

Towards an inclusive circular Amsterdam: A framework for evaluating local circular initiatives, projects and startups in the city of Amsterdam



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Summary

This thesis presents a framework developed for AMS Institute for the performance measurement of local circular initiatives, projects and start-ups focused in upcycling organic waste in the city of Amsterdam. The research question answered is *What are the criteria needed to assess and communicate the performance of the initiatives, projects and start-ups in the city of Amsterdam in moving towards a circular economy?* This question was answered by combining an analysis of the literature in governance, performance measurement and sustainability assessment and, empirical data consisting of 16 semi-structured interviews. There is often a lack of sustainability assessment tools that focus on communities or at the local level. Thus by having such a tool, it is possible to incorporate the performance of these local projects to the results regarding circularity in the city, and based on their performance, communicate them their strengths and the areas they could improve in order to achieve their mission.

Circular economy is defined as an economy in which waste is designed out by, allowing resources and materials to safely re-enter either the biological or the technical cycle, natural resources are used carefully, and renewable energy is used. The framework presented in this thesis, focuses on the biological cycle.

The concept of circular economy is important because in the next decades the world's population will rise and by 2050, nearly 65% of the total population will reside in urban areas. This fast growth will increase the challenges of urban areas regarding the environment, social and economic impact. Cities are accountable for approximately 50% of the waste produced globally and consume about 75% of natural resources. Because of this, cities have started to work on becoming more sustainable by implementing different approaches such as the circular economy approach.

The Municipality Of Amsterdam has set sustainability goals for 2020. One of these goals has to do with implementing the circular economy approach in the city. The steering of the society towards circularity is not only coming top-down but also from the bottom-up. There are different initiatives, projects and start-ups in the city that are concerned about the environment and have decided to start taking

action independently from what the Municipality's goals and ambitions are. Even though there are citizens that are already doing something to change the situation in their neighborhoods by implementing circular economy principles, there is not yet an official evaluation tool that focuses on measuring the performance and impact that they have at a local scale.

Next to the municipality, and local initiatives, projects and start-ups, other stakeholders such as Amsterdam Institute for Advanced Metropolitan Solutions (AMS) are also concerned about this topic and are performing research on it. AMS aims to develop metropolitan solutions to the problems that urban areas are facing regarding water, energy, waste, food, data and mobility.

Based on the analyzed theory and the data obtained throughout this research thesis, the four main perspectives that were developed to be taken into consideration while evaluating the performance of local circular projects are: *the impact and ability of closing loops, resource cooperation, the community, and generation of awareness and behavioral change*. This framework is not meant to measure the success of these initiatives, but rather to include them in the process of moving towards becoming a circular city, and to help them to achieve their own mission. Also, by implementing such a tool, both parties, the researcher as well as the project being evaluated, can get practical information from the results while inviting the initiatives to perform better.

The framework is recommended to be used as a guideline of the aspects that today are important for this projects to be measured regarding their performance on moving towards a circular city. However to continue to develop this framework, it needs to be tested to find what is still lacking and what could be improved. Besides its conceptual contribution, this thesis in addition makes an empirical contribution to improve our understanding on organic waste streams within the city by including the cooperation between stakeholders regarding waste streams. Finally, this framework is meant to be used as a communication tool, which is why the results as well as the process need to be communicated to the stakeholders involved.

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1. Introduction

Cities have always been a place where people want to gather around with the desire of finding a better life, a better future (UN Habitat, 2013). Cities are “places where humankind realizes ambitions, aspirations and dreams, fulfill yearning needs, and turn ideas into realities” (UN Habitat, 2013, p. X). But due to the socioeconomic power that a city can have and the large agglomeration of people, urban areas are dealing with social, environmental and economic crisis (UN Habitat, 2013). If actions are not taken, these crises can only be expected to get worse as the world’s population grows.

According to the United Nations (2014), in 1950 about 30 % of the global population resided in urban areas. In 2014 it was estimated that 54% of the world’s population was living in urban areas, and it is expected that by 2050 this percentage will increase to 66% (United Nations, 2014). The world’s urbanization will bring more challenges for urban sustainable development, because cities will have to deal with the social, environmental and economic impacts of population growth (United Nations, 2014). These impacts will call for the need of integrated policies for urban and rural population (United Nations, 2014).

More people concentrated in one area means one thing: more appetite for resources (C40 Cities, 2015) and more waste generated. Cities are dense and have no space for storage (Stokes, 2015). Challenges in managing the resources needed in the urban areas as well as the outputs and waste generated by the growing population will appear to become bigger and bigger. For example, even though cities do not even cover 2% of the planet’s surface, they are accountable for 78% of the total consumption of energy generated and contribute to more than 60% of the carbon dioxide (CO₂) emissions (UN Habitat, 2015). Besides this, according to UNEP (2012), cities produce 50 % of global waste, consume 75% of natural resources and produce 80% of global GDP.

1.1 Towards a Sustainable Amsterdam

Because of the fast growing population that has been seen in urban areas in the last decades, urban sustainability is a concept that has gained importance and will continue to be present in the planning for sustainable cities.

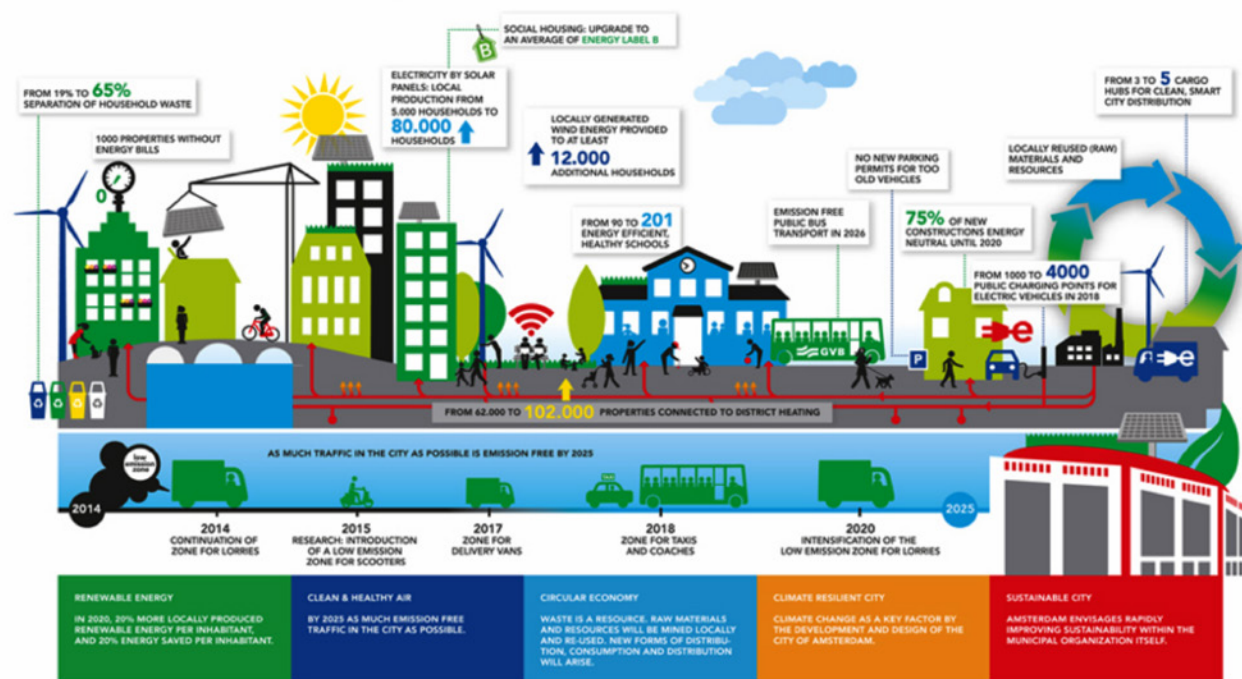
The concept of *sustainability* and its importance for cities has been an important subject of discussion around the globe. Cities are eager to become (more) sustainable and not only because it is the “right thing to do” but because it has turned into a necessity. Amsterdam has planned to become more sustainable in the coming years (Gemeente Amsterdam, 2016; Municipality of Amsterdam, 2015).

In March 2015, the Sustainable Amsterdam Agenda was adopted by the Municipal Council of Amsterdam. This Agenda explains the ambitions, goals and directions concerning the city’s “sustainabilization”. The ambitions, goals and directions described in the document are formulated for five pathways (Municipality of Amsterdam, 2015, p. 8). These pathways are: renewable energy, clean air, circular economy, climate-resilient city, and the last one has to do with the operational management of the municipality.

Some of the main goals stated in The Sustainable Agenda (2015) are:

- Use 20 percent less energy per inhabitant by 2020 (in relation to 2013’s energy use) and produce 20 percent more renewable energy. This goal wants to be achieved by producing more wind and solar energy, making use of renewable heating, making existing housing stock more sustainable, reducing energy consumption and, encouraging energy-neutral construction.
- Comply with the national and European standards for air quality by having motorized traffic as clean as possible and emission-free as possible by 2025. The city will continue to provide and increase the electric chargers to 4,000. The city also wants to encourage citizens to walk and/or bike rather than using motorized vehicles. The city will invest in the needed infrastructure to enhance these practices.
- Transition into becoming a circular economy. The city will make improvements in the waste separation, recycling and collection system. It is expected that by 2020, 65% of the separated domestic waste will be reused. The municipality will “encourage innovation and circular activities” (2015, p. 27) and will make partnerships to create a circular economy at a regional scale.
- Adapt the city regarding water issues and make Amsterdam a resilient city.
- Increase the waste separation and collection in the municipal offices to 75 percent by 2025.

Figure 1. Infographic Sustainable Amsterdam (Gemeente Amsterdam, 2016)



Each pathway represents different goals, but at the same time are interconnected and rely on each other to succeed. One of the main goals focuses on transforming the current economy into circular. It is a complex approach that if it were to be successful, could bring several benefits to the society by improving the economic system and having no net effect on the environment (World Economic Forum, 2014).

According to the Sustainable Amsterdam Agenda, in a circular economy “energy, water, natural resources and food are used carefully. Waste is considered a natural resource, and energy is derived from renewable sources” (Municipality of Amsterdam, 2015, p. 26)

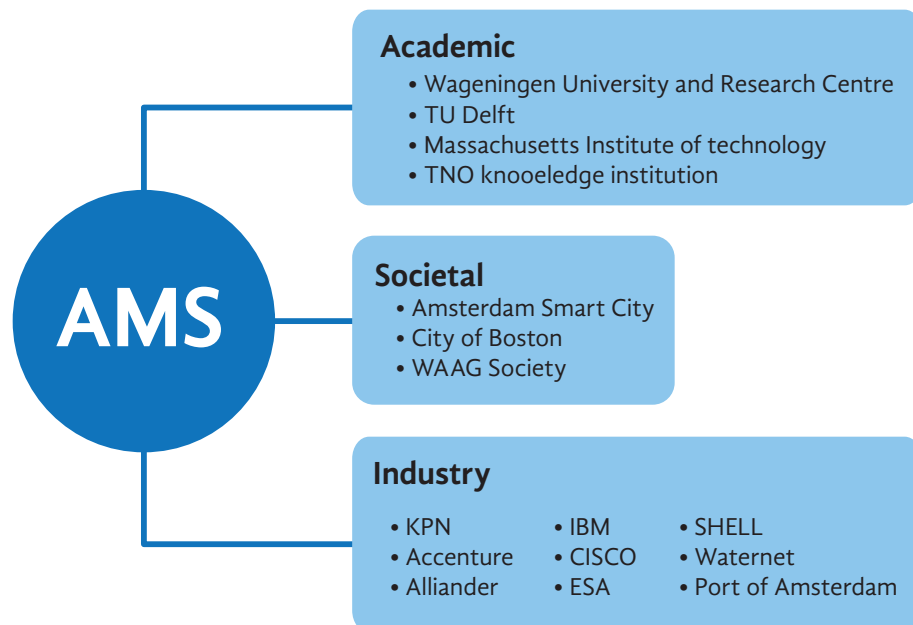
1.2 Circular Economy: an approach used by other actors: Amsterdam Institute for Metropolitan Solutions (AMS)

The municipality alone cannot transform the city into a circular city. It requires, as stated before, the participation and partnership with different stakeholders. In the sustainability agenda, one of the stakeholders mentioned, which is already working in the sustainability transition of the city, is the Amsterdam Institute for Metropolitan Solutions (AMS).

AMS is an institute that collaborates by providing information and active participation on trying to understand the “sense of the city” so new solutions can be designed and integrated into the city of Amsterdam (AMS, 2014b). It uses the city as a place where these designs can be tried out by citizens after being created (AMS, 2014b).

AMS works mainly as a network in which different partners contribute information and knowledge with the aim of generating new knowledge that is practical and that could change how the city is sensed. AMS has academic, societal and industry partners. Figure 2 shows the current partners of AMS Institute (AMS, 2014c).

Figure 2. Partners of AMS Institute (AMS, 2014c)



AMS will keep working to create solutions that will change the city of Amsterdam. The concept of circularity is a concept that derives from the industrial ecology paradigm. It has not only changed the perception of how industrial systems work, but also of cities (Murray, Skene, & Haynes, 2015).

There are already some examples of circular economy initiatives in the region of Amsterdam, and more are expected to come up in the next years. These examples range from neighborhood and small business initiatives to projects from big companies such as the port of Amsterdam and AEB Amsterdam.

Currently AMS institute is collaborating with different stakeholders in one big project related to circularity in the city of Amsterdam. This project is called

the Adaptive Circular Cities (ACC). The project is in the neighborhood of Buiksloterham, smart retrofitting, smart energy systems and resource flows in the city of Amsterdam. Thus, as it can be seen the participation and collaboration from the institute is important and it will continue to be key in the transformation to a circular city.

1.3 Circularity in Amsterdam

In June 2012, the document, *Towards the Amsterdam Circular Economy*, was published by the City of Amsterdam. In this booklet, as it is described in the publication, the different cycles regarding circularity in the city are introduced as well as the future perspective for each cycle. The described cycles are: food, phosphate, waste, water, electricity and heat (City of Amsterdam, 2012). In this document it is acknowledged that the subject of circularity is of importance within the sustainability policy of the city (City of Amsterdam, 2012).

According to this document it is intended for the city to:

- Produce more local and seasonal food for local consumption, use less pesticides, as well as less energy, packaging and food miles for transportation. In the Netherlands, an average of 50 kg of food is wasted yearly per person (WUR, n.d.).
- Recover phosphate by the food processing industry, use it in production and trade it.
- Minimize the amount of non-recyclable waste by using innovative methods for collecting and separating waste so it can be upcycled and recycled by business in the region.
- Recover water and treat it so it can be reused after purification.
- Produce renewable energy and use little amount of fossil fuels.

Even though this publication describes what the current situation of the city and the desire for the future, some of these concepts and/or plans have already started to become tangible in the city of Amsterdam. Some of them have begun as local initiatives or projects. Some others are startups and/or small business that

are engaged with the society while implementing the circularity principles. It is important to highlight that in order for a city to adopt circular economy principles, the participation and engagement of citizens is crucial. For example: if organic waste is intended to be separated to be used as compost or energy production with the most advanced technology, but people do not know how to separate the waste, the technology efforts result useless. But what if citizens instead of just learning how to separate waste would actually start an initiative/project in which they would engage the community with the practice of separating waste?

This is exactly what the city of Amsterdam is experimenting. Citizens are creating, participating, and engaging with a variety of different local projects that will help the city to adopt and put in practice the circular economy approach while helping the city become more sustainable. At the same time networks have enhanced this participation, because they serve as platforms to share and exchange knowledge. This shows how the circular economy principles are being steered, not only by the government, but also by concerned citizens. Even though the municipality has its own visions about the city, other important stakeholders also share the vision and are working towards reaching the same vision and goals.

There are different scales of circular projects: Buildings, neighborhoods/communities, small businesses, industrial parks, and now the concept has been used for cities. It is important to measure the performance of the projects so after being evaluated, decisions regarding circularity can be made. There are already some tools being developed related to circularity. For example, Circle economy developed circular economy indicators at a city level (Circle Economy, Fabric TNO, & Gemeente Amsterdam, 2016) that focus on value retention, economic impact and, ecological impact.

What is important to keep in mind is that nowadays, at least in the city of Amsterdam, citizens are setting up some projects and initiatives at a local scale. People are starting to get together, and within their own network build their own houses or their own small businesses. These types of participatory (Bottom-up) initiatives should also be measured and be evaluated. Niven (2003) explains that in order to be able to define success and show how certain actions are affecting others, measurement is needed. The word success needs to be treated carefully, because at the end what defines if something or someone is successful? But what can be said is that in order to know if specific goals are being achieved, measurement is needed.

The perception of the city is shifting more towards horizontal governance, in which inclusive participation is gaining more importance and presence, and networks are gaining more power. But how can this type of projects at a neighborhood scale be measured? What elements are needed in order to decide if these projects are achieving sustainability by using circular economy principles?

1.4 Problem description

The circular economy approach has been used in the last years in different regions of the world, especially in Asian countries, thanks to its contribution to sustainable development (Geng, Fu, Sarkis, & Xue, 2012). In the Dutch context, circular economy has gained a lot of interest. Transitioning to become a circular hotspot by applying the circular economy approach to projects that are replicable and by stimulating the innovation, research and circular activities is one of the main goals set by the municipality in the document Sustainable Amsterdam (Municipality of Amsterdam, 2015). Thus, it can be said that it is a concept that will play an important role in moving towards a more sustainable Amsterdam.

Although different projects/initiatives and startups have already started to implement the circular economy approach in Amsterdam, there is not an existing tool that looks at this circular local scale projects and measures their performance.

One of the most important steps for reaching sustainability goals is assessment (Roseland, 2012). The main purpose of conducting sustainability assessments is to “provide decision makers with an evaluation of global to local integrated nature–society systems in short and long term perspectives in order to assist them to determine which actions should or should not be taken in an attempt to make society sustainable” (Ness, Urbel-piirsalu, Anderberg, & Olsson, 2006, p.499). This explanation from Ness et al. can be applied also, to the case of circular economy in Amsterdam. Because by evaluating the local system of circular economy in a short term perspective, the actions that are being done today in the city will provide information on whether the attempt to transform the city to a sustainable city through circular economy activities is working. Thus, by measuring the performance of these different projects, information and understanding in what the role of the local community in this transition towards a sustainable city is.

There are community assessment tools that are suitable for citizens groups that do not require a lot of training (Roseland, 2012). Assessment tools are used to

measure the current situation of a community and evaluates where it is going (Roseland, 2012). Currently there is not a tool that focuses on measuring the performance of local circular projects. Thus, following this logic, if one of the main strategies to transform Amsterdam into circular is by “prioritizing circular projects that are scalable and replicable” (Municipality of Amsterdam, 2015, p. 27), assessment on the current projects that might be eligible for scaling up and replicating need to be done. Otherwise how can it be known the current situation of a project? Or, that a project is succeeding and is a good example for replicating?

1.5 Objective

There are two key elements that the city of Amsterdam is showing regarding circularity and they are important for this research project. The first element is that the city, as described in Sustainable Amsterdam, is aiming to become a more sustainable city. This transition will happen and evolve in the future, but for now, one of the key elements that is considered to transition into a more sustainable city is circularity. And second, AMS is and will be part of Amsterdam’s transition into becoming more sustainable (Municipality of Amsterdam, 2015).

