the Covid-19 heath emergency has closed many opportunities to merge the planning processes with the stakeholders. However, digital platforms have emerged with more intensity since that. There are many options to know about current processes and ideas as Digital Twin Cities, Virtual Reality approaches, Urban Living Labs, etc. Even though these tools are not completely implemented and have a limited range of people that are able to participate it increases the chances of participation approaches.

1.4 Objectives of the thesis

General Objective

The thesis aims to identify, analyze, and compare existing planning tools implementing participatory approaches including both private (such as citizens, NGOs, business sector, companies, etc.) and public (decision-makers and policymakers) stakeholders in the field of circular cities. It also aims at developing a recommendation handbook to support public decision-makers in the inclusion of participatory approaches in the transition to circular cities. In general, the thesis attempts to investigate how participatory tools and methods are integrated into planning tools to support the transition toward a circular city.

Specific Objectives

In order to fulfill the general objective, it is possible to identify some more specific objectives, representing the different steps followed in the thesis, as shown in the following list:

- Create a background information of different case studies of transition process into circular cities.
- Analyze participation approaches in the planning tools of transition processes into circular cities in order to identify good practices in the European context.
- Develop a guideline/recommendation handbook for a practical use for students and researchers to analyze the participation approach of planning tools leading to circular cities.

1.5 Research Question

Based on the background information and further research for the statement problem, I used this research question to guide my thesis and achieve the general objective and the specific objectives as well, therefore the following is the research question of this thesis:

How participatory are the transformation tools into circular cities and how it affects the process of transition to create a guideline for best practices?

1.6 Methodology structure of the thesis

To fulfill the general and specific objectives, some specific steps have been followed as shown in the next list:

- Collect and analyze articles and publications, as a Literature Review, about circular cities and related terms
- Analyze and compare different case studies of transition processes leading into circular cities or circular economies.
- Analyze the different planning tools and identify the participation approach for the case studies in the transition into circular cities.
- Develop a guideline/recommendation handbook for a practical use for students and researchers to analyze the participation approach of planning tools leading to circular cities.

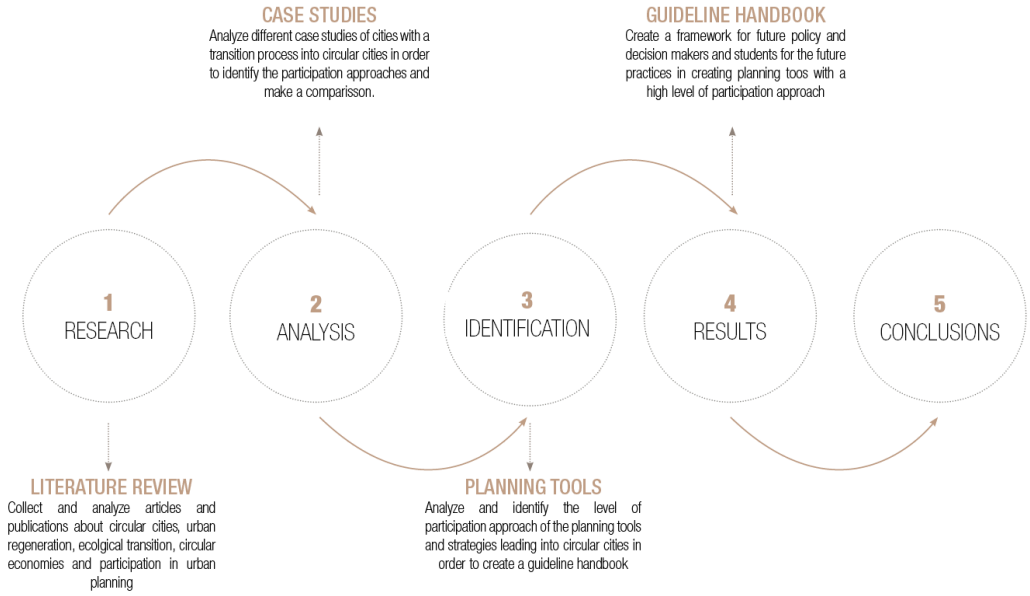


Figure 1: Methodology of the thesis (Author)

The thesis is organized as follow: in chapter 2 the literature review about circular cities and the main components is presented. Chapter 3 illustrates the methodology used for the development of the research project. Chapter 4 develops the case studies and analysis that finally concludes in a guideline handbook.

Chapter 2 – Literature Review

2.1 Circular Cities

As the main topic if this thesis are the circular cities, this chapters wills to explain all the aspects of what a circular city is. Starting from the main definitions that were given to circular cities and what are the bases that shape a circular city. Furthermore, there are 4 main components that once integrated form the circular city model. The first one and the foundation of circular cities is the circular economy which opens the discussion for material loops, resources, and market. The second component is the urban regeneration in which topics such as the remodification of urban areas for a more sustainable system. The third component is the ecological transition which takes into account the bioeconomy concept that is linked with the circular economy system. The fourth and last component is the circular society which works in cooperation between the community in order to achieve sustainable goals for the city.

2.1.1 Definition

There are many definitions of circular cities. Among them, Prendeville defines a circular city as "a city that practices circular economy principles to close resource loops, in partnership with city's stakeholders (citizens, community, business and knowledge stakeholders) to realize its vision of a future-proof city" (Prendeville et al., 2018). This leads to an understanding of circular cities as a reform in the economic cycle as well as an intended approach to more participation between stakeholders.

Additionally, the European Investment Bank in 2018 defined “A circular city conserves and reuses resources and products, shares and increases use and utility of all assets, and minimizes resource consumption and wastage in all forms”. This definition opens another area that circular cities tackle, which is the life cycle of materials in order to increase the utility and decrease waste.

These two definitions will be used as a guide in this study since they include some of the main aspects of circular cities like resource loops, stakeholders' partnership, production and consumption minimization and waste management. This is also connected with the UN Sustainable Development Goals, more specifically the 11th based on sustainable cities, the 12th in responsible consumption and production and the 13th in climate action. (United Nations, 2015)

Cities are meant to be an adaptive urban ecosystem, which in general terms is a regenerative and closed resource loop system (Williams, 2021). Nowadays, cities are the contrary, following linear economic systems and increasing their ecological footprint. To achieve circular cities, there are three principal targets to be achieved: increase urban resource security, improve population health, and reduce greenhouse emissions. (Williams, 2021) This gives a wider overview of circular cities, facing not only resource management but environmental, social and economic variables that every city handles.

In conclusions, there are some experts that address Circular Cities entirely to Circular Economies (Satu Paiho, 2020) and others that claim for a "Circular Development" (Williams, 2021).

Moreover, to have a complete circular city there are 4 main components that are necessary, the first one is to follow a circular economy system, the second one to work in urban regeneration process, the third one is the ecological transition and finally to embrace a circular society/culture. The following sections aim to explain the definition of each component and how they work.

2.1.2 Circular economies

Circular economies means that the value of products, materials and resources is maintained in the economy as long as possible, and the generation of waste in minimized. (Girard & Nocca, 2019)

The Global Urban Agenda addresses 12 priority themes for the development of cities, one of them is the circular economy. Translating this to the city-level means a transition from the linear economy to the circular. (United Nations, 2015)

As mentioned before, the circular economy seeks for a closed production-consumption process. To achieve that, a transition process must be held. This process in divided in three

main steps: slowing, closing, and narrowing the loop or resources. Focusing in these three processes, slowing the loop means design long-life products by reusing, repairing, and recycling. For closing the loop, it is needed to take advantage of the residual resources and have an industrial symbiosis. Finally, narrowing the loop means maximizing the resource efficiency by using less resources than in past production processes. (Doyon, 2019)

Moreover, to start a transition for linear to circular economy, a new business model needs to be created. Flowing the steps mentioned in the article Toward Circular Cities (Satu Paiho, 2020), it is necessary to close material loops, reduce resources and keep materials as long as possible. Additionally, it is also needs to find new collaboration partners and reconsider value offered to stakeholders. The circular economy has a strong connection with urban regeneration core aspects that will be explained later.

There are also three ways to categorize circular business models. First is slowing the loop by designing long-life products, secondly, closing the loop by taking advantage of the residual resources and the third way is narrowing the loop by maximizing resource efficiency and use few resources as well.

Taking this into account, the circular economy in the city context is divided in 6 thematic areas by Local Governments for Sustainability (ECLEI) for an International Circular Economy in a global network for sustainable urban development: city planning and governance, buildings and construction, public procurement, industrial symbiosis and waste, water, food, and energy management. All of them are needed to work together in order to fulfill the aims of circularity in cities in an ecological, social, and economic way.

2.1.3 Urban regeneration

Urban regeneration consists in the remodification of consolidated urban areas in the center of the city. It is used as a mechanism to reverse a process of economic, demographic, and social decline through an intervention that in many cases is marked by strong public action (ONU HABITAT - Centro Cultural Fernando Lazaro Carreter, 2016). This mechanism is based in the relocation of activities and businesses, together with the updating and modernization of urban infrastructure and land use and property structure modification.

UN-Habitat promotes an inclusive participatory urban regeneration process to reach sustainable cities to reintegrate deficiencies and declined areas of the city. All this is

achieved by improving connectivity in different levels and with a coherent configuration of public space and urban facilities to guarantee the integration of the designated area or regeneration

Additionally, urban regeneration brings many benefits to the city. It increases in urban productivity, job creation, investment attraction, increase accessibility to housing, existing infrastructures capitalization, crime reduction, revitalization of obsolete facilities, the preservation of historic buildings and the reduction of air pollution and of traffic. (ONU HABITAT - Centro Cultural Fernando Lazaro Carreter, 2016)

As for the circular city development, urban regeneration plays a very important role since the principal goals circularity in cities are increase urban resource security, improve population health, and reduce greenhouse emissions. (Williams, 2021) Taking into account the definitions about circular cities mentioned before, the aim of closing resource loops and creating local stakeholders' partnerships we can analyze the relation with the "urban regeneration" concept. The increase or urban productivity aim to close resource loops of production and consumption prioritizing the local production and material. The investment attraction and job creation are linked with embracing local stakeholder partnership. Also, the revitalization and preservation of existing buildings is associated with the resource loop closing as well by applying the reuse, recycle and repair concepts.

For further appliances of urban regeneration linked with circularity processes in cities there are many topics to be addressed. Firstly, the urban resource security issues are an increasing problem of water, food, and energy matters. It also considers urban ecosystems health issues like loss of vegetation and soil degradation. All these facts impact on the urban economy and population health. Although circular cities and circular development seeks for a regeneration and renewal of practices into a circular way, there is a difference between these two key terms.

On one hand, the circular cities seek for industrial actors to adopt a closed-loop production processes and business models, an overlooked and well-planned urban provision system and three base SDGs, responsible production, industrial innovation, and economic development. On the other hand, circular development is a new normative model for urban development that creates infrastructures and urban activities supporting circular urban systems in a natural, social, and artificial way. It also allows the adaptation of long-term changes and immediate changes by reducing urban resource consumption, waste and

greenhouse gas emissions, regenerates urban ecosystems and builds urban resilience. (Williams, 2021)

To achieve the goal of circular cities and circular development, there are three actions to be considered and each one of them gives benefits in an ecological, social, and economic way.

The first action is the resource loop; reuse (resources used again with any further processing like graywater reuse or repair processes), recycle (resources are reprocessed for the original or other purposes like waste-water treatment and circular economy) and recovery (the energy is produced from reprocessing resources like in heat production, biogas, and waste-to-energy processes). The second action is the ecological regeneration which is based in the infrastructure that helps regenerate the ecosystem services for example the drainage systems, or in general terms green and blue infrastructure and the ecosystem management, for example urban agriculture, water management, urban forestry, etc. The third action is adaptation which is seen in the infrastructure (adaptable, movable, versatile), in the communities (pop-up economy, cooperatives, social housing) and the urban form (pop-up spaces, temporary urbanism, multi-use space) (Williams, 2021)

As said before, the sustainability benefits from the circular development and circular cities are divided in three main groups, ecological, social, and economic. The ecological benefits are the reduction in urban resource consumption, the reduction of air and surface temperature, the increase of resource security within urban systems, the restoration of urban ecosystems services, the tackle of pollution, the regulation of local climate, increase biodiversity and fertile soils in cities, a local resource production, and clean water and air. The social benefits are divided in two, health and community. The health benefits are a positive impact on mental and physical health, the increase of resilience in population, the encouragement to active lifestyles, the reinforcement of walking and cycling in cities, the reduction of obesity and levels of stress, and long-term health resilience. The community benefits are to build stronger social capital and human capital, faming cooperatives, generate local economic and physical capital, increase resilience and adaptiveness of communities, the generation of new pop-up activities and increase access to resources, however, sometimes they are not equally experienced. As for the economic benefits, they are the reduction of waste, the creation of new economic sectors, industries and business, new job opportunities, avoid health, flood and pollution remediation costs, the valorization of biological waste and reduce economic risks. (Williams, 2021)

To conclude, all the sustainability benefits in closing resource loops are linked and related to some of the urban regeneration benefits, however all this is possible with a very accurate planning system with a well-done participatory approach in order to create systems that adapt to each community and be functional.

2.1.4 Ecological Transition

The main concern for the term" circular cities" to develop is the rising of world's population. Since cities have a great economic weight, they generate around 70% of the global GDP meaning that cities also consume 70% of the global resources and energy, produce 70% of the global waste and greenhouse gases (Satu Paiho, 2020). To give solutions to this problematics and concerns, the United Nations Department of Economic and Social Affairs established that the urbanization processes need to implement the Sustainable Development Goals for 2030. The European Union Cities are in process of transition for sustainable and low carbon societies facing urbanization challenges every day.

The core aspects for a Circular City are the recovery of end-of-life products; bioeconomy focusing on organic products, waste recovery and urban farms; the logistics in re-use repair and remanufacturing products; sharing the information in digital tools; have a clean and shared mobility system; embrace the local and renewable production of products and energy and have modular, shared, and disassemble buildings. (Satu Paiho, 2020)

To understand what "Circular Cities" are and mean, there are some key principles that must be considered. First, the use of natural resources being non-efficient in the past and second, recycling as process to be done with goods and materials and third, the minimization of food waste.

2.1.5 Circular Society

As mentioned before, the sustain of circular cities is the circular economy. However, there is a major concern in the achievement of this goal despite all the technical action plans which is the missing concern for social transformation. (Jaeger-Erben, Jensen, Hofmann, & Zwiers, 2021). The concept of Circular Society (CS) claims that a circular city or circular economy will not be able to achieve if there is not commitment and participation of societal actors. In order to fulfil the purpose of circular economy there are some social actions needed to be

followed such as the transparency of production processes and accessibility to products. Additionally, there are some actions for an economic reorganization that leads to circular economy involving a circular society by having a more fairly distributed and circulated production in a regional and participatory way. (Jaeger-Erben, Jensen, Hofmann, & Zwiers, 2021)

Furthermore, a transdisciplinary approach is needed for a better implementation of actions in a circular economy transition process. This transdisciplinary approach is seen in the cooperation of different stakeholders in different levels and areas of the society system in a co-creation and co-design of products, services, and social innovation processes.

2.2 Transition into Circular Cities

For a further literature review, it is necessary to know which cities have been implementing the system and how. It is important to know what this transition to circular economy means exactly and which are the processes to be followed.

The transition to circular cities also means the transition to a circular economy by keeping products, components and materials in the highest value and use in all aspects and systems that a city has, construction, manufacturing, fashion, food, etc. To achieve this goal, first is needed to follow the circular business models in the circular economy system. Therefore, different scenarios require to be con considered like; have a collective action, work in a city offering system, be part of international network and have local competing services. It is also fundamental to have a clear definition of stakeholders being business, public sector, knowledge institutes and citizens that work together as enablers, promoting and facilitating an activity, provider of goods or services and user. (Satu Paiho, 2020). As a first reference, the European Commission developed “The European Green Deal” which aims to tackle climate change and environmental challenges by transforming the society into a more sustainable one.

> *“*This Communication sets out a European Green Deal for the European Union (EU) and its citizens. It resets the Co*mmission’s commitment to tackling climate and* environmental-*related challenges that is this generation’s defining task. The atmosphere* is warming and the climate is changing with each passing year. One million of the eight million species on the planet are at risk of being lost. Forests and oceans are being polluted and destroyed1.

> The European Green Deal is a response to these challenges. It is a new growth strategy that aims to transform the EU into a fair and prosperous society, with a modern, resource-efficient and competitive economy where there are no net emissions of greenhouse gases in 2050 and where economic growth is decoupled from resource use.” (European Commission, 2019)

Once the transition is ongoing, there is the need to monitor the process with the evaluation of proper indicators. In 2018 and 2020, The European Commission proposed in the “EU Circular Economy Action Plan” ten indicators for a monitoring framework divide in four main stages: production and consumption, waste management, secondary raw materials, and competitiveness and innovation.

This monitoring framework refers to the official strategic document of the European Commission “A new Circular Economy Action Plan For a cleaner and more competitive Europe” in which 35 actions aggregated in 7 main areas are illustrated to guide the transition toward a more circular Europe. The 7 areas are: the Sustainable product policy framework, key product value chain, lees waste more value, making circularity work for people, regions, and cities, crosscutting actors, leading efforts at global level and monitoring processes. (European Commission, 2020)

Finally, Satu Paiho (2020) identified 7 steps to be followed to achieve circularity in urban areas. The first target is about the definition of what circularity is for each specific city. Second, each city has to define the path for the transition towards circularity. The third step is to establish the targets and objectives. The fourth step is to select indicators to measure progress during and after the transition. The fifth is to define the concrete means to achieve all the steps and goals for a circular system implementation. Sixth, work in all the support services of the city that play a role in the transition. Finally, the seventh step is to engage with the stakeholders.

Circular economy in cities can be approached considering different sectors, such as the food system, the construction sector, the water management, the reuse and bioremediation of abandoned spaces, and the use of the blue and green infrastructure. To conclude, for a proper transition toward a circular city and the achievement of sustainability targets there is a need of investments, political support, and public engagement.

Chapter 3 – Methodology

Following the main objective of the thesis, the development of the guideline/recommendation handbook that identifies the participation approach in the transition into circular cities, it is necessary to have a deep analysis and understanding of the main planning tools, roadmaps, strategies, and programs of the transition case studies and therefore develop the handbook.

The next diagram shows how this identification and analysis will work and how the methodology will be developed.

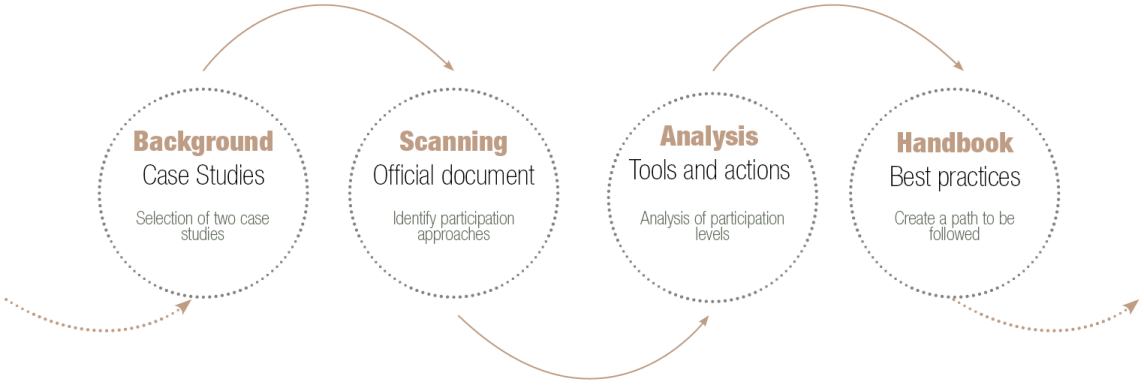


Figure 2: Methodology for the analysis of participation approach (Author)

3.1 Literature Review

The first step was to investigate about circular cities, what problematics this system aims to tackle and what are the main components that make a circular city work (circular economy, urban regeneration, ecological transition, and circular society). This literature review opens a wider panoramic view of how a circular city should work and what are the main challenges and goals. Additionally, to the first literature review, a transition process section of case studies will recomplicate different articles about how cities transform their system.

This literature review will help the development of the thesis in order to find the results in participation approaches in circular cities transition processes by analyzing the official documentation, define guidelines and finally create a handbook for good practices.

3.2 Selection and analysis of case studies

From the literature review elaborated in this thesis, some cities were mentioned in the articles about circular cities and transition processes. Therefore, 5 case studies were selected which are Amsterdam, Paris, Brussels, Porto, and Sweden. These 5 sites where selected to have different perspectives form European countries. This case studies have been implementing the transition process from 2015-2018 until now, therefore, they have an extensive experience in the topic and in the transition outcomes. All of them are based in the reports and documents developed by the European Commission such as the Green Deal and the Circular Economy Action Plan.

3.3 Analysis of participation tools in the transition into Circular Cities

The third step is the analysis and comparison of the participation tools of two of the case studies analyzed before. It aims at identifying the most relevant and advanced participatory tools already implemented in the European context to support the transition to a circular city. The expected outcome of this step is the identification of the most successful elements and insights to be possibly replicated in other European contexts focused on the participatory approaches.

The official documentation is scanned to identify the participation strategies and tools used in each city/country transition process. It is important to highlight that the participation approach is one of the main pillars in any transition process to circular cities since the involvement of citizens and all stakeholders guarantee a better process with more efficient results. The case studies selected for a deeper analysis are Amsterdam and Paris taking into account that these cities have a much more complex system than the other case studies, and the years that they have been implementing the system.

3.3.1 Scanning of official documents

To undertake a deep and accurate analysis, different aspects were analyzed. As a first step the analysis focused on the structure of the document, the main goals set by the city and how it will be divided and developed in the document. Then, addressed aspects including areas and sectors of the cities, the stakeholders involved, and the levels of action developed were analyzed. Having all that information clear, the next step focused on the identification of participatory tools and actions implemented in the processes. A participatory action is

defined as one including two or more stakeholders in a highly interactive way; therefore, the stakeholder identification is made. Finally, the last step is to organize the information in a table that explains the tool or action developed and which stakeholders are involved. After having the scan and information identified the next step can be done.

To do a deep and more precise analysis in participation approaches, there are different aspects that were taken into account. In the first place the scan of the document is important in order to understand the structure of the document, the main goals of the city and how it will be explained and divided. Then the identification of the core aspects includes the areas and sectors of the cities that were taken into account, the stakeholders involved, and the levels of action developed. Having all that information clear, the next step is to identify all the tools and actions that are participatory, meaning that includes two or more stakeholders in a highly interactive way, therefore the stakeholder identification is made. Finally, the last step is to organize the information in a table that explains the tool or action developed and which stakeholders are involved. After having the scan and information identified the next step can be done.

3.3.2 Identification of participation approach in the planning tools leading to circular cities

In order to proceed with a more detailed analysis of each planning tool, action plan, roadmap or strategy implemented in the case studies, a more in-depth analysis was undertaken to identify in more effective way the level of participation of each best practice. Three main elements were considered: the main components in each strategy and associated actions, the used channels of involvement, and the type of stakeholders involved. The final purpose of this methodology is to have an overview the most relevant case studies, visualize the average of results and proceed to elaborate more detailed work in what might be missing in some components, what channels of involvement are not being used and which

stakeholders are not being taken into account. Therefore, the following diagram explains how the analysis is performed and which elements were considered.