The city claims that wants to build a circular economy in the city; AMS has as one of their main pillars the concept of circular city; there are startups, initiatives and projects that are already working and contributing towards sustainability by applying the circular economy approach. They all are working for the same goal. But then, what determines if they are being successful in achieving circularity in the city of Amsterdam?

The main objective of this thesis is to generate a *framework* for the AMS institute that will identify and prioritize the main elements of circularity regarding organic flows and serve as criteria and communication tool for measuring the performance of inclusive circular projects¹ at the neighborhood scale in the city of Amsterdam

As mentioned before, AMS is a network formed by different stakeholders, which in theory have common goals. AMS will continue to work in the transition to a sustainable city in which circularity will play an important role. The institute focuses on experimenting in the city of Amsterdam in order to generate more

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¹ The term inclusive circular projects refer to the different initiatives developed by concerned citizens that focus on the circular economy approach. The word inclusive is used to describe the participatory and active role and involvement from citizens have in achieving a circular city.

knowledge and impact the transition of the city to sustainability. The framework elaborated in this research project will provide elements for the generation of new knowledge and information regarding circularity in the city of Amsterdam. This new knowledge will contribute to a better understanding on what the “sense of the city” is regarding circularity.

1.6 Research questions

Given the considerations and research objective presented in the previous subsections, the following research questions were formulated to be addressed.

Main research question:

WHAT ARE THE CRITERIA NEEDED TO ASSESS AND COMMUNICATE THE PERFORMANCE OF THE INITIATIVES, PROJECTS AND/OR STARTUPS IN THE CITY OF AMSTERDAM IN MOVING TOWARDS A CIRCULAR ECONOMY?

Additional sub-questions are:

- What are the key indicators/ measures needed to evaluate the performance of inclusive circular projects at a neighborhood scale in the city of Amsterdam?
- How can the criteria be brought together in a consistent and understandable framework?

By answering the main question and the sub-questions knowledge related to measuring of the performance of inclusive circular initiatives, projects and start-ups will be gained. This information besides generating knowledge can also be put into practice. By suggesting a set of criteria that is based on the current situation from the local circular initiatives, projects and star-ups, knowledge and understanding of their contribution to the transition towards a circular city will be gained.

2. Concepts

In the following section the main concepts, approaches and theories for this research thesis will be presented. First a short explanation on the definition of urban sustainability will be presented. Second, the circular economy approach will be presented. Third, the governance theory will be introduced. Fourth, urban sustainability assessment will be debated. Then, the circles of sustainability approach followed by the Balanced Scorecard will be explained. Last, a theoretical framework based on the circles of sustainability and the Balanced Scorecard for non-profit organizations is formulated.

2.1 Urban sustainability

The concept of *urban sustainability* comes from the definition of sustainable development applied to a city (Munier, 2006). A sustainable city is “that in which the community has agreed on a set of sustainability principles and has further agreed to pursue their attainment. These principles should provide the citizenry with a good quality of life, in a livable city, with affordable education, healthcare, housing and transportation” (Munier, 2006, p. 17). Maclaren (1996) explains that the definition of urban sustainability is very similar to the definition of an urban sustainable development. The difference between these two concepts, relies on distinguishing that sustainability is a “desirable *state* or set of conditions that persist over time” while development is the “*process* by which sustainability can be attained” (Maclaren, 1996, p. 185).

There are three main pillars that compose the concept of *sustainability*. These are: society, environment and economics. These pillars are interconnected and the interactions between them have an effect on each other.

2.2 Circular Economy

Circular economy is a concept that emerged as a strategy for businesses and as a new approach regarding sustainability (Murray et al., 2015) “In a circular economy, energy, water, natural resources and food are used carefully. Waste is considered a natural resource, and energy is derived from renewable sources”

(Municipality of Amsterdam, 2015, p. 26). The idea behind implementing a circular economy is to have an efficient economy while avoiding polluting the environment (Yuan, Bi, Moriguchi, & Yuan, 2006).

The origin of the concept is still not clear because it is often related to different authors and different periods of time (Murray et al., 2015). In spite of these associations, all authors have in common one thing: they refer the term circular economy to the concept of “cyclical closed-loop system” (Murray et al., 2015, p. 4).

2.2.1 DEFINITION AND MEANING OF THE CIRCULAR ECONOMY APPROACH

According to Yuan et al. (2006) there is not yet a definition of circular economy that is commonly accepted but rather a consent that the circular economy focuses on “(closed) flow of materials and the use of raw materials and energy through multiple phases” (p. 5). The World Economic Forum (2014) and the Ellen Macarthur Foundation (2016) describe the circular economy as “an industrial system that is restorative or regenerative by intention and design. It replaces the end-of-life concept with restoration, shifts towards the use of renewable energy, eliminates the use of toxic chemicals, which impair reuse and return to the biosphere, and aims for the elimination of waste through the superior design of materials, products, systems and business models” (World Economic Forum, 2014, p. 15).

Murray et al. (2015) argue the concept of circular economy has “a linguistic and a descriptive meaning” (p. 3). The first meaning is an antonym referring to the current economic system and the second meaning has to do with the concept of “cycle” (Murray et al., 2015).

The current economic system is known as a *linear economy* which transforms “natural resources into waste, via production” (Murray et al., 2015, p. 3). In other words, resources are extracted, they go through a production process, the final product is used or consumed, and finally, it ends up being nothing more than waste (World Economic Forum, 2014). This way of production directly affects the environment by the extraction of natural resources with unsustainable methods/practices and by the generation of waste which pollutes the environment and reduces the value of the natural capital (Murray et al., 2015). While the linear economy affects directly the environment, the circular economy has “no net effect on the environment” (Murray et al., 2015, p. 3).

Instead, a circular economy avoids the generation of waste or generates as little waste as possible throughout the production processes and product's life cycle by reducing, reusing and recycling resources and materials (Murray et al., 2015; Yuan et al., 2006). The premise of “waste is food” is fundamental to the concept of circular economy (Murray et al., 2015). *Waste is food* means that what seems useless and valueless to some people might be useful and could become a resource to others. Instead of generating waste, resources and materials are reincorporated into industrial or biological cycles.

The second meaning of the word circular, refers to nature's cycles and the ability for them to cope with change (Murray et al., 2015). Nature works with biochemical cycles. For example, a seed grows to become an apple tree. Once the apple is ripe, it falls to the ground, it decomposes, fertilizes the soil and the seeds go back into the ground so the cycle can start all over again. All resources are somehow used. Because of human activity, cycles have been affected and have been forced to change. In theory, circular economy would create less need for the “removal of material from a cycle” (Murray et al., 2015, p. 3) because materials and resources are being reincorporated into a cycle which results also in the reduction of “the excessive release of materials into a cycle” (Murray et al., 2015, p. 3). What is important within natural cycles is the rate in which they are able to cope with change, that is why circular economy intends to “slow or manage the fluxes so they can be restored to their natural levels” (Murray et al., 2015, p. 3).

In a circular economy there are two types of nutrients: biological and technological which are found in different processes and products (World Economic Forum, 2014). These nutrients compose the biological and technical cycle (Ellen Macarthur Foundation, 2016b). In a circular economy, products are designed in such a way that once they are no longer used, their nutrients can safely re-enter either the biological and/or technical cycle (Ellen Macarthur Foundation, 2016b).

2.2.2 PRINCIPLES AND CHARACTERISTICS OF A CIRCULAR ECONOMY

According to the document published by the Ellen MacArthur Foundation (2015) the circular economy approach is based on three principles and has five main characteristics.

Principles for action according to the Ellen MacArthur Foundation (2015):

- *Principle 1: Preserve and enhance natural capital by controlling finite stocks and balancing renewable resource flows.* In a circular economy, utility is dematerialized. Where it is possible, the technologies and processes in which the use of “better performing- renewables or better performing resources are chosen. Another two important aspects from the circular economy which enhance the natural capital are: the encouragement of flows of nutrients within the system and helping the system to regenerate by creating the optimal conditions for it to happen (Ellen MacArthur Foundation, 2015, p.5).
- *Principle 2: Optimize resource yields by circulating products, components, and materials at the highest utility at all times in both technical and biological cycles.* What this principle basically says is that technical components and materials should be designed in such a way that they can keep circulating within the system and re-entering different cycles. This can be achieved by using “tighter inner loops” when possible. Tighter inner loops refers to trying to keep the value and energy of the materials instead of getting rid of them. An example given in the document is “maintenance before recycling”. On the other hand, in the biological cycle products are designed in such a way that once they are “consumed or metabolized by the economy and regenerate new resource value” they can return safely to the biosphere to decompose and be part of a new cycle. Extracting value from products can be achieved by cascading. (Ellen MacArthur Foundation, 2015, p.6).
- *Principle 3: Foster system effectiveness by revealing and designing out negative externalities.* This is a very important principle because it directly impacts the different “systems and areas such as food, mobility, shelter, education, health, and entertainment” by reducing possible damage and it also focuses on managing externalities such as “land use, air, water and noise pollution, and the release of toxic substances” (Ellen MacArthur Foundation, 2015, p.7).

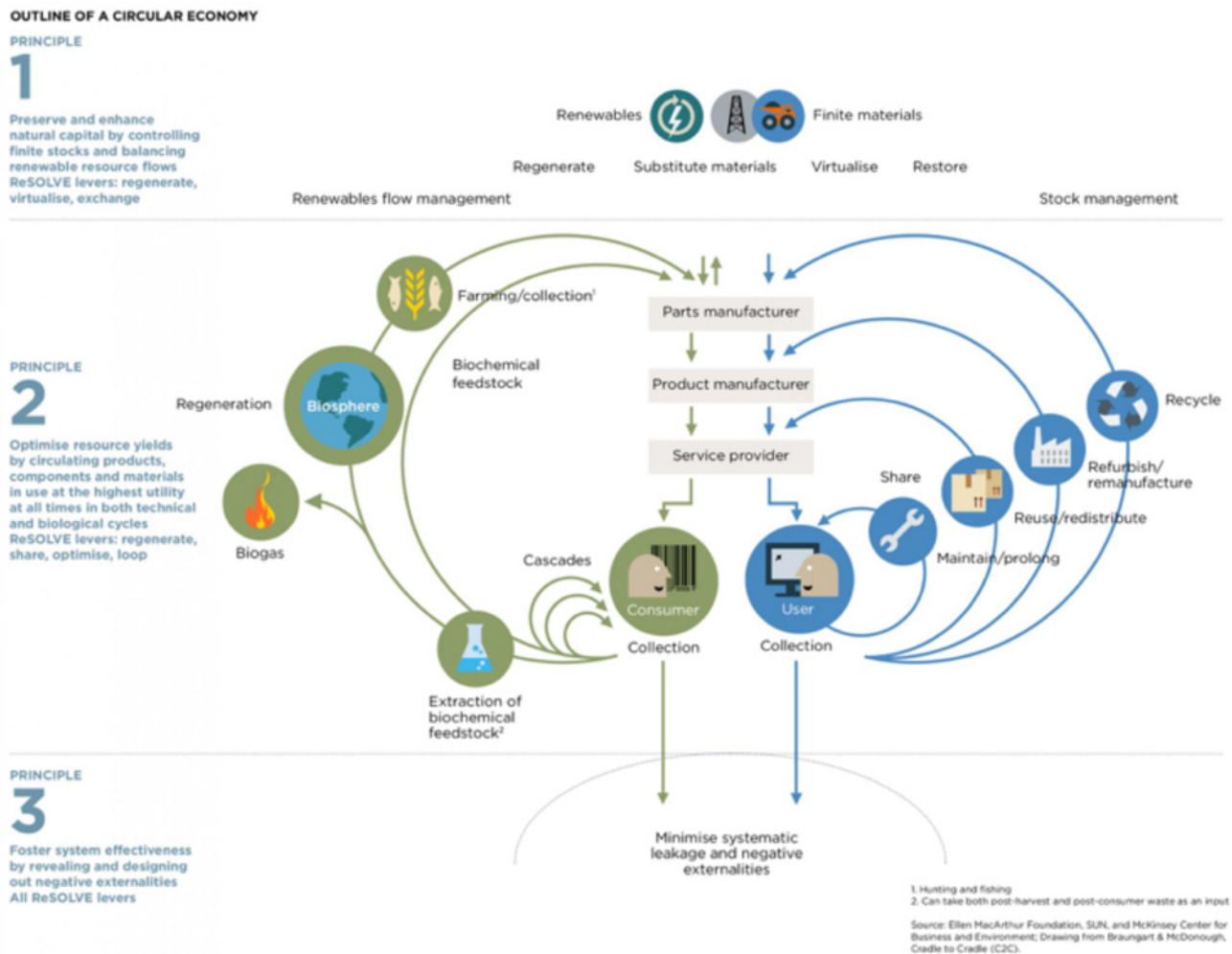
Characteristics of a circular economy

- *Waste is designed out.* There is no waste in a circular economy. “Biological materials are non-toxic and can easily be returned to the soil by composting or anaerobic digestion. Technical materials are designed to be recovered, refreshed and upgraded, minimizing the energy input required and maximizing the retention of value” (Ellen MacArthur Foundation, 2015, p.7).

- *Diversity builds strength.* The presence of diversity within the systems is enhanced and valued.
- *Renewable energy sources power the economy.* Renewable energy is seen as the economy's main source of energy.
- *Think in systems.* There is an acknowledgement that the different elements form the “real-world” are strongly linked to each other and the actions of one element affects the rest of the system. The circular economy takes this kind of thinking into consideration.
- *Prices or other feedback mechanisms should reflect real costs.* Prices need to be transparent and reflect full costs. Thus negative externalities need to be considered while setting a price.

In Figure 3 the principles of a circular economy are shown in a diagram.

Figure 3. A circular Economy (World Economic Forum, 2014, p. 15)



Besides outlining the principles, Figure 3 shows both cycles within a circular economy. On the left side the biological cycle is illustrated whereas the right side illustrates the technical cycle. As it can be seen, the biological cycle deals with the renewable materials and seeks to regenerate the biological nutrients. As for the technical cycle it deals with the finite materials and seeks to recover technical materials to restore them within the technical cycle.

2.2.3 APPLYING THE CIRCULAR ECONOMY APPROACH

Yuan et al. (2006) explain that there are three levels in which the concept can be applied. These levels are: micro or individual firm level, meso level and, macro level (p.6). The first level refers to companies and how their environmental performance is measured; the second level is when an eco-industrial network is developed in which different production systems and environmental protection benefit; and lastly, the third level is reached when eco-municipalities, eco-cities or eco-provinces have been developed (Yuan et al., 2006).

This research thesis intends to contribute to the micro level of the circular economy in Amsterdam by generating a set of criteria that will focus on the performance measurement of individual initiatives, projects and start-ups in the city of Amsterdam.

2.3 Governance

According to Rhodes, (2007) the term *governance* is nowadays used as “a new process of governing; or a changed condition of ordered rule; or the new method by which society is governed” (p.1247). But as he explains, the term is not that easy to define. Kjær (2004 as seen in Rhodes, 2007) suggests that the term governance can be used among different areas in political science such as: public administration and public policy, governance in international relations, European Union governance, governance in comparative politics, and good governance (p. 1246). Within these areas the meaning and use of the term differs so much that according to Rhodes (2007), -they have little or- nothing in common. On the other hand, what Kjær (2011) argues is that even though the concept of governance is “slippery” it is still possible to find a base of institutionalism in it (Kjær, 2011).

To Kjær (2011) there are two key points to define governance. First is that governance goes beyond networks and “should be able to include other forms of

set-ups than networks” (Kjær, 2011, p. 105). Second is that the different uses of governance “reflect a common concern with institutes and institutional change” (Kjær, 2011, p. 104). Taking these two characteristics into account, the definition of governance, according to Kjær (2011) should address “the way political agents go about rules and rule-making” (p.105). Kjær advises to use the definition proposed by Feeny (1993, p. 172 as seen in Kjær, 2011) which is “the setting of rules, the application of rules and the enforcement of rules in pursuing public goals” (p. 105). According to her, even though this definition may have imperfections, it captures what the essence of the term is which is “combining the structure and agency in analyzing changes in the political rules of the game” (Kjær, 2011, p. 105).

Rhodes (2007) sees governance as “governing with and through networks” (Rhodes, 2007, p. 1247). Rydin (2010) defines governance as “a policy system in which formulation and implementation operate through networks. These networks bring together a variety of stakeholders in ways that provide new means of legitimacy, release new forms of resources and overcome conflict in novel ways” (p.47). Thanks to these networks, the problems in public policy are not only for the state to overcome, but these networks can also act on them indirectly in a more “generalized and diffuse way” (Rydin, 2010, p. 47).

For Kjær (2011), governance “has to do with much more than networks. It has to do with how political actors affect formal and informal rules; how they live by and through rules. Such rules could be, but are not necessarily, of the network type” (Kjær, 2011, p. 108).

As Kjær (2004) explains, governance theory involves institutional change and human agency. She states that one of the problems that institutionalism has, is that it cannot give an answer to the question of why some governments are able to implement policies in an effective way while others are not able to do so. There is this element of change that institutionalism by itself is lacking. Governance, from an institutionalist perspective “is about affecting the frameworks within which citizens and officials act and policies occur, and which shape the identities and institutions of civil society” (March and Olsen, 1995:6 as seen in Kjær, 2004. p.10).

The old governance focused on studying the capacity of government to steer society (Kjær, 2004). The new governance “has more to do with how the center interacts with society and asks whether there is more self-steering in networks” (Kjær, 2004, p.11).

Governance has to do with the setting and implementation of rules but the objective of this is to “enhance legitimacy of the public realm” (Kjær, 2004, p.15). This legitimacy comes from democracy and efficiency. Kjær (2004) explains that democratic inclusion of citizens is necessary to achieve social and economic outcomes. Democratic legitimacy is important in a normative sense but also because in order to have efficient outcomes, democratic procedures are essential for ensuring the activity of citizens. An example that Kjær points out is the one explained by Stoker (2006): if there is a plan to launch a waste recycling program, this involves automatically a change in habits from the citizens. To achieve this, dialogue and high levels of trust are needed between the citizens and the authorities. In this case, democracy and efficiency are mutually related (Stoker, 2006).

As this section shows, defining governance is not easy and has been debated. For this research, the definition and point of view from Kjær will be used while acknowledging the presence of networks and their role within governing such as Rhodes (2007) and Rydin (2011) propose. But just as Kjær explains, governance goes beyond networks and it also has to do with institutional change and the implementation of rules.

2.3.1 URBAN GOVERNANCE

The presence of networks at the urban scale has been of attention because city governments have changed into “a patchwork of networks and partnerships” (Rydin, 2010, p. 52). In other words, local authorities are not working alone but have created partnerships and networks towards achieving local goals. Since Local Agenda 21, urban governance has been linked to achieving the goal of sustainability because the involvement of local communities was seen as important for reaching changes towards sustainability (Rydin 2010). When local action was encouraged regarding sustainability, local behavior and values were influenced by it (Rydin, 2010).

Local Agenda 21 encouraged a variety of actors that usually would not be involved in local policy, to engage and focus on sustainability issues (Rydin, 2010). This involvement contributed to building local networks which focused on energy use, transportation, waste, biodiversity and other policy issues (Rydin, 2010). These networks included all types of different actors such as: local neighborhood community groups, local businesses, high retailers, faith groups and schools

(Rydin, 2010, p. 52). One of the main challenges that local sustainable networks face is the struggle to keep the different actors actively engaged (Rydin, 2010).

According to Murphy (2000), in order for a city to become more sustainable, the need for a strong urban governance that is capable to relate to the “needs and desires of the inhabitants” is necessary (p.239). The base of this strong urban governance should be “subsidiarity in a partnership model to provide the political leadership and dynamism needed to achieve more sustainable cities for the benefit of all inhabitants” (Murphy, 2000, p. 239). This partnership model makes reference to the local partnerships between public, private and voluntary sectors. Cities should respond to the inhabitants’ demands and be placed where active participation is possible and encouraged (Murphy, 2000).

It is important to keep in mind that in order to talk about local or urban governance, local activity and networks need to be seen “within the context of activity and networks at broader spatial networks” (Rydin, 2010, p. 53). This makes reference to local/urban governance as part of a multi-level governance (Bulkeley & Betsill, 2005; Rydin, 2010). In other words, urban governance, which focuses at a local scale, is also related to regional, national, and even European and international scales (Rydin, 2010). Multi-level governance sees networks as “active at each scale but also, operating across scales. They can involve actors from a number of different tiers of government in combinations that are relevant to a particular problem, issue and policy at hand.” (Rydin, 2010, p. 53).

Multi-level governance is needed to understand the politics of urban sustainability (Bulkeley & Betsill, 2005). It “can examine the ways in which urban sustainability is being constructed and contested at a variety of scales of governance and through multiple political spaces” (Bulkeley & Betsill, 2005, p. 59) by analyzing the relations between state institutions and new forms of network governance (Bulkeley & Betsill, 2005). Multi-level governance is relevant because the city is part of a larger system. The public regulations and laws influence the local activity, and it can also be the other way around.

Urban governance is important and relevant for this study because different stakeholders with a shared interest are starting to form their own networks and partnerships in order to impact the society, environment, and economy in Amsterdam. Achieving circularity in Amsterdam is not only the municipality’s task, but it requires the interest and involvement of different actors.

If sustainability wants to be achieved in cities, there's a need for urban governance in which change and policies are not only driven by the local authority but also civil society, business and industry, and all levels of government (Murphy, 2000). This governance should have a democratic and inclusive culture which embraces innovation and democratic legitimacy (Murphy, 2000).

2.4 Urban sustainability Assessment

According to Science for Environmental Policy (2015), in order to create sustainable cities, it is essential to “measure and assess policies, infrastructure, socio-economic factors, resource use, emissions and any other processes that contribute to and profit from the city’s metabolism, prosperity and quality of life.” (p. 7). By doing this the authorities and policymakers will have relevant information to identify the problems, which can also be seen as opportunities for the city (Science for Environmental Policy, 2015). Once the opportunities and concerns have been identified, the authorities can respond by developing the city’s sustainability goals (Science for Environmental Policy, 2015).

2.4.1 WHAT IS AN INDICATOR?

An indicator is a policy tool that measures a specific aspect from policy and that can later be used to steer policy (Rydin, Holman, & Wolff, 2003). The information obtained from indicators will help decision-makers to understand the reason behind a system’s change, (Indicators-what are they?, FAO, 2002 as seen in Science for Environmental Policy, 2015) so they can later respond to it. The three main purposes for the use of indicators are: as “explanatory tools, pilot tools, or performance assessment tools” (Shen et al., 2011 as seen in Science for Environmental Policy, 2015, p. 8).

Nowadays there is a wide range of indicators that measure different aspects of human life. A large variety of sustainability indicator frameworks going from international to community/neighborhood scale is available to policymakers (Rydin. et al., 2003; Science for Environmental Policy, 2015). These indicators attempt to measure the position that a given project, policy and/or initiative has regarding the concept of sustainability (Scerri & James, 2009). Regardless of the specific purpose from the different frameworks, they all have a common objective which is to promote urban sustainability by using information as “focused and applicable knowledge”(Hiremath, Balachandra, Kumar, Bansode, & Murali, 2013).

2.4.2 SUSTAINABILITY INDICATORS AT A LOCAL SCALE AND ITS CHALLENGES

In the last decades, the use of sustainability indicators has grown due to the fact that policymakers find them very “attractive” (Rydin et al., 2003, p. 581). Over the last years, there has been a *boom in the use of sustainability indicators at a subnational and local level* (Rydin et al., 2003; Scerri & James, 2009). Indicators have become very important in measuring and ranging processes for community projects in relation to sustainability (Scerri & James, 2009). Sustainability indicators have also been used for raising sustainability awareness, enhancing behavioral change, and communicating information regarding the local environment (Rydin et al., 2003). But it has been seen that these indicators tend to fail “to bring into question the nature of the relationships and values that go into reproducing resilient, cohesive, fair and, so, sustainable communities over time” (Scerri & James, 2009, p. 220). This failure happens because the process of developing sustainability indicators is seen merely as a “technical task”, (Rydin et al., 2003; Scerri & James, 2009) and it has been focused on the how to design and develop the indicators rather than how these processes can be linked to policy action (Rydin et al., 2003). That’s precisely why research has not been able to find an actual link between indicators and the actual results seen in policy and decision making (Rydin et al., 2003). While developing indicators, there has been a lack of understanding regarding the local context in which indicators are being developed, the way in which different forms of expertise are inter-related, and what the involvement of different stakeholders could mean to the definition of sustainable development (Rydin et al., 2003). One of the reasons why sustainable development cannot be achieved is that experts are requested to “generate the ‘right’ indicators and then tailor a solution to get the community ‘back on track’” (Scerri & James, 2009, p. 2). This does not work for communities (Scerri & James, 2009). Quantitative indicators can be used and may provide useful information as long as they are “understood in terms of qualitative indicators” (Scerri & James, 2009, p. 4). Scerri & James (2010) argue that “quantitative indicators can make a greater contribution to understanding and practicing sustainable community development when embraced as part of a broader approach to how persons engage with each other: that is, as ‘participatory’ projects that engage ‘active’ citizens (p. 3).

Another problem that sustainability assessment is facing is that the indicators used cannot cover the different pillars of sustainability (Science for Environmental Policy, 2015). Financial accountability has a key element for sustainability

assessment, and often, sustainability assessment is seen merely as an economic-environment condition with just some social aspects (James, 2014).

2.4.3 WHAT DOES LOCAL SUSTAINABILITY ASSESSMENT NEED?

The finding that indicators are merely seen as a technical task, has opened doors for a new research agenda in which sustainability indicators are studied as a “link between indicator development and policy action” (Rydin et al., 2003).

According to Rydin et al. (2003), this new research suggests that it is important to understand the local context in which the indicators are being developed. This will help to shift from the technical political task that focuses on just involving different actors to focus on finding how these actors can be combined (Rydin et al., 2003). As Rydin et al. (2003) argue, a shift from government to governance is necessary. This shift suggests that instead of the local authorities focusing on how to use the indicators on the traditional means-ends, an involvement of a wider range of policy actors within different networks should occur (Rydin et al., 2003).

Expertise is also necessary for specifying the indicator, collecting data, and monitoring (Rydin et al., 2003). And lastly, an indicator needs to be socially constructed because all these actors that get involved in the process will be looking, in some way, to serve their own interests while expressing and imposing their own definition of sustainable development; which, at the end, will shape and give a definition to what sustainable development is (Rydin et al., 2003). Thus, in other words, a sustainability indicator will be at the end, the product of different stakeholders seeking to define the concept of sustainability (Rydin et al., 2003).

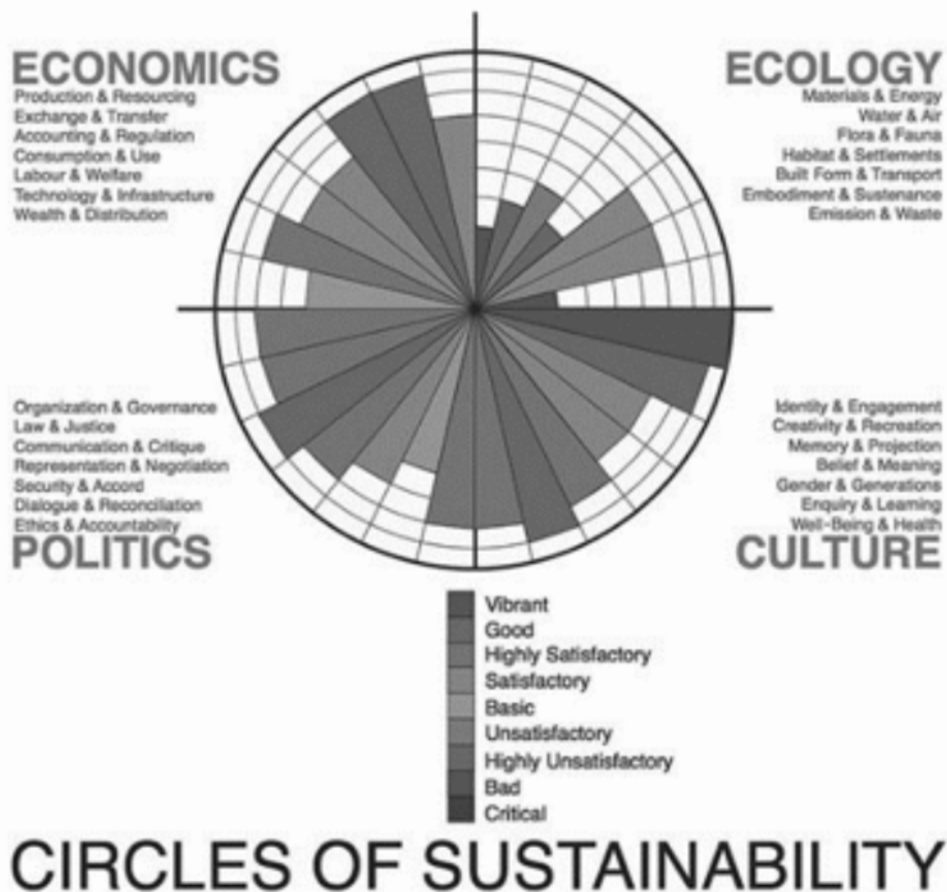
2.5 Circles of Sustainability

Circles of sustainability is a theoretical model elaborated by Andy Scerri and Paul James (Magee, Scerri, & James, 2012). It is a theory that focuses on urban development while seeking reintegration of the theory and practice (James, 2015). This model responds to the need of connecting the concept of sustainability with locally engaged practices, “we need a new paradigm that moves beyond the current narrow focus on growth-based productivity and high-technology ‘solutions’. We need an alternative paradigm that can respond to the challenge of connecting globally debated principles and new ideas about sustainability with locally engaged practices” (James, 2015, location 228 of 6003).

Circles of sustainability proposes treating the concept of sustainability “under a broadly social constructionist and critical pragmatic paradigm” (Magee et al., 2012, p. 244). This approach recognizes the social domain as essential for defining sustainability (Magee et al., 2012) and seeks to “measure the extent to which a community’s goals, desires and ambitions are being met” (Magee et al., 2012, p. 244).

Unlike the triple bottom line approach, the circles of sustainability approach treats each domain as social, and most importantly sees each of them as part of an “integrated social whole” (James, 2015, p. location 653 of 6003). There are four conceptual domains identified in the approach and seen as equal (James, 2015). These domains are economy, ecology, politics and culture (James, 2015; Magee et al., 2012). Figure 4 shows the four domains and the areas that are measured by applying this approach.

Figure 4. Circles of sustainability (James, 2015)



2.5.1 THE FOUR DOMAINS OF CIRCLES OF SUSTAINABILITY

Circles of Sustainability is an approach that recognizes the “tensions between generative values that arise in different domains of practice. It also recognizes that community life necessitates that commonalities and continuities expressing particular values exist across different domains of practice” (Scerri & James, 2009, p.6). What this approach suggests is to stop treating the domains of social practice, such as the environment and economics, separately from the social, but to rather start treating them as social domains of practice. In other words, society needs to be the starting point and then it can be analytically divided into different domains. Circles of sustainability divides society into four domains of practice: the economic, ecological, political, and cultural domains (Scerri & James, 2009).

The **economic domain** is defined as “a social domain that emphasizes the practices, discourses and material expressions associated with production, use and management of resources” (James, 2015, Location 1525 of 6003). Besides looking at the activities related to the use, exchange and management of resources, it also focuses on production, consumption, exchange, organization and distribution of goods and services (Scerri & James, 2009). According to Scerri & James, current economics focuses on giving a quantitative value and cost to the production, consumption and distribution. This fails to meet the aim of the approach, because it does not explain where the economic value comes from. That is why in this approach the economic domain attempts to look at the constitution and meaning of value (Scerri & James, 2009). Instead of appropriating the capitalist economic system which is mediated by money exchange, the approach “takes as given only that people draw upon resources to produce and exchange things, knowledge and services in order to maintain and enhance social life”(Scerri & James, 2009, p.225).

The **ecological domain** is defined as “a social domain that emphasizes the practices, discourses and material expressions that occur across the intersection between the social and the natural realms” (James, 2015, location 1514 of 6003). This domain focuses mainly on “the dimension of human engagement with and within nature”(Scerri & James, 2009, p.8). This domain is comprehended by nature and social. It focuses on questions related to the interaction between the social activities and the environment, such as the impact of human activity on the environment (James, 2015).

The **political domain** is defined as “a social domain that emphasizes practices and meanings associated with basic issues of social power as they pertain to the organization, authorization, legitimation and regulation of social life held in common” (James, 2015, location 1525 of 6003). The approach sees this domain as the organization of rules which is not only related to governments but also to corporations, non-government organizations, and non-formal institutions (Scerri & James, 2009). This domain includes social relations between these different actors (James, 2015). Many of the issues on this domain directly affect the sustainability in a city (James, 2015).

The **cultural domain** is defined as “a social domain that emphasizes the practices, discourses and material expressions which, over time, express the continuities and discontinuities of social meaning of life held in common” (James, 2015, location 1537 of 6003). This domain focuses on the “how and why we do things around here” (James, 2015). The ‘how’ refers to the practices from a materialistic perspective, the ‘why’ has to do with the meanings, the ‘we’ represents to a life held in common, and finally the ‘around here’ refers to the spatial and temporal of culture which can go from the local to global (James, 2015).

Having explained what the main four domains of the approach of circles of sustainability are, following the explanation of the main themes for analyzing the data will be presented.

2.6 Balanced Scorecard

The balanced scorecard (BSC) is described as a “carefully selected set of quantifiable measures derived from an organization’s strategy” (Niven, 2003, p. 14). Balanced scorecards are used as “customized communication tools within a management control system” (Olve & Sjöstrand, 2006, p. 1). A balanced scorecard shows the relationship between the current state of a system and its cause and effect relationships, and the long-term success (Olve & Sjöstrand, 2006). A balanced scorecard can be seen or used as a measurement system, strategic management system and a communication tool (Niven, 2003; Olve & Sjöstrand, 2006).

The balanced scorecard was developed for businesses and it combines the financial and non-financial metrics into a performance report (Olve & Sjöstrand, 2006). Besides this, a balanced scorecard shows time dimension, internal and

external processes of the business and linkages between cause and effect. They can be used for different purposes and will vary per organization. But what they have in common is that they help with the alignment of business activities to the organization's vision and strategies (Olve & Sjöstrand, 2006).

Because of the features of the BSC to measure the performance of companies and communicate results, this approach will be explained in the following sections and later on will be integrated with the circles of sustainability approach into a framework for measuring the performance of local circular initiatives, projects and start-ups.

2.6.1 BALANCED SCORECARD AS A MEASUREMENT SYSTEM

The BSC helps an organization to achieve its mission and strategy. The BSC serves a measurement system in the sense that it helps an organization to derive performance measures from its strategy. All the measures in a BSC are a translation of an organization's strategy (Niven, 2003). It gives room for an organization to tell its story through the different objectives and measures that the organization has chosen (Niven, 2003). Also, measuring goals as well as objectives makes it more likely for an organization to be successful in its strategy.

2.6.2 COMMUNICATION TOOL

A BSC helps an organization to define its strategy and also helps the strategy to be aligned with the vision through the performance measurements that have been chosen but, the most powerful feature of a BSC is that it can be used as a communication tool (Niven, 2003). Also, by sharing the results of a BSC within an organization, it makes it clear to the rest of the employees where are they heading and what is the strategy to get there (Niven, 2003).

2.6.3 THE FOUR PERSPECTIVES OF A BSC

There are four perspectives in a balanced scorecard which are driven by the company's strategy (Olve & Sjöstrand, 2006). These perspectives are: financial, customer, internal, and learning and growth which comprehend the "strategic goals, critical success factors, measures and action plans" (Olve & Sjöstrand, 2006, p. 7).

The *financial perspective* looks at the financial measures taken to achieve the strategy. Classic lagging indicators are usually seen in the financial perspective. The *internal process perspective* identifies the key processes of an organization needed to allow it to keep growing and adding more value to the customers; the *learning and growth perspective* or *organizational capacity* looks at the measures needed in order to close gaps between the other perspectives. Finally, there is the perspective that enables the other three; the customer perspective focuses on answering the question of who are the target customers and helps an organization to identify the steps to develop customer measures (Niven, 2003). Figure 5 shows the four perspectives of the BSC.

Figure 5. Balanced scorecard (Balanced Scorecard Institute, 2016)



2.7 BSC for nonprofit agencies

The balanced scorecard is designed for companies but can be adapted to non-profit organizations (Niven, 2003). In order to do this the BSC needs to be adjusted. As figure 5 shows, the mission is placed on top of the diagram. The strategy stays

as the core of the BSC; while the customer perspective is elevated, the financial perspective is set to the left side of the strategy; the internal processes to the right side of the strategy and on the bottom the learning and growth perspective is set. The placement of the perspectives is very important because it shows which perspective is the closest to the mission (Niven, 2003).

One of the main differences between the private and public BSC is that the mission is set at the top of the framework (Niven, 2003). From the mission, the customer perspective flows down. This is because it is important to show that whatever the organization is doing is to support the customers (Niven, 2003). As it can be seen in Figure 6, the mission statement is introduced and the order of the perspectives is changed.

Figure 6. Balanced scorecard for Non-profit organizations. (Niven, 2003)



2.7.1 FROM THE MISSION TO THE STRATEGY

The mission describes what the initiative, project or start-up is aiming for. Questions such as who are you as an organization? Whom do you serve? And why do you exist? Are questions that should be answered in the organization's mission (Niven, 2003). The mission statement is a very important one because

it will define the purpose of the organization. According to Niven (2003) the mission, statement should address:

- The reason to exist: primary purpose, need served or problem solved
- For whom: primary clients or customers
- In order to: core services offered
- So that: long-term outcomes determining success

After developing a mission the core values need to be identified. This can be done by first doing an honest identification of the current values and analyze what needs to be changed. Once the values are identified the vision need to be developed. The vision statement explains what the organization intends to become in the future. It should provide guidance to the organization (Niven, 2003).

Finally the organization's strategy needs to be developed. A strategy represents " the broad priorities adopted by an organization in recognition of its operating environment and in pursuit of its mission" (Niven, 2003, p.129).

An initiative, project or start-up should have a mission statement and a strategy developed. If circular economy is an economy in which resources are being used carefully and waste itself is considered a resource, both of these characteristics should be present in an organization's strategy. As for the desire of preserving the environment, including people, and enhancing economic activity, they should be part of the mission statement.

2.7.2 WHY USE THE BSC FOR THIS FRAMEWORK?

As described before, the BSC is a tool that looks at and measures the strategy that a company is following to achieve its mission. One of the main reasons to use the BSC in this research is because a BSC helps organizations to align their activities to their vision and strategy (Balanced Scorecard Institute, 2016). This is a very important aspect to take into consideration for a measurement framework because it not only measures the activities taken by an organization to reach its mission, but it also helps to develop new activities to coming closer to reach their mission.