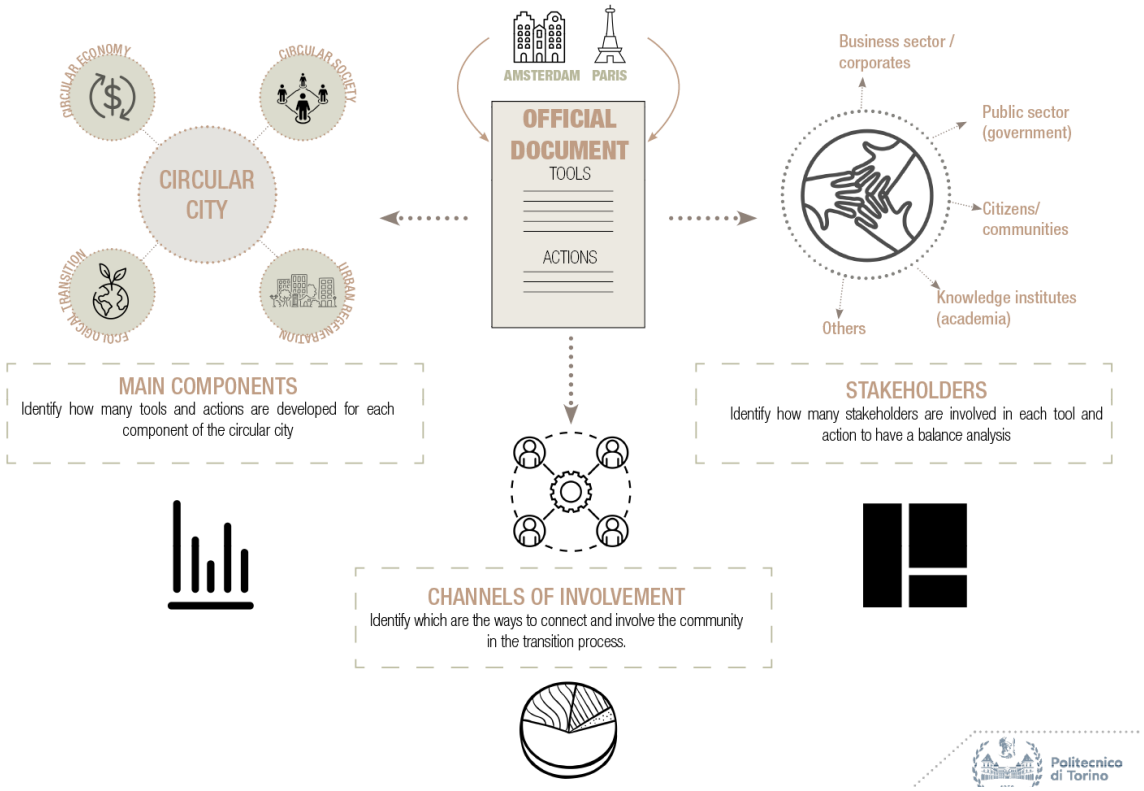


Figure 3: Identification process of participation approach in planning tools leading to Circular Cities (Author)

3.3.2.1 Main components

After identifying the participatory actions and strategies in the planning tools in the scanning process, the analysis of which components of a circular city are considered in each action and strategy is made. This step is important to evaluate how involved are the stakeholders in the different aspects of the city. The components taken into account were the ones presented in the literature review, circular economy, urban regeneration, ecological transition, and circular society.

For an extended analysis of this, once the actions and strategies are written in the table, a bar chart can be implemented in furtherance of comparing the quantity and connections of each one of them in different components of circular cities. The following table and chart

presented are hypothetic examples of how it could be done to then be implemented in the results section of the thesis for each case study.

Table 1: Example of quantification of participatory actions and strategies in each component of circular cities

Participatory actions and strategies in each component of circular cities in CITY 1			
Circular economy	Urban regeneration	Ecological transition	Circular Society
Action 1	Action 1	Action 1	Action 1
Action 2			Action 1
Action 3			
3	1	1	2

Once the table is done, a graph can be developed to visualize the balance between the participatory actions in every component of a circular city. In this hypothetic example, the circular economy component is the one with the majority or participation actions followed by circular society, but on the other side the urban regeneration and the ecological transition are the components that have less participatory actions.

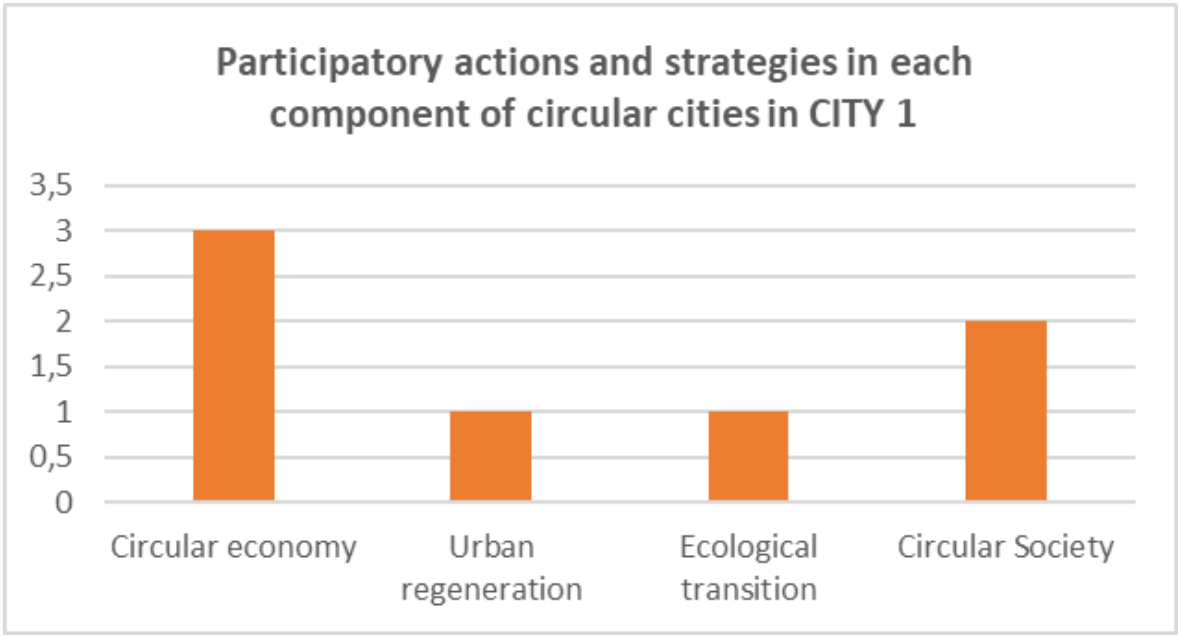


Figure 4: Example of quantification of participatory actions and strategies in each component of circular cities

3.3.2.2 Channels of involvement in the participatory actions and strategies toward circular cities

As a second step, the channels of involvement of stakeholders were analyzed. in order to categorize the proposed communication channels, the classification made by (Münster, y otros, 2017) was used as a reference. In this work, communication channels are classified as physical and virtual and as 1-way or 2-way approach. This approach for analyzing the different channels of communication intents to classify each one of the channels. In a 2-way channel, the physical communication can be workshops, booths or interactive installations that can have a response from the different stakeholders in a more immediate way, on the other hand the virtual approach involves other mechanisms such as websites, apps, social media and remote attendance to conferences or meetings that also enable stakeholders to comment and participate. In a 1-way channel of involvement there are in a virtual approach method such as advertising in the street or building with banners for example, the media e.g., newspapers and mailings of brochures, on the other hand the virtual methods are the same, but the difference is the procedure or approach like radio, commercials, podcasts, vlogs and emails.

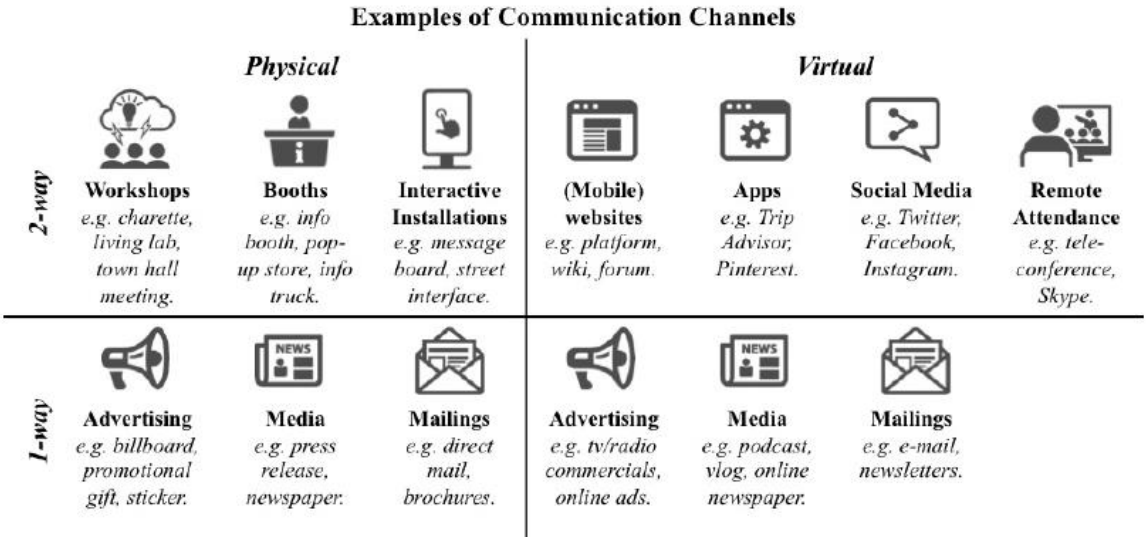


Figure 5: Overview of communication channels: physical, virtual, 1-way and 2-way (Munster, y otros, 2017)

Following the chart explained above, for the analysis methodology that will be implemented, a similar chart is formulated in order to add the quantity of actions and strategies that are in every case study document. This way a panoramic visualization of all the channels of involvement is done.

Table 2: Example of chart to quantify the channels of involvement in planning tools toward circular cities

	2-way			1-way		
Channels of involvement	Physical	Workshops	2	Physical	Advertising	1
		Booths	3		Media	2
		Interactive installation	2		Mailings	9
	Virtual	Mobile and apps	7	Virtual	Advertising	1
		Social Media	1		Media	5
		Remote Attendance	5		Mailings	6

The following step is to graph the information from the table to be able to visualize inequalities or unbalance in the channels of involvement. Also, this step is important in order to make comparisons with other cities that are also implementing circular cities actions and how effective their transition is going.

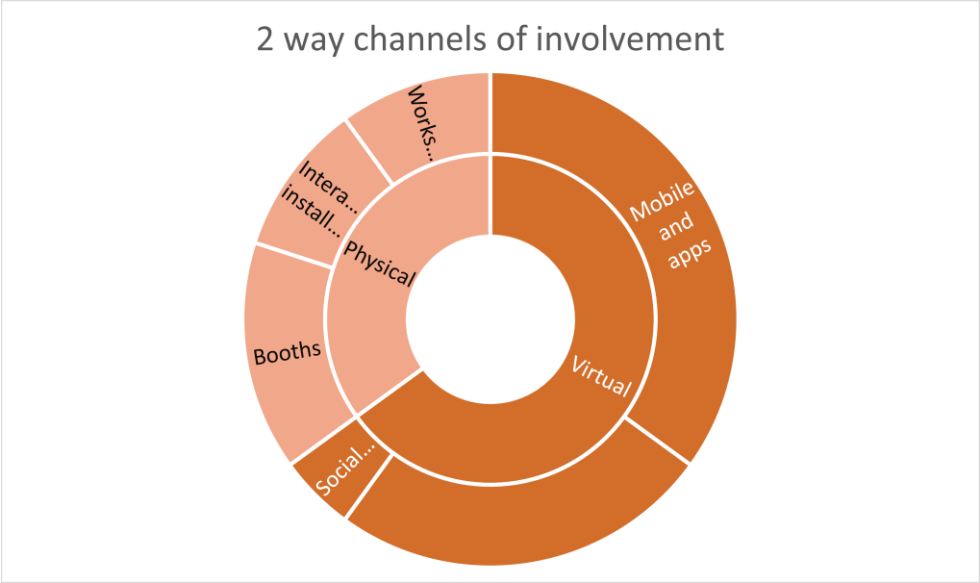


Figure 6: Example of a graphic representation of a 2 way channels of involvement

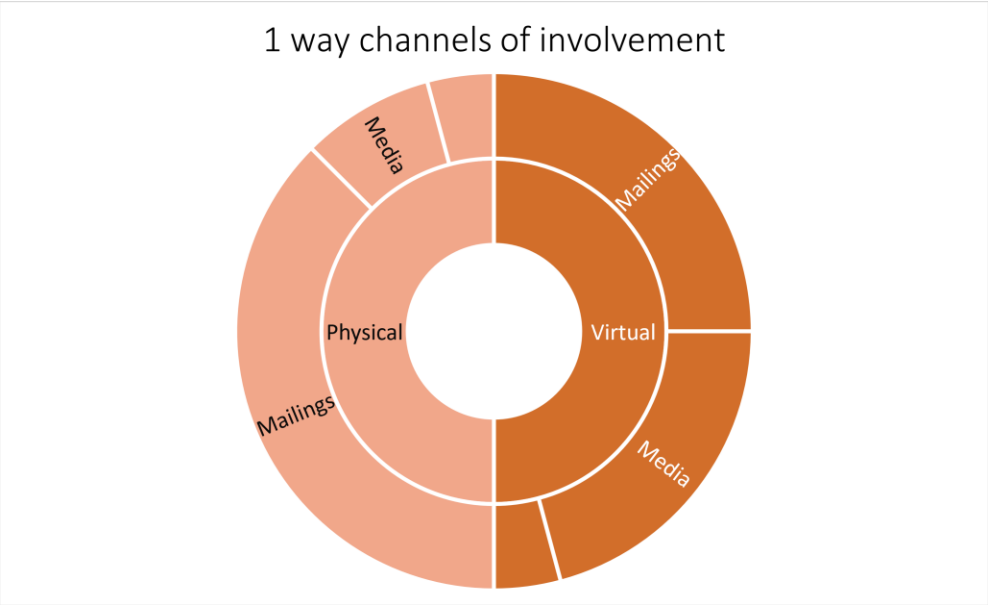


Figure 7: Example of a graphic representation of a 1 way channels of involvement

3.3.2.3 Analysis of stakeholders involved in the participatory actions and strategies toward circular cities

One of the main pillars for every planning tool Is the involvement of stakeholders, therefore this section is about the analysis of all the people that can be involved in a participatory way towards the transition into circular cities and that are included in the official document in the case studies. There is completely necessary to listen to the community and have as much accurate information as possible in order to have an efficient and effective transition process.

Table 3: Example of chart to quantify the involvement of stakeholders in planning tools toward circular cities

Amsterdam Stakeholders involved				
Business sector /corporates	Public sector (government)	knowledge institutes (academia)	Citizens/communities	Others
15	5	20	9	1

The following step is to graph the information and this way a comparison between other case studies can be developed in a better way. In this hypothetical case, the business sector is highly more involved that the other stakeholders, therefore is necessary to have a deeper analysis in how the other stakeholders can be more involved in the other actions and strategies or generate new ones for them.

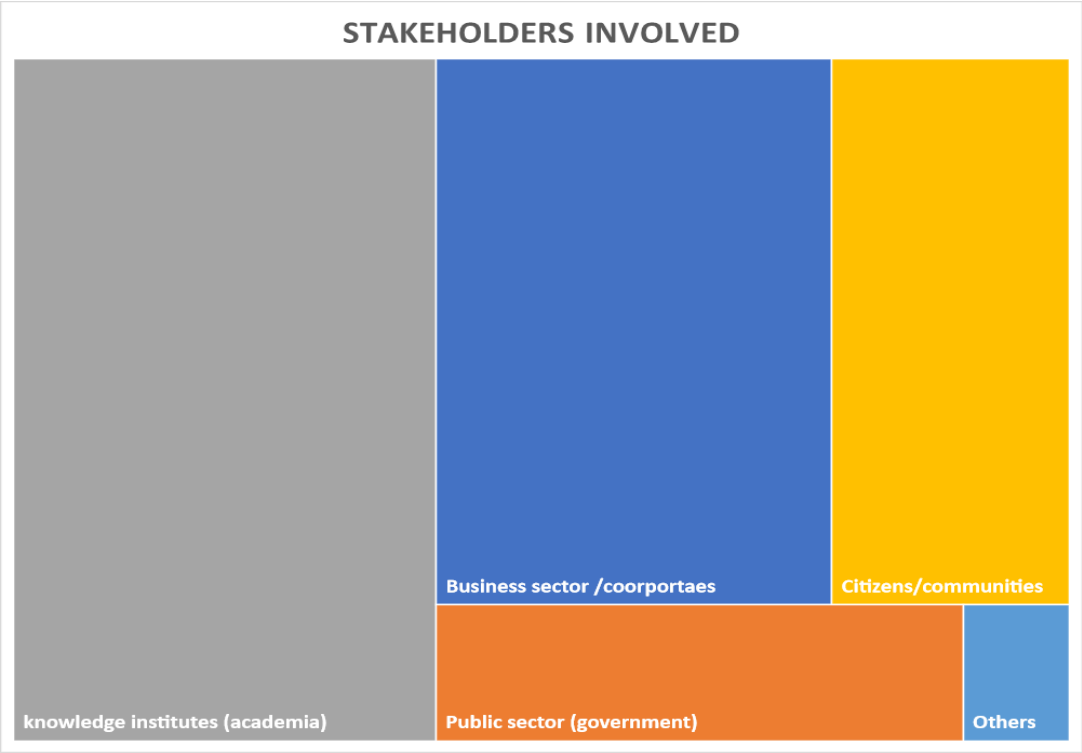


Figure 8*: Example of a graphic representation of stakeholder's involvement*

Chapter 4 – Results

After the research about circular cities and transition processes to them the next step is to analyze 5 case studies, the scan on the official documentation is necessary to identify the participation strategies and tools used in each city transition process. It is important to highlight that the participation approach is one of the main pillars in any transition process to circular cities since the involvement of citizens and all stakeholders guarantee a better process with more efficient results. The case studies analyzed are Amsterdam and Paris taking into account that these cities have a much more complex system than the other case studies, in addition to its ease of the language in which the official document is written and the years that they have been implementing the system.

4.1 Selection and analysis of case studies

Taking into account the meaning of the transition explained in the literature review, the five case studies were selected and analyzed, Amsterdam, Paris, Brussels, Porto, and Sweden. This is based on different articles, reviews, and reports about these cities which have been implementing the system and can also be useful for the methodology part.

4.1.1 Amsterdam

The city of Amsterdam, located in The Netherlands, has developed a plan towards an “Smart City” indicating as a goal to achieve a “Circular Economy” followed by a knowledge co-production of the “Green Deal”. As mentioned before, this economic system follows a new method of production, distribution, and consumption. To reach the goal and start implementing circularity, six principles where implemented.

> *“In order to reach these goals, the City of Amsterdam has committed itself to the following six* principles (City of Amsterdam,2015):
>
> 1. No waste: all materials will end up in an in*fi*nite technological or organic cycle
> 2. Energy will be entirely derived from renewable sources.
> 3. Natural resources will generate new *fi*nancial or non-*fi*nancial gains.
> 4. System adaptability will be supported by modular and *fl*exible product design and supply chains

> 5. New business models for production, distribution and consumption will be developed in order to transition from possession to the use of services
>
> 6. Human activities will contribute to eco-system services and to the rebuilding of *'natural capital'."*
>
> (Exploring circular economy imaginaries in European cities: A research agenda for the governance of urban sustainability transitions, 2019)

Based on the cited article. The core element of the of the circular economy model is the localization of resource flows in order to minimize the importation of basic materials to have an independent resource market. To achieve this, it is necessary to work on a new production, consumption, and distribution in a regional and local scale. Additionally, this transformation is organized in six cycles: food, phosphate, waste, water, electricity and heat.

On the other hand, Amsterdam's Journey to a Circular City Webinar based on the work of "The Amsterdam City Doughnut – A tool for transformative action" (Doughnut Economics Action Lab (DEAL), 2020) Marieke van Doorninck, Deputy Mayor of Amsterdam for Spatial Development and Sustainability talked about the implementation of circularity for developing a sustainable and circular future by 2050.

The City Doughnut model adopted by the city of Amsterdam is a tool for a transformative action that relies its theory in building a model which purpose is not growth but instead focus on the well-being of population and ecological ceiling, which might be not wealthy but is healthy in all levels. As a circular strategy, the city of Amsterdam aims the use of all their materials in a using, reusing, and repairing way; as for example construction of buildings, in order to fulfill this objective, they are looking for different ways to develop it; for instance, in the city governments promoting the consumption of local goods, food and organic waste.

The economy model developed in the City Doughnut Model is based in securing that everyone has enough health and is contributing to climate change as well. However, this is the first City Doughnut Model in the world making it a testing framework. This framework has four main pillars in social foundation and ecological ceiling in a local and global level. The global aspect is taken into account in this model since the city of Amsterdam also uses materials, products, etc. from external nations for the wellbeing of Amsterdam's citizens.

As mentioned previously, the four pillars are divided in the ecological and the social level. In the ecological level, Amsterdam has a public transportation system that works perfectly according to climate change actions, however in fishing and shipping there is some action that needs to be considered. In the social level, many systems work according to the

premises established by the city, however, the price of housing is a problematic since it is very expensive and, in many cases, difficult to approach.

All this is very important since the City Doughnut is a mirror to see the footprint of the city and helps the monitoring of projects and accomplishments. This is as well a circular strategy; the mirror, since its is a way for innovation projects to make sure all the goals are accomplished. This is crucial also in the residents' point of view; the citizens in this model play a very important role since many of them cannot be sustainable in every way and in that case scenario the responsibility relies in the government.

Stakeholders are also a crucial part of the model, since the stimulation of innovation is necessary for the model to work, this stimulation is generated in relationships between companies and institutions that work together and set standards and impose rules. One of the main standards followed by all innovation plans is the "right to repair". This is followed by the concept of closing loops in a circular economy model and a commitment in fund runners in making sure taxes in raw materials go up and in labor go down.