The BSC is seen in this research as a measurement system and as a communication tool that can help place or set a strategy for achieving circularity regarding organic flows in the city of Amsterdam. It is also important to mention that a

BSC is a communication tool that can help developing a storyline (Niven, 2003). By developing a storyline, results can be communicated in a clear way internally and externally. Thus, one more advantage of trying to develop a storyline is that the framework can also be used for developing a storyline of the organization's mission and activities to achieve it.

2.8 Theoretical framework for measuring the performance of local circular economy initiatives, projects and start-ups

In this section the theoretical framework for measuring the performance of local circular economy initiatives, projects and start-ups will be introduced and explained. The framework is based on the BSC and the Circles of sustainability approach. Before presenting how these two approaches have been used for the theoretical framework, the mission for circularity in the area of Amsterdam is identified.

2.8.1 THE MISSION FOR CIRCULAR ECONOMY IN THE AMSTERDAM AREA

Because this research is focusing in the city of Amsterdam and the AMS institute, a general mission regarding circularity in the city is identified and used for this research.

Based on the documents from the Municipality of Amsterdam (2015) and AMS institute (2015), the following mission statement for developing circularity in the city of Amsterdam, will be introduced:

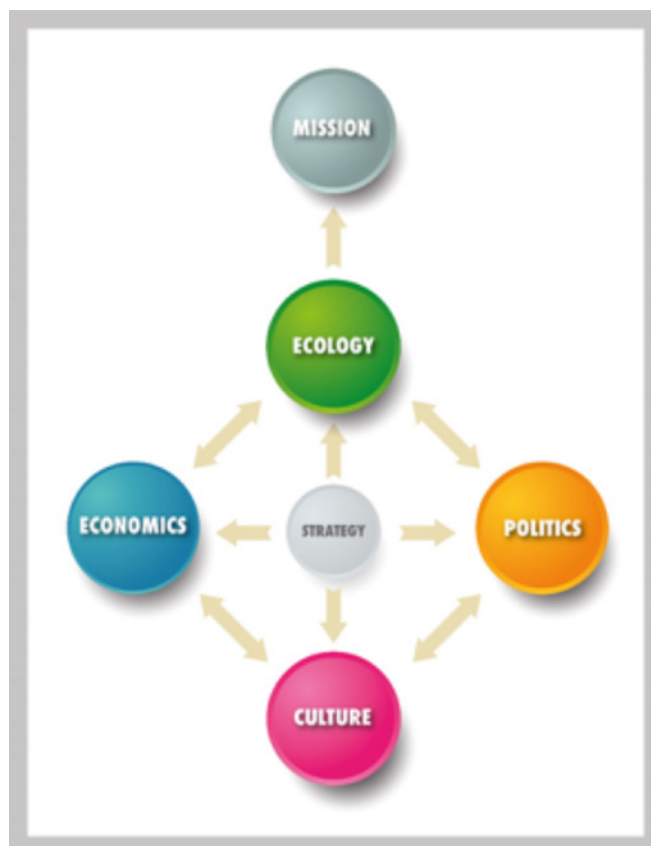
Create a circular economy in the Amsterdam area in which energy, water, natural resources and food are used carefully. In this economy, waste is considered a natural resource, and energy is derived from renewable sources. Natural resources are recovered and used to generate new financial or non-financial gains (Municipality of Amsterdam, 2015, p.26). There is a design for circular reuse. In this circular economy at a metropolitan level, loops are closed and waste no longer exists (AMS, 2015, p.7).

2.8.2 INTEGRATING THE CIRCLES OF SUSTAINABILITY'S PERSPECTIVES TO THE BSC FOR ELABORATING A PERFORMANCE MEASUREMENT FRAMEWORK

For this research the BSC for non-profit organizations is the core of the framework but it is modified. Instead of using the perspectives proposed by the model, these perspectives will be translated into the four domains from the circles of sustainability approach. Applying the circles of sustainability to the BSC adapted for nonprofit agencies will give as a result a four-perspective framework: economy, ecology, politics and culture. As it is shown in figure 7 there are seven categories or areas measured per domain. Because they are tailored at a city level and not for a specific area, the adaptation of them to the BSC will be regarding the areas that have a direct impact on moving towards achieving circularity in the city of Amsterdam.

In the circles of sustainability approach each domain has seven main practices that are assessed (see figure 4). For this project's purposes, not all practices from the circles of sustainability approach will be linked to the four main perspectives from the BSC, but only the most relevant characteristics for measuring the performance of inclusive initiatives, projects and start-ups regarding circularity will be taken into account.

Figure 7. Theoretical Framework for evaluating the performance of local circular initiatives, projects and start-ups



2.8.2.1 FROM THE CUSTOMER PERSPECTIVE TO THE ECOLOGY PERSPECTIVE

As Figure 5 shows, the first change made to the non-profit BSC model was switching from the customer's perspective to an ecology perspective. Instead of having customer right below the mission, the ecological domain which describes the intersection between the social and natural realms (Scerri & James, 2009) will be placed in this position. The ecological domain will be on top of the framework because according to the circles of sustainability, it is the domain that focuses on human engagement with and within nature (Scerri & James, 2009, p. 8). The ecological domain focuses on the impact of human activity on the environment. Thus by closing loops, designing out waste and reusing-materials, human activity will definitely impact the environment.

Taking the principles and characteristics of the circular economy regarding biological nutrients and what the ecology domain is, the practices that are important to measure are: availability of (waste) materials, contribution from the project to quality of air and or/water, if applicable their impact on flora and fauna and the emissions generated and waste that is being reused.

What the ecological domain in the framework will measure is the impact that these initiatives, projects and start-ups have on the environment by closing loops. For example, how many CO2 emissions are being avoided? What are the materials recovered and reused? How are these projects contributing for a better quality of the air? In the case of a green roof, how are they impacting biodiversity in the neighborhood?

2.8.2.2 FROM THE FINANCE PERSPECTIVE TO THE ECONOMICS PERSPECTIVE

Next, the second change made is on the finance perspective. Instead of having the financial perspective, the economic perspective is introduced. The economic domain is described as the one that looks at the production, consumption, exchange, organization and distribution of goods and services (Scerri & James, 2009). In other words the economic domain looks at: the production, use and management of resources (Circles of Sustainability, n.d.) Thus, the economic perspective will represent everything that has to do with the resources that come in and out during the production processes. Also, another practice that is mentioned in the economics perspective, which is important for closing loops, is technology and infrastructure. So as suggested in the circles of sustainability

approach (James, 2015), the technology and infrastructure will be considered under this new perspective.

Since all projects need funds and investments to start, getting funding is considered under the economics perspective. The BSC has a financial perspective, which is placed on the top of the BSC. The non-profit BSC also has the financial perspective but instead of being placed at the top of the BSC, is moved to the center-left side of the BSC. Instead of having an entire perspective that focuses only on the finances, activities related to getting financial resources are incorporated to the economics perspective. Funding is a common process for initiatives, projects and start-ups to begin and continue to operate. Funding can be obtained from public and private sources. Thus it can be argued that public funding needs to be considered under the politics perspective. However, since there are often private-public collaborations for funding, instead of dividing public and private funding, it will all be treated as funding under the economics perspective. This way one of the activities that needs to be taken into consideration while measuring the strategies of an organization is getting funds for operating.

2.8.2.3 FROM THE INTERNAL PROCESS PERSPECTIVE TO THE POLITICS PERSPECTIVE

Thirdly, in the BSC, the internal process perspective is located at the same level of the financial perspective but on the right side from the mission. In this perspective, the internal processes which are key to create an impact for customers are measured (Niven, 2003). According to Niven (2003), the processes that should be measured in the internal process perspective are: quality, innovation, partnering, and marketing.

According to the Circles of Sustainability approach, the political domain looks at the practices and meanings related to social life held in common (Scerri & James, 2009). The process of organization of rules does not rely only on the authorities but also on corporations, non-government organizations and non-financial institutions (Scerri & James, 2009). Therefore, the politics perspective looks at the role of these different stakeholders and how they are interfering with or impacting in the rule-making process. Figure 3 shows the different characteristics that are assessed under the politics domain.

Within this framework, here is where the governance theory comes into practice. In order to achieve circular economy the participation of different stakeholders

is required (Municipality of Amsterdam, 2015), but this participation is expected to have an impact on the rule-making process. Therefore, what the politics perspective will be measuring is the impact of the project at the local level in terms of networking, participation of different stakeholders, impact on laws and regulations, and the impact of local or even national policy levels.

2.8.2.4 FROM AN EMPLOYEE LEARNING AND GROWTH PERSPECTIVE TO A CULTURE PERSPECTIVE

The cultural domain focuses on explaining and relating practices in a specific place. Why are we doing things in a certain way? (Scerri & James, 2009). In this context “we” equals to the group of people involved and the “why” is related to practices. The cultural domain also looks at the specific aspects that define certain practices (James, 2015).

The learning and growth perspective focuses on measuring human capital, information capital, and creating a climate for positive action. In the Circles of Sustainability approach, one of the practices measured under this domain is the enquiry and learning in the region. Although the BSC focuses on learning and growing within the employees, in the framework, the culture perspective will look at enquiry and learning of the community (volunteers, employees, employers, neighbors) that is participating in the project. Because this framework proposes a measurement for inclusive projects that involve the community, the identity and engagement aspect from the culture domain will be also considered on the framework. Thus under the culture perspective, the learning for the community will be measured as well as the participation and engagement of citizens.

3. Methodology

In this chapter the methodology for selecting, collecting and analyzing data will be presented. This chapter starts with an introduction and is followed by the section explaining the data collection and analyzing phases for this research thesis.

3.1 Introduction

It is important to first mention that this research is a qualitative research. The research questions will be addressed in a qualitative way. In qualitative research there is often an overlap with the study design and the data collection. This happens mainly because collecting data contributes to the design of the study² (Kumar, 2014). After elaborating a theoretical framework for measuring the performance of circular initiatives, projects and start-ups (see chapter 2), data from primary and secondary sources will be collected. With this information, a final framework, which is based on theory and on the empirical knowledge of people that are already involved and working on closing loops, can be elaborated. By mixing the theoretical framework and empirical methodology a more complete analysis can be conducted (Corbin & Strauss, 2015). In the following section the methodology for collecting and analyzing data will be explained.

3.2 Data collection

After reviewing literature regarding theories and concepts and elaborating the theoretical framework the data collection will follow. In this phase primary and secondary data regarding the projects in the city will be collected for analyzing and finding answers to the research questions.

First, research on the different stakeholders involved in the initiatives/projects and startups will be made to understand what the different projects are currently doing regarding circularity of bio flows in the city of Amsterdam. Then, cases in the city will be chosen and the researcher will make contact with one of the representatives from the projects via email or phone to invite

² To see a diagram of the research design for this study see appendix 1

them to participate with an interview or allowing the researcher to make some observations.

3.2.1 SELECTION OF INITIATIVES, PROJECTS AND START-UPS

Before the selecting process a detailed search on initiatives, projects and start-ups via internet was made. After several cases were found, some criteria was applied to these projects to narrow down the number of cases to the ones that are most relevant to this research. A snowball effect is also expected after beginning sending emails and interviewing people.

The selection of initiatives, projects and startups was mainly through the following criteria:

- Are located or have worked in the city of Amsterdam
- For initiatives and projects: involves the local community
- Started to operate in the past five years
- Closing loops within the biological cycle through upcycling organic waste.

3.2.2 PRIMARY DATA COLLECTION

After selecting the initiatives, projects and start-ups, meetings were arranged in order to conduct interviews and some observations. Interviews allow the researcher to get relevant information and still go in depth if the interview allows it (Kumar, 2014). The information gathered from this interviews is extremely important for this research because it will help to define how the different projects understand and see circularity in the city of Amsterdam and what according to them the criteria for a framework should be. The interviewees have practical information from their own experience and some of them will be treated as experts because they are already doing actions that influence and impact circularity in the city.

Non-participant observations, which are the ones in which the researcher remains passive and is not involved in the group's activities (Kumar, 2014), were scheduled when possible. These kinds of observations will provide with a better insight of how circularity is being achieved by these different projects.

Before the interviews were conducted, a questionnaire (see appendix 2) and a ranking exercise (see appendix 3) were elaborated based on the four perspectives

from the theoretical framework for measuring the performance of inclusive circular initiatives, projects and startups. Both the questionnaire and ranking exercise were revised and tested before being used.

3.2.3 SECONDARY DATA COLLECTION

Secondary collection is the one that is not coming directly from the primary source (Kumar, 2014). For this research some official documents and collaborations from the municipality regarding circularity in Amsterdam area were used and analyzed. These kind of documents provide information on the targets of the city and measures that the municipality is taking or will be taking in order to achieve circularity in the city.

3.3 Analyzing interviews

While conducting interviews, recordings will be made. These recordings will help to elaborate transcripts of the interviews so they can be later analyzed.

For analyzing the interviews the approach used was content analysis. Content analysis is an approach that is often used for analyzing qualitative data such as verbal and written data (Elo & Kyngäs, 2007). With content analysis, the written material that is going to be analyzed is first read a couple of times by the researcher. While reading the material, notes and headings are elaborated. These headings become codes and are later categorized into themes (Burnard, 1991; Elo & Kyngäs, 2007; Kumar, 2014). Once the list of categories/themes is defined, the researcher goes through the transcripts, and based on the categories and headings, starts coding the text (Burnard, 1991). Coding helps the researcher to quantify the qualitative data (Kumar, 2014).

After developing a coding system and assigning codes to the text, an analysis was made. After this, the results chapter was written (Kumar, 2014). There can be different methods to effectuate content analysis: manually or by using computer programs such as Atlas (Kumar, 2014). Because this is a masters' thesis project and has a duration of six months, the number of interviews conducted in the period of five weeks were sixteen. Due to the amount of time allotted for research and since the number of expected interviews was not very large, the heading and coding were made manually instead of using a computer program (Kumar, 2014).

After the interviews were manually coded, the themes and responses were integrated into the text of report (Kumar, 2014). Verbally responses, as well as quantification of the frequency in which theme were discussed during the interviews (Kumar, 2014) were integrated into the report. In the following section the findings from the interviews, observations and literature review are presented.

4. Results

In the following chapter the results from the data collected will be presented. The results comprehend the analysis made from the interviews, which were analyzed with the content analysis approach explained in chapter 3, the observations made and the official governmental documents that were selected.

4.1 An overview of the data collected

Through weeks 9-12 of 2016, a total of 18 semi-structured interviews with different participants were conducted. These semi-structured interviews were based on a questionnaire (see appendix 2) that was elaborated before the interviews and was based on the theoretical framework proposed in chapter 2. During the interview, a ranking exercise was performed by the participants (see appendix 3).

Sixteen out of eighteen interviews were made to representatives from different initiatives, projects and start-ups in the city of Amsterdam. From these 16 interviews, two were discarded due to a lack of relevance to the research. The remaining two interviews were conducted to researchers from AMS institute. This brings a total of sixteen interviews made to representatives from different projects (see table 1) that were used for developing the final framework and answering research questions.

All interviews followed the same questionnaire and were recorded. Additionally, the interviewer also took notes during the interview. The interviews took place at different locations. Thirteen interviews took place at the interviewee's office or working place and the remaining three interviews took place at cafes.

In chapter 3 there was some criteria presented for selecting the projects to be interviewed. These criteria were followed for every case except the project of Wasted from CITIES foundation. As seen in table 1 the project Wasted complies with two out of the three criteria because it is closing loops but not regarding organic flows. It is upcycling plastic waste. The reason why this project was included is because of its success in involving and working with the community from Amsterdam Noord on waste separation.

Observations made on the projects of City Plot, Buurtcomposter, Le Compostier and, Gascoland (see table 1) were combined with the time of the interview. An additional observation was made on a weekly dinner from Taste Before you waste. For analyzing this information notes were elaborated and some photos were also taken.

Regarding the collection and analysis of secondary data, three governmental documents were selected. These documents are Sustainable Amsterdam (Municipality of Amsterdam, 2015) and Towards the Amsterdam Circular Economy (City of Amsterdam, 2012) and, Circular Amsterdam (Circle Economy et al., 2016) written in collaboration by the municipality of Amsterdam, TNO Fabric and Circle economy.

Table 1. Description of initiatives, projects and start-ups that were interviewed

| Name | | Description |
|-----------------------------|--|---|
| Wormhotel Campaign | A campaign from Food Guerrilla which is a project from OneWorld. | Food guerrilla is a network that supports initiatives regarding food. In 2015 they launched a campaign in Amsterdam called Wormhotel. It enhanced and taught citizens how to build and maintain a wormhotel. A wormhotel reduces organic waste by using it as worm food and getting compost out of it. |
| De Dakdokters | Start-up | They design and build green roofs. Green roofs can have solar panels, water retention systems, plants and edible food. |
| InStock | Start-up | Restaurant in Amsterdam that makes food with the Albert Heijn's food 'waste'. This food is still perfectly edible but because of the supermarket's policies they can't sell it anymore. They upcycle what's considered food waste. |
| Localwise | Start-up | Development and research on Eco-toilets. Treat human secretions to create compost. Impartment of knowledge and also workshops on how to build eco-toilet, solar food dryers, and solar heating systems for water. |
| Wasted | Project from CITIES foundation | A project in Amsterdam Noord in which citizens can join the project and collect plastic waste. Wasted collects the waste, turns it into different things, such as art while rewarding citizens with wasted coins. These coins are exchangeable in different places and business in the city. Wasted also gives workshops to students to educate about plastic waste. |
| City Plot | Initiative Start-up | It is a start-up that gives workshops regarding urban agriculture. They have a project, run by volunteers, that is located in Amsterdam west and enhances urban agriculture while using different composting techniques. They also teach other community gardens on composting and gardening techniques. As a start-up gives workshops on composting |
| Containing mushrooms | Start-up | Marleen collects coffee waste form the University of Amsterdam and other offices around the Zuidas Tuin. With the coffee waste she grows edible mushrooms and sells them to people in the neighborhood. |

| Name | | Description |
|-------------------------------|---|--|
| Taste Before you waste | Bottom-up initiative | TBYW is now a foundation that started as a bottom-up initiative. They collect food that's considered as waste in the small vegetable stores in Amsterdam East. They do different activities with the food that is collected. Give it away in two markets, cook dinners in the neighborhood (voluntary contribution), catering services and give the food away to local charities. |
| Oedipus | Start-up | Oedipus is a brewery. They had a crowdfunding project for raising money for solar panels. At the moment, they are working with 4 students from the University of Amsterdam to make bread with the malt waste that is been already used in the brewing process. |
| The Weedburger | Start-up. Offices at de Ceudel | The weedburger is a start-up that makes 100% seaweed burgers. They have their offices at the Ceudel so the interview was about De Ceudel, which is a circular project in Amsterdam Noord in which different offices are settled. The soil was polluted so they started a project in which different plants clean the soil and water. They also have eco-toilets and they are currently working on a bio-gas project. |
| Buurtcomposteren | Bottom-up initiative | Peter Jan started a community worm compost project in his street. At the moment, there are around 25 families that instead of throwing away their organic waste they are feeding it to worms to make compost. Last March they had their first harvest day. People from the street came with buckets to collect their share of compost. |
| Le Compostier | Start-up and blogger | Rowin is working at the project of the living lab, and started building and giving workshops related to worm compost. He is now trying to scale his designs for larger loads of organic waste. He also has a website in which he shares his knowledge related to worm composting is explained. |
| Gascoland | A project from the collective Cascoland | It's a collective located in Amsterdam West. They have managed to change the image of the neighborhood, which was one of the most unsafe places in the country. One of the projects that they have been working on over the past years, is a kitchen in which bio-gas is been produced from the surplus bread collected from the community. |
| Sustainable Amsterdam | Start-up and blogger | It is a startup that focuses more on mobility in the city. They also have a blog in which different cases about sustainability in Amsterdam are shown. These cases cover all kinds of themes, including circular economy. |

4.2 Results from the analyzed data

In the following section the results based on the analysis from the data collected will be presented. First the results on the ranking exercise will be presented. Then the results from the interviews and secondary data will be elaborated.