Furthermore, to accomplish the city doughnut model that is entirely connected with the circular city concept and the theme of this thesis, this case study follows up with the role of business in the transformative action of the city of Amsterdam. The business sector focus in innovation models and in the responsibility of collecting high quality products and make sure that they get back to the material for reuse. To succeed in these processes, there are some actions taking place such as "Repair Cafes" where people meet and repair damaged or broken electroosmotic of other artifacts to avoid the need of buying a new one. Another example is the "Sustainable Neighborhood in the water" which generates entirely the energy they consume; this is a project in testing face which in case it works will be applied in other areas of the city. (Doughnut Economics Action Lab (DEAL), 2020)

4.1.2 Paris

The city of Paris, located in France has combined the circular economy policies and strategies with the national agenda being the first city adopting an official circular economy plan. The document that gives base to this is the Municipality Program for a Circular Paris and The White Paper on the Circular Economy of Greater Paris made by the Paris City Hall. In the Conference on Climate Change of 2013, France expressed for the first time the intention for a transition to a circular economy, in 2015 the Energy transition law was adopted

and in 2017 the first roadmap on circular economy by the City Hall was released. (Lica, 2019)

As mentioned before, the official document in The White Paper on the Circular Economy of Greater Paris in which 7 strategies and 65 proposals were written. The first strategy is “encourage and support economic players” as in product or service business models, ecological design in products, production responsibility, donation and repair or products and finally a circular business finance. The second strategy is “innovate and experiment” contemplating a foster industrial and regional ecology, supporting research in circular business models, incubators, finance innovation and development of sustainable projects. The third strategy is “scale up and establish regional momentum”, this strategy combines actions like initiatives for framework in industrial and regional economy, urban planning, sharing of spaces, protection and support of local agriculture, waste management partnership, recycle and reuse of materials and products and transportation of donations. The fourth strategy is “change attitudes and practices” which is highly linked to circular society by having actions such as digital platforms, labelling products, inform stakeholders and citizen, have a circular economy curriculum in schools and teach professional stuff new models of circular economy. The fifth strategy is “involve local authorities, businesses and citizens” intending the reduction and recovery of food waste and unsold goods, the reduction of disposable products, composting local level support, life-cycle extension and better management of recycling and sorting. The sixth strategy is “create network linking players” by connecting people for good exchange and make connection, give second chance to products in a social network reuse and have platforms for food waste and renewable energy. The seventh and final strategy is “change legislation” generation planning tools and agriculture, reuse and recycle procedures and construction. (Lica, 2019)

As for the municipal level, there is a “Paris Economy Plan” by the Paris City Hall, this is the action plan in the food sector reconstruction (waste management, sustainable chain supply, etc.) and the territorial innovation and urban metabolism (methods to tackle issues, support of sustainability, involve local stakeholders, natural resources management, consume and process, etc.) In this document the “roadmaps” are included with 15 actions for a responsible consumption, repairing and reusing materials, collection and treatment of waste, renewable energy, recycling recovery and selling raw materials, clean transportation energy control and waste incineration and recovery. (Lica, 2019)

4.1.3 Brussels

The city of Brussels located in Belgium has established some circular economy strategies and climate change mitigation having as a background document the 2015 Paris Agreement pointing out the acceptance on circular economy in national and local governments as well as climate change strategies in circular economy at the urban scale.

The main strategies the city of Brussels is focusing on are the primary material footprint and the carbon footprint in the household consumption (food, housing, transport) in order to identify and understand flows and effects such as environmental hotspots of consumption and/or production activities. The goal of this strategies is to provide insight to extend the circular economy implementation and enable climate change mitigation.

To achieve this goal, the city of Brussels has implemented a methodology in the residential area based on three main steps. First, the input and output analysis of an estimate city's footprint, measure of indirect impacts and comparison with local impacts. Secondly, the link and overlap of two footprints, local and global in order to identify the hotspots. Third and last one, the CE strategies that are linked to the hotspots identified in the previous step.

The identification of the hotspots plays a very important role in the CE strategies since it is divided in food, housing, and mobility. The Framework used in this case is the reSOLVE framework which has CE principles such as regenerate, share, optimize, loop, virtualize and exchange.

Finally, the city of Brussels has a structured analysis for the CE strategies to be implemented in the city after identifying the hotspots in food, housing, and mobility consumption domain. The structure continues in a shift of consumption network and compare it to the shift in fulfilling the consumer needs. As a conclusion the city of Brussels has been activating the local economy, however the focus now must be in the consumption on citizens and rest of stakeholders. (Maarten Christis, 2019)

4.1.4 Porto

The city of Porto, located in Portugal has a multi-sectorial and macro level framework for a circular economy using the UN Sustainable Development Goals as a baseline. Additionally, the CE key concepts that the city of Porto took into account were flexibility, modularity, and transparency. The circularity in Porto is established by having a definition, implementation,

monitoring in the city, indicators, and data collection. The tool to measure and set goals of circularity in the city us the Circular City Analysis Framework (CCAF) in which the main goal is to help municipalities and cooperating actors understand a city's circularity. Finally, the official document for the transition to a circular city in the city of Porto is "Porto Circular Economy Roadmap" made in 2017 which has a long-term vision of a program with specific actions that will lead Porto into a circular city by 2030.

The roadmap mentioned before is based in some materials and methods, first there is the Circular City Analysis Framework which captures the circularity in any analyzed city and is composed by a Circular City Diagram (CCD) in which there are 3 circles, the core circle is the information of the city, the middle circle are the industry and sectors, and the outer circle are the aspects with broader fields. The second material in the Circular Economy Indicators which are currently under development. The third methodology is the Field-by-Field Development which identifies 13 sectors in 3 levels: inner circle, intermediate circle, and outer circles.

The inner circle is based in local resources like energy, food, material, and cultural sources. This reflected in Porto is seen in the increase of green space areas like promoting green roofs. The intermediate circle is based in renewable energy, transport sector, building sector, food sector, water management, waste management, CE innovation, and specific industries. The reflection of the intermediate circle in the Porto's case study can be seen in the generation of power by wind and air potential in a 63%, innovation hubs and platforms to promote circularity (which have the 0.009% of the total municipal budget). The outer circle works in education, digitalization, demographics, and policies that in Porto are seen and companies that embrace new technologies for digitalization, a gender-balance un demographics and connection of policies in the EU Circular Economy action plan.

To conclude, some of the actions elaborated for the transition of Porto into a circular city are the following, increase energy independence, use local resources, increase green areas, have a grid network that connects the country, increase innovation, decrease waste flow, increase food waste allocation to send life, integration of electrical vehicles, implement circular business models, recycling and waste separation education, include education programs focusing on CE, improve digitalization and monitoring, adaptation of policies for the public, among others. (Ferreira & Fuso-Nerini, 2019)

4.1.5 Sweden

The case study of Sweden was made for the entire country and not just a city since the official document Circular Economy Delegation of 2018 is made in a national and regional level as well as the Circular economy – Strategy for the transition in Sweden document.

The transition of Sweden into a circular country is based on the implementation and adaptation of policies in each municipality and in the sectorial structure of its economy and availability of resources. The central government is the one in charge of applying strict environmental regulations and provide incentives in technology and policies to support the transferring knowledge and resources as well. There are 4 benefit pillars in the circular economy transition for Sweden; environmental, economic, resource and social benefits that held the transition's goals.

The Sweden's general information in circularity in the Assessment of Circular Economy in Sweden (Heshmati & Rashidghalam, 2022) mentions that a 36% of energy consumption is bioenergy and 99% of the household waste and 53% of plastic is recycled having a high rate of recycling compared to Europe countries.

Sweden's implementations for a circular economy and circular country are based in the improvement of conditions of productive growth. These conditions are determined in the solid waste, water waste management and recycling in public education and programs incentives as well as the green political parties in decision-making processes.

The objectives that were established for a circular economy are four. The first one is the standards for CE in a multidimensional way in a municipal level which are covered by an index of waste collection, waste recycling and utilization, emission of air pollutants, infrastructure and mechanism, waste tax, investment, waste management and clean transport and renewable energy. The second objective is to estimate a composite index based on the CE principles. The third objective is the use of index for evaluation of CE practices and their variations taking into account location, population size, density, concentration of industries and investment programs covering all sectors of economy. The fourth objective is to get the indicators to therefore level and develop the CE.

Additionally, Sweden's CE and sustainability is based in general actions. The incorporation of green political parties in the first one, followed by having incentives programs that seek optimal conditions for a gradual and effective increase in recycling and finally the innovation in market economy, product, and processes to reduce materials and substitutions as

possible. Therefore, three areas of action were established in 2018 by the Delegation for a Circular Economy, design for circularity, plastic materials, and public procurements in which their main askes are develop strategies, have an inclusive participation, education, have a transition process, etc.

Furthermore, Sweden has sone techniques for the measurement of the circular economy index. One technique is the index-based on material flows, another one is based in energy flows and land use and consumption. Finally, there are other single indicators that helps measure that circularity such as ecosystem damage potential, carbon footprint, life-cycle assessment, among others.

In total there is a composed index made by eight of them, waste collection, recycling and utilization, emission of air pollutants, infrastructure, mechanism and culture waste tax, investment and waste management costs, clean transport, and renewable energy. These indexes are used for the evaluation of practice of CE and the results vary and have differences due to the geographical conditions of the county and regions, population density, concentration of industries and investment programs. (Heshmati & Rashidghalam, 2022)

4.1.6 Comparison of Case Studies

In order to have a full perspective of all the Case Studies mentioned before, the next comparison table (see **Error! Reference source not found.**) has the objective to identify a ll the characteristics of each city or country in the different aspects of CE but mostly having a critical view into the participation processes and circular society. Therefore, from the five case studies, five main elements where identified, the start year to know how much time this transition process have been active, the general features of the site to know what the area of the city or country and how many inhabitants it has, next the main strategies implemented in the city, the participation approach identified form the articles and reviews and finally the official document of each one.

This comparison table will help ion the methodology part to pick two of them for a deeper analysis to identify and analyze the participation approach in order to build the guideline for best practices as a tool for future decision makers, students, and urban planners.

Table 4: Case Studies Comparison Matrix (Author)

Case Study	Start year	General Features of the site	Main strategies	Participation approach	Official document
Amsterdam	2015	Population: 1,165,898 inhabitants Area: 219,3 km^2	- 4 main pillars: social foundation and ecological ceiling, in a local and global level. - Work in the localization of resource flows - Minimize the importation of basic materials - Consumption of local goods, food and organic waste	- Stimulation of innovation between companies and institutions - "The right to repair" as a main standard for closing loops - The "Sustainable Neighborhood in the water" testing with citizens	"The Amsterdam City Doughnut – A tool for transformative action" "Amsterdam Circular Strategy for 2020-2025"
Paris	2015	Population: 11,142,202 inhabitants Area: 105,4 km^2	The 7 main strategies for a Greater Paris Document - Encourage and support economic players - Innovate and experiment - Scale up and establish regional momentum - Change attitudes and practices - Involve local authorities, business, and citizens - create network linking platers - change legislation	- incubators for innovation for sustainable projects - use of digital platforms - circular economy curriculum in schools and universities - connecting people for good exchange - build a social network of reuse, food waste platforms and renewable energy.	The White Paper on the Circular Economy of Greater Paris by Paris City Hall
Brussels	2016	Population: 2,109,631 inhabitants Area: 162 km^2	- identify and understand flows, effects and hotspots of the primary material footprint and carbon footprint in the	- Create a consumption network based in local primary material.	PROGRAMME RÉGIONAL EN ECONOMIE CIRCULAIRE

			household consumption - focus actions in regeneration, sharing, optimization, closing loops, virtualization, and exchange.		
Porto	2017	Population: 1,320,347 inhabitants Area: 41,42 km^2	Capture circularity in the "Circular City Diagram" in 2 main strategies. - First, focus on local resources, energy, food, material, and culture. - Second, focus on renewable energy, CE innovation, etc.	- Innovation hubs - Platforms to promote circularity - Embrace new technologies for digitalization - Education programs focusing on CE - Adaptation of polices for the public	"Porto Circular Economy Roadmap"
Sweden	2018	Population: 10,218,971 inhabitants Area: 528,447 km^2	- Improvement of conditions of productive growth - Have a CE standard in a multidimensional way - Estimate a composite index and use it for evaluation of CE practices in order to get indicators	- Work on public procurements by having inclusive participation and education	Circular Economy Delegation and the Circular economy – Strategy for the transition in Sweden.

To conclude, the transition case studies opened a wider view on how cities are implementing the circular economy system to achieve the circular city model as well. It is important to add that the area of the site and its inhabitants has an important impact in the development of the strategies and tools together with the starting year of implementation process. Therefore, all the case studies have similarities but also many differences that adapts each system to the site such as the organization process, the dynamics of the city or country, the cultural aspects, the economic system, among others.

4.2 Analysis and Identification of participation approach in planning tools in the transition of Amsterdam into Circular City

4.2.1 Scanning of official documents

The city of Amsterdam has developed 2 official documents. The first document is the "The Amsterdam City Doughnut – A tool for transformative action" (Doughnut Economics Action Lab (DEAL), 2020). This strategy uses the Amsterdam City Doughnut to describe how societies and businesses contribute to economic development and identifies the limits of the planet and our society in order to respect them and have a better functioning system. (City of Amsterdam, s.f.)

The second document is the Amsterdam Circular Strategy 2020-2025 in which the City Doughnut tool has contributed. Therefore, this strategy

> *"Aims* to significantly reduce the use of new raw materials, thus contributing to a sustainable city. In the coming years, the city will map out various material flows, from entry to processing, in order to preserve valuable raw materials. The aim is to halve the use of new raw materials *by 2030 and to achieve a fully circular city by 2050."* (City of Amsterdam, s.f.)

4.2.1.1 "The Amsterdam City Doughnut – A tool for transformative action" (Doughnut Economics Action Lab (DEAL), 2020)

The Amsterdam transition process to circularity is structured in 4 lenses, local social and ecological and global social and ecological as well. All of them aims to answer the question How can our city be a home to thriving people in a thriving place, whole respecting the wellbeing of all people and the health of the whole planet?

Figure 9: The Thriving City Portrait - Shaping the lenses: city targets and snapshots (Doughnut Economics Action Lab (DEAL), 2020)

The main tools used is “The City Portrait” in which the first participatory methodology is identified, the City Doughnut Workshops which consists in creating feedback questions and suggestions about the city and the transition process. The result of this lenses creation is to create a “big-picture” of the city’s actual situation and opinions on the different stakeholders. The workshops were held in 7 different neighborhoods of Amsterdam in which the city staff was together with the residents to hear visions and priorities for a thriving Amsterdam. There fore four insights are mentioned in the document: thriving in nature, housing and social cohesion, ensuring a just transition and citizen-led transformation.

The following step presented in the document is the answer of 3 main questions. The first one is “What would it mean for Amsterdam to thrive withing its natural habit?” in which diverse areas of biodiversity were taken into account divided in three groups (water, air, and land). This responds to the ecological transition and urban regeneration transition process of circular cities.

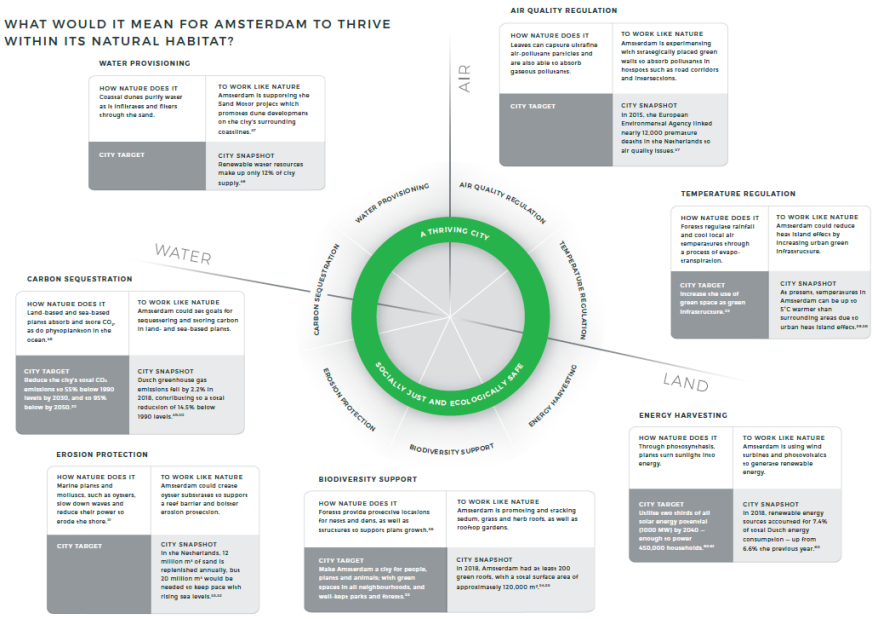


Figure 10: The Thriving City Portrait - Diagram 1 (Doughnut Economics Action Lab (DEAL), 2020)

The second question is “What would it mean for Amsterdam to respect the health of the whole planet?” this question aims to analyze the ecological impacts of the city also in the three groups (air, water, and land). This questions directly linked to the urban regeneration main component of circular cities which aim for a transition for sustainable and low carbon societies and urbanization challenges.

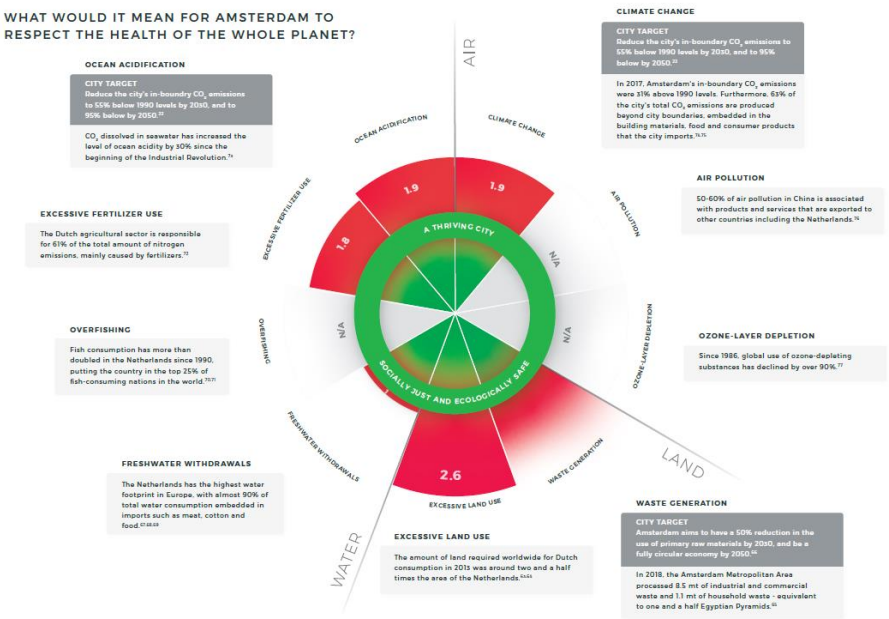


Figure 11: The Thriving City Portrait - Diagram 2 (Doughnut Economics Action Lab (DEAL), 2020)

The last question is “What would it mean for Amsterdam to respect the wellbeing of people worldwide?’” This question takes into account all actions of people thought their purchases, investments, innovations, educational opportunities, and cultural influence and how this affects other citizens inside and outside the city. The last question is connected with the circular society component that works for a transdisciplinary approach, participation of societal actors and social transformation.

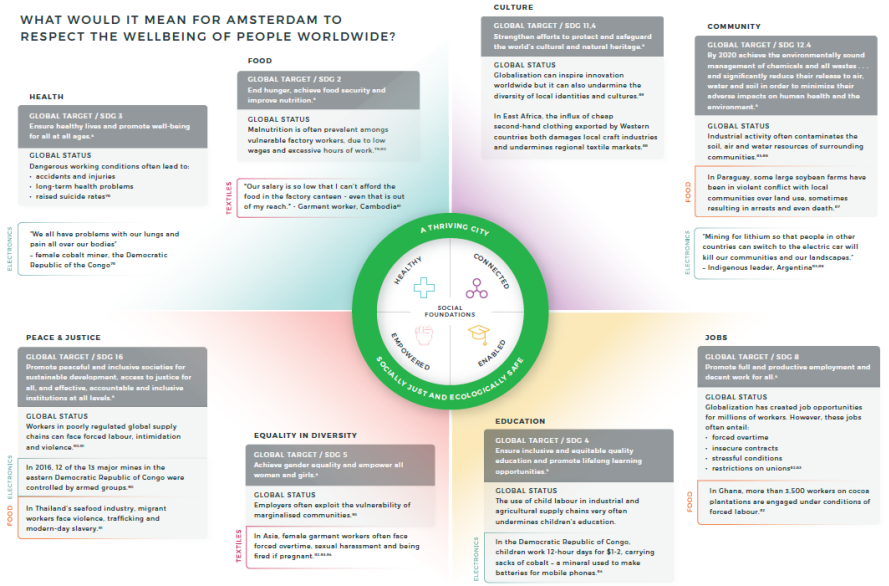


Figure 12: The Thriving City Portrait - Diagram 3 (Doughnut Economics Action Lab (DEAL), 2020)

Finally, the “City Portrait” is done with all the information collected, creating a very complete and accurate tool. Therefore, this transformative approach proposes 5 levels of analysis, global, national, city, neighborhood, and household. In order to create the City Portrait, the cycle for this co-creation begins with the insight of the community comments and workshops, then the actions and then the impact evaluation to proceed again in the City Portrait development. The tools and methods used are the City Portrait as mentioned before, the Doughnut Workshops, the Doughnut Deals, the Integral Theory, the Iceberg Model, etc. Finally, the network of changemakers or stakeholders involved to build this transformative tool and of course put it into action are the SMEs/Startups, Communities, Commons, Corporates, Governments and Academia. Graphically is all explained in the Figure 5.

To conclude, this tool that aims to transform the city of Amsterdam into a circular model has diverse areas to tackle and therefore transform. Additionally, the participation approach of this tool aims to collaborate with different stakeholders, takes into account all kinds of perspective and aims to constantly build a panoramic view of the city, its challenges and opportunities.

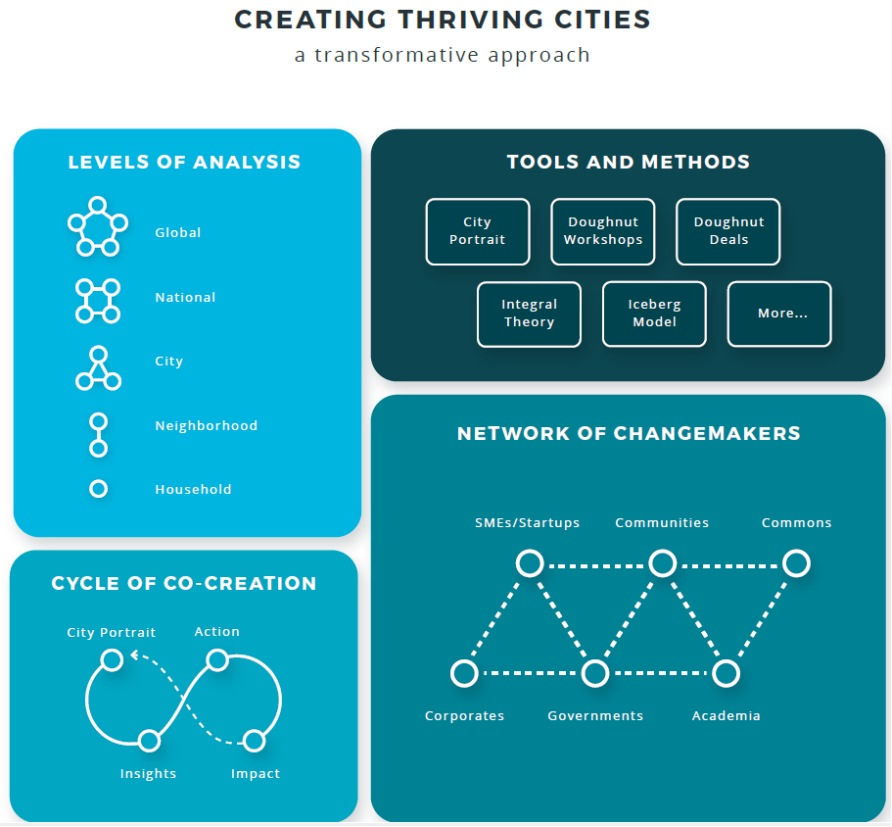


Figure 13: Creating Thriving Cites Graph (Doughnut Economics Action Lab (DEAL), 2020)

4.2.1.2 Amsterdam Circular Strategy 2020-2025 (Amsterdam, 2020)

The final document to analyze of the city of Amsterdam is the Amsterdam Circular Strategy for 2020-2025. This document is directly linked with the previous one and functions as a base and also as a feedback tool for the process.

Figure 14: Visual overview of the relationship between the strategy, the implementation programme, the monitor and the city doughnut. (Amsterdam, 2020)

The Amsterdam Circular Strategy for 2020-2025 is divided in 5 chapters; first the introduction, the second in the “Circular Amsterdam” in which the perspective of how Amsterdam would look like functioning with the circular economy. The third chapter is “Ambitions and Courses of Action” in which they describe how they arrive to the strategy, the methodology, cross-value chain approach and policy instruments of each of three main pillars; food and organic waste streams, consumer goods and built environment. The fourth chapter is the monitoring part for the measurement of the progress. And finally, the last chapter are the references used.

The final purpose or main objective of the City of Amsterdam is being a thriving and equitable city and to ensure a good life for everyone withing the Earth's natural boundaries. Therefore, the "Circular Amsterdam" is being developed by working with 7 districts of the city, having local initiatives, market parties, knowledge institutions and residents into account. The approach used is called "learning by doing" following the idea that actions are more than words. Finally, there are 3 value chains that were taken into account for the transition process as first insight, The first one is "food and organic waste streams", the second one is "consumer goods" and the third one is "build environment". This three were chosen since they have an economy significance to the city according to the City of Amsterdam.

The participation approach of this strategy and main objective of analysis for this thesis is divided in 3 main actors, the citizens, the business sector, and the municipality. For each one, there is a different participation approach, for example for the citizens is more directed in appealing messages, campaigns, online and offline communication etc. On the other hand, for the business sector the participation is seen in new collaborations by having a chain of actors or sectors meetings and discussions. For the municipality, the participation approach is giving example in the public space and their own properties,

The methodology used for the development of the strategy is based in workshops for suggestions, details, and refinements as we saw in the City Doughnut to then be presented in the Amsterdam Circular Strategy for 2020-2025. This discussion results then go thought decision-making processes to be then submitted to residents for participation advice and develop the "Value Chain Program".

The Cross-Value Chain approach is a tool developed focusing on the three chains mentioned before, each one is analyzed for then having a clear development direction which are all the actions relates to each chain and finally and ambition to fulfill. The sectors involved in the Value Chains are social institutions such as museums, schools, universities, and hospitals since they all play a role in resident's daily life. Other group of actors involved is the SME and large business corporate market which are non-industrial such as hotels restaurants, retail, and services because they all share commercial purpose and provides employment and business activity. Additionally, the port and the industry play a significant role in the process since a big challenge is to turn the port into a circular ecosystem using waste streams and the sail (as a very important activity in The Netherlands) must be 100% circular by 2050.

Finally. The policy instruments used in the strategy are divided in 3, regulatory, economic, and soft, each one with a different level of participation. For example, the economic instruments have economic frameworks and public-private partnerships and the soft instruments have almost all the actions participatory such as research activities, information campaigns, exchange platforms, living labs, etc.

The following step is to analyze the policy instruments explanation of the document in the 3 value chains and *identify the participation approaches in each one organized in a table. The first one is "Food and organic waste streams" which has a main purpose* a better align of production with local consumption reducing the waste.

Table 5: Food and organic waste and streams participation identification based in the Amsterdam Circular Strategy 2020-2025

#	Participation tools	Stakeholders
1	Awareness campaigns to have a behavioral change called the AIDAS (awareness, interest, desire, action, satisfaction	Citizens, municipality
2	Set up a cluster of processing companies to find good applications to ensure high quality of production	Business sector, municipality
3	Have a sustainable food chain in urban agriculture by having networks such as "Food Connects" based in research	Knowledge institutions
4	Awareness campaigns in cooperation with company canteens and social institutions	Business sector and institutions.
5	Allocate waste in an effective way by campaigns on schools, associations, neighborhood initiatives, shopping mall managers and business associations held by the knowledge institutions	Knowledge institutions, business sectors, citizens.
Actions		
1	Circular Experimental Garden in West: educational laboratory for the experiments in food production, biomass soil, fertilization, and biodiversity	Citizens, knowledge institutions, business sector
2	Zuidoost Food Forest: initiative of residents that stimulates social cohesion between generations and different population groups.	Citizens, knowledge institutions.
3	Kitchen and garden waste in Amsterdam: local initiatives such as worm hotels, leaf baskets, local composting, and bread baking to facilitate the collection of waste to upcycle them	Citizens, municipality.

The second value chain is the "consumer goods" which is focused on the fashion business and the main objective is a good design as first step for long lasting products. As done in the step before, the policy instruments in the document are analyzed in order to identify the participation approach.

Table 6: Consumer goods participation identification based in the Amsterdam Circular Strategy 2020-2025

#	Participation tools	Stakeholders
1	The City sets right example of consumption reductions and will cooperate with innovative companies and develop partnerships with business startups, knowledge institutes and other Dutch Municipalities	Municipality, business.
2	Work for better products by stimulating innovation in cooperation with knowledge institutions, CE business and people	Knowledge institutions, business, citizens.
3	Awareness campaigns to encourage people to share, repair and reuse.	Municipality, citizens
4	Improve sharing and repairing products having libraries for used products (clothes, tools, etc.) to repair called “Repair cafes” that also allows to have social function and contact activity, also sharing platforms, local craft centers and circular shopping centers	Citizens, municipality
5	Stimulate dialogue and innovation with a cooperation with knowledge institution to increase awareness by campaigns and policy advertising on the public space	Knowledge institutions, municipality.
6	Upcycle materials that are no longer repairable by awareness and raising campaigns in design schools	Knowledge institutions.
7	Create clusters to promote innovative reuse or recycled materials in new products	Business, knowledge institutions, municipality (public authorities)
Actions		
1	Amsterdam Made: 150 manufacturing local companies that help each other in the transition into CE.	Business
2	Extend the useful life of consumer goods: investigation in if scooters, cars and trucks can help identify bulk waste along roads	Knowledge institutes, municipality.
3	Hub in the Dutch Circular Textile Valley: magnet for business and initiatives to exchange knowledge.	Business, knowledge institutions.

Finally, the built environment chain is focused on the city and is linked with the components of the circular city such as urban regeneration and ecological transition in a very high level.

Table 7: Built environment participation identification based in the Amsterdam Circular Strategy 2020-2025

#	Participation tools	Stakeholders
1	Since the complexity of circular construction is very high and has limited experience a cooperation between different stakeholders is needed to share information and ideas to develop new instruments	Market, knowledge institutions, citizens, municipality
2	The municipality formulate circular ambitions for each district infrastructure in consultation with the stakeholders as the basis for the	Citizens, municipality, market, knowledge institutions

	development transformation and management and as the market and knowledge institutions	
3	Central municipal expertise center with relevant municipal departments for practical advice about circular construction practices and urban development	Municipality, knowledge institutions
4	The City sets right example for formulating circular criteria with the cooperation of knowledge research institutes and consultancies.	Knowledge institutions, municipality.
5	Renovation of infrastructure by having a "circular toolbox" with information about technical, financial, social, organizational, and legal implementation issues	Knowledge institutions, municipality, citizens
6	Encourage innovation by launching competitions to challenge and integrate companies, housing, corporations' institutions, and schools	Citizens, municipality, knowledge institutions, business
7	Physical storage spaces and online inventories to close material loop	Municipality, business
Actions		
1	Bulksloterham: former industrial area transformed into a circular city district for living and working as a testing ground for research, innovations, and experimentation	Municipality, citizens, knowledge institutions.
2	Timber construction investigation process: one existing building "The Vivaldi Building" as an investigation of wood construction to reduce the concrete in construction processes.	Knowledge institutions, business.
3	Circular Road: circularity in public solace designing in Amstelstad district by having a road with innovative materials.	Citizens, municipality, knowledge institutions, business
4	Sustainable Canal Banks: renovating, restoring, and replacing with circular concrete and maintenance with emissions-free vehicles and equipment.	Knowledge institutions, business

4.2.2 Identification of participation approach in Amsterdam's planning tools leading to circular cities

The following step after the analysis of the document is to identify how participative is each tool and action, therefore the next section of this chapter follows the information of Amsterdam and Paris and quantifies the components of circular cities involved in each tool, the stakeholders and the channels of involvement.

As a first step, the compilation of all the tools and actions was made in a unique chart, that way the detailed information and analysis was able to be written and visualized better. The next chart shows the main components that each tool and action is working with taking into

account the literature review about circular cities. This means that in each tool was identified rather circular economy (CE), urban regeneration (UR), ecological transition (ET) and circular society (CS). On the other hand, all the stakeholders were algo grouped in 5 categories: the business sector (BS), the public sector (PS), the knowledge institutes (KI), the citizens (C) and others (O). Finally, the last main column was the channels of involvement that was divided in 1-way and 2-way following the physical and virtual criteria explained in the methodology part. Thanks to this chart, the followings analysis was held and specified afterwards.

Table 8: Analysis of participation approach of the Amsterdam Circular Strategy 2020-2025

Tool/Action	Stakeholders	Main components	Channels of involvement			
			1-way		2-way	
			Physical	Virtual	Physical	Virtual
Awareness campaigns to have a behavioral change called the AIDAS (awareness, interest, desire, action, satisfaction	C, PS	CS	Advertising campaigns	Advertising campaigns		
Set up a cluster of processing companies to find good applications to ensure high quality of production	BS,PS	CE	-	-	Booths, workshops	
Have a sustainable food chain in urban agriculture by having networks such as “Food Connects” based in research	KI,BS	CE, CS	-	-	-	Mobile apps
Awareness campaigns in cooperation with company canteens and social institutions	BS,KI	CS	Advertising campaigns	Advertising campaigns	-	-
Allocate waste in an effective way by campaigns on schools, associations, neighborhood initiatives, shopping mall managers and business associations held by the knowledge institutions	KI,BS,C	CS	Advertising campaigns	Advertising campaigns	interactive installation	-
Circular Experimental Garden in West: educational laboratory for the experiments in food production, biomass soil, fertilization, and biodiversity	C,KI,BS	CE,CS,ET	-	-	Workshops, interactive installation	-
Zuidoost Food Forest: initiative of residents that stimulates social cohesion between generations and different population groups.	C,KI	CS	-	-	Workshops	-
Kitchen and garden waste in Amsterdam: local initiatives such as worm hotels, leaf baskets, local composting, and bread baking to facilitate the collection of waste to upcycle them	C,PS	CS, ET	-	-	Workshop, interactive installation	-

The City sets right example of consumption reductions and will cooperate with innovative companies and develop partnerships with business startups, knowledge institutes and other Dutch Municipalities	PS,BS	CS,CE	-	-	Workshop, booths	-
Work for better products by stimulating innovation in cooperation with knowledge institutions, CE business and people	KI,BS,C	CS,CE	-	-	Workshop, booths	-
Awareness campaigns to encourage people to share, repair and reuse.	PS,C	CS	Advertising campaigns	Advertising campaigns	-	-
Improve sharing and repairing products having libraries for used products (clothes, tools, etc.) to repair called “Repair cafes” that also allows to have social function and contact activity, also sharing platforms, local craft centers and circular shopping centers	C,PS	CS,CE	-	-	Booths, interactive installation	Mobile and apps, social media
Stimulate dialogue and innovation with a cooperation with knowledge institution to increase awareness by campaigns and policy advertising on the public space	KI,PS	CS	Advertising campaigns,	Advertising campaigns	Booths, interactive installation	-
Upcycle materials that are no longer repairable by awareness and raising campaigns in design schools	KI,C	CS,ET	Advertising campaign	Interactive campaigns, media, mailing	Booths	-
Create clusters to promote innovative reuse or recycled materials in new products	BS,KI,PS	CS,CE	-	-	Booths, interactive installation, workshops	-
Amsterdam Made: 150 manufacturing local companies that help each other in the transition into CE.	BS	CS,CE	-	-	Workshop, booths	-
Extend the useful life of consumer goods: investigation in scooters, cars and trucks can help identify bulk waste along roads	KI,PS	CE,ET	-	-	Interactive installation	-
Hub in the Dutch Circular Textile Valley: magnet for business and initiatives to exchange knowledge.	BS,KI	CE,CS	-	-	Workshop, booths	-
Since the complexity of circular construction is very high and has limited experience a cooperation between different stakeholders is needed to share information and ideas to develop new instruments	KI,C.PS,O	UR,ET,CS	-	-	Workshop, booths	-

The municipality formulate circular ambitions for each district infrastructure in consultation with the stakeholders as the basis for the development transformation and management and as the market and knowledge institutions	C,PS,O,KI	UR,CS	Advertising campaigns	Advertising, mailings	Workshops	-
Central municipal expertise center with relevant municipal departments for practical advice about circular construction practices and urban development	PS,KI	UR,CS	-	Advertising campaigns	Workshops, interactive installation	-
The City sets right example for formulating circular criteria with the cooperation of knowledge research institutes and consultancies.	KI,PS	UR	-	-	Workshops	Remote attendance
Renovation of infrastructure by having a “circular toolbox” with information about technical, financial, social, organizational, and legal implementation issues	KI,PS,C	UR,CS	-	Advertising campaigns	Workshops	Mobile and apps, social media,
Encourage innovation by launching competitions to challenge and integrate companies, housing, corporations’ institutions, and schools	C,PS,KI,BS	CS,UR	Advertising campaigns	Advertising	Booths, workshops	Social media
Physical storage spaces and online inventories to close material loop	PS,BS	UR,CS,CE	Advertising campaigns	Advertising	Interactive installation	Social media, Mobile and apps
Bulksloterham: former industrial area transformed into a circular city district for living and working as a testing ground for research, innovations, and experimentation	PS,C,KI	UR,CS,CE, ET	-	Advertising, media, mailings	Interactive installation, workshops	Social media
Timber construction investigation process: one existing building “The Vivaldi Building” as an investigation of wood construction to reduce the concrete in construction processes.	KI,BS	UR	-	-	Interactive installation	-
Circular Road: circularity in public solace designing in Amstelstad district by having a road with innovative materials.	C,PS,KI,BS	UR	-	-	Interactive installation	-
Sustainable Canal Banks: renovating, restoring, and replacing with circular concrete and maintenance with emissions-free vehicles and equipment.	KI,BS	UR	-	-	Interactive installation	-

After the analysis and identification of different aspects of the tools ins the Amsterdam's official document, 29 tools out of 42 of the tools have a participation approach which means that involves the stakeholders through different channels to build together the system and create better processes. This is the 70% of the tools implemented in the strategy plan to make the circular city works.

The next steps are to analyze those planning tools and identify which component of a circular city they work on, the stakeholders involved, and the participation channels used.

4.2.2.1 Participatory actions and strategies in circular cities' main components

The following step in the analysis is to countdown the quantity of tools and actions that involve each one of the components of a circular city, almost all the tools involve two or more components, therefore the analysis leads to the identification of whether some components are being taking more into account than other and how balanced can it be. The next table shows that quantification. This means that from the 29 tools and actions analyzed, 12 respond to circular economy (41%), 11 to urban regeneration (38%) 7 to ecological transition (24%) and 23 to circular society (79%). These results mean that the Amsterdam Circular Strategy 2020-2025 has a high focus is circular society and circular economy to achieve the goals for a circular city.

Table 9: Participatory actions and strategies in each component of the Amsterdam Circular Strategy 2020-2025

Participatory actions and strategies in each component of circular cities in Amsterdam			
Circular economy	Urban regeneration	Ecological transition	Circular Society
12	11	7	23

Conjointly to the previous table, the next graph aims to show the balance of the tools and actions for the city of Amsterdam in the four main components of a circular city. As we can see, most of the tools and actions are focused on "circular society" meaning that the City of Amsterdam aims to work very hard in changing the behavior of citizens into a more collaborative way and build a society that follows the principles of circular economy (reuse, repair and recycle). On the other hand, the other three components have also a high level of importance, this is because the circular society component is almost in all the tools and actions together with the other components.

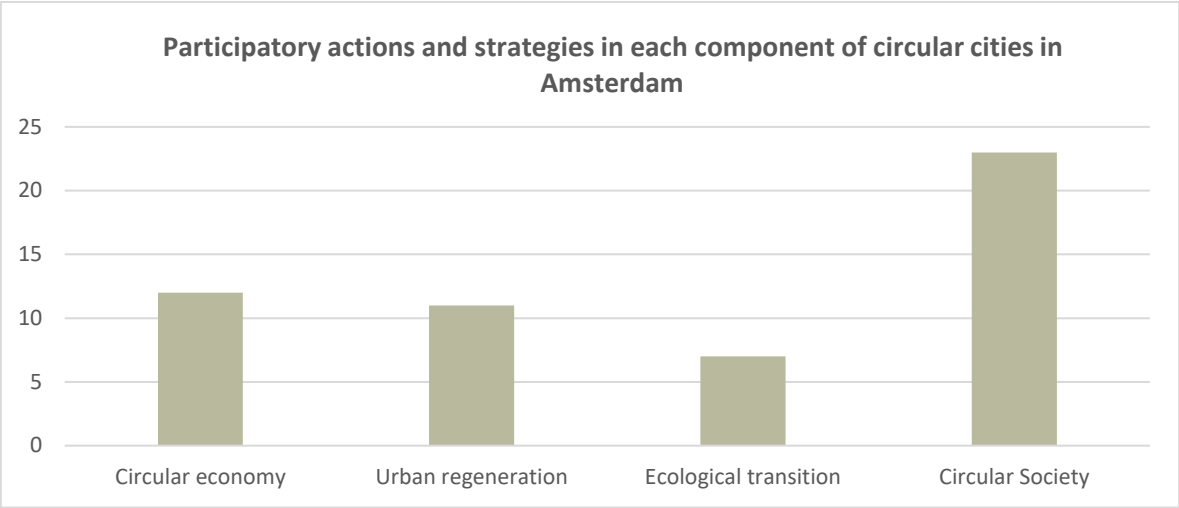


Figure 15: Graph of participatory actions and strategies in each component of the Amsterdam Circular Strategy 2020-2025

4.2.2.2 Channels of involvement analysis

The next step of the analysis is the channels of involvement, as explained before, this analysis aims to identify how are the ways of communicating the information of tools and plans to the stakeholders. This step is highly important since it can also show how this communication is being done and how participatory is meaning if there are in a 2-way channel which is completely participatory and 1-way channel which is poorly participatory and just communicative. The following table shows the countdown of all the channels of involvement for each tool and action.

Table 10: Channels of involvement in the Amsterdam Circular Strategy 2020-2025

	2-way			1-way		
Channels of involvement	Physical	Workshops	16	Physical	Advertising	9
		Booths	11		Media	0
		Interactive installation	13		Mailings	0
	Virtual	Mobile and apps	4	Virtual	Advertising	12
		Social Media	5		Media	3
		Remote Attendance	1		Mailings	2

The Amsterdam Circular Strategy 2020-2025 has a high participatory approach mostly working on circular society, therefore has many channels of involvement that encourage stakeholders to participate in the development of policies and future strategies. Therefore,

as seen in Table 8, there are 50 2-way channels of involvement in the tools and actions identified and from those, the 80% are physical channels such as workshops, booths, and interactive installations. The other 20% rely on virtual involvement, which means that receives comments, opinions, and discussions from the stakeholders, these channels are mobile apps, websites, social media and remote attendance to meetings, workshops, etc. The following graph shows the balance of the 2-way channel of involvement divided in physical and virtual

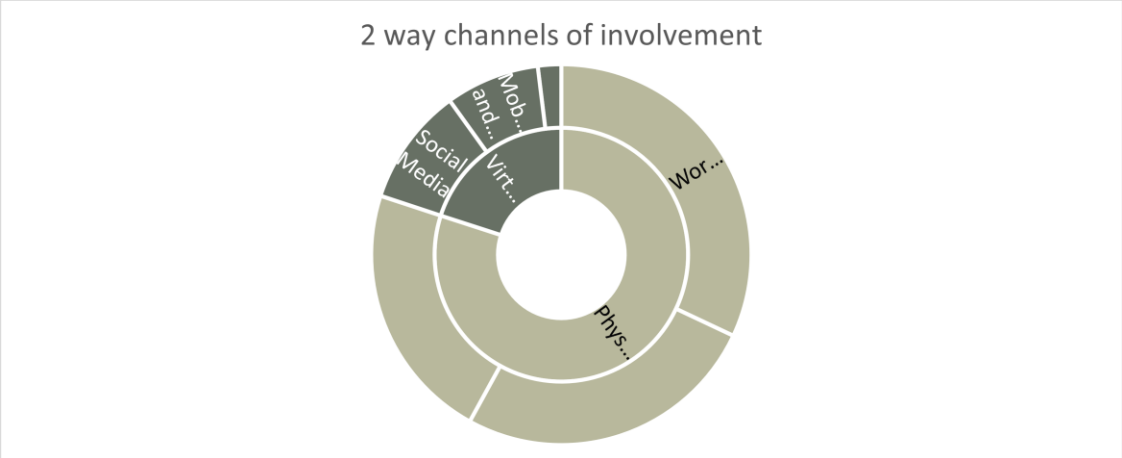


Figure 16: Graph of 2-way channel of involvement in the Amsterdam Circular Strategy 2020-2025

On the other hand, the 1-way channels of involvement rely more in the virtuality rather than physically like the 2-way channels. Although there are 26 channels in the 29 tools and actions identified, being 65% of them virtual. The highest channel used is the advertising channel in a virtual way communicating stakeholders of the plans and actions to be developed or instructions to be followed e.g., recycling methods, etc.

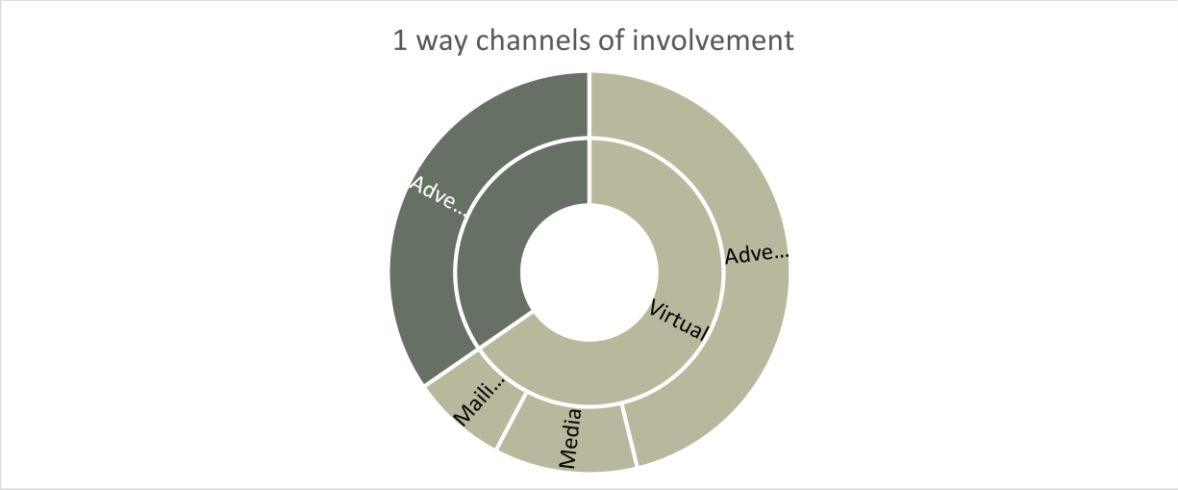


Figure 17: Graph of 1-way channel of involvement in the Amsterdam Circular Strategy 2020-2025

4.2.2.3 Stakeholders analysis

The final step of the analysis is to identify and quantify the stakeholders involved in the tools and actions from the Amsterdam Circular Strategy 2020-2025. From Table 6 we can see that out od 29 tools and actions, 14 involved the business sector (48%), 20 the public sector (69%), also 20 the knowledge institutions (69%), 15 the citizens (52%) and 1 the market stablished like “others” in the following table (3%).