4.2.1 RANKING EXERCISE

Next to the interviews, the participants were asked to do a ranking exercise. This exercise consisted of ranking five statements regarding the main contribution of

circular initiatives, projects and start-ups. The participants were asked to base their answers on their own experience, opinion or understanding of the role of initiatives, projects or start-ups in achieving circularity.

Thirteen out of the fourteen participants from projects were willing to rank these statements. In this exercise five different statements regarding the contribution of circular initiatives, projects and start-ups were presented. The participants were asked to rank them from what they considered as the most important (5) to least important (1). Once the analysis of information started, the answers to this ranking exercise were introduced into an Excel sheet. In this sheet the number of points were counted to see which statement was the one with the most and with the least of points. The number of points were equivalent to: most important 5 points, second place 4 points, third place 3 points, fourth place 2 points, and fifth place with one point. Thus the maximum that a statement could get was 65 points. In excel it was also counted how many times most important, second, third, fourth and last place was given to each statement.

The statements for the exercise were based on one of the main components from each perspective explained in the theoretical framework for measuring the performance of inclusive circular initiatives, projects and start-ups that was presented in chapter 2.

Table 2 shows the statements that the participants were asked to rank. In appendix two the overall explanation of each statement can be consulted.

Table 2. Statements for ranking exercise

| <i>Statement</i> | <i>Description</i> | <i>Belongs to the perspective of</i> |
|------------------|--|--------------------------------------|
| A | Contribute to a better use of resources, designing out waste and enhancing economic activity while having no net effect on the environment | Economics |
| B | contribute to a better quality of the environment | Ecology |
| C | enhance participation of the community and neighbors | Politics |
| D | contribute to participation of different stakeholders | Politics |
| E | enhance culture and define the city's identity | Culture |

Statement A has to do mainly with the management of resources which belongs to the economics perspective from circles of sustainability. Statement B represents the interaction between nature and human activity which is the core of the ecology perspective. Statement C and D represent the different relationships and partnerships that are fundamental for achieving circularity. These statements represent the governing through networks and the participation and collaboration between different actors which has to do with the governance and organization category which belongs to the politics perspective. Statement E represents the culture perspective which seeks to create and enhance culture and develop an identity in the city. Table 3 shows the answers from the participants for the ranking exercise.

Table 3. Results from the ranking exercise

| | Participant | Statement | | | | |
|-----|------------------------|-----------|-----------|-----------|-----------|-----------|
| | | A | B | C | D | E |
| 1. | Wormhotel | 5 | 4 | 1 | 3 | 2 |
| 2. | De Dakdokters | 5 | 4 | 1 | 3 | 2 |
| 3. | InStock | 5 | 4 | 1 | 3 | 2 |
| 4. | LocalWise | 2 | 5 | 4 | 3 | 1 |
| 5. | Wasted | 4 | 3 | 5 | 2 | 1 |
| 6. | City Plot | 4 | 5 | 1 | 2 | 3 |
| 7. | Containing Mushrooms | 1 | 4 | 3 | 5 | 2 |
| 8. | Taste Before you Waste | 4 | 5 | 3 | 2 | 1 |
| 9. | Oedipus | 5 | 4 | 2 | 1 | 3 |
| 10. | The Weedburger | 4 | 5 | 3 | 2 | 1 |
| 11. | Buurtcomposteren | 2 | 5 | 4 | 1 | 3 |
| 12. | Le Compostier | 5 | 4 | 3 | 2 | 1 |
| 13. | Sustainable Amsterdam | 5 | 4 | 2 | 3 | 1 |
| | Total | 51 | 56 | 33 | 32 | 23 |

As table 3 shows the statement with the most points is statement B with a total of 56 points. Following statement A with 51 points, statement C with 33 points, statement D with 32 and last statement E with 23 points. Although statement B has the most points it was ranked as the most important five times while statement A was ranked as the most important 6 times. While statement B was ranked seven times as second most important and never ranked as the least important, Statement A was ranked four times as second place in importance and one time as least important. Statement E had the lowest ranking: six times was placed as

least important. Overall statement B, followed by statement A, was ranked as the most important. Looking at this table, another interesting finding is that both, Statement C and D, were ranked one time as the most important. This shows that at least one initiative find statement C or D as the closest for achieving the mission of circularity, and that is also important to keep in mind.

This information is relevant when deciding how to place the perspectives in the framework. These answers show what people, that are doing something regarding circularity, see as closest to the mission of circular initiatives, projects and start-ups. Thus it can be concluded that based on the total of points, the ecology's statement is the closest to the mission of circular projects. Based on the number of times that the statement was ranked as the most important, then the economics' statement is the one that was chosen the most. Since there is an occurrence where the politics' statements were viewed as the most important, this shows that, to some extent, there are exceptions from the norm (or majority of opinion). The culture's statement was never mentioned as the most important contribution from circular projects. This shows that there is a majority leaning towards economics and ecology but that there are exceptions. This has to do mainly because all projects are unique and have their own mission or ideas of contribution from circular projects.

4.2.2 INTERVIEWS

In the following section, the analysis of the data collected regarding the content of the interviews will be presented. The following subsections reflect how people, who are already working in circular projects, experience and perform through their projects. The information collected is very important, because these projects are seen as the 'laboratory' or as places that already started experimenting with circularity at a local/neighborhood scale. As it was seen in the section before, their insight is very valuable and important for this research, because they have experience and knowledge on their particular project. But there is an additional reason why the information gathered from the participants is so important for the content of the framework, and it has to do with relevance. This framework is designed to give information to AMS and the initiatives/projects themselves on the performance of circular projects. That is why this framework needs to be relevant to what these initiatives, projects and start-ups see as relevant to them. By elaborating on and working with a framework that is relevant to the projects as well as for AMS, communication between the different parties is enhanced because initiatives, and what they think or know based on experience to be

important for evaluation, is being taken into consideration. If a framework is being designed to know what is relevant for initiatives, projects and start-ups to be evaluated, it needs to involve them and their vision. In other words, for the framework to serve as a communication tool, the projects need to be involved. The measurement tool used for evaluating should be relevant for the ones that are evaluating as well as the ones that are being evaluated.

The ranking exercise was an exercise to get information on the project's understanding and opinion regarding the mission of circular initiatives, projects and start-ups. The content from the interviews shows the in depth and more elaborated information regarding the four main statements, which represent the four main perspectives described on the theoretical framework presented on chapter 2.

The following subsections are divided through the main topics that were discussed during the interviews. These are: closing loops, cooperation of resources, community and, awareness and behavioral change. Additionally the main and more relevant obstacles that initiatives are facing are mentioned.

4.2.2.1 CLOSING LOOPS AND ENVIRONMENTAL IMPACT

According to the municipality (2015), in a circular economy “energy, water, natural resources and food are used carefully. ‘Waste’ is considered a natural resource, and energy is derived from renewable sources. It is called ‘circular’ because scarce natural resources are recovered and used to generate new financial or nonfinancial gains” (p.26).

In the ranking exercise the highest score was for contribution to a better quality of the environment. Although contribution to an economy in which resources are used carefully was the one ranked as most important, overall the highest score was for contribution to a better quality of the environment. In order to say that an initiative, project or start-up is performing successfully in circularity, they should be able to show how they are contributing to a better quality of the environment.

The projects selected to be interviewed are somehow trying to close loops with different types of waste. Nine out of 14 interviewees mentioned closing loops as an indicator of being successful in achieving circularity.

Measuring waste recovered, what comes in and comes out and, materials used are important for evaluating the performance of an initiative, project and start-up in achieving circularity (Bensch, 2016; Brouwer, 2016; Jorritsma, 2016; Seddik, 2016; Spits, 2016). “Last year we saved I think 60.000 kilos of food. And yeah, that’s a lot of food... 60.000 won’t solve the problem of food waste but we have hope we can be an example for other people here or abroad” (Seddik, 2016, p.2). By doing this, it is possible to see the real impact on the environment “It is very important to measure what’s coming in and what’s coming out... because with that you can see the impact on the environment and see if loops are being closed. With these results you could see if circularity is being achieved or not” (Jorritsma, 2016, p.2). Measuring this should not be complicated and much elaborated. It should show with numbers what is the amount of waste that comes in and what for product comes out from it in. For worm composting and example could be “kilos of waste and kilos of soil” (Brouwer, 2016, p.3).

Three out of fourteen interviews mentioned that it is also important to consider that there is a production chain and this one also has an impact on the environment. When a start-up was asked what it was missing in order to consider itself circular, the answer given was “more cradle to cradle products. We do try to buy second hand products. But it’s very difficult totally. And you are still dealing with the rest of the city. You are still buying gas from those companies, or the water supplying net” (Seddik, 2016, p.2). Transportation is another example of having a negative impact on the environment. If you still have to get products from another places, this transfers into a negative impact on the total product. That is why trying to use local resources is the best option (Klapwijk, 2016; Kulsdom, 2016). Initiatives are already thinking of this; for example, Instock uses an electrical car to pick up the food every day (Seddik, 2016) and TBYW uses bikes to pick up and deliver food (Bensch, 2016).

A last example that was mentioned just once but shows the importance of considering these aspects for measurement of performance is the impact on health. In the interview, it was mentioned that besides having an impact on the environment, green roofs have an impact on health. Having green roofs can help to reduce stress and illness problems (Klapwijk, 2016). It impacts directly the quality of the environment and health. The quality of the environment impacts directly the quality of life. The impacts of circular initiatives, projects and start-ups go beyond environmental impacts. Thus, if the product or service of the initiative, project or start-up is contributing somehow, for example, to quality of the air this automatically

will be translated into a better health, which is crucial for measuring the quality of life of individuals. The aim of this research is not to measure the quality of life or of the environment, but the example of the impact on health is discussed just to show how the impacts on one system impact other systems around it. In this case by impacting positively the air, water and soil the whole environment around it is impacted.

Another important aspect that some projects mentioned was the existing of technology. According to some participants, having the adequate technology was crucial in order to close loops. In the case of the project of Wasted and Gascoland, having the right technology was key to being able to close loops. Although, the current technology can be upscale to have better performance on circularity (Schoenmakers, 2016). Thus under the closing loops measurement, innovation and technology need also to be considered.

Summing up, the measurement of the materials and waste that is coming in and out is important to measure. This is crucial for measuring the impact that human activity is having on the environment. The technology used and implemented is also important for achieving closing loops. Without the right technology it is not possible to close loops in an optimal way. In the case of worm composting, technology is not really needed, but having knowledge on what to feed the worms and a place where worms can eat the waste and make compost is necessary. In other words, some processes are required for closing loops. Thus in conclusion having the right, innovative technology is key for closing loops, but additionally the adequate space and infrastructure, as well as the knowledge on the process, are also needed to close loops. To know if loops are being closed and the impact on the environment waste, material streams and emissions need to be measured. Negative impacts such as transportation (type of transport and distance covered) need to be considered if wanting to know the net impact on the environment.

4.2.2.2 ANALYSIS OF THE COMMUNITY

The aspect of involving the community was one of the most mentioned themes during the interviews with projects and initiatives. Twelve out of fourteen interviews mentioned the involvement of the community and/or transformation of the neighborhood as part of what the projects and initiatives should be doing or contributing to. Subjects regarding community and its role within the projects and initiatives were mentioned about sixty times in the interviews. This shows the

importance and relevance of the involvement and participation of the community for moving towards achieving circularity in the city. Subjects such as involving, benefiting and targeting the community, among others, were relevant to the initiatives and projects. The analysis of the three most relevant areas that were found regarding the community are explained in the following sections.

PROJECTS AND INITIATIVES CONNECT, ENGAGE AND BRING CITIZENS TOGETHER

One of the main outcomes of involving the local community in projects is that through these initiatives and projects, citizens connect with each other and social cohesion is built. Connecting citizens is one of the main outcomes from local initiatives and projects while trying to close loops. A great example for this is the initiative *Buurtcomposter*.

Buurtcomposter is a bottom-up initiative that is based in Amsterdam-Zuid. This initiative started with a citizen that was disappointed on the city's waste management system. It is important to mention that in the city of Amsterdam there's no infrastructure for separating organic waste at a household level in all the districts. One of the goals from the municipality is to separate 65% of household waste by 2020. At the moment, if citizens want to see their waste be used for a better purpose, they have to do it by themselves and (if needed) treat it. Examples of this could be making their own compost or giving the organic waste to animals in the city. Otherwise the organic waste will just go straight to the incinerator (Brouwer, 2016). The main goal of the initiative *Buurtcomposter* is to use the organic waste from the households in the street to feed it to worms to make compost and use it in the neighborhood. With funding and permission from the municipality, containers with a total of 400 worms were placed on the street. The participant neighbors have keys to open these containers and throw their organic waste into the worm containers. The worms eat the waste and generate compost that later can be used by the citizens (Brouwer, 2016). This has been a very successful initiative in the street, because it has been able to grow in the amount of people involved. The initiative started with about five persons. They each got a green bucket in which they can put their organic waste and bring it to the containers on the street. After some time people started asking questions and getting interested in the initiative. In a total of eight months, it grew from five persons involved to twenty-three families and three containers placed on the street. They did not use any publicity, they didn't tell people but somehow others got interested and wanted to be part of what was happening in their street.

“I think at the beginning we started with five people... We didn’t know if it was going to be a success or not. The funny thing is that everybody wanted to have a bucket. I didn’t make any publicity... After three months of going well I thought let’s take another five people to get involved. So we gave five more buckets and five more keys. So then we had 10 families. A couple of months later another seven came and today there are twenty-three families, putting their stuff inside... It’s very funny you throw in your stuff and within a day or two everything is gone. 20 percent of the mass will remain the rest is gone. In eight months twenty-three families threw their stuff and it’s gone. It’s like a magic trick!” (Brouwer, 2016, p.1).

What started with five people from the street grew to involve about 25 families on the street. This caused people to work together and start to get to know each other. “It’s so funny, 14 years until we started this project I knew four people in the street. Now I know like thirty-five” (Brouwer, 2016, p.2). Targeting and involving the community led to creating relationships between neighbors and gave the neighborhood a true sense of community. When asked if Interviewee11, (2016) would consider the initiative successful in achieving circularity his immediate answer was “Yes! It’s better than I expected! I mean 25 families are involved now!” (Brouwer, 2016, p.3). This shows how the performance of this initiative is perceived as successful, not only because it is closing a loop with the organic waste, but because it grew in the number of neighbors involved and built social relationships. Also by involving in a group of local citizens, people work together while sharing and celebrating together the success of their project (Interviewee 12, 2016, p.12). The more people that are working towards a common goal, results in a greater impact that can be made in closing the loop.

Another example of citizens connecting to each other can be taken from the *Wasted project* in Amsterdam Noord. Although *Wasted* is not focused on organic flows but in recycling and up-cycling plastic from the neighborhood, this project is a very good example of how to engage local citizens in a project while also connecting them with different stakeholders. By separating plastic and giving it to Wastedlab, participant citizens get in return Wasted coins, which they can exchange in a variety of different places in Amsterdam Noord and other parts of the city. These places are in its majority small local businesses. By connecting local citizens to these entrepreneurs local economic activity is increased (Interviewee 5, 2016, p.2). In the case of *Wasted* the more people that are getting involved in the project, the more plastic that can be up-cycled. But in *Wasted* one of the main incentives for people to engage, is to get back the Wasted currency so they can

exchange their work for a service or product. This also promotes and stimulates local economic activity.

Community gardens are well known for doing a great job in transforming neighborhoods and for being good places for people to connect and make contact with other people, “(Interviewee 7, 2016, p.1). The project City Plot is working in a community garden Amsterdam West. It focuses on educating people from the community garden as well as people from other community gardens in the city on how to garden but also on how to compost using organic waste. City Plot has also as a main goal to connect citizens to different community gardens so at the end they can find one that is the right fit for them (Doherty, 2016).

Taste Before you Waste (TBYW) is an Amsterdam based initiative in which (still) edible food is collected from the local stores and is being used instead of been thrown away. They engage with locals from Amsterdam East and other people in the city by: collecting edible food that is considered waste because of the strict regulations regarding food; giving away edible food considered as waste in two local markets while explaining the reality about food waste; cooking a weekly dinner which is free and opened for everybody at some community centers in the neighborhood. What they do is try to engage people by giving food for free. People are not used to receiving food for free, so by doing this, the initiative engages people by just letting them ask questions about the food (Bensch, 2016). TBYW is run by engaged citizens and international students that are committed to food waste prevention. They pick up food every day thanks to the very fast growing community (Bensch, 2016). It is amazing to see how in the weekly dinners, about 25 people from different places, social classes, and professions come together in a community kitchen to eat a perfectly good diner that otherwise would have been thrown into the incinerator. Volunteers engage with some locals that come regularly and also with people that just want to learn more about the initiative. People at the tables connect with each other while enjoying the food together.

In summary, what this section of the analysis shows is how projects and initiatives connect, engage and bring people together which builds up a community. The circular projects or initiatives that were discussed in this section help building social cohesion, which at the end is important for the neighborhood and city. The fact that the community actively involved in the project or initiative grows, is a sign that the project is somehow reaching the community. The growth of relationships between participants of the initiative or project shows that a

project is not only growing in numbers of people involved but that the project is being successful in developing relationships between people that before the project did not exist.

INCLUSIVE PROJECTS

Another social aspect that was mentioned three times during the interviews was the inclusion of people in the projects. Including different people with different social classes, nationalities and genre in the projects and initiatives also contributes to building social cohesion. City Plot is giving the opportunity to different people, especially people that don't fit into the conventional Dutch system because of the language barrier, to join and work in the community garden (Doherty, 2016). In this sense this project, which is run by volunteers, is enhancing that different people participate and connect with other people in spite of the fact that they don't speak Dutch and fit into the "Dutch system". Next to being socially inclusive, an increasing participation on closing the loop has been seen because volunteers from the garden as well as external people bring their own organic waste from their homes to compost. This happens mainly because they really want to do something with their own organic waste but don't have the space (Lotte Sluiter, 2016) or the facilities to do it. Community gardens offer space for locals to realize activities that otherwise would not be possible to do. What has happened in this community garden is that people from the neighborhood bring their own boxes with food waste from their homes to feed it to the worms (Doherty, 2016). Being inclusive brings the opportunity for different people to participate and together close a loop regarding food waste. It is how Peter-Jan (2016) said, "Something is happening here, because you have to things together, even if it's small" (p. 2).

The project Gascoland from the collective Cascoland, is an example of how by including people from the local community big changes within the community can be achieved. Even changing the image of one of the worst neighborhood in the Netherlands into a "neighborhood in transition and a neighborhood that is now in the vanguard of innovative technology that is part of the community" (Schoenmakers, 2016). The collective started engaging with the community five years ago by doing activities that people didn't want to participate in such as cooking and gardening. Now people participate in different activities and economic activity has been enhanced through these activities. Because of the success and support from the community, the project of Gascoland was able to get

realized. But one of the reasons that helped the collective to succeed in collecting the surplus bread was because they explained to the Muslim community what they were planning on doing with the surplus bread that they were throwing on the streets. Once the Muslim community knew that their surplus bread would be used for something better, they engaged and started participating with the surplus bread separation. “Even though people didn’t understand the technology or were not interested in the technology. But the fact that the bread was not thrown away but was used in a better way... they loved it” (Schoenmakers, 2016). In the project Buurtcomposter, the inclusion of families on the street with a circular project was at the end what brought people together.

One of the most interesting observations gathered at the weekly dinner that TBYW offers on Wednesdays, was that the variety of people that attended to this free meal was undeniable. There were about 22 people that evening excluding the team of volunteers that were delivering the service. From these people, a group of professionals from Rotterdam that were in the city for a work activity came to eat and learn more about TBYW; there was another group about the same size of international students; and there were a couple of people from the neighborhood from which some of them didn’t even speak Dutch. There you had a table with 22 people from different backgrounds, nationalities and social classes sharing food and talking to each other. From the volunteers working that evening there were five in total of which two were Dutch and the other three were international exchange students. This is an example of how the inclusion of different people in the neighborhood is liked also to engaging and bringing people together. On the one hand you had the customers that were welcomed no matter their social class, genre or nationality, sitting together and sharing food, while on the other hand, the team of volunteers was not exclusive to a particular target group, but is formed by people that share the same goal of up-cycling food waste. Thus, sharing the same goal is an opportunity for being inclusive instead of exclusive.

GIVING SOMETHING BACK TO THE COMMUNITY

The former examples show how projects are working in closing loops while including and involving the community. These projects and initiatives mentioned want to close loops while giving something back to the community. The original idea that Wasted had in mind, was to make different items for the community with the recycled plastic they got from the community. So from the effort that the community put into separating their plastic something also goes back to

the community, “In the pilot the original idea was indeed that then we use that plastic to make products for the neighbourhood. So that through separating your plastic you see the results like in furniture or other objects that benefit the local community. In first instance, we’re still in a pilot phase” (Interviewee 5, 2016, p.1). An example of this possibility can be seen at FabCity where people can sit in a bench that is 100% made from recycled plastic.

In Buurtcomposterren, neighbors organized a Harvest party in which people could collect compost and put it in their own gardens or balconies. Once again giving something back to the community is an important aspect to consider while trying to involve the locals in some activities because getting something back from your effort and work is highly appreciated and motivating.

“The thing is that we had a harvest party. I had a mail and sent it by email to the compost friends. I told them to come with a small shovel and a bucket and let’s harvest! And then they came we put it out and put it on the gardens. That’s the trick. That’s the psychological trick between collecting greenery and take it on the car to somewhere outside the city and make compost, this is much more sympathetic because the people know that they get back something worth something from their own garbage.” (Interviewee 11, 2016, p.2).

In the project Gascoland, showing to the community that the organic waste, in this case bread, was being used as a resource was highly accepted and therefore the project counted with the participation from the Muslim community which was key to solve the problem of surplus bread being thrown away in the canals or on the streets.

Buurtcomposterren has been successful because a group of people from the street has been working together for a common objective. This has shown people outside the initiative that working together as a community can be possible and be successful, “Some civil servants came and they looked at it and they said ‘Amsterdam people would not do it’ and looked at it! Now these civil servants are very happy because they see that something is happening here because you have to do things together, even if it’s small” (Interviewee 11, 2016). Peter Jan (2015) also mentioned that what would be ideal is to be able to sell the surplus compost and use the money back in the neighborhood. For him, having a project in the neighborhood also has to give something back to the community. In fact, while interviewing he showed how he has already begun to work and transform the trees on his street.

TBYW is also giving something back to the community. Whether it is by giving away free food or cooking free meals, they try to engage citizens in this battle against throwing away edible food. Wasted for example is giving back the Wasted coins so citizens can exchange them for a product or service in different establishments in the city. The worm hotel campaign on the other hand was providing the community with practical knowledge on how to begin and maintain a worm hotel for composting. Projects are giving something back to the community in different ways: education, local currency, by investing in the own neighborhood and make it more livable, and by giving away something considered as waste than can be used (such as waste food). Projects are giving back tools for the community so they can have a better quality of life.

4.2.2.3 COOPERATING WITH RESOURCES

Cooperation of resources was another topic that came up several times during the interviews. Thirteen out of the fourteen interviews with the projects initiatives and start-ups mentioned cooperation as a key factor for achieving their end product or activity. Whether these relationships involve just a couple of different stakeholders or a big networks of actors, it was acknowledged that working together is fundamental for circular economy. There were three main ways of cooperation identified: waste as a resource, funding as a resource and, enabling as a resource.

COOPERATING WITH WASTE

As it was explained in the conceptual framework, a circular economy is the one that designs out waste and uses existing waste as an input for another activity (Municipality of Amsterdam, 2015). This calls out for cooperation between stakeholders to provide waste, so others can use it for a different activity. Whether it is a project, initiative or start-up that wants to close a loop cooperation regarding inputs and materials is needed.

Eleven out of fourteen projects that were interviewed are working together with people to get or give out waste so others can use it. Some projects were already explained in previous sections. Now two start-up cases will be introduced to show how using the waste of other stakeholders can enhance economic activity.

Oedipus is a brewery located in Amsterdam Noord. They have gained popularity in the area and their beer is now available at a big national store chain and a

supermarket in the area. They had a crowd-funding project to raise money for solar panels so they can have a lesser impact on the environment. In the last months they have been working together with a group of students to find a way to close a loop with the malt that is used in the process for brewing beer. A group of students from the University of Amsterdam had the idea of making bread with the malt that was already used in the process. Once that the malt is used, there's nothing else you can do with it. Until now, the only thing that they could do with it, was to feed up animals (Spits, 2016). Thanks to letting the students try to create their own bread recipe, the company Hartog is interested in collaborating with this idea of making bread out of waste malt. Once the final recipe is finished, three different companies will be working together to produce and distribute bread made out from waste malt (Spits, 2016). This is an example of how organic waste can be used to close loops. In this case one company's waste is the input for another company.

Another example of a start-up collaborating for up-cycling waste is the restaurant InStock. This restaurant was the winner of a competition within employees of the supermarket Albert Heijn. The idea was to create a pop-up restaurant that would cook with the daily food that the supermarket could no longer sell and therefore had to throw away. The idea was so well developed that instead of having a pop-up location they went for a permanent location (Seddik, 2016). Right now they are generating economic activity by using the daily supermarket's waste food to create meals. They collect the waste food from the supermarket every single day and then come up with the menu for the day. In this case the supermarket's waste is the restaurants input.

TBYW gets daily food waste from shops to either give it away in the markets or use it for preparing meals. They get their input from the local vegetable shops. But they also cooperate with other actors from the network that has already been formed. "We went to a conference in Paris about a year ago and there we met so many people from the Netherlands and even Amsterdam. We had to go all the way to Paris to pick up all these collaborations. But now we are in contact. Email contact or referring to each other. Like Instock once had a really big delivery of spices that they didn't need to use, so they have us the other half. That kind of things are just great" (Bensch, 2016, p.3).

Containing mushrooms is a start-up located in Amsterdam Zuid that uses coffee waste to grow mushrooms and later sell them. Coffee waste is collected from some

companies around the area and some installations from the University of Amsterdam. This start-up depends on the coffee waste from people around the area.

COOPERATING WITH MONEY AND/OR FUNDING

Six out of fourteen interviewees talked about cooperation by investing and getting funding for their initiative, project or start-up. “There’s always the challenge of big money. I think a lot of good ideas come from people who don’t have ‘making a lot of money’ as their primary interest” (Kulsdon, 2016). All initiatives and projects need money to get started. There are different ways of getting it to start projects that require cooperation. As in the case of InStock restaurant and containing mushrooms, funding can come from private actors by: winning a competition (Marleen, 2016; Seddik, 2016), crowd-funding (Kulsdon, 2016; Spits, 2016), municipality (Brouwer, 2016) and a combination of different stakeholders (Koole, 2016).

Cooperation is necessary to perform an activity to close a loop. In order to achieve closing loops, cooperation is essential (Bensch, 2016). When asked if LocalWise was successful in achieving circularity Fedde (2016) answered yes because there’s cooperation, “I am a person that is working at practical level, there are other people working in the law... we should cooperate and bring together everybody with their talents. Work together with other parties” (Fedde, 2016, p.3). In addition Fedde (2016) said, in order to achieve circularity different actors need to work together and cooperate.

COOPERATING WITH EDUCATION

Learning processes are part of developing and carry on out an initiative or project. There are learning process that will affect the performance of the initiatives and projects. That’s why people involved need to do some research, learn, develop skills, develop technologies and infrastructure, teach and instruct the voluntaries or workers, and elaborate plans.

As it was mentioned before, local initiatives and projects are places to try out new ideas that later can be up-scaled (Brouwer, 2016). But while experimenting, knowledge will be generated. This knowledge will show areas of improvement to later be spread (Jorritsma, 2016). That’s for example, what Fedde has been doing while developing a safe system for composting human manure. He’s not only generating knowledge

but he is part of the open source movement. This movement promotes making knowledge accessible to everybody by sharing and spreading it (Jorritsma, 2016).

Learning processes also have to do with having a trained working team. Even if they are volunteers they need to have knowledge on the subject. That's why City Pilot offers training to the volunteers on the garden. This way they all can contribute and work together and there's no need for someone to be directing step-by-step everything that volunteers are doing (Doherty, 2016).

One of the things the initiatives and projects have in common is teaching what they have learned in their own experience. Either as part of the initiative/project or as part of their job, people involved are teaching with workshops or classes to other people about closing loops. Peter Jan (2016) is now giving talks to people to encourage them to compost with their own waste. Le Compostier has a blog in which he shares his knowledge on composting and also gives workshops to people (Rowin, 2016). City Plot is busy with teaching people from other community gardens how to compost in their garden (Doherty, 2016). Fedde (2016) is also teaching people how to build eco-toilets, solar food dryers, and solar heating systems for water. Wasted gives workshops to young students between 12 and 14 years old (Koole, 2016). Learning processes are not only about designing measures internally to have a better performance but are also about sharing knowledge on what they have learned by working and developing the initiatives.

THE MEDIA AS A PARTNER

Some projects mentioned that the media helped them to be known and grow. For example, restaurant Instock has had really good reviews and has even been mentioned in an international magazine (Seddik, 2016). This has helped them to attract more customers. On the other hand, De Ceutel has also had really positive publicity that professionals from around the world come constantly to learn more about the project (Kulsdom, 2016). Lastly Buurtcomposteren and containing mushrooms have been also featured in local news explaining what they do (Brouwer, 2016; Marleen, 2016).

INFLUENCE THE LOCAL AND NATIONAL POLICIES

The initiatives and projects that were analyzed are involving and targeting the community while moving towards achieving circularity in the city. So by looking

at what these initiatives and projects are doing in and through the local community in the city, local and national policies can be influenced and also cooperation can be enhanced. These are the examples off the initiative Buurtcompostereren and the project of Gascoland.

It has grown in the last months and now the municipality is even considering upscaling this project for another area in Amsterdam-East (Brouwer, 2016). So what started as an experiment in a street has been able to get the attention of the authorities and influence the strategy that the local government is following on waste management in the city.

Another example of how projects and initiatives can influence the policies at a national level is the project of Gascoland. After the bio digester was finished, because of the strict safety regulations, Gascoland was asked to remove the digester and place it in another place. At the moment the digester is at FabCity in Amsterdam and later will be translated to the Lucas Community in Amsterdam. Because of this project, policymakers in Hague are reassessing the permission regulations, and civil servants will be looking at the installations and interviewing Gascoland for giving advice in The Hague on how to adjust the regulations (Schoenmakers, 2016). According to Roel this process might take years but the fact is that this initiative is influencing regulations at a national level.

4.2.2.4 AWARENESS AND BEHAVIORAL CHANGE

Generating awareness along with behavioral change was mentioned over 40 times and was present in all fourteen interviews. They both were mentioned either as something that is essential for change and something they are currently working on, or as an obstacle and something that is still lacking among citizens. But why is generation of awareness and behavioral change so important at this stage in circular economy?

What was observed during the interviews and looking back at the different projects and initiatives, something that they all have in common is that they have recently began with operations (they are not older than five years). The twelve out of fourteen interviewees mentioned that they were somehow trying to generate awareness but at the same time struggling with it. Just as Lotte Sluiter (2016), explained the struggle doesn't end there but once that people know about a problem and a possible solution to it, how many people actually did something

about it? It would seem that once people know about the existence of a problem, but also a solution to it, people would start acting right away. The reality versus practice is very different. Food Guerrilla last year launched a campaign and a competition to encourage and challenge citizens to build their own wormhotel. They came up with a Youtube video to show what worms can do regarding compost and in their website they explained what a wormhotel was. They worked together with some big hotels in the city to also show in practice what a wormhotel was. The goal from Food Guerrilla was to share a message regarding the soil and worm composting (Lotte Sluiter, 2016). There were about 150,000 views of the video, 489 likes and 59 reactions in social media, but how many people actually built a wormhotel? 65 (Lotte Sluiter, 2016). As it can be seen the number of people that did something was not even 1% of people that watched the video. For them the campaign was successful because their goal was to spread a message (Lotte Sluiter, 2016). But for a city to become circular only knowing about waste and the potential for it to become a resource is not enough.

The municipality of Amsterdam has set as a goal to separate 65% of household waste by 2020 (Municipality of Amsterdam, 2015). They recognize that the capital city is lagging in waste separation in comparison to other cities in the country and internationally in separating waste. The Sustainable Amsterdam Agenda (2015) acknowledges that the participation of the inhabitants as well as cooperation between the districts and waste industry is essential to achieve their goal. But involving the inhabitants in this process also requires of awareness and change in their habits and practices. Wasted has seen that by engaging citizens in separating just one of the many different waste streams has two important outcomes. The first one is that people that are separating their plastic are also trying to consume less plastic (Koole, 2016). By the combination of being aware and doing something about it people change another habit that is the consumption and generation of more waste. In an impact study made by CITIES, it was found that about a quarter of people that were participating in the Wasted project, were trying to consume less plastic (Koole, 2016). The second important outcome is that once that you understand and see how waste can transform into something new, something that brings life again such as compost, people start being aware of other waste streams and separate them too, “if you start with something like this, something so simple and environmentally friendly it makes you start thinking. All my friends here that are doing the composting, they are also separating plastic, glass and paper. It’s part of the same stuff and not hard at all!” (Brouwer, 2016, p.2). One of the

things that Rowin le compostier (2016) has noticed is that once that people start composting, people somehow get more aware of cycles and this leads to appreciate more what there is and what you have. This impacts someone's life because for example by composting people see what would have originally gone to the trash is now in their gardens growing something new (Rowin, 2016).

It is not entirely necessary that people are extremely aware of what waste represents when they join a project or initiative. But if along the way they become aware and change their practices the initiative or project would have succeeded in spreading a message and getting people to act. Even better if people act beyond the initiative or project's waste stream target.

TBYW is focusing on giving information so people can become aware of the food waste problem. They give away food along with information to "empower people to act responsible" (Bensch, 2016. p.1). What started as an initiative from a concerned citizen has been able to be reproduced in other three places in the Netherlands, including Utrecht, and soon will go international. The main objective is to start making people conscious about the problem so the change their practices and in the future prevent food waste from happening (Bensch, 2016). In order to change behavior in the future, people have to change their mindset first.

When asked if they would consider that the project or initiative would be contributing to enhancing circularity in the city, Roel from Gascoland said yes because they have at least created awareness about circularity. Awareness in the sense that the community has seen how at a local level they can use their waste for energy and other activities (Schoenmakers, 2016).

When asked if Wasted was successful in achieving circularity, the answer was yes because besides from being circular and involving the community they have managed to make people more aware about waste.

Another example of awareness generation is one of the projects from Fedde Jorritsma from LocalWise. Fedde lives and works in Groningen. He builds and teaches people how to build eco-toilets. These eco-toilets are designed in such a way that human secretions can be separated. Once that they are separated they can be composted and used as fertilizer. Because of the regulations and law, at the moment it is not possible to commercialize food in which compost coming from human

manure has been spread on. But eco-toilets are perfect for gardens or community gardens. Human manure can be used as compost as long as the products are not being commercialized. Eco-toilets are perfect for gardens or community gardens. What Fedde is doing now is working and designing along with other people, an eco-village in Groningen. A couple of years ago Fedde was invited to set his eco-toilets at the Magneet festival in Amsterdam. People seemed very interested in the concept and reacted very positive to the idea of an eco-toilet. At the end Fedde was left with 2,000 liters of urine and nowhere to put it. These kind of events are very helpful to let people see in a practical way how loops can be closed and create awareness. But in this case, nothing changed after they showed to people what an eco-toilet could do.

Circular economy is still a new approach to most people. To get people on board it is necessary a change in their mindset. People need to realize how something that is considered waste can be the input for something else. As it was discussed earlier people cooperate when they see results. That's why the awareness phase may now be an important phase and a very challenging one (Koole, 2016), but it should walk aside with changing habits and practices. It's a combination that needs to happen before projects upscale. This was an important theme that came up during the interviews with initiatives, projects and start-ups. The performance of circular initiatives, projects and start-ups it is not only defined by the capacity of generating awareness and behavioral change. But based on the information collected it seems at the moment as an important criterion to considerate for evaluating their performance towards closing loops in the city.

4.2.2.5 OBSTACLES

Five out of 13 interviewees answered that one of the biggest challenges they have faced is related to either getting money for the projects or the expensive cost of labor. "I think a lot of good ideas come from people who don't have 'making a lot of money' as their primary interest. This also means that sometimes the good ideas are not supported immediately by a lot of money" (Kulsdom, 2016).

Although projects seem to move forward in closing loops, there are some common obstacles seen in achieving this. Laws and regulations were mentioned as an obstacle in four out of fourteen interviews. These laws and regulations have affected directly or indirectly the process of using waste as a resource.

Also, the learning processes remain an obstacle for initiatives, projects and start-ups. Four out of thirteen interviews mentioned this as an obstacle. This has to do with people learning how to close loops in a correct way, but also for people that are participating in the projects. These learning processes costs time (Marleen, 2016) and are necessary for closing a loop.

And lastly, for initiatives and projects, the creation of awareness and behavioral change, remains as a big challenge. This was mentioned in three out of thirteen interviews as a challenge. “The thing that most initiatives are battling with is start collecting waste. To start creating awareness with the residents to collect the stuff” (Schoenmakers, 2016). These obstacles are mentioned because they affect directly the projects performance in achieving circularity.

5. Final Framework

Having presented the results on the data collected, the following section serves as a space to present the final framework for measuring the performance of local circular initiatives, projects and start-ups in the city of Amsterdam. In this section, the redesign of the theoretical framework presented in chapter 2 is introduced. This redesign consists of putting together the theoretical framework and the information obtained from the interviews.

To answer the research question, *what are the criteria needed to assess and communicate the performance of the initiatives, projects and/or startups in the city of Amsterdam in moving towards a circular economy?* the following framework was elaborated by integrating the theoretical framework presented in chapter 2 and the information obtained from the interviews.