Table 11: Stakeholders of the Amsterdam Circular Strategy 2020-2025

Amsterdam Stakeholders involved				
Business sector /corporates	Public sector (government)	knowledge institutes (academia)	Citizens/communities	Others
14	20	20	15	1

Figure 18: Graph of stakeholders involved of the Amsterdam Circular Strategy 2020-2025

Finally, the graph with the data collected show us that the public sector and the knowledge institutions have an equal level of involvement, followed by the citizens and then the business sector, the market on the other hand is rarely mentioned in the tools and actions. Therefore, we can conclude that the high level of participation and the channels of involvement used are seen mostly between the public sector and the knowledge institutions searching for innovative ideas to then be followed by the citizens and the business sector. It is worth mentioning that there is not a high inequality in the stakeholder’s involvement.

4.3 Analysis and Identification of participation approach in planning tools in the transition of Paris into Circular City

4.3.1 Scanning of official documents

For the analysis of Paris, the official document issued is the "The White Paper on the Circular Economy of Greater Paris" (Paris, 2015). This document was released in 2015 and aims to create strategies and initiatives for the transition into circular economy and therefore a circular city in the metropolitan area of the city.

> *"…has adopted* a plan for circular economy for 2017-2020, which has been elaborated based on 65 proposals made after a General Assembly on circular economy and included in a White paper on the circular economy of Greater Paris. These initiatives *were thought as unifying work strategies in connection with metropolitan planning."* (Circular Economy Club, 2017)

4.3.1.1 "The White Paper on the Circular Economy of Greater Paris" by Paris City Hall

The city of Paris has the aim of create a model based on sharing rather instead of profit, collective intelligence rather than individual competition and recovery rather than waste. The steps followed to develop "The White Paper on the Circular Economy of Greater Paris" where first to organize a General Assembly on CE with partner authorities to stimulate the regions' transformation, this partners where formed by 21 local authorities, 100 players and 250 people in order to do a collaborative effort, come up with initiatives, create a roadmap and finally do a 7-strategy proposal.

Paris seeks to change the economic paradigm, the one of a linear economy system. Therefore, companies need to transform the neighbors into partners, clients into suppliers (this is in order to reverse the cycle), products into services and brands into communities. One of the main challenges for this transition process to work is to create the GPM (Greater Paris Metropolis) that unifies Paris with the 124 municipalities of the inner suburban areas. This way, the process will be held in a widescale CE and for that purpose, there are 65 initiatives to unify strategies in a metropolitan planning way.

Finally, the General Assembly brings a wide spectrum of stakeholders such as the government authorities, business sector, associations, NGOs, the academia, and research

institutions, etc. All these stakeholders were organized in working groups (WG) to discuss how to tackle a specific topic and as a result 7 main strategies were established.

The first strategy is to encourage and support the economic players, this strategy seeks for the business sector to implement a circular economy in their companies in order to close the material loop and me more sustainable in reaching the raw materials, producing their product, and selling it.

Table 12: S1 - Support of economic players participation identification based in the White Paper for Greater Paris

#	Participation tools	Stakeholders
1	Product-service system that offers a service from a sell having the assessment of local authorities' case by case and comparing investment and costs as well as legal support to enable new sectors to emerge	Business sectors, local authorities, public actors (advocates)
2	Encourage research in eco-design for and extended producer responsibility	Business sectors, academia
3	Support repaired products by involving companies with other players (buyers) for a second life of products. Also, environmental associations that receive donations from this companies pay less taxes	Business sector, citizens, NGOs
4	Create and test a software tool for economic analysis to compare the two approaches of construction projects (linear and circular) in order to receives incentives and tax reductions.	Business sector, public sector
5	Create a recoverable energy wicket to solve questions relates to government aids and administrative procedures	Public sector. Business sector, citizens
6	Feedback hubs and clusters between circular economy players and site visits to facilitate the launch of new Industrial and Regional Ecology (IRE) approaches by sharing best practices, impediments, experiences, etc.	Local authorities, public sector, planners, business sector
	Actions	
1	Solidarity Band of Household articles to provide a low-priced household article to people in precarious situations doing partnerships between companies and local associates	Business sector, public sector
2	"Towards zero-waste" events for companies to enter in the CE system by helping in the supply designers and architects with recycles materials for the events and recover waste afterwards	Business sectors, citizens
3	Resource stores and recycling centers that also returns work to individuals in reintegration, re-use of secondhand materials and furniture to eliminate waste. Contributes to the creation of regional eco-systems.	Public sector, citizens

The second strategy is about innovate and experiment, this strategy aims for different stakeholders and the city to create new ways to implement the circular economy in different areas of the city and the market as well. Therefore, it is full of participatory tools and actions presented in the following table.

Table 13: S2 - Innovate and experiment participation identification based in the White Paper for Greater Paris

#	Participation tools	Stakeholders
1	Civic Savings Account to finance innovative and responsible companies organizing new financial models to develop IRE approaches and motivate stakeholders and create partnerships	Business sector, public sector
2	Creation of an academic research chair for circular economy that operates based on partnerships with companies, universities, engineering, business schools and research institutions.	Business sector, academia
3	Business incubators to support companies in the process of eco-design with start-ups. SMBs as a mentoring system	Knowledge institutes, public sector
4	Support structure for pilot projects that are successful afterwards by spreading the knowledge and experiences in events like Ted talks.	Business sector, citizens. Knowledge institutions
Actions		
1	"Reinventing Paris" is an initiative for innovative urban projects for 23 sites in Paris in architecture, new usage, environmental innovation and co-construction. The projects need to contribute to a sustainable and intelligent city	Business sector (architects, urbanists), public sector

The third strategy is to scale up and establish regional momentum, this strategy seeks for a bigger scale in the circular economy system with an area beyond the metropolitan area of Paris and enlarge the system into a regional one as well.

Table 14: S3 - Scale up and establish a regional momentum participation identification based in the White Paper for Greater Paris

#	Participation tools	Stakeholders
1	Creation of a coordinating committee to support operational development of IRE initiatives by the creation of a network of platers to communicate best practices, guide future leaders, conduct studies, develop methodologies, etc.	Public sector, business sector, NGOs
2	Designate an authority to accompany public and private projects that will rely in a multi-disciplinary team with diverse profiles for assessment in technical, legal, and economic doubts.	Business sector, public sector
3	Office spaces to share to optimize area, reduce grant requirements, provide services and play a key factor on social and solidarity economy	Business sector, public sector, citizens

4	Workshops for a better communication between business, associations and local authorities in the product donation, re-use, repair and recycle process.	Business sector, public sector
Actions		
1	Eco-district (with housing, shops, and schools) using heating network of energy recovered from wastewater and near-surface geothermal energy	Public sector, citizens, business sector
2	Reinforcement of resource conservation by implementing a network of voluntary waste drop-off in association with recycling centers	Public sector, citizens, NGOs
3	SOLDating is a soil exchange service that enables the exchange between sites in a web and mobile platform	Business sector

The fourth strategy is to change attitudes and practices, this strategy refers more in the daily dynamics of citizens, companies, etc. in sustainability actions. Therefore, this strategy aims to change the behavior of different stakeholders in consumption, production, waste management, sharing and innovating.

Table 15: S4 - Change attitudes and practices participation identification based in the White Paper for Greater Paris

#	Participation tools	Stakeholders
1	On-line information and exchange platforms about circular economy for all sector players following the concept of cooperation. Coordinated by social networks and updated through newsletters	Business sector, public sector, citizens, knowledge institutions
2	On-line laboratory of circular economy to raise company awareness, citizen information center, creation and exchange of information. Is a communication tools of major knowledge for all audiences (complements tool #1)	Business sector, public sector, citizens, knowledge institutions
3	Labels for sustainable products that follow a circular economy system to inform consumers	Business sector, citizens
4	Raise awareness with on-site visits, events assembling several competencies, compiling updated data useful for all stakeholders	Business sector, public sector, citizens, knowledge institutions
5	Educational kits as a training facility in sustainable food for schools for kids to become sustainable food ambassadors	Knowledge institutions
6	Raise awareness of food waste defined by survey data collection in colleges and schools	Knowledge institutions
7	Include circular economy principles un educational programs to expose young people to a mindset of circularity in all levels of education and with external contribution of volunteers	Knowledge institutions, NGOs

8	Include “alternative planning” and “green construction” in programs of architecture and planning in universities	Knowledge institutions
Actions		
1	Committee of circular economy players to provide tools and feedback in collective discussions to identify links, initiatives, models, and methods	Public sector, business sector
2	RCube.org is a federation that labels second-hand products (mobile phones) with a certification system to recognize the quality of refurbished equipment and the idea is to extend it to other products	Business sector, citizens
3	Schools’ canteens that benefit from bio-waste sorting to produce energy	Knowledge institutions
4	Box of tricks is an educational tool to raise the awareness of children in recycling material (in this case steel) and communicated in the widest possible public	Knowledge institutions, citizens

The fifth strategy is to involve local authorities, business, and citizens in order to achieve a better management of recycling and soring products, therefore the stakeholders play an essential role in the transition process. This strategy is mainly based in the waste management by household citizens, companies, and the support of NGOs as well as the public sector involvement.

Table 16: S5 – Involve local authorities, business and citizens participation identification based in the White Paper for Greater Paris

#	Participation tools	Stakeholders
1	Encourage local composting on site, balconies, green spaces, shared gardens, etc. Neighborhood representatives and associations support neighbors in the task by increasing awareness and improving communications.	Citizens, public actors
2	Reduce the use of disposable packaging by launching a competition for the reaction con a reusables eco-designed container and setting experiments to connect consumers and a best practice guide by the Greater Paris	Business sector, citizens, public sector
3	Improve the cardboard collection plan by installing bins in companies to sort their waste and for household a local drop-off point. Additionally raising awareness campaigns and communication initiatives	Business sector, citizens, public sector
Actions		
1	Unite the catering business in working groups to rise the recommendation and identification of best practices in bio-waste prevention. This groups will lead the creation of a film and factsheets on it.	Business sector

2	Recovery of bio-waste using an electromechanical composter in a department in Paris. It aims to raise awareness among kitchen staff and schools' canteens.	Business sector, knowledge institutions, citizens
3	Test the redistribution and recovering by composting fruit and vegetables in two municipal markets by encouraging traders to give the unsold food. Additionally, the involvement of volunteers to distribute the food are needed.	Business sector, public sector, NGOs, citizens
4	Labelling sustainable packaging in the 11th district of Paris that also has a kit with a practical tool booklet, small poster and sticker.	Business sector, citizens
5	Refill service of Guerlain Paris stores that reduces the product value by re-using materials	Business sector, citizens
6	Repair cafes as cooperative workshops to give objects a second life, its free, open and runed by volunteers	Citizens, public sector
7	UpCycly Fest: cooperative event to build furniture from recovered materials leaded by volunteers. It boosts regions, create intercommunity and intergenerational ties	Business sector, citizens, public sector
8	The Happy Recyclers: facilitate sorting in homes and offices to reduce the lost of waste in incineration processes by gibing a recycling handbook for homes to citizens, having an internet portal and providing boxes to offices to recycle	Business sector, citizens
9	Ecofolio: selective collection of paper in a test local community to improve recycling performance	Citizens, public sector

The sixth strategy is to create network linking players in which the connection between stakeholders to give a second chance to products by platforms, mobile apps, workshops and networking strategies.

Table 17: S6 – Create network linking players participation identification based in the White Paper for Greater Paris

#	Participation tools	Stakeholders
1	Facilitate donations and product repair by networking different stakeholders in recreational events, community ambassadors, etc.	Citizens, public sector, business sector
2	Create a community for second life products to give a collective meaning reporting to different organizations. It is also an online community by mobile apps to donate, assist or accumulate points	Citizens, business sector
3	Create a network for waste and resources called "Wastebook" with a mobile app to contact waste owners with waste recovery firms	Citizens, business sector
4	Develop a shared platform for food collection and donations	Citizens, business sector
5	Set a cooperative platform for discussions between stakeholders in the IRE to coordinate strategies, identify flows	Business sector, public sector

6	Create a platform for producers and consumers of renewable and recoverable energy as a portal to update knowledge of the area.	Business sector, citizens
Actions		
1	Amistocks network that facilitated donation processes by a web platform to make online appointment for home collections or to locate drop-off points	Citizens, business sector
2	Mundum: lending and borrowing platform to qualify objects thought the useful life and extend their life cycles.	Citizens, business sector
3	Solidarity-based Makeover Workshop: enable more then 60 women living in poverty to take unsold clothes	Citizens, business sector

The seventh and final strategy is to change the legislation by generating planning tools and agriculture, reuse and recycle procedures and construction. (Lica, 2019)

Table 18: S7 – Change legislation participation identification based in the White Paper for Greater Paris

#	Participation tools	Stakeholders
1	Promote renovation of buildings rather than demolish by a communication strategy with prime contractors and imposing a renovation scenario analysis before demolishing	Public sector, business sector, legal actors (advocates)
2	Have a public database listing of available resources linked with local storage platforms and aligned with the Building Information Modeling (BIM)	Public sector, business sector, legal actors (advocates)

4.3.2 Identification of participation approach in Paris' planning tools leading to circular cities

For the general identification of the different factors in participation approaches, the next table shows the main components identification labeled as Circular Economy (CE), Ecological Transition (ET), Urban Regeneration (UR) and Circular Society (CS). On the other hand, the stakeholders were labeled as Public Sector (PS), Business Sector (BS), Knowledge Institutions (KI), Citizens (C), Non-governmental organizations (NGOs), Legal Actors such as lawyers (LA), and others (O). Additionally, the channels of involvement were identified in the 1-way and 2-way channels in a virtual and a physical approach. In total there were 56 participation tools and actions identified form the official document.

After the scanning of Paris's official document, the participation tools identified from the document were 56 out of 65. Therefore 86% of them involved different in different scenarios to build a circular city system and get in the action plans processes.

The next steps, as mentioned in the methodology part, are to analyze those planning tools and identify which component of a circular city they work on, the stakeholders involved, and the participation channels used.

Table 19*: Analysis of participation approach of "The White Paper on the Circular Economy of Greater Paris"*

Tool/Action	Stakeholders	Main components	Channels of involvement			
			1 way		2-way	
			Physical	Virtual	Physical	Virtual
Product-service system that offers a service from a sell having the assessment of local authorities' case by case and comparing investment and costs as well as legal support to enable new sectors to emerge	BS, PS, LA	CE, CS			Workshops, booths	
Encourage research in eco-design for and extended producer responsibility	BS, KI	CE, CS			Workshops	
Support repaired products by involving companies with other players (buyers) for a second life of products. Also, environmental associations that receive donations from this companies pay less taxes	BS, C, NGO	CE				Websites, social media
Create and test a software tool for economic analysis to compare the two approaches of construction projects (linear and circular) to receives incentives and tax reductions.	BS, PS, LA	CE			Workshops	Remote attendance
Create a recoverable energy wicket to solve questions relates to government aids and administrative procedures	PS, BS, C	CS			Workshops, booths	
Feedback hubs and clusters between circular economy players and site visits to facilitate the launch of new Industrial and Regional Ecology (IRE) approaches by sharing best practices, impediments, experiences, etc.	PS, BS, O	CE, ET, CS			Workshops	
Solidarity Band of Household articles to provide a low-priced household article to people in precarious situations doing partnerships between companies and local associates	BS, PS	CS			Interactive installations	

"Towards zero-waste" events for companies to enter in the CE system by helping in the supply designers and architects with recycles materials for the events and recover waste afterwards	BS, C	CE, CS, ET			Workshops	
Resource stores and recycling centers that also returns work to individuals in reintegration, re-use of secondhand materials and furniture to eliminate waste. Contributes to the creation of regional eco-systems.	PS, C	CS, UR, CE			Interactive installations	
Civic Savings Account to finance innovative and responsible companies organizing new financial models to develop IRE approaches and motivate stakeholders and create partnerships	BS, PS	CE, CS				Websites (account)
Creation of an academic research chair for circular economy that operates based on partnerships with companies, universities, engineering, business schools and research institutions.	BS, KI	CE, CS			Interactive installations	
Business incubators to support companies in the process of eco-design with start-ups. SMBs as a mentoring system	KI, PS	CE,CS			Workshops, booths	
Support structure for pilot projects that are successful afterwards by spreading the knowledge and experiences in events like Ted talks.	BS, C, KI	CS				Remote attendance
"Reinventing Paris" is an initiative for innovative urban projects for 23 sites in Paris in architecture, new usage, environmental innovation and co-construction. The projects need to contribute to a sustainable and intelligent city	BS, PS	UR, ET			Workshops	
Creation of a coordinating committee to support operational development of IRE initiatives by the creation of a network of players to communicate best practices, guide future leaders, conduct studies, develop methodologies, etc.	PS, BS, NGO	CS			Workshops, booths, interactive installations	Remote attendance
Designate an authority to accompany public and private projects that will rely in a multi-disciplinary team with diverse profiles for assessment in technical, legal, and economic doubts.	BS, PS	CE, CS			Booths	

Office spaces to share to optimize area, reduce grant requirements, provide services and play a key factor on social and solidarity economy	BS, PS, C	CE, CS			Interactive installation	
Workshops for a better communication between business, associations and local authorities in the product donation, re-use, repair and recycle process.	BS, PS	CE, CS			Workshops	
Eco-district (with housing, shops and schools) using heating network of energy recovered from wastewater and near-surface geothermal energy	PS, C, BS	CE, UR, ET, CS			Interactive installation	
Reinforcement of resource conservation by implementing a network of voluntary waste drop-off in association with recycling centers	PS, C, NGO	ET, CS			Workshops, booths	
SOLDating is a soil exchange service that enables the exchange between sites in a web and mobile platform	BS	CE, ET, CS				Website and app
On-line information and exchange platforms about circular economy for all sector players following the concept of cooperation. Coordinated by social networks and updated through newsletters	BS, PS, C, KI	CS	Media	Media, mailings		Website, apps
On-line laboratory of circular economy to raise company awareness, citizen information center, creation and exchange of information. Is a communication tools of major knowledge for all audiences (complements tool #1)	BS, PS, C, KI	CE				Website
Labels for sustainable products that follow a circular economy system to inform consumers	BS, C	CE, CS	Advertising			
Raise awareness with on-site visits, events assembling several competencies, compiling updated data useful for all stakeholders	BS, PS, C, KI	CS			Workshops, interactive installations	
Educational kits as a training facility in sustainable food for schools for kids to become sustainable food ambassadors	KI	CS	Advertising		Workshops	
Raise awareness of food waste defined by survey data collection in colleges and schools	KI	CS				Website

Include circular economy principles un educational programs to expose young people to a mindset of circularity in all levels of education and with external contribution of volunteers	KI, NGO	CS			Workshops	
Include "alternative planning" and "green construction" in programs of architecture and planning in universities	KI	CS			Wrokshops	
Committee of circular economy players to provide tools and feedback in collective discussions to identify links, initiatives, models, and methods	PS, BS	CE, CS			Workshops	
RCube.org is a federation that labels second-hand products (mobile phones) with a certification system to recognize the quality of refurbished equipment and the idea is to extend it to other products	BS, C	CE, ET, CS	Advertising			
Schools' canteens that benefit from bio-waste sorting to produce energy	KI	CS			Interactive installation	
Box of tricks is an educational tool to raise the awareness of children in recycling material (in this case steel) and communicated in the widest possible public	KI, C	CE, CS	Advertising			
Encourage local composting on site, balconies, green spaces, shared gardens, etc. Neighborhood representatives and associations support neighbors in the task by increasing awareness and improving communications.	C, PS	CE, UR,ET,CS			Interactive installation	
Reduce the use of disposable packaging by launching a competition for the reaction con a reusables eco-designed container and setting experiments to connect consumers and a best practice guide by the Greater Paris	BS, C, PS	CE, CS			Workshop	
Improve the cardboard collection plan by installing bins in companies to sort their waste and for household a local drop-off point. Additionally raising awareness campaigns and communication initiatives	BS, C, PS	CS	advertising		Interactive installation	
Unite the catering business in working groups to rise the recommendation and identification of best practices in bio-waste prevention. This groups will lead the creation of a film and factsheets on it.	BS	CE, CS			Workshops	

Recovery of bio-waste using an electromechanical composter in a department in Paris. It aims to raise awareness among kitchen staff and schools' canteens.	BS, KI, C	CE,ET			Interactive installation	
Test the redistribution and recovering by composting fruit and vegetables in two municipal markets by encouraging traders to give the unsold food. Additionally, the involvement of volunteers to distribute the food are needed.	BS, PS, NGO, C	CE, ET, CS			Interactive installation	
Labelling sustainable packaging in the 11th district of Paris that also has a kit with a practical tool booklet, small poster and sticker.	BS, C	CE, ET, CS	Advertising			
Refill service of Guerlain Paris stores that reduces the product value by re-using materials	BS, C	CE	Advertising	advertising	interactive installation	
Repair cafes as cooperative workshops to give objects a second life, its free, open and runed by volunteers	C, PS	CE, CS	Advertising		workshops, interactive installation	
UpCycly Fest: cooperative event to build furniture from recovered materials leaded by volunteers. It boosts regions, create intercommunity and intergenerational ties	BS, C, PS	CE, ET, CS	Advertising	advertising	interactive installation	
The Happy Recyclers: facilitate sorting in homes and offices to reduce the loss of waste in incineration processes by gibing a recycling handbook for homes to citizens, having an internet portal and providing boxes to offices to recycle	BS, C	CE, CS	advertising	advertising	interactive installation	Websites, apps
Ecofolio: selective collection of paper in a test local community to improve recycling performance	C, PS	ET, CS			interactive installation	
Facilitate donations and product repair by networking different stakeholders in recreational events, community ambassadors, etc.	C, PS, BS	CS			workshops, booths	
Create a community for second life products to give a collective meaning reporting to different organizations. It is also an online community by mobile apps to donate, assist or accumulate points	C, BS	CS				Website, apps

Create a network for waste and resources called “Wastebook” with a mobile app to contact waste owners with waste recovery firms	C, BS	CS				Website, apps
Develop a shared platform for food collection and donations	C, BS	CS				Website apps
Set a cooperative platform for discussions between stakeholders in the IRE to coordinate strategies, identify flows	BS, PS	CE,CS				Website, apps, social media
Create a platform for producers and consumers of renewable and recoverable energy as a portal to update knowledge of the area.	BS, C	CE, ET, CS				Website
Amistocks network that facilitated donation processes by a web platform to make online appointment for home collections or to locate drop-off points	C, BS	CE, CS	advertising	advertising	interactive installation	Website
Mundum: lending and borrowing platform to qualify objects thought the useful life and extend their life cycles.	C, BS	CE				website, apps
Solidarity-based Makeover Workshop: enable more than 60 women living in poverty to take unsold clothes	C, BS	CS	advertising	advertising	workshop	
Promote renovation of buildings rather than demolish by a communication strategy with prime contractors and imposing a renovation scenario analysis before demolishing	PS, BS, LA	CE, UR			Workshops booths	
Have a public database listing of available resources linked with local storage platforms and aligned with the Building Information Modeling (BIM)	PS, BS, LA	CE, UR	advertising	advertising		

After the analysis and identification of different aspects in the planning tools from the official document of Paris, the next steps are to quantify and see in perspective how this participation tools are managed and addressed.