The answer to the sub research questions:

what are the key indicators/ measures needed to evaluate the performance of inclusive circular projects at a neighborhood scale in in the city of Amsterdam? and how can the criteria be brought together in a consistent and understandable framework? The information presented and explained through this chapter is essential. The answers to the three questions are presented in the conclusions chapter.

Each project or initiative is different, so the specific measures for each one would vary according to each case. Along the suggested criteria examples of measures are presented as well as ideas of what kind of measures should be incorporated in each perspective.

5.1 Framework for measuring the performance of circular initiatives, projects and start ups

Based on the circles of sustainability approach, which is designed for assessing sustainability in a city scale (James, 2015), and the Balanced Scorecard (BSC) for nonprofit organizations, awchich is intended for measuring the performance of

organizations and be used as a communication tool (Niven, 2003), a framework was elaborated in chapter 2. In this framework the four domains of the circles of sustainability were adapted to the BSC diagram.

After analyzing the data, it was possible to further develop the framework already presented in chapter 2 by redefining and articulating it with the obtained data. This was done by integrating the concepts and theory from the framework to the analysis of the interviews.

5.1.1 AS A MEASUREMENT SYSTEM

One of the main purposes of a balanced scorecard (BSC) is to be used as a measurement system (Niven, 2003; Olve & Sjöstrand, 2006). For this thesis research the approach from the balanced scorecard was applied to elaborate a specific framework for assessing the performance of initiatives and projects in Amsterdam regarding circularity.

In the theoretical framework there were four perspectives suggested: ecology, economy, politics and culture. Based on the information collected and analyzed the following are the perspectives that influence the performance of initiatives and projects at the moment: closing loops, community, cooperation of resources and, awareness and practices. Just as in theoretical framework the strategy stays at the core of the framework. Because it is though the strategy that they have chosen that they will walk towards their mission (Niven, 2003).

5.1.2 AS A COMMUNICATION TOOL

The most powerful feature of a BSC is that it can be used as a communication tool (Niven, 2003). A BSC helps an organization to define its strategy and also helps the strategy to be aligned with the vision through the performance measurements that have been chosen (Niven, 2003). By sharing the results of a BSC within an organization, it makes it clear to the rest of the people involved where are they heading to and what is the strategy to get there (Niven, 2003). In the case of AMS by using the framework to measure the performance of initiatives, projects and start-ups, AMS would know which projects are successful regarding circularity in the city, and the projects would also be able to get this information and evaluate themselves. This can later be communicated to people within the organization and/or projects and also to different stakeholders.

5.1.3 MISSION AND THE STRATEGY

As it was explained in chapter 2, the core of the BSC is the strategy and the mission as to where the organization is moving.

The BSC typically takes the mission from the organization and designs the BSC for the organization. Thus on top of the framework, the mission of the initiative, project or start-up will be placed. As explained in the results, not all projects have as their mission achieving a circular economy. Sometimes closing loops is a byproduct of their processes and not necessarily the mission itself or sometimes it is part of their strategy to achieve their mission. In any case, one way or another they are closing loops and contributing to circularity.

Thus this framework suggests the perspective of closing loops being placed right below the mission statement. This suggestion is based on the definition of circularity for the city of Amsterdam which is introduced on chapter 2 section 2.8.1. Even though this decision is based on the results of the ranking exercise, it might still differ per project because closing loops might not be the mission itself for every initiative. That is why, from a circular point of view, the perspective of closing loops is placed under the mission statement. One thing that is important to mention is that the order for the perspectives is not fixed. This means that they can be placed in the most optimum way that fits the initiative, project and start-up the best. Thus, the placing of the perspectives may differ per initiative because the one that is closest to reach their mission needs to be placed under the mission statement. This can also be seen as a comparative way of getting information on the performance of the projects. The more that the framework needs to be adapted to fit a specific mission, the more that the initiatives are not aligned with the general mission of transforming Amsterdam into a circular city. This would mean that projects are still contributing to circularity, while not having as their main goal closing a specific loop.

For this specific research, the circular economy mission of Amsterdam is considered as the mission. That is why, the framework is presented in such a way in which AMS or other platforms stimulating circular initiatives or projects may be able to use. But if the framework would be used by individual initiatives. It might change from the one presented in this thesis. This could happen because an individual initiative might have a different or a more specific mission which could influence the placement of the perspectives.

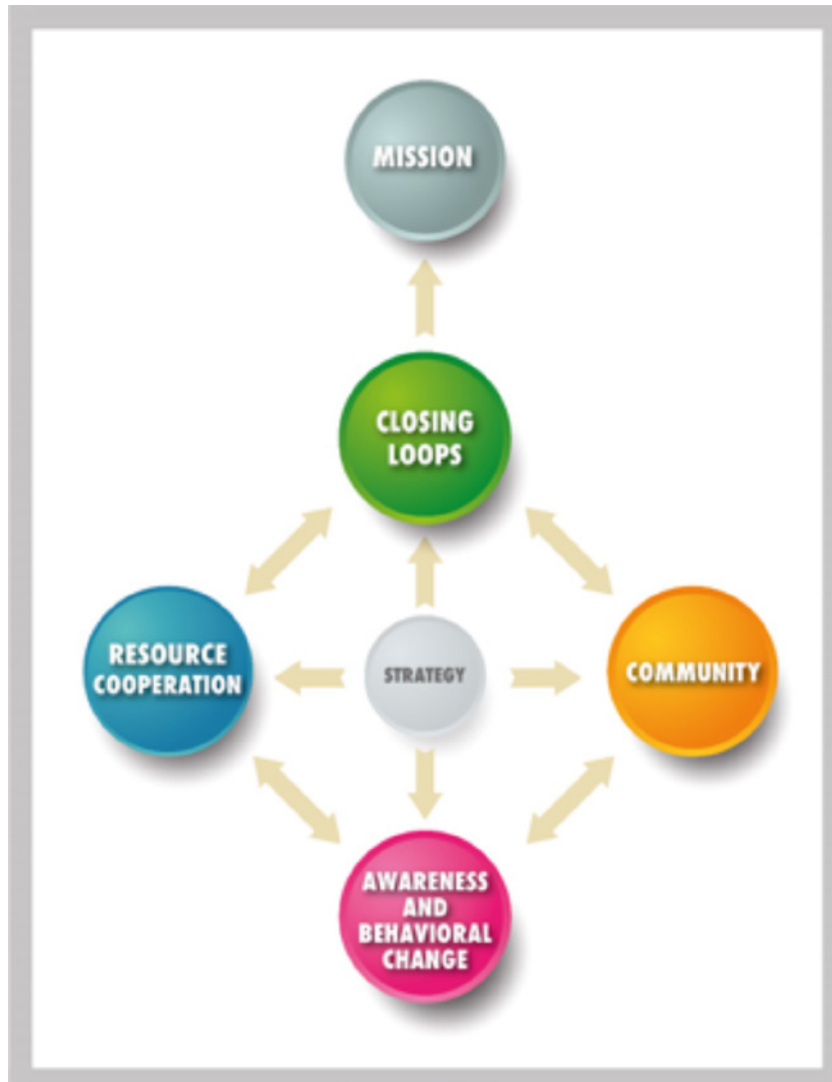
The strategy of the framework will focus on what the initiatives, projects and start-ups are doing to achieve circular economy. The metropolitan area of Amsterdam already has citizens, start-ups, companies, organizations and research institutions working in circular economy (Municipality of Amsterdam, 2015). The participation of citizens especially for waste separation is crucial for achieving the municipality's goals. If it is intended to accelerate the transition to a circular economy by identifying projects and initiatives that are replicable and scalable (Municipality of Amsterdam, 2015), there is a need to first find out which initiatives are successful in achieving circularity and why are they succeeding to then analyze if they are scalable and/ or replicable. By measuring the performance of local projects, and including their contribution to circularity in the city in reports, a better scanning of what is going on in the city could be made and later decide which of this successful projects might be eligible to be up-scaled and replicated.

5.1.4 FOUR PERSPECTIVES

In the following section, the final framework is presented. This framework derives and is an adaptation from the theoretical framework presented in chapter 2. Following an explanation of each perspective is explained.

Figure 8 shows the diagram for the framework for measuring the performance of inclusive circular initiatives, projects and start-ups in Amsterdam. This diagram is the graphic design of the four perspectives proposed for the framework and that were explained in this section. Closing loops is placed right under the mission. To being able to close loops, the cooperation of resources as well as the participation of the community or costumers (in the case of start-ups) is necessary. In the bottom, the generation of awareness that is translated into change in behavior is a condition that affects the cooperation of resources and the community or customer's participation. This conditional perspective can be achieved by the two perspectives placed on top of it but also can influence them. That is why the arrows are not one way but two.

Figure 8. Framework for measuring the performance of inclusive circular initiatives, projects and start-ups in the city of Amsterdam



CLOSING LOOPS PERSPECTIVE

As it was shown in the results chapter, most of the interviewees agreed that the initiatives, projects and start-ups should first contribute to a better quality of the environment (5 out of 13) and a better use of resources (6 out of 13).

In the theoretical framework for local circular initiatives, projects and start-ups the ecology perspective was proposed. In the final framework instead of calling this perspective 'ecology' it will be called closing loops because it addresses more

specifically the processes within a project in order to close loops. As it can be seen in Figure 6, this perspective is placed right on top of the other perspectives and is the closest to the mission. Although closing loops might seem as the mission, the process of doing it is part of the strategy. It might be that the ultimate mission of one initiative is to use organic waste as an input to contribute to a better quality of the environment. This mission will be eligible for this framework because this mission is aligned and contributes to the enhancement of circular activities in the city.

Closing loops is a series of learning processes but also of using the adequate technology, logistics and planning processes, quality of the product or service offered, input of waste and output of the end product, publicity measures. This perspective derives from the ecology perspective explained in the theoretical framework. The ecology perspective focuses on the interaction of human activity and the environment. Circular economy is an attempt to change today's production and consumption model to a different one in which waste is designed out and materials are recovered and reincorporated into (economic) activities (Municipality of Amsterdam, 2015). The fact of switching from a linear model to a circular model affects directly the relationship between human activity and the environment. Thus, this perspective is the result of zooming in the ecology perspective into the circular context. This perspective is the closest for achieving closing loops.

Circular economy is about closing loops (AMS, 2015) and reducing waste (Municipality of Amsterdam, 2015) There are a series of processes needed to get to achieve circularity by closing loops. In the case of the initiatives, projects and start-ups questions such as: How much input is needed? How much waste is coming in and coming out? How is the waste being collected? What technology is needed to achieve circularity? What is the impact on the environment? All of these are important to be measured to know the final contribution to the environment through their activities. This contribution to the environment will be translated into circular achievements.

Closing loops is strongly related to cooperation with resources because some of these processes can't be done alone by the organization but needs the cooperation of other stakeholders to achieve them. That's why in the diagram it is located right next to cooperation with resources. So in the closing loops perspective processes that can be excelled internally and are more technical need to be measured.

RESOURCE COOPERATION PERSPECTIVE

According to Rydin (2010), since 1980, systems changed and were no longer completely hierarchical. Since then, citizens and civil society groups have been more and more active in the policy process. There is a policy system in which the formulation and implementation is operated through different networks (Rydin, 2010). These networks are formed by different stakeholders that “provide new ways of legitimacy, release new forms of resources and overcome conflict in novel ways” (Rydin, 2010, p.47). As a result, these networks have enhanced the state’s capacity to identify policy problems and act in a more diffused way (Rydin, 2010).

This perspective is a very important one for achieving circularity in the city. Whether the circular economy approach wants to be applied at a small or larger scale, the approach requires of cooperation from different stakeholders. As it was explained in the results chapter, a circular economy requires for a network of different actors to carry out different processes and activities.

One of the main aspects found in the performance of these initiatives and projects is the need for cooperation. There is no initiative or project that is running without cooperating with other stakeholders. This cooperation might be financial, enabling, generating and sharing knowledge and/or, exchanging waste to reincorporate it in social or economic activities. In this perspective it is important to analyze the different relationships with stakeholders to see what needs to change in order to influence the performance of the initiative/project. If they want to achieve their mission, with whom is it necessary to cooperate? And how?

This perspective is a combination of the economics and politics perspectives from the theoretical framework. While the cooperation and managing of resources was one of the main areas to consider in the economics perspective, the presence of different stakeholders and the way they were steering society was considered under the governance section on the politics perspective. Thus this perspective is the product of the action of cooperating with different resources and materials that were already suggested on the theoretical framework.

In this perspective measures related to what the initiatives, projects and start-ups are doing regarding cooperation will be analyzed and the different networks

can be seen. By doing this, not only could the network be mapped but it is also possible to learn what kind of organic waste streams are being used by what kind of initiatives, projects and start-ups. What are the connections that are already happening in the city and what needs to change in order for them to become stronger?

As it was shown in the results, there are four common ways of cooperating with resources amongst the initiatives, projects and start-ups. The four main ways identified for resource cooperation are: inputs (what others see as waste), financial, education and media.

- Cooperating with inputs¹ looks at the different relationships and streams of exchanging waste. For example how many kilos of waste are being received from each grocery store? How many actors are contributing for exchanging waste?
- Financial cooperation has to do with the amount of funds collected to use in a project. For example how many people are investing in the project? What is the final budget recovered for the project? Are more stakeholders necessary?
- Education cooperation has to do with the different stakeholders that are contributing to generating or sharing knowledge. This can be a two way street. Learning from other people's experiences is also important for the processes. This category is not easy to measure but it is important to take into account. Where can we find the information we need? Or in the case of projects that are giving workshops, how many workshops are we giving? How many people are attending to them? Is the knowledge we are sharing easy to practice in daily bases?
- Media cooperation has to do with how the project is presented in the media and in their internal social media. The first one has to do when they are featured in the media: Are they being featured in magazines? Are they being requested for interviews? Are they setting an example for other cities in the Netherlands? Other countries? And it can also be translated into the internal social media from the project: for example how are we sharing and connecting to people? Blog, website page, videos? How many people are

¹ Since circular economy states that what to one person is waste, to other it may be a valuable resource (Ellen MacArthur Foundation, 2015; Geng et al., 2012; Murray et al., 2015, the word input is used to describe one of the main aspects of cooperation instead of using the word waste).

sharing our project through social media? How many people are watching and sharing our videos?

Just as an interviewee said, the power of cooperation will determine if a project is successful because circular economy is not something that you can achieve by working on your own Community's perspective.

COMMUNITY PERSPECTIVE

For projects and initiatives, the role of the community is a key factor to succeed in closing loops at the local level. But why is the community's perspective so relevant to this framework? To have an impact on a global level, change needs to first come from local communities (Roseland, 2012). Roseland, (2012) even says that it is only at the community level that sustainable development can be demonstrated and after this can it be scaled up. This shows how important what happens at the local level is. So then, what are the elements from the *Community's perspective should be taken into consideration while assessing the performance of the initiatives and projects at a local level?*

The term community refers to “a group of people bound by a geography and with a shared destiny, such as a municipality or a town” (Roseland, 2012, p.12). Communities also play a very important role in a city and even in a country because they can also be seen as laboratories in which policy can be created and local initiatives can serve as examples for national policies and programs (Otto-Zimmerman, 2011 as seen in Roseland, 2012).

In this light communities in Amsterdam are groups of people that are living and/or working in the city and share a common destiny or goals. In Figure 6, it can be seen that the community perspective is placed to the right of the strategy. This is a new perspective that is introduced in this final framework. The community's perspective derives from the culture perspective because it has to do with the society and its role for holding life in common. This framework includes the community on the framework because they have a role in achieving circularity in their neighborhoods, which impacts the city as a whole.

In the case of projects and initiatives, the local community is not only enjoying the final outcome but is also working to get it. When a project or initiative is developed the targeted community is important to be considered. What is the

target community to involve? What is this project or initiative doing for the community? In the case of start-ups this is still different because what start-ups do is offer a final service/product to customers while setting an example to customers and community. In the case of start-ups, this perspective should be focused on customers as well as on the community.

The question that Niven, (2003) proposes to choose the measures for the customer perspective is “What do our customers demand or expect from us?” (p.191). The question proposed for this framework is: “What is the community receiving from the projects? Or what is being offered to the community?” Instead of seeing the community as a customer and someone that demands something, the initiative, project, or start-up -up is seen as something that is giving something back to the community without the community demanding it.

Based on the information collected, the measures to be considered in the community’s perspective are:

- Bringing together and engaging people. Are people being connected to each other? Is there a strong community feeling? Are people engaging in the project or initiative? How many people is the project reaching? One of the main factors of success in a local project is if people are getting to know each other and working together (Brouwer, 2016).
- Inclusive projects. Who is the project targeting and including? Is it viable and accessible for everyone to join the project? Inclusion of people is a matter of success. Because for example if you are offering a product that is too expensive, who will be able to afford it? (Bensch, 2016). Sometimes projects just need to be open and include people on the neighborhood to succeed as a project (see Cascoland).
- Giving something back to the community. What is the project giving back to the community? How is the project constructing and investing in the community? What is this project doing to contribute to make a more livable neighborhood? Examples of how to give back something to the community, giving instructions and teaching people, giving away still edible food that’s considered waste, investing in the streets so they look nicer for the neighborhoods, cooking for the neighborhood and offering a local product to support local producers.

AWARENESS AND BEHAVIORAL CHANGE PERSPECTIVE

One of the things that was noticed in the projects and initiatives is that applying the approach of circular economy is still new but it's growing in the city. This has to do with the fact that, right now, one of the things that is most needed to change in the current system is awareness which needs to be translated into change of attitude and behavior (Koole, 2016).

In this perspective the processes that are leading to the generation of awareness and change in practices should be analyzed. This is needed to move towards reaching the mission. For example, if a project wants to separate organic to make compost: are people doing it in the correct way? If they are not, what needs to be changed so people understand what they have to do and do it? Once that the awareness and behavioral change perspective is stable, this perspective might not be necessary anymore. But for circular economy, practices need to be adjusted and changed because people need to change their mentality and their habits.

In the case of the start-ups, it might seem that creating awareness is not crucial for them to be successful. But it actually is. If people are not aware of the environmental problems been faced, how are they going to support the start-up that is doing something to minimize these problems? Why would a customer purchase their product? On the other hand, awareness might be one of the by-products because if people are choosing this particular service or product that involves closing loops, people might learn from it and change their habits. Either way, awareness is playing a role in the customer's decision making.

This perspective represents what today is needed for initiatives and projects that involve citizens to achieve circularity. This might be completely different in the future. Maybe ten years from now people have already changed their practices and are aware of the waste problem. But today the change of practices is needed to collect waste so it can be up-scaled. It is something related to education and culture that might change in the future. This perspective derives from the culture perspective presented in the theoretical framework. The cultural domain looks at the social practices and discourses that contribute to this life held in common (Scerri & James, 2009). Circular economy requires changes in social practices. These projects and initiatives are calling out citizens to get involved and participate in this new practice that is eventually changing every day practices.

What is important to measure on this perspective is the amount of people involved and being reached by the project. How many people are participating on the project? Are people separating waste correctly? How many people has the project reached? What are the processes needed to generate awareness and behavioral change? How is the initiative helping on the creation of awareness?

This is a very difficult perspective to measure, but it is necessary for now, to take it into consideration. If circularity is indeed one goal to achieve as a city in the coming years (Municipality of Amsterdam, 2015), the creation of awareness among citizens is crucial today. That's why if it's something that right now can be created, in the future this perspective might not be necessary to measure. To measure this perspective surveys among customers and participants could be directed.

5.1.5 MEASURING THE FOUR PERSPECTIVES

Based on what was presented in the results and discussed in each of the perspectives, Table 4 shows the criteria for measuring the perspectives as well as some measures considered important with some examples. Some examples from the data collected are given just to illustrate the kind of processes that could be used to measure the perspectives. It is important to have in mind that these are only examples and that for the table to be complete it would require actual number for all the categories.

Table 4. Criteria for measuring the performance of circular initiatives, projects and start-ups

| Criteria for measuring the perspectives | Examples of measures for evaluating | Examples from the initiatives, projects and start-ups that were interviewed |
|---|--|--|
| Closing loops | | |
| 1. Waste | <ul style="list-style-type: none"> Amount of waste being upcycled. From the amount of waste that is received how many kilos are upcycled. Add a timeframe: Weekly, monthly, yearly | TBYW is saving about 250 Kg per week |
| 2. Technology and innovation | <ul style="list-style-type: none"> Having the adequate technology Contributing to innovation | For example, Gascoland and Wasted mentioned that in order to be operating they first needed to have the adequate technology. This required of investment of course, but once they had it they could start upcycling waste. |

| | | |
|---|---|--|
| 3. Production, collection, distribution and transportation | <ul style="list-style-type: none"> • Transportation used for collecting, distributing • Emissions from transport • Emissions from production process • Packaging | <ul style="list-style-type: none"> • TBYW only uses bikes for collecting and distributing so they do not generate emissions • The Dutch weed burger mentioned that using biodegradable packaging is too expensive for them to use |
| 4. Final product or service | <ul style="list-style-type: none"> • Quality of the product or service • Does it require labeling/certificate to be commercialized? • Is it legal to sell to commercialize the product? | <ul style="list-style-type: none"> • InStock uses waste food from the supermarket to make the meals from the restaurant. They still have to take care of offering good quality food. • Buurtcompostereren cannot sell their compost because even though it seems like the compost being produced has excellent quality in order to sell them, they need to get certified and have their compost tested • Even though Localwise is working on composting human manure, they are not able to sell it because it is not legal to commercialize this type of compost. |
| Resource cooperation | | |
| 1. Input | Amount of kilos that are being received from the different stakeholders. | TBYW is receiving 250 kilos of waste food from different partners. How many partners? |
| 2. Financial | The amount of money received from the partners | Wasted mentioned that they have been funded by the Municipality , a bank and philanthropic NGO |
| 3. Education | <ul style="list-style-type: none"> • Meetings established for educational purposes • Amount of people that have required the educational services from the projects • Material provided to teach/learn | |
| 4. Media | <ul style="list-style-type: none"> • Times a promotional video has been watched • Times that the project has been featured in a magazine, newspaper, radio, tv. | <ul style="list-style-type: none"> • InStock has been mentioned in an international magazine at least once • Buurtcompostereren and containing mushrooms have been featured in the local news. |
| Community | | |
| 1. Bringing together and engaging people | <ul style="list-style-type: none"> • Number of people that know each other since the project started. • Sense/feeling of community | In the project Buurtcompostereren the founder went from knowing five people from his street to knowing 23 families through the project. The next thing to know would be if it is the same for the other families that are participating |

| | | |
|---|--|---|
| 2. Inclusive projects | Social diversity | In the project Gascoland, it was mentioned that the project has been successful because of the involvement of the Muslim community and at the same time it was helping foreign women living in the neighborhood. The next thing to answer would be how many nationalities are participating in the project. |
| 3. Giving something back to the community | What is the project giving back to the community? | In Buurtcomposter, compost from the project is being used for the trees and flowers from the street. The next step will be to know how many kilos from the compost are being used on public spaces. |
| 4. People involved/participating | Amount of people that are actively participating | Buurtcomposter said that there are 23 people involved at the moment. Next thing to do is to know how many people are on the street in order to know the percentage of participants based on the total number of residents from that street. |
| Awareness and behavioral practices | | |
| 1. Change of habits within participants | Amount of people that have changed their habits since they joined the project | |
| 2. People separating waste featured in the project | <ul style="list-style-type: none"> • Amount of people that are separating their organic waste • Amount of people that are upcycling their organic waste | |
| 3. People separating more streams of waste | Amount of people that are separating more than one stream of waste | What Buurtcomposter and Wasted have seen is that once that a person starts separating one waste stream, they start separating more streams. |
| 4. People knowing about the project | <ul style="list-style-type: none"> • People attending to events • People reading their material (blogs/websites) • People watching their videos | <ul style="list-style-type: none"> • 25 people attended the TBYW weekly dinner on May 18, 2016 • The wormhotel had about 150,000 views of their video |

Summing up, this chapter introduced the final framework for evaluating the performance of inclusive circular initiatives, projects and start-ups. It features a diagram and explains the different perspectives and how these may vary from initiatives and start-ups. The last section shows an example of how the input, output and outcome measures can be combined and used to measure and determine the strategy for achieving the mission. As it can be seen the awareness and behavioral change becomes the hardest to measure and that is why it focuses on the amount of people involved before and after a certain period of time.

6. Discussion

In the following section the discussion is elaborated. In the first section a discussion on the limitations of the thesis is presented. Following, a critical discussion on the theories used for this thesis will be presented. Then the relevance of the framework to today's situation on Amsterdam is introduced. To close the discussion, the successful case of glass recycling in the Netherlands is introduced as an empirical example on the arguments that make up the perspectives on the framework.

6.1 Limitations

A framework for AMS to measure the performance of circular initiatives, projects and start-ups in the city of Amsterdam was elaborated based on the data collected during this thesis research. Fourteen semi-structured interviews were conducted with initiatives, projects and start-ups. Upon the data collected from these interviews, were the criteria and measures formulated. Although accurate and real information was obtained from the interviews, fourteen is still a relative small number of projects in a city. There is no knowledge on how many circular projects there are in the city of Amsterdam. Thus these fourteen projects are just a sample of a bigger number that is not known.

Because this is a master's thesis the time for collecting data was around six weeks. Which also influences the size of the sample. If this were to be bigger and longer research project, more people could have been interviewed and more data could have been analyzed.

This framework is intended to be for organic flows. Thus if it would be wanted to be used for inclusive projects with different material flows the framework may slightly change.

An important limitation can be attributed to the use of the framework. The framework has not being tested and inconsistencies might be found if the framework will be used. The measuring of the social measures especially in the awareness and limitations perspective become challenging and might end up being not very

accurate. But, even though the framework has not been used, it presents the three main areas for start-ups and the four main areas for initiatives and projects to be considered while wanting to be measured to evaluate their performance. The criteria are presented but in practice some perspectives or categories might have to be modified. This framework serves as a base and guide for measuring the performance of the initiatives, but it is not until being put into practice that the inconsistencies can be spotted and the framework could be further modified and developed.

6.2 Discussion of the framework

In the following section different aspects from the framework will be discussed. First a critique and discussion on the theories used and on the final framework will be presented. Then, the relevance of having an inclusive circular framework in today's context will be discussed.

6.2.1 THE CIRCLES OF SUSTAINABILITY APPROACH

As explained in chapter 2, the circles of sustainability approach is an assessment model that treats sustainability under four main domains which are seen as social (Scerri & James, 2009). This approach has been applied to different cities around the world (James, 2015). The results have proved that this approach can be applied and give interesting data regarding the sustainability of a city (James, 2015). The approach proposes seven categories under each domain to be measured. Each category has subcategories for more specific measurements.

Overall this is a good and interesting approach. The fact of changing how sustainability is conceived is revolutionary and challenging. One of the main contributions of this approach is the fact that sustainability is conceived as a whole as social and it provides a new way of perceiving the meaning of ecology, economics, politics and culture on everyday life. It is a fresh approach that has potential of being used.

While applying this approach to this thesis one of the main obstacles that came across was the broadness of the approach applied to local circular projects. This might be because this approach is meant for cities and make assessment at a city scale rather than at a neighborhood scale. Also the fact that there are so many categories might fall into what was discussed in the previous section regarding the BSC. Too many choices might make the tool confusing and not successful while using.

6.2.2 GOVERNANCE

Governance is an important theory to consider this framework for measuring the performance of inclusive circular projects, because the word governance comes from the Greek verb *kubernan* which means to pilot or to steer. This term led to the Latin term *gubernare* which also means piloting, rule-making, steering (Kjær, 2004)

Nowadays the state is not the only one in charge of steering the society. Switching from governing to governance has implied the “recognition that governance processes also typify regional, urban and other local scales too” (Rydin, 2010, p.52). This recognition has led to the transformation of city governments “into an overlapping patchwork of networks and partnerships” (Rydin, 2010, p.52) which engages the private sector and community organizations.

The projects and initiatives are somehow helping on this process of steering the society. None of the projects are breaking the rules but are acting sometimes independently or in collaboration with the municipality to experiment and impact their neighborhood. This urban governance is associated to achieving urban sustainability because of the building of local networks which involves a wide range of actors including local communities (Rydin, 2010).

Projects are educating citizens by giving workshops at schools, non-profit organizations are financing projects so they can operate, different stakeholders are collaborating to reach the same goal and some of these projects have been able to penetrate the system and infiltrate to have an impact at a larger scale. As it was shown in the results some projects are even challenging the actual system by rethinking and proposing a change in some regulations and laws. They are contributing to the institutional change and how the rules are being set and implemented (Kjær, 2004). This is why it is worth looking at what local projects are doing and consider them in this transition towards a circular Amsterdam.

6.2.3 THE BALANCED SCORECARD APPROACH AND THE FRAMEWORK FOR LOCAL CIRCULAR INITIATIVES, PROJECTS AND START-UPS

The BSC is a framework used within companies and some non-profit organizations to align the strategy of the company to its mission and develop measures to achieve

it. There are some limitations for the BSC that have been debated by different authors and are presented by Zeng & Luo, (2013) The limitations that apply to the framework developed throughout this research such as ambiguous validity of the cause-effect relationship, common measure bias and obese measure are discussed.

AMBIGUOUS VALIDITY OF THE CAUSE-EFFECT RELATIONSHIP

This limitation is based on the argument that in the BSC there are no cause-effect relationships (Nørreklit, 2000) being one of the reasons why organizations have failed to establish causality among the perspectives (Ittner & Larcker, 2003). Another argument that Zeng & Luo (2013) discuss is that non-financial measures are often not the drivers of financial measures. In studies it has been seen that the change in the other three perspectives do not necessarily affect the financial perspective (Neely, n.d.)

Let's first discuss the relevance of the financial perspective and why this perspective is not presented in the framework for circular initiatives, projects and start-ups as a perspective but as a part of another perspective. For a company, the financial perspective is set at the top because it is one of the most important perspectives (Niven, 2003). For a non-profit organization it is placed at the left side from the strategy and the customer is moved to the top.

Instead of dedicating an entire perspective to the financial aspects just as the BSC suggests, the financial activity is incorporated into the framework under a broader perspective, which is resource cooperation. Although projects and initiatives do need cooperating with other stakeholders to get funding to begin and keep operating, their main mission however is not making big financial gains. The case of the start-ups is different because they do look to make profit, but most of them in the beginning rely on external investments to begin operating and later on keep operating with their own profit. Thus, getting funding is essential and relays on the participation of external actors but in circular economy, waste is essential and also relays on other actors. Circular economy is all about giving value to waste and transform/upscale it into an important resource that will contribute to economic activity. This is represented in the closing loops perspective, which is placed right under the mission. But in order to achieve closing loops, resources, both financial and waste, are essential.

The second part of this argument makes reference to the cause-effect relationship validity. According to (Ittner & Larcker, 2003) this happens because when using a regular BSC, companies cannot prove basic causality which leads to not being able to choose the adequate measures. The framework for circular initiatives, projects and start-ups, would need to be tested in order to see if cause-effect relationships are actually well established. There are some relationships that in theory would be causal but in practice might not be such as: if more waste is collected and one has the sufficient technology, then more waste would be up-scaled and the impact on the environment would be better. That is why in order to prove the causality, Ittner & Larcker (2003) suggest that hypothesis need to be developed and then tested.

COMMON MEASURE BIAS

This limitation has to do with the finding that not all perspectives are treated equally during the evaluation process. As it has been mentioned in this section, the framework has not been tested. Thus, this argument cannot be supported empirically. But as it was mentioned in chapter 5 there are some perspectives that are closer to the mission and some other that are more of a conditional character. This does show a difference of importance between the perspectives. Also in the measurement, some perspectives such as the closing loops and cooperation of resources are easier to measure rather than the awareness and behavioral change due to the root of the quantitative and qualitative character of the measurements. Although for the social aspects there is an attempt of translating the qualitative character into quantitative, there is a possibility that in practice there might be some inconsistencies in the results. Unlike what commonly is done by the organizations which is the simplification of performance measurement and relying on common measures (financial measures), and ignoring the non-financial measures (Zeng & Luo, 2013), this framework has attempted to incorporate these non-financial measures.

AN OBESE MEASURE

The obese characteristic makes reference to the amount of measurements that the BSC proposes. The large amount of measurements makes the BSC complex and unstructured (Dilla & Steinbart, 2005). The static problem makes reference that the BSC cannot solve the time lag problem (Veen-Dirks & Wijn, 2003). In the framework the set of criteria is of four, which are referred as four

perspectives. These four perspectives each have sub-categories, which can be translated into indicators or measures. For each perspective there is a set of three to four measures suggested. These measures or indicators can be modified depending on the specific research aim. Zeng & Luo (2013) argue that too many measures might make the BSC unsuccessful because of the variety of choices. This could be a limitation to the framework for circular projects. But if there is a huge overlap when the framework is being implemented, there might be room for change. And this is the advantage of this framework. It is not fixed and the measures can be further tailored depending on the research aim. And as it was suggested in the previous chapter the perspective of awareness and behavioral change might not even be necessary for start-ups. If these extra categories are not necessary, then there can be room for customizing each perspective to what the organization needs or the research aim. For example in this case AMS, they could decide which criteria are necessary for them to measure among the different initiatives.

Summing up, it can be seen that the BSC has some limitations when it comes to be used by companies or organizations. Although these limitations apply to the BSC approach, some of them do not apply to the framework elaborated and presented on this thesis. The discussion on the limitations to the BSC framework gave room for analyzing on that light the framework elaborated for this thesis. It also helped to suggest some challenges and limitations that if put in practice, the framework for measuring the performance of inclusive circular projects might face.

Overall the theory used and applied to the framework for inclusive circular projects suited the research aim. As it was discussed there are some limitations especially regarding the validity of the framework attributed to not having tested the framework. In spite of this, the framework provides a set of criteria that is based on empirical knowledge that can help and serve as a guide when wanting to evaluate the performance of inclusive circular initiative, projects and start-ups.

6.3 Towards a circular Amsterdam: a relevant framework

The Circular Amsterdam (2015) is a document developed by Circle Economy, Fabric TNO and the Gemeente (municipality) of Amsterdam that develops a vision for creating two circular chains in the city of Amsterdam. These chains are on construction industry and organic residual streams. Just as in the framework

presented on this thesis, results were partially elaborated based on conversations with experts and stakeholders. This confirms the relevance of involving experts in the process of developing a framework.

Regarding organic flows, there are four main strategies developed for the region to achieve the vision which local initiatives and innovative markets (p.48). The four strategies are: central hub for bio refinery, separation and return logistics, cascading of organic streams and recovery of nutrients (Circle Economy et al., 2016). The three action points proposed on this document have to do with the role of the municipality and its relationships with different stakeholders. One of the challenges this document acknowledges is the determination of a strategy to measure circularity (Circle Economy et al., 2016).

This Circle economy's framework focuses on measuring circularity in the city. This framework as well as the framework proposed in this thesis, consists of quantitative and qualitative data for measuring circularity in the city. They propose measuring the ecological impact, economic interest, potential for value retention and transition potential. All except the potential of value retention are somehow incorporated in the framework presented in this thesis. The word somehow is used because they are not exactly the same.

The frameworks' focus is different from each other. The circle economy framework focuses at a city level and the framework proposed on this thesis focuses at a neighborhood level. Also, while the framework from Circle economy is focusing mostly in the ecological impact, the framework presented in this thesis is taking an approach that sees sustainability as a social domain and apply it at a local (neighborhood) scale. This is precisely what the document published by Circle Economy is lacking on. The social indicators are mentioned little in compared to the ecological indicators and the framework is a macroeconomic framework that has tendency to focus on the role of the industry and the ecological impact of economic activity. Once again the role of small projects and start-ups are not mentioned in their results from their measurements.

If communities are indeed places to experiment (Roseland, 2012) and their projects are starting to be so important that, just as the data collection mentioned, the municipality is even looking to up-scale them, they need to be considered in this transition to circularity. That is what this framework offers: looking beyond the city scale and taking one step further by zooming into these small places inside

the city/region that are experimenting with circularity while having an impact on the local neighborhood. This impact could be later translated into impact at a city level. Measurements for the different circular activities in a city are needed and one should not be undermining the other one but rather complementing it.

6.4 An historical case that supports the framework

The framework and the set of criteria along with the measures that are presented, show what is key for initiatives, projects and start-ups to walk towards reaching circularity. The framework not only is relevant for initiatives and research institutions such as AMS and/or policy makers, but it is a communication tool that connects, in this case AMS to the initiatives and projects in the city, and invites them to collaborate and work together.

The framework emphasizes the need for reducing and reusing waste (closing loops), the need for stakeholders to get involved and cooperate towards reaching closing loops together (resource cooperation), the necessity of involving the community especially for initiatives and projects, and the need for generating awareness within the society. These four perspectives determine the performance of an initiative and could also be used besides evaluating the current situation, as a guideline for developing and designing future activities to reach their mission. But some of these activities have been present in the past and have helped demonstrating that they are key for succeeding in reaching a specific goal. Following an example of how these activities/perspectives were present in a historical episode in the Netherlands.

In the 70s two Dutch concerned women started in Zeist a glass recycling movement that later on became the basis for glass recycling in the entire country. But how is this story relevant to this thesis? Well because what started as a bottom-up initiative was able to penetrate and change an entire nation's waste management system. According to Oldenziel & Veenis (2013) there were three key factors that led this initiative to success:

1. Referring to the issue as personal ethics (p.473). By doing this these women stimulated people to contribute so they would no longer feel guilty or bad about generating waste, but instead feel relieved that waste was being reused. This led to a new policy known as 'sensible saving'.

2. In closing the recycling cycle they involved key stakeholders such as local authorities, business players and women volunteers” (p.473).
3. The glass industry was facing a problem with the rising of costs so they were interested on reusing glass waste as an alternative (p.473).

These three key elements can also be translated into today’s context on circular economy and are actually very relevant to the framework presented in the previous section. The glass recycling initiative’s success factors are somehow represented in the framework for measuring the performance of circular initiatives, projects and start-ups presented in this thesis research.

The first key factor makes reference to changing daily practices and behavior by changing how people see an activity and making this activity personal. In other words this initiative succeeded because it was able to involve and make citizens participate by making the general glass waste problem also their personal problem. So it was no longer about generating awareness on the environmental problem of waste, but it was about generating awareness on how this problem could be changed and influenced by their daily actions and how their contribution actually mattered. In the framework presented in chapter 4, the awareness perspective is present because today’s circular projects are realizing that this is a key factor to achieve closing cycles. Just as generating awareness was important in 1972 for enhancing glass recycling, it is still important today for achieving circularity. Creating an environmental responsibility is key to achieve circularity.

The second key factor mentioned, was the involvement and cooperation with key stakeholders. This article proves that closing cycles requires of the participation of different stakeholders. Just as several interviewees stated