4.3.2.1 Participatory actions and strategies in circular cities’ main components

The next step of the analysis is the countdown the tools and actions that are involved in each one of the components of a circular city, since the majority of the tools involve two or more components, the analysis leads to the identification of whether some components are

more involved than others and how balanced can it be. The next table (Table 20) shows that quantification. This means that from the 56 tools and actions analyzed, 36 respond to circular economy (64%), 6 to urban regeneration (10%) 15 to ecological transition (26%) and 47 to circular society (84%). To conclude, “The White Paper on the Circular Economy of Greater Paris” has a high focus is circular society and circular economy to achieve the goals for a circular city as the Strategy Plan of Amsterdam.

Table 20: Participatory actions and strategies in each component of "The White Paper on the Circular Economy of Greate*r Paris”*

Participatory actions and strategies in each component of circular cities in Paris			
Circular economy	Urban regeneration	Ecological transition	Circular Society
36	6	15	47

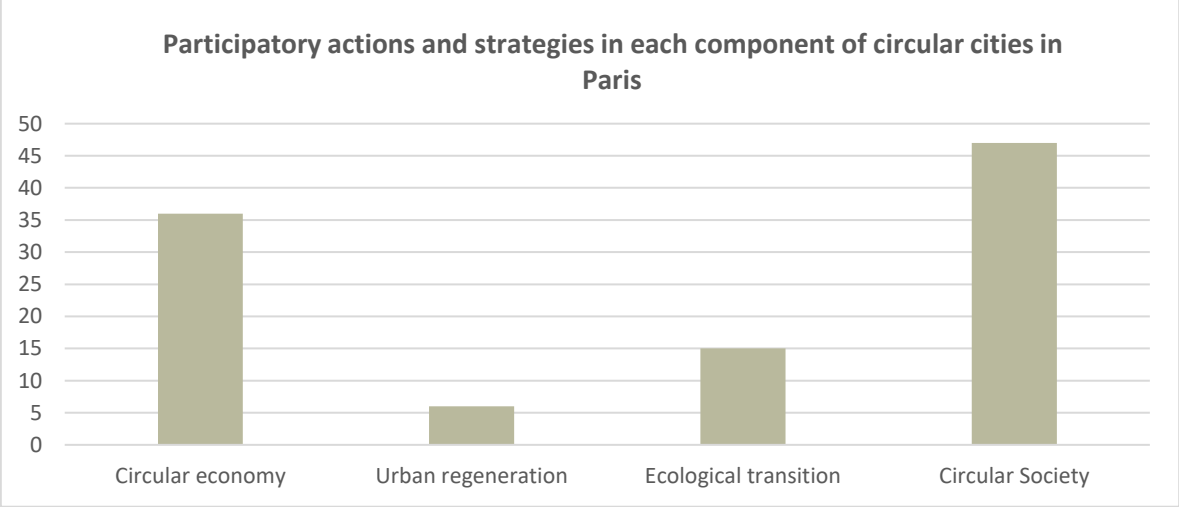


Figure 19: Graph of participatory actions and strategies in each component of "The White Paper on the *Circular Economy of Greater Paris”*

The previous chart (Figure 19) shows the levels of approach into the different components of a circular city in the Paris official document. The urban regeneration has the lowest level being just 6 out of 56 tools and actions working into this component.

4.3.2.2 Channels of involvement analysis

The next step is to analyze the channels of involvement, to identify the different ways of communicating the information of tools and plans to the stakeholders. The following table shows the countdown of all the channels of involvement for each tool and action.

Table 21: Channels of involvement in *"The White Paper on the Circular Economy of Greater Paris"*

	2 -way			1 way		
Channels of involvement	Physical	Workshops	21	Physical	Advertising	13
		Booths	8		Media	1
		Interactive installation	17		Mailings	0
	Virtual	Mobile and apps	14	Virtual	Advertising	6
		Social Media	2		Media	1
		Remote Attendance	3		Mailings	1

As seen in Table 21, there are 65 2-way channels of involvement in the tools and actions identified and from those, the 70% are physical channels such as workshops, booths, and interactive installations. The other 30% rely on virtual involvement, which means that receives feedback as comments, opinions, and discussions from the stakeholders. These channels are mobile apps, websites, social media and remote attendance to meetings, workshops, etc. The following graph shows the balance of the 2-way channel of involvement divided in physical and virtual. From the graph we can conclude that the workshops and interactive installations are the channels most used in the physical approach and the websites and mobile apps the most used in the virtual approach.

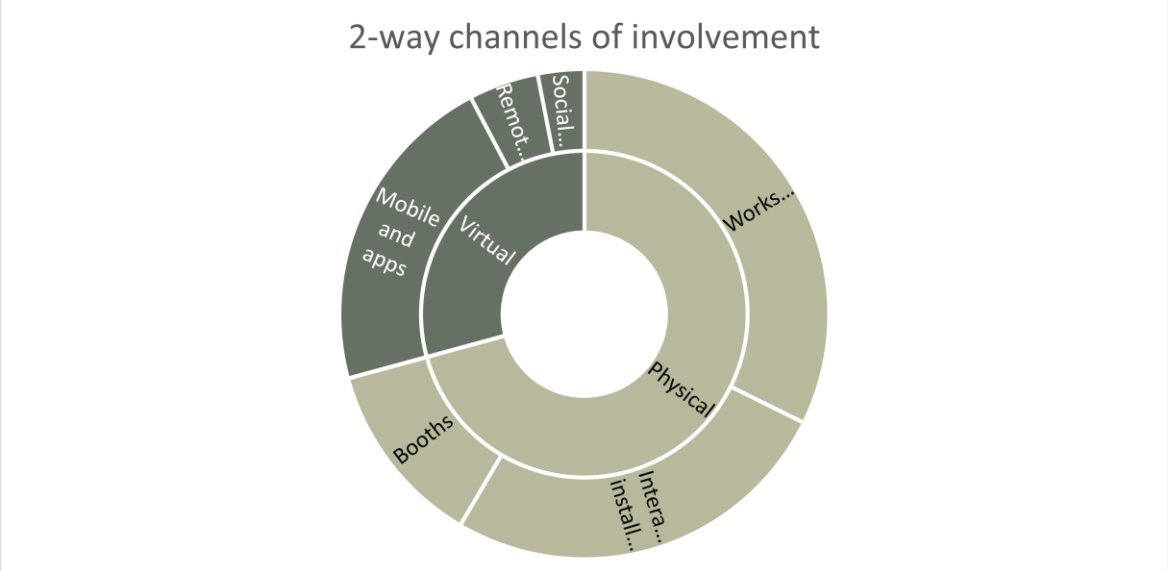


Figure 20: Graph of 2-way channel of involvement in "The White Paper on the Circular Economy of Greater *Paris"*

On the other hand, the 1-way channels of involvement rely more on, and contrary to Amsterdam, the physical approach rather than virtual like the 2-way channels. Although

there are 22 channels in the 56 tools and actions identified, being 63% of them using a physical approach such as advertising channel in brochures or handbooks with instructions to be followed e.g., recycling methods, etc.

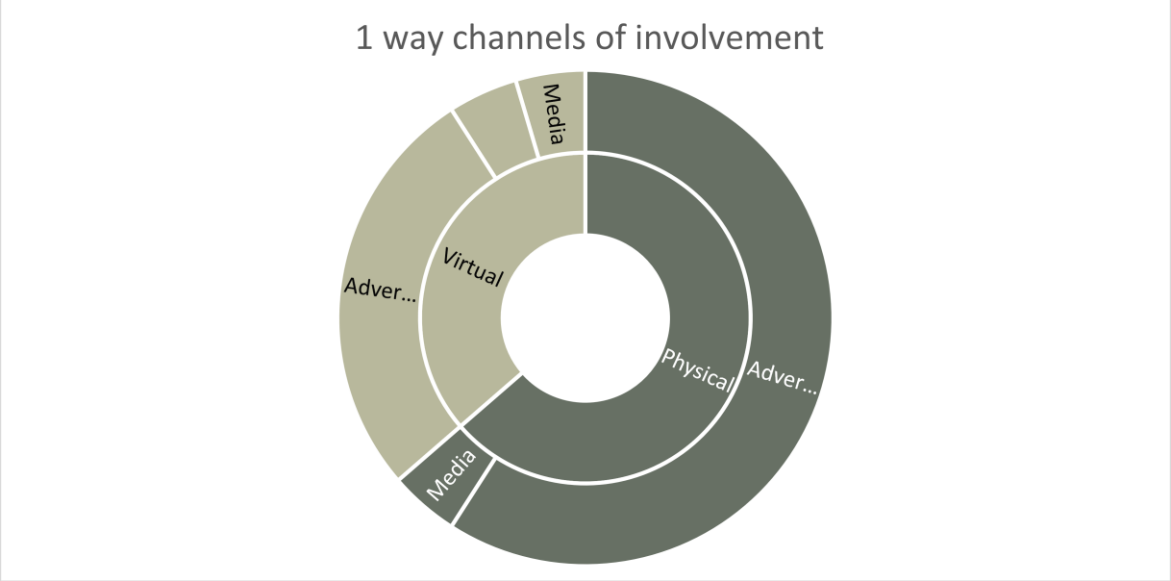


Figure 21: Graph of 2-way channel of involvement in "The White Paper on the Circular Economy of Greater *Paris"*

4.3.2.3 Stakeholders analysis

Finally, the analysis concludes in identifying and quantifying the stakeholders involved in the tools and actions from the Paris' official document. From Table 22 we can see that out of 56 tools and actions, 44 involved the business sector (78%), 30 the public sector (53%), also 14 the knowledge institutions (25%), 15 the citizens (27%), 5 NGOs (9%, 4 the legal actors (7%) and 1 stablished like "others" in the following table (1,8%).

Table 22 *Stakeholders of "The White Paper on the Circular Economy of Greater Paris"*

Paris Stakeholders involved						
Business sector /corporates	Public sector (government)	knowledge institutes (academia)	NGOs	Legal Actors	Citizens/communities	Others
44	30	14	5	4	15	1

Figure 22: Graph of stakeholders involved of "The White Paper on the *Circular Economy of Greater Paris"*

To conclude the last step, the previous graph with the stakeholder's countdown, the business sector occupies the highest involvement followed by the public sector. On the other hand, knowledge institutions have an equal level of involvement as citizens and communities, followed by NGOs and legal actors.

4.4 Guidelines of good practices for participatory approaches in planning tools leading into Circular Cities

The main result of this thesis is a guideline that aims to present all the main concepts of circular cities, the importance of participation approaches and the analysis and identification of the participatory actions, channels and stakeholders involved in the planning tools. These recommendations are presented as best practice examples to be followed as a path and therefore guide urban planners into a track of transition to circular cities in a more participatory way.

These guidelines, as well as the analysis are divided 3 sections. The first section is the balance of the main components of a circular city. The second section is to have all

stakeholders possible included and to be in a proportionate way and with a strategic linking. Finally, the third section is to develop all kinds of channels of involvement possible that suits better to the community and stakeholders.

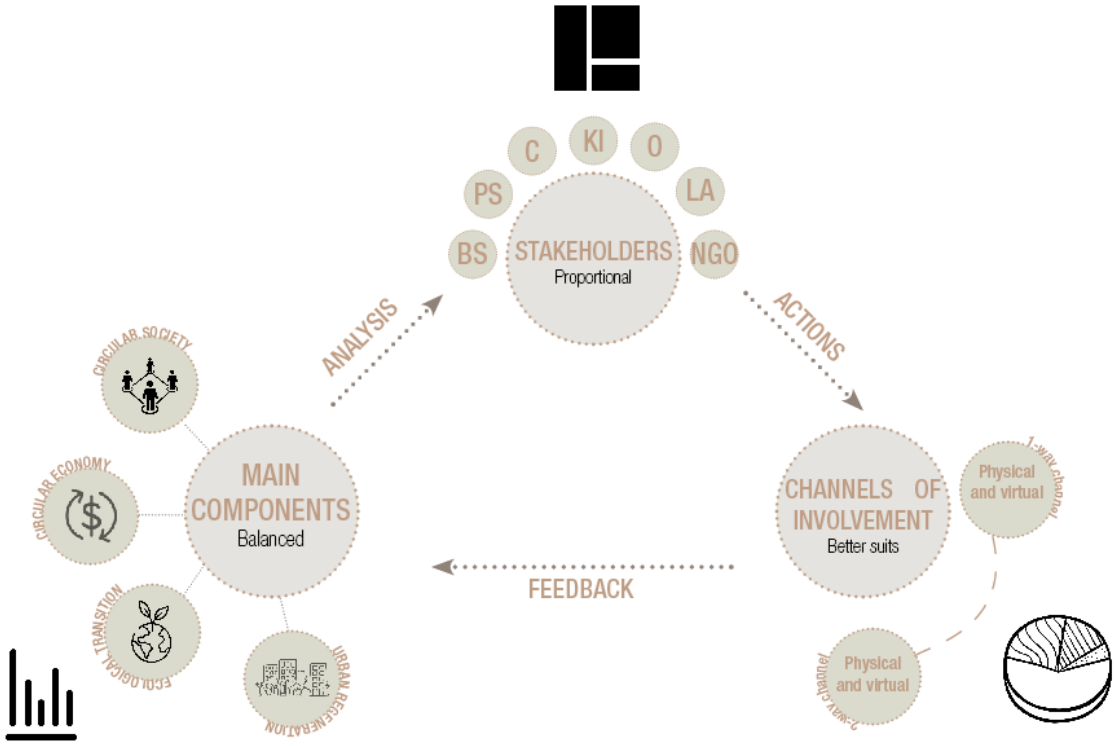


Figure 23: Three sections for a participatory approach in the transition into Circular Cities

The first section aims to tackle all kinds of problematics and actions that are not being sustainable. The main components as mentioned before are “Circular Economy”, “Ecological Transition”, “Urban Regeneration” and “Circular Society. From the case studies of Amsterdam and Paris we can tell that both included in the majority of the participation tools the Circular Society component being the one more towards creating a community based on sharing and connecting. To have a general idea of what those tools include the next list of 8 actions summarize the ones identified in the case studies.

1. Create awareness campaigns in order to inform the community of the new processes of circular economy in the city, country or neighborhood
2. Connect different initiatives with knowledge institutions to stimulate research and innovation
3. Have experimental areas for stakeholders and citizens to de completely involved

4. Teach to recycle and other circular processes to the community in schools, companies and neighborhoods e.g. educational kits implemented in Paris
5. Create sharing and repairing centers to create community based ono solidarity and sustainability
6. Have donation programs of food, clothes, furniture, etc.,
7. Open offices spaces to share and incentive the communication of ideas.
8. Include circular economy in school and university programs.

Moreover, circular economy was the second most included in both case studies, being the circular economy the main pillar of circular cities, it aims to narrow, close and slow resource loops and therefore needs new business models to be developed and new collaboration partners. In the analysis of the case studies 11 actions were summarized that included the circular economy.

1. Create clusters for companies to share good practices
2. Create networks to incentive a sustainable food chain
3. Innovate and experiment on sustainable food production
4. Enable platforms and spaces to share, repair and recycle
5. Create simulation areas for production innovative ideas
6. Encourage eco-design companies
7. Have a test software for economic analysis
8. Develop a supply system in between companies
9. Have business incubators to support sustainable processes in companies
10. Have an accompany team for economic, legal and technical advice
11. Facilitate web pages and apps for recycling a donation.

The urban regeneration is another component that in the case of Amsterdam has almost the same involvement level as circular economy and in the case of Paris it decreases from the first two. The urban regeneration, as mentioned before, works for a relocation of activities and businesses, update and modernize urban infrastructure and have a las use property structure modification. Therefore, 10 actions were generalized.

1. Share information and ideas in sustainable construction to develop new instruments
2. Formulate circular ambitions for infrastructure
3. Develop a center for practical advice about circular construction practices and urban development

4. Incentive research and innovation in sustainable construction and urban development
5. Crate a “circular toolbox” for renovation infrastructure to share technical, financial, social, organizational and legal implementation issues
6. Have experimental areas and buildings
7. Enable areas of the city for recycling centers
8. Enable compositing areas in neighborhoods
9. Promote renovation of buildings rather than demolish
10. Create a BIM database for resource availability in local storages.

The last component is the ecological transition, that works for the minimization of food production to get an equilibrium, promotes the use of recycling materials and aims to tackle the non-efficient use of natural resources. Therefore, 6 actions were summarized from the case studies.

1. Have experimental areas for food production, biomass, fertilization, etc.
2. Create awareness campaigns for upcycling materials
3. Create a communication tool to solve doubts and share good practices between companies of food production
4. Create a volunteer network to develop all kinds of sustainable projects
5. Create platforms (websites, apps) to exchange services and resources between stakeholders
6. Encourage local compositing

Moving forward, the second section is about the involvement of stakeholders, as we can see from the case studies there are six general types of stakeholders, the public sector (local authorities, government, city hall, etc.), business sector (companies), knowledge institutions (schools, universities, research centers), citizens, NGOs, and legal actors (lawyers). It is important to include all of them because they all give different perspectives of the city and how the economy works. Therefore, the next table shows the importance of each stakeholder and the role they play in the transition process into circular cities.

Table 23: Stakeholders role in transition process of circular cities

Stakeholder	**Role in the transition process**
Public sector	Sets up the rules and is the decision-maker actor. Also gives incentives to citizens a company for good sustainable practices
Business sector	Start the circular economy process by being the actors that use the natural resources, they are responsible for most of the transition processes
Knowledge Institutions	Are involved in research and innovative ideas in order to create actions and tools for better sustainable practices
Citizens	Are in charge of a community and culture change into a more sustainable lifestyle
NGOs	Leaders and supporters of innovative and sustainable initiatives
Legal actors	Create the normative path for the changes in the transition processes.

The last section is the channels of involvement in which many of them were identifies in the case studies. Hence, the next chart shows the most used channels to the approach the community

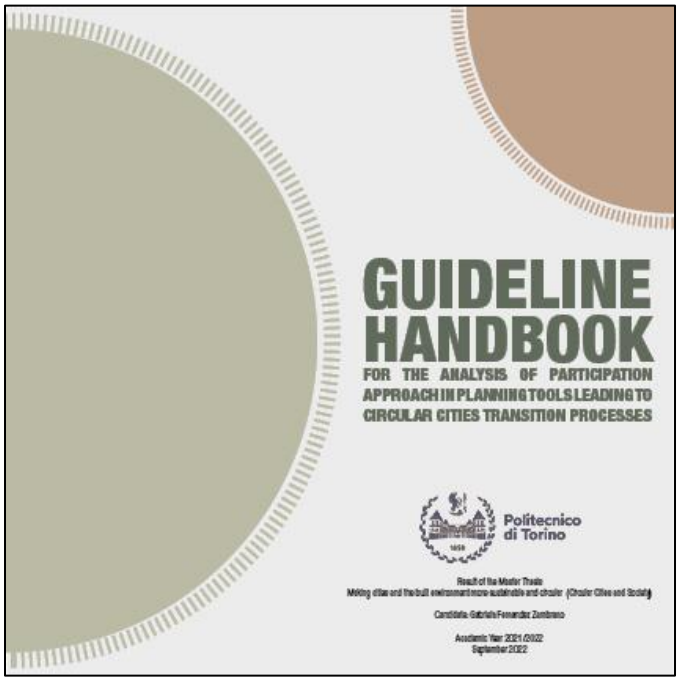
Table 24: Channels of involvement in transition processes to circular cities

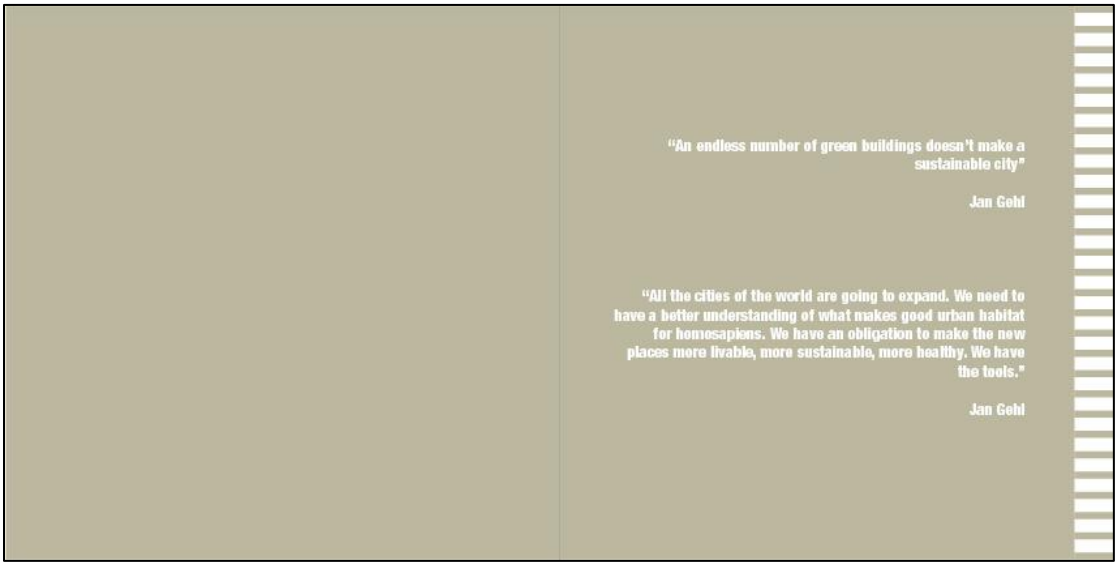
Channels of involvement	**2 -way**		**1 way**	
	Physical	Workshops and booths for the involvement of all stakeholders to build networks and support each other in ideas and processes. Interactive installations such as experimental areas to test initiatives	Physical	Adverting by labeling products to inform people about sustainable products, educational kits with instructions, bins installation,
	Virtual	Website platforms, mobile apps to connect stakeholders, have support information and create feedback. Also, the remote attendance meetings for the discussion of different ideas	Virtual	Commercial, online advertising, radio, and podcasts to inform, newsletters.

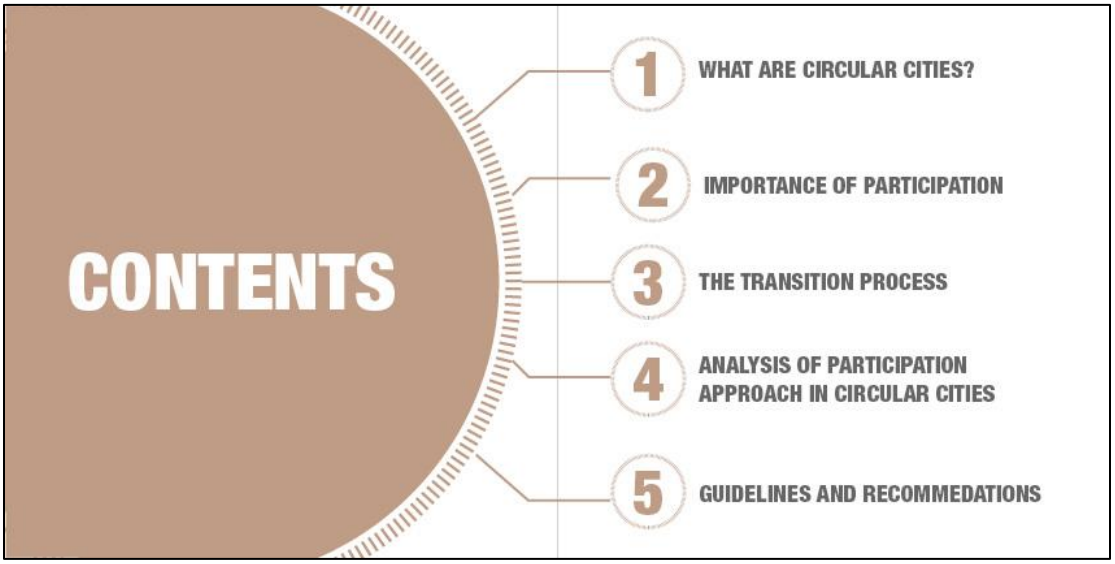
4.4.1 Guideline Handbook for the analysis of participation approach in planning tools leading to circular cities transition processes.

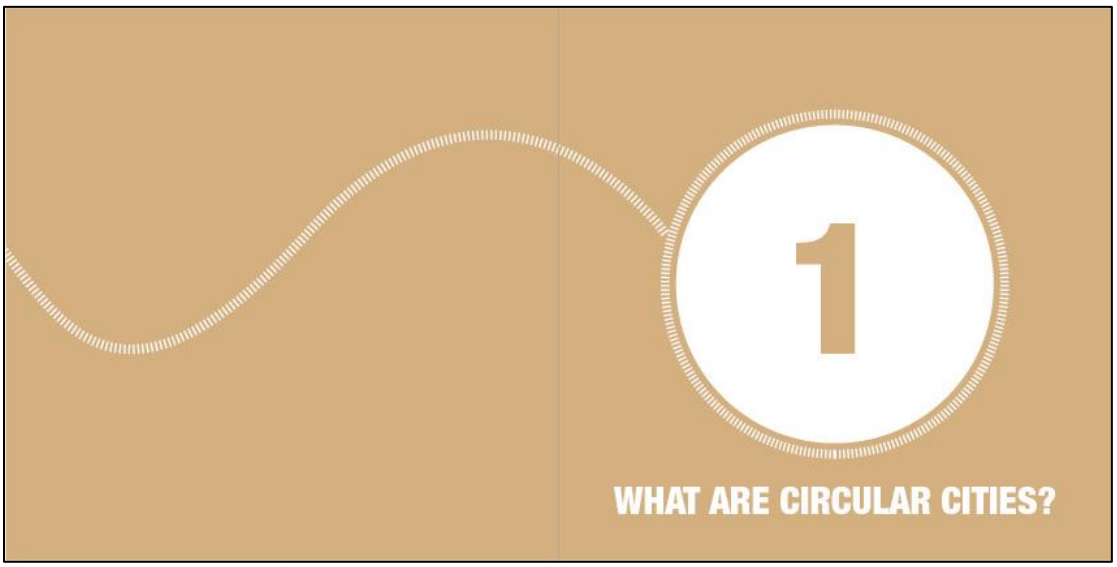
The guideline handbook is divided in five main chapters; the first one is a brief explanation of circular cities and the four main components; circular economy, urban regeneration, ecological transition, and circular society. The second chapter aims to inform the importance of having a participation approach in planning tools in any context as explained in the "Problem Statement" established in the first chapter of this thesis. The third chapter is the explanation of the different case studies mentioned before with a special focus in the participation approach. The fourth chapter focus on the analysis of the participation approach in the transition process to circular cities of Amsterdam and Paris. Finally, the fifth chapter is based in the guidelines and recommendations for a high level of participation approach in planning tools that lead transition processes of circular cities mentioned in the methodology chapter. The following handbook is annexed to the thesis.

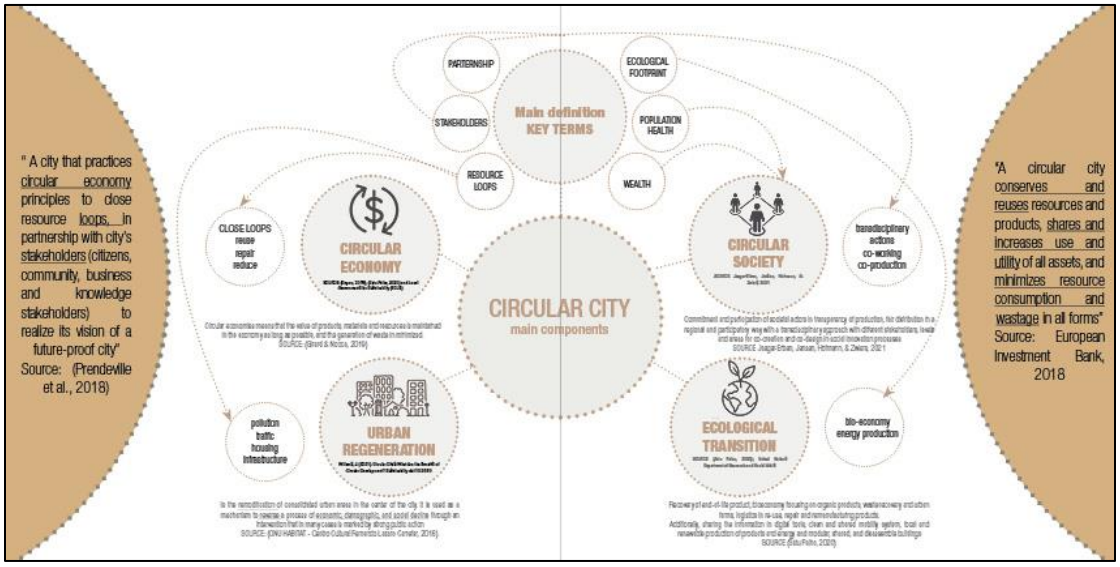
Annex A: Guideline handbook for the analysis of participation approach in planning tools leading to circular cities transition process

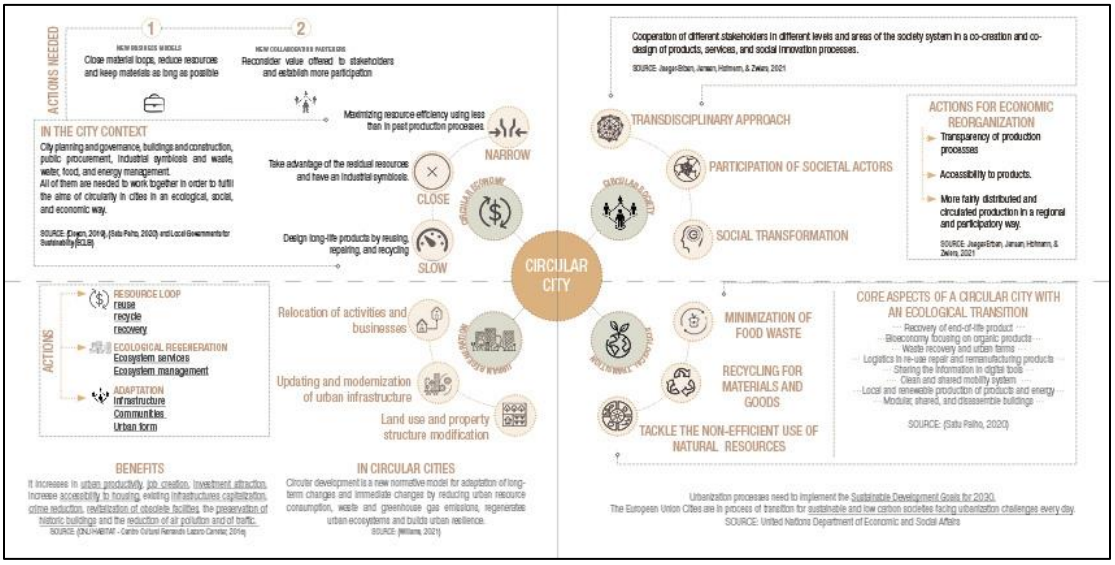


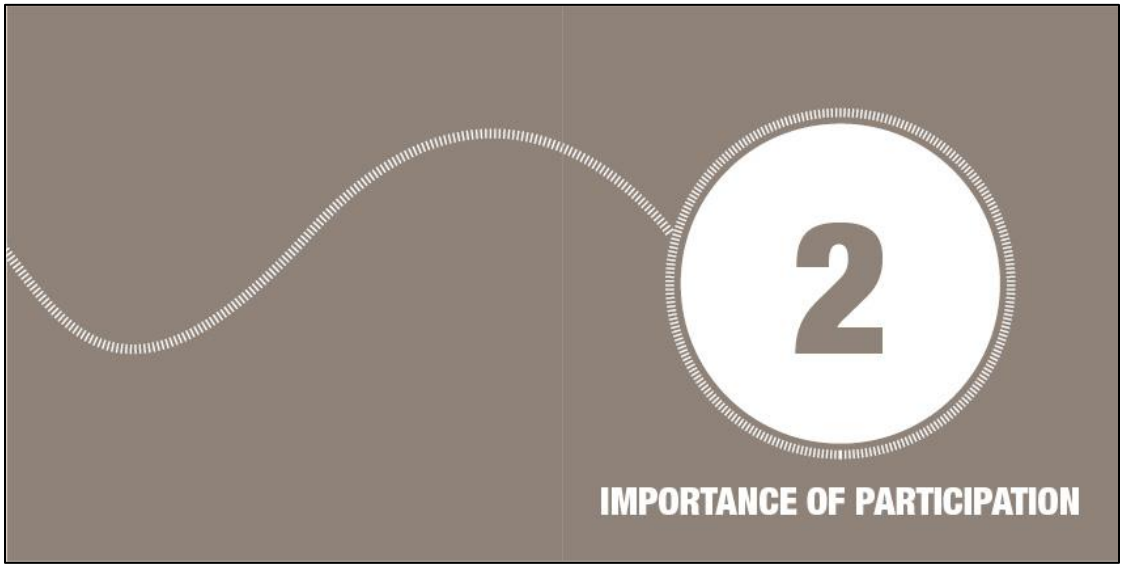

"An endless number of green buildings doesn't make a sustainable city"
Jan Gehl
"All the cities of the world are going to expand. We need to have a better understanding of what makes good urban habitat for homosapiens. We have an obligation to make the new places more livable, more sustainable, more healthy. We have the tools."
Jan Gehl

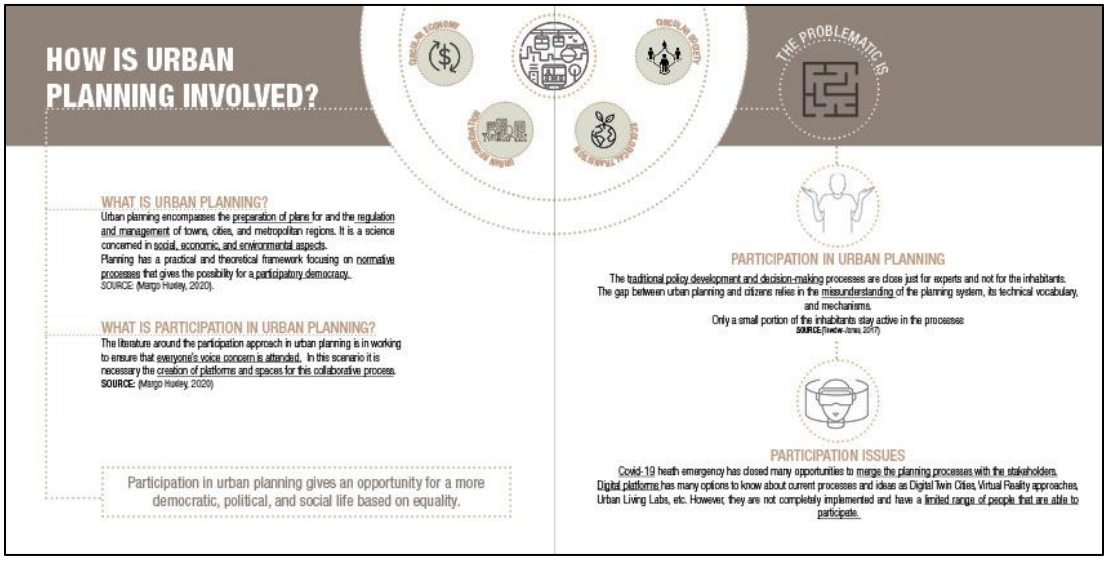

CONTENTS
1 WHAT ARE CIRCULAR CITIES?
2 IMPORTANCE OF PARTICIPATION
3 THE TRANSITION PROCESS
4 ANALYSIS OF PARTICIPATION APPROACH IN CIRCULAR CITIES
5 GUIDELINES AND RECOMMEDATIONS

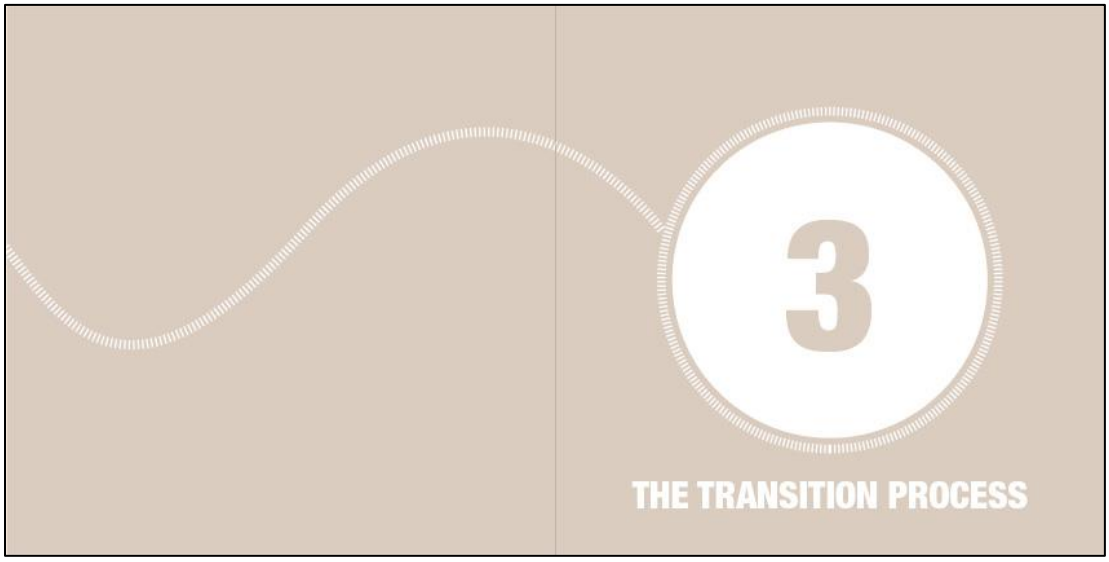

1
WHAT ARE CIRCULAR CITIES?


" A city that practices circular economy principles to close resource loops, in partnership with city's stakeholders (citizens, community, business and knowledge stakeholders) to realize its vision of a future-proof city"
Source: (Prendeville et al., 2018)
Main definition
KEY TERMS
PARTNERSHIP
STAKEHOLDERS
RESOURCE LOOPS
ECOLOGICAL FOOTPRINT
POPULATION HEALTH
WEALTH
CIRCULAR CITY
main components
CIRCULAR ECONOMY
CLOSE LOOPS
reuse
repair
reduce
URBAN REGENERATION
pollution
traffic
housing
infrastructure
CIRCULAR SOCIETY
transdisciplinary actions
co-working
co-production
ECOLOGICAL TRANSITION
bio-economy
energy production
"A circular city conserves and reuses resources and products, shares and increases use and utility of all assets, and minimizes resource consumption and wastage in all forms"
Source: European Investment Bank, 2018

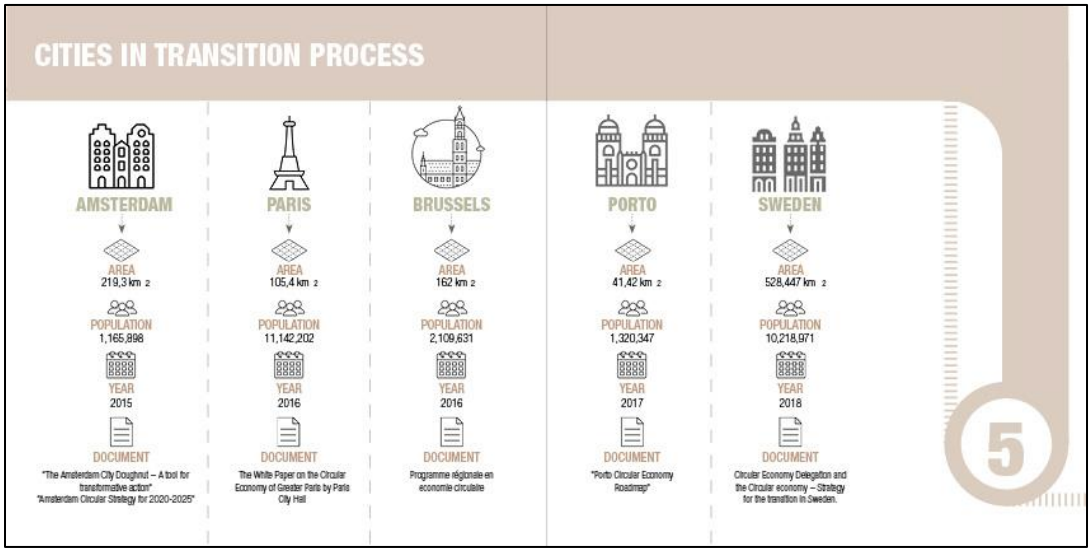

ACTIONS NEEDED
1
Close material loops, reduce resources and keep materials as long as possible
2
Reconsider value offered to stakeholders and establish more participation
IN THE CITY CONTEXT
City planning and governance, buildings and construction, public procurement, industrial symbiosis and waste, water, food, and energy management.
All of them are needed to work together in order to fulfil the aims of circularity in cities in an ecological, social, and economic way.
Maximizing resource efficiency using less than in past production processes
NARROW
Take advantage of the residual resources and have an industrial symbiosis.
CLOSE
Design long-life products by reusing, repairing, and recycling
SLOW
CIRCULAR CITY
ACTIONS
RESOURCE LOOP
reuse
recycle
recovery
ECOLOGICAL REGENERATION
Ecosystem services
Ecosystem management
ADAPTATION
Infrastructure
Communities
Urban form
Relocation of activities and businesses
Updating and modernization of urban infrastructure
Land use and property structure modification
BENEFITS
IN CIRCULAR CITIES
Cooperation of different stakeholders in different levels and areas of the society system in a co-creation and co-design of products, services, and social innovation processes.
TRANSDISCIPLINARY APPROACH
PARTICIPATION OF SOCIETAL ACTORS
SOCIAL TRANSFORMATION
ACTIONS FOR ECONOMIC REORGANIZATION
Transparency of production processes
Accessibility to products.
More fairly distributed and circulated production in a regional and participatory way.
MINIMIZATION OF FOOD WASTE
RECYCLING FOR MATERIALS AND GOODS
TACKLE THE NON-EFFICIENT USE OF NATURAL RESOURCES
CORE ASPECTS OF A CIRCULAR CITY WITH AN ECOLOGICAL TRANSITION
Recovery of end-of-life product
Bioeconomy focusing on organic products
Waste recovery and urban farms
Logistics in re-use repair and remanufacturing products
Sharing the information in digital tools
Clean and shared mobility system
Local and renewable production of products and energy
Modular, shared, and disassemble buildings
Urbanization processes need to implement the Sustainable Development Goals for 2030.
The European Union Cities are in process of transition for sustainable and low carbon societies facing urbanization challenges every day.

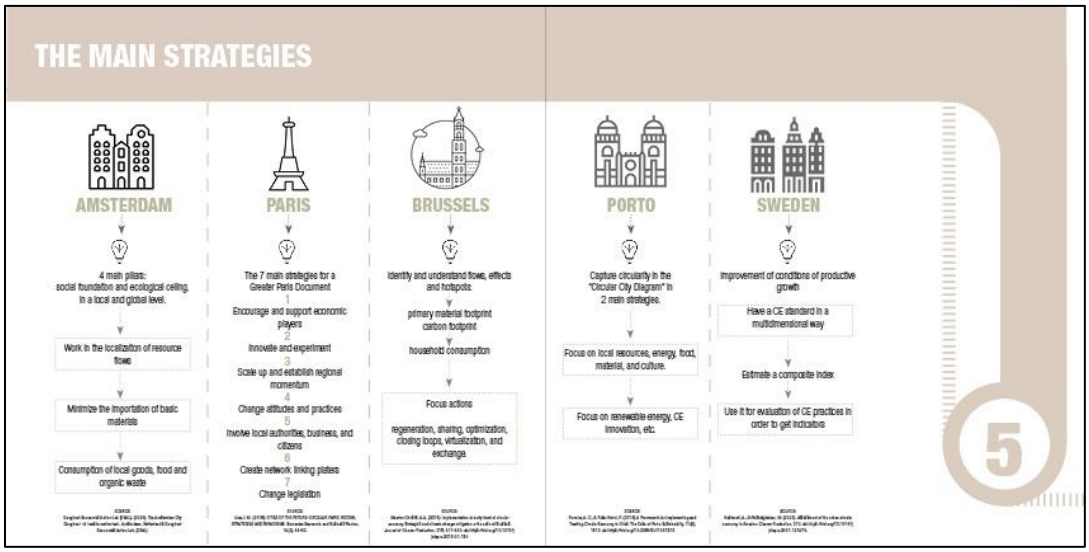

2
IMPORTANCE OF PARTICIPATION

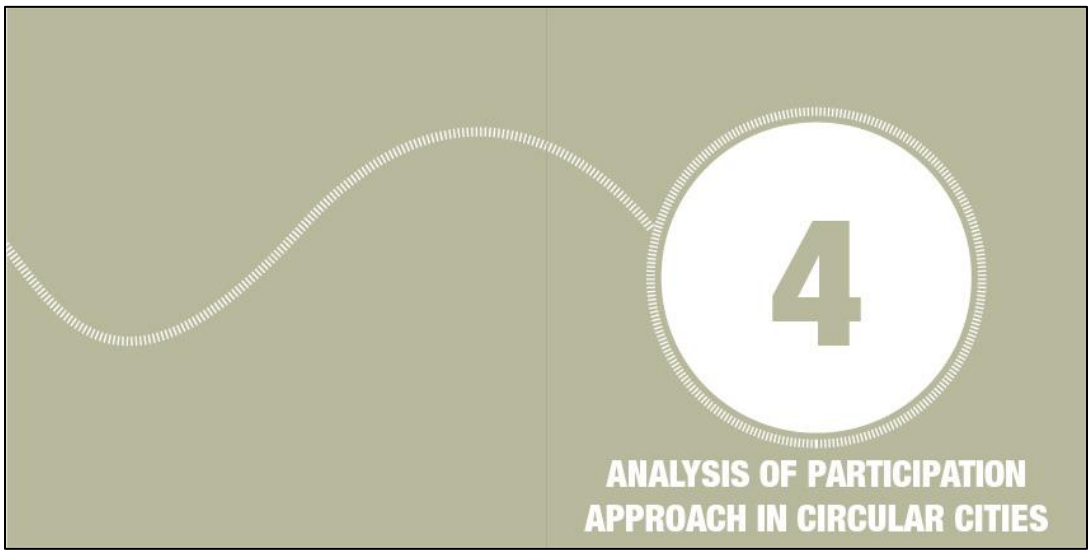

HOW IS URBAN PLANNING INVOLVED?
WHAT IS URBAN PLANNING?
Urban planning encompasses the preparation of plans for and the regulation and management of towns, cities, and metropolitan regions. It is a science concerned in social, economic, and environmental aspects.
Planning has a practical and theoretical framework focusing on normative processes that gives the possibility for a participatory democracy.
SOURCE: (Margo Huxley, 2020).
WHAT IS PARTICIPATION IN URBAN PLANNING?
The literature around the participation approach in urban planning is in working to ensure that everyone's voice concern is attended. In this scenario it is necessary the creation of platforms and spaces for this collaborative process.
SOURCE: (Margo Huxley, 2020)
Participation in urban planning gives an opportunity for a more democratic, political, and social life based on equality.
THE PROBLEMATIC IS
PARTICIPATION IN URBAN PLANNING
The traditional policy development and decision-making processes are close just for experts and not for the inhabitants.
The gap between urban planning and citizens relies in the misunderstanding of the planning system, its technical vocabulary, and mechanisms.
Only a small portion of the inhabitants stay active in the processes
SOURCE:(Tweedy-Jones, 2017)
PARTICIPATION ISSUES
Covid-19 heath emergency has closed many opportunities to merge the planning processes with the stakeholders.
Digital platforms has many options to know about current processes and ideas as Digital Twin Cities, Virtual Reality approaches, Urban Living Labs, etc. However, they are not completely implemented and have a limited range of people that are able to participate.

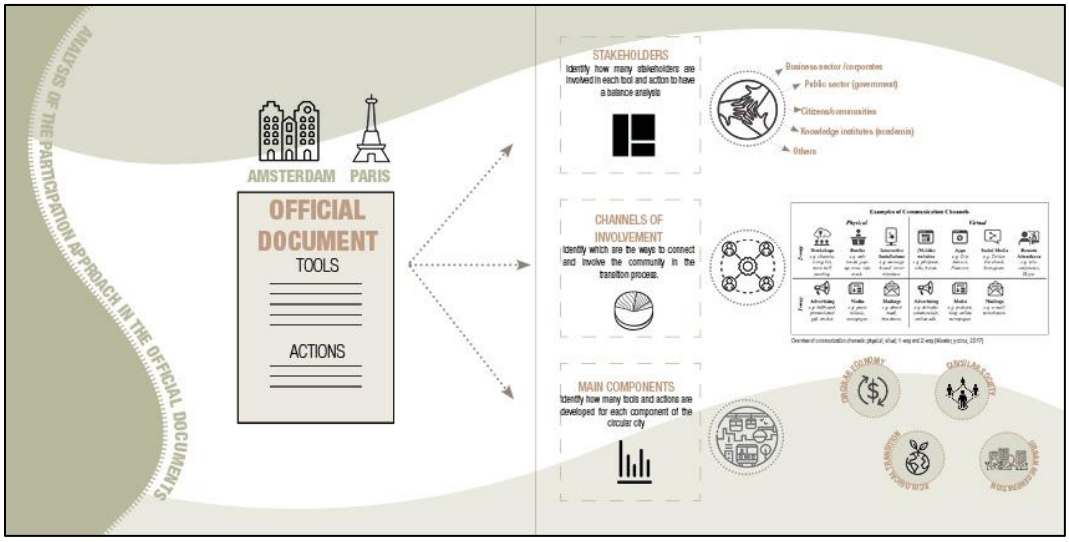

3
THE TRANSITION PROCESS

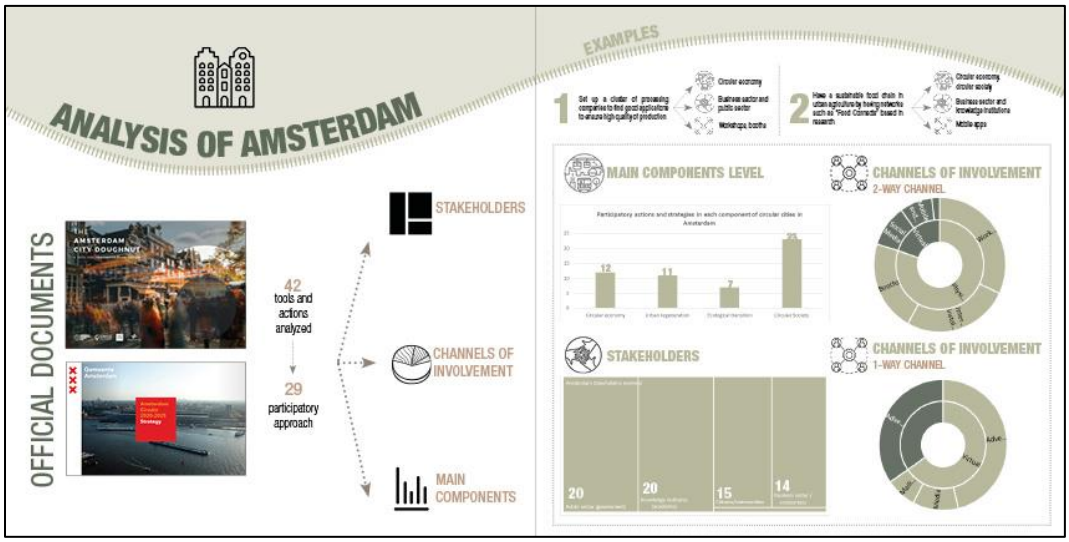

THE TRANSITION INTO CIRULARITY
Circular Economy Action Plan
For a cleaner and more competitive Europe
THE PARIS AGREEMENT
The European Green Deal
#EUGreenDeal
OFFICIAL DOCUMENTS

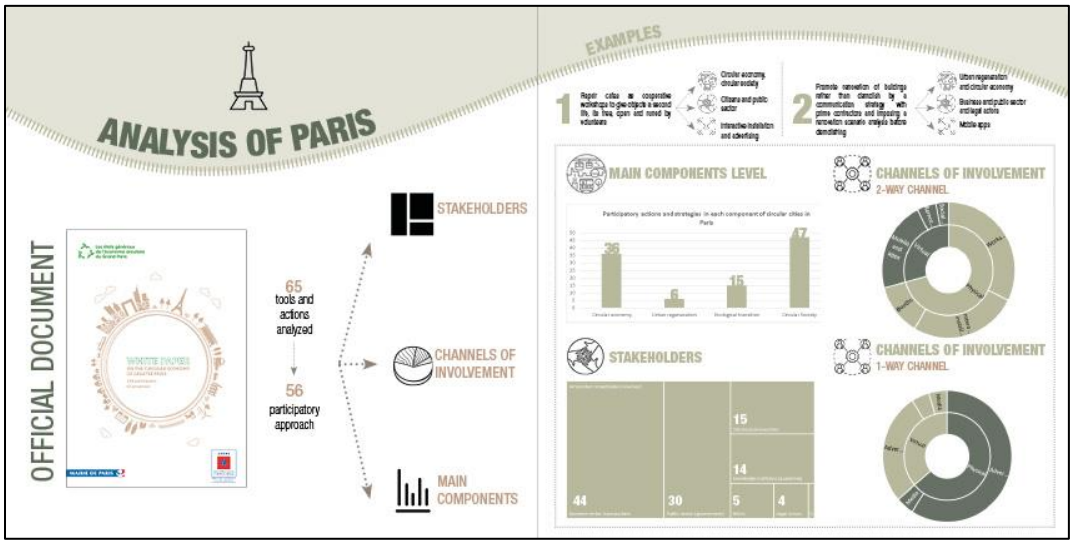

CITIES IN TRANSITION PROCESS
AMSTERDAM
AREA
219,3 km 2
POPULATION
1,165,898
YEAR
2015
DOCUMENT
"The Amsterdam City Doughnut – A tool for transformative action"
"Amsterdam Circular Strategy for 2020-2025"
PARIS
AREA
105,4 km 2
POPULATION
11,142,202
YEAR
2016
DOCUMENT
The White Paper on the Circular Economy of Greater Paris by Paris City Hall
BRUSSELS
AREA
162 km 2
POPULATION
2,109,631
YEAR
2016
DOCUMENT
Programme régionale en economie circulaire
PORTO
AREA
41,42 km 2
POPULATION
1,320,347
YEAR
2017
DOCUMENT
"Porto Circular Economy Roadmap"
SWEDEN
AREA
528,447 km 2
POPULATION
10,218,971
YEAR
2018
DOCUMENT
Circular Economy Delegation and the Circular economy – Strategy for the transition in Sweden.
5


THE MAIN STRATEGIES
AMSTERDAM
4 main pillars:
social foundation and ecological ceiling,
in a local and global level.
Work in the localization of resource flows
Minimize the importation of basic materials
Consumption of local goods, food and organic waste
PARIS
The 7 main strategies for a Greater Paris Document
Encourage and support economic players
2
Innovate and experiment
3
Scale up and establish regional momentum
4
Change attitudes and practices
5
Involve local authorities, business, and citizens
6
Create network linking plates
7
Change legislation
BRUSSELS
Identify and understand flows, effects and hotspots:
primary material footprint
carbon footprint
household consumption
Focus actions
regeneration, sharing, optimization, closing loops, virtualization, and exchange.
PORTO
Capture circularity in the "Circular City Diagram" in 2 main strategies.
Focus on local resources, energy, food, material, and culture.
Focus on renewable energy, CE innovation, etc.
SWEDEN
Improvement of conditions of productive growth
Have a CE standard in a multidimensional way
Estimate a composite index
Use it for evaluation of CE practices in order to get indicative
5


4
ANALYSIS OF PARTICIPATION APPROACH IN CIRCULAR CITIES

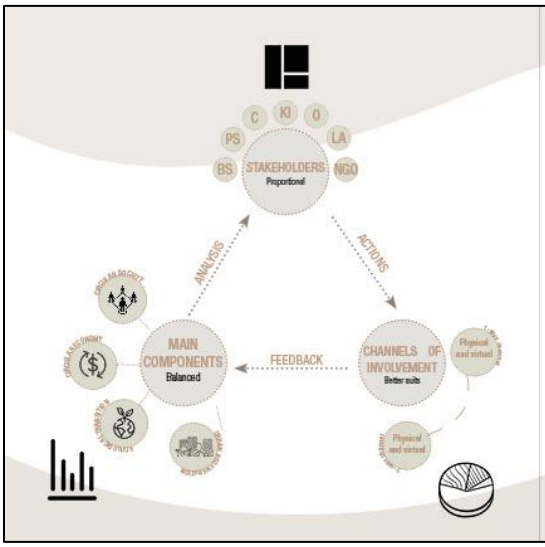

ANALYSIS OF THE PARTICIPATION APPROACH IN THE OFFICIAL DOCUMENTS
AMSTERDAM
PARIS
OFFICIAL DOCUMENT
TOOLS
ACTIONS
STAKEHOLDERS
Identify how many stakeholders are involved in each tool and action to have a balance analysis
Business sector /corporates
Public sector (government)
Citizens/communities
Knowledge institutes (academia)
Others
CHANNELS OF INVOLVEMENT
Identify which are the ways to connect and involve the community in the transition process.
MAIN COMPONENTS
Identify how many tools and actions are developed for each component of the circular city


ANALYSIS OF AMSTERDAM
OFFICIAL DOCUMENTS
AMSTERDAM CITY DOUGHNUT
42
tools and actions analyzed
29
participatory approach
STAKEHOLDERS
CHANNELS OF INVOLVEMENT
MAIN COMPONENTS
EXAMPLES
MAIN COMPONENTS LEVEL
CHANNELS OF INVOLVEMENT
2-WAY CHANNEL
STAKEHOLDERS
CHANNELS OF INVOLVEMENT
1-WAY CHANNEL


ANALYSIS OF PARIS
OFFICIAL DOCUMENT
65
tools and actions analyzed
56
participatory approach
STAKEHOLDERS
CHANNELS OF INVOLVEMENT
MAIN COMPONENTS
EXAMPLES
MAIN COMPONENTS LEVEL
CHANNELS OF INVOLVEMENT
2-WAY CHANNEL
STAKEHOLDERS
CHANNELS OF INVOLVEMENT
1-WAY CHANNEL

5

GUIDELINES AND RECOMMENDATIONS



MAIN COMPONENTS

The first section aims to tackle all kinds of problematics and actions that are not being sustainable in all aspects of the city. The main components as mentioned before are "Circular Economy", "Ecological Transition", "Urban Regeneration" and "Circular Society. It is ideal for all the main components to be included in the strategies and tools in order to find a balance and the whole city transforms in an equitable way.

STAKEHOLDERS

Moving forward, the second section is about the involvement of stakeholders, as we can see from the case studies there are six general types of stakeholders, the public sector (local authorities, government, city hall, etc.), business sector (companies), knowledge institutions (schools, universities, research centers), citizens, NGOs, and legal actors (lawyers). It is important to include all of them because they all give different perspectives of the city and how the economy works.

CHANNELS OF INVOLVEMENT

The last section is the channels of involvement in which many of them were identifies in the case studies. The way all entities approach to the stakeholders is crucial since the communication part is the starting point of action and therefore, progress of transition. Since there are many methods to approach it is necessary to analyze each stakeholder and community in order to pick the channel that best suits them.

THE GUIDELINES

MAIN COMPONENTS

BALANCED

1. Create awareness campaigns in order to inform the community of the new processes of circular economy in the city country or neighborhood
2. Connect different initiatives with knowledge institutions to stimulate research and innovation
3. Have experimental areas for stakeholders and citizens to de-completely involved
4. Teach to recycle and other circular processes to the community in schools, companies and neighborhoods eg. educational kits implemented in Fifa
5. Create sharing and repairing centers to create community based one solidarity and sustainability
6. Have donation programs of food, clothes, furniture, etc.,
7. Open of/low spaces to share and incentive the communication of ideas
8. Include circular economy in school and university programs.

1. Create clusters for companies to share good practices
2. Create networks to incentive a sustainable food chain
3. Innovate and experiment on sustainable food production
4. Enable platforms and spaces to share, repair and recycle
5. Create simulation areas for production innovative ideas
6. Encourage eco-design companies
7. Have a tool software for economic analysis
8. Develop a supply system in between companies
9. Have business incubators to support sustainable processes in companies
10. Have an accompany team for economic, legal and technical advice
11. Facilitate web pages and apps for recycling a donation.

1. Have experimental areas for food production, biomass, fertilization, etc.
2. Create awareness campaigns for upcycling materials
3. Create a communication tool to solve doubts and share good practices between companies of food production
4. Create a volunteer network to develop all kinds of sustainable projects
5. Create platforms (websites, apps) to exchange services and resources between stakeholders
6. Encourage local composting

1. Share information and ideas in sustainable construction to develop new instruments
2. Formulate circular ambitions for infrastructure
3. Develop a center for practical advice about circular construction practices and urban development
4. Incentive research and innovation in sustainable construction and urban development
5. Create a "circular toolbox" for renovation infrastructure to share technical, thermal, social, organizational and legal implementation issues
6. Have experimental areas and buildings
7. Enable areas of the city for recycling centers
8. Enable composting areas in neighborhoods
9. Promote renovation of buildings rather than demolish
10. Create a BIM database for maximize availability in local storages

STAKEHOLDERS

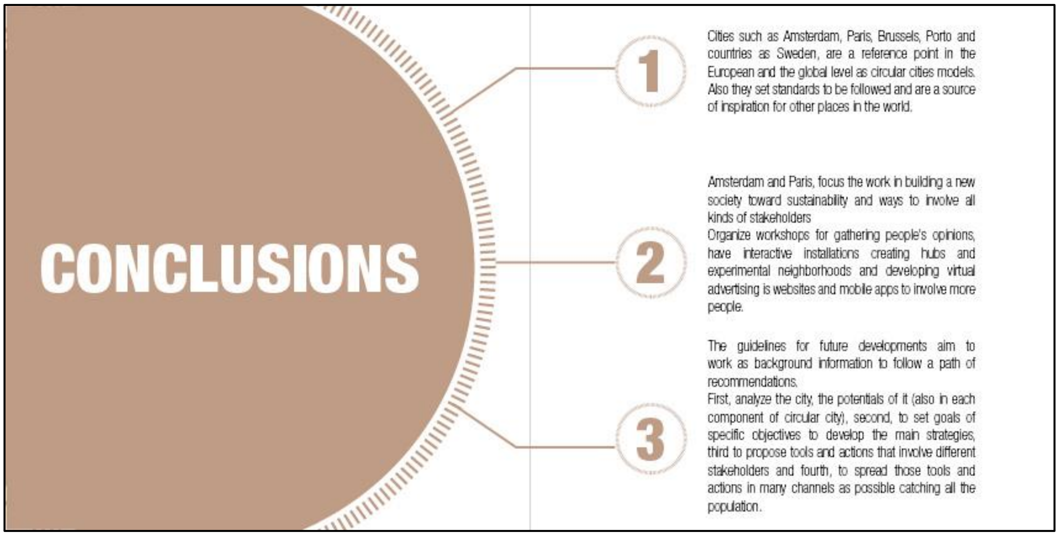
PROPORTIONAL

STAKEHOLDERS	ROLE IN THE TRANSITION PROCESS
PUBLIC SECTOR	Sets up the rules and is the decision-maker actor. Also gives incentives to citizens a company for good sustainable practices
BUSINESS SECTOR	Start the circular economy process by being the actors that use the natural resources, they are responsible for most of the transition processes
KNOWLEDGE INSTITUTIONS	Are involved in research and innovative ideas in order to create actions and tools for better sustainable practices
CITIZENS	Are in charge of a community and culture change into a more sustainable lifestyle
NGOs	Leaders and supporters of innovative and sustainable initiatives
LEGAL ACTORS	Create the normative path for the changes in the transition processes.

CHANNELS OF INVOLVEMENT

BEST FITS

CHANNELS OF INVOLVEMENT		2-WAY	1-WAY	
	PHYSICAL	Workshops and booths for the involvement of all stakeholders to build networks and support each other in ideas and processes. Interactive installations such as experimental areas to test initiatives	PHYSICAL	Advertising by labeling products to inform people about sustainable products, educational kits with instructions, bike installation,
	VIRTUAL	Website platforms, mobile apps to connect stakeholders, have support information and create feedback. Also, the remote attendance meetings for the discussion of different ideas	VIRTUAL	Commercial, online advertising, radio, and podcasts to inform, newsletters.


CONCLUSIONS
1
Cities such as Amsterdam, Paris, Brussels, Porto and countries as Sweden, are a reference point in the European and the global level as circular cities models. Also they set standards to be followed and are a source of inspiration for other places in the world.
2
Amsterdam and Paris, focus the work in building a new society toward sustainability and ways to involve all kinds of stakeholders
Organize workshops for gathering people's opinions, have interactive installations creating hubs and experimental neighborhoods and developing virtual advertising is websites and mobile apps to involve more people.
3
The guidelines for future developments aim to work as background information to follow a path of recommendations.
First, analyze the city, the potentials of it (also in each component of circular city), second, to set goals of specific objectives to develop the main strategies, third to propose tools and actions that involve different stakeholders and fourth, to spread those tools and actions in many channels as possible catching all the population.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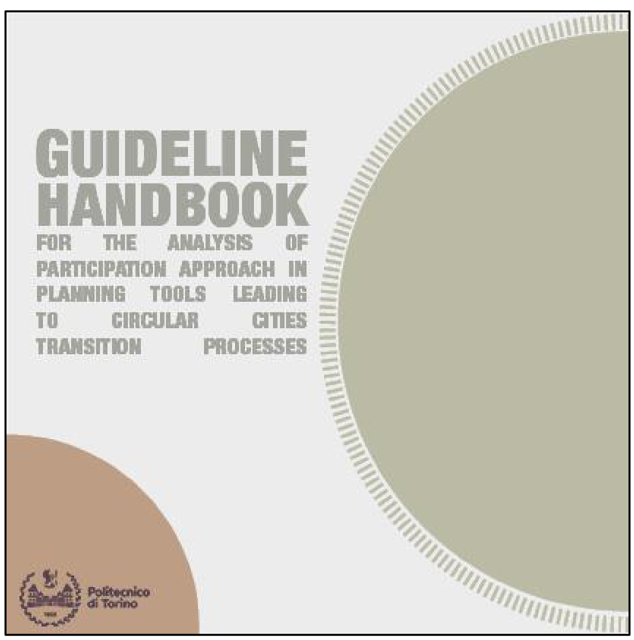
GUIDELINE HANDBOOK
FOR THE ANALYSIS OF PARTICIPATION APPROACH IN PLANNING TOOLS LEADING TO CIRCULAR CITIES TRANSITION PROCESSES
Politecnico di Torino

Chapter 5 – Conclusions

To conclude this thesis, it is worth mentioning that its most important purpose was to contribute to the sustainable development for cities from different points of view, from the economy to the daily behaviors of people. This thesis was intended to be a support document and guide for urban planners, architects, students, teachers, and decision makers and support the development of strategies toward circular cities and guarantee that approaches are highly participatory in order to generate a deeper and democratic change and thinking in the process of adaptation of people.

Taking into account all the previous developments of important documents such as the Sustainable Development Goals (United Nations, 2015), the Paris Agreement (United Nations, 2015), the Green Deal (European Commission, 2019), and the Circular Economy Action Plan, (European Commission, 2020), this thesis intended to meet several of the objectives of these documents in order to work towards a more circular economy, to think of a more sustainable urbanization development and a higher participatory approach. The key to achieving all these objectives is to work from the root of the problems, transforming processes of production, consumption, construction, etc. into environmentally friendly ones.

As we saw in the case studies, many cities are already being a reference point in the European and the global level in terms of sustainability and circular cities. For this reason, these cities set standards to be followed and are a source of inspiration for other places in the world. For example, the city of Brussels has a model based on a detailed analysis of hotspots where current environmental and economic issues are visualized in order to work more detail in that ones and tackle them. The case of Porto inspires a development more linked to the cultural environment of the place, and to implement processes rooted in the history and lifestyle of the people. Finally, the case of Sweden gives a look more towards multidimensional standards that allow a more accurate evaluation of processes and to develop indicators of status and progress.

Furthermore, the city of Amsterdam is also a source of inspiration and a role model for many cities and countries around the world, being its system organized in 3 important pillars such as food chain, industry and infrastructure, its work towards a circular city is based on society. The main purpose of the Strategy Plan (Amsterdam, 2020) is to make all changes through all stakeholders, changing unsustainable behavior patterns and creating a new culture

around the care of the environment. Therefore, its development starts from there and the implementation of the other actions focused on the economy, infrastructure and industry begins.

On the other hand, the City of Paris follows a strategy of 7 items; support to economic players, innovation, regional scale, change of attitudes, involvement of stakeholders, creation of networks and change of legislation. The strategy plan of Paris also works on a circular society approach, leading actions with a high involvement of people. However, the involvement of stakeholders is not as balanced as the City of Amsterdam having a priority for the business and private sector and public sector. The involvement of citizens is a third part of the involvement of the business sector and the knowledge institutions involved are the half of the public ones. This doesn't mean that the City of Paris is having a wrong approach, in fact Paris leads the transition process to circular economy worldwide and the action plan is one of the most detailed ones having 65 actions and tools compared to Amsterdam that has 42.

Moreover, both cities; Amsterdam and Paris, focus the work in building a new society toward sustainability and their way to involve all kinds of stakeholders are similar, they organize workshops for gathering people's opinions, have interactive installations creating hubs and experimental neighborhoods and developing virtual advertising is websites and mobile apps to involve more people. All these approaches are highly inclusive since they manage to catch people of different occupations, age, sectors, etc.

Finally, the guidelines for future developments aim to work as background information to follow a path of recommendations. From the case studies, we can conclude as well that there are previous steps that are needed to be followed such as; first, analyze the city, the potentials of it (also in each component of circular city), second, to set goals of specific objectives to develop the main strategies, third to propose tools and actions that involve different stakeholders and fourth, to spread those tools and actions in many channels as possible catching all the population.

To conclude, it is important to think in the future of cities, this generation is the in charge of tracking the world into a better future, a more sustainable one. There is an enormous need to work on building a world based on respect for nature and therefore, this thesis aims to help in achieving those goals.

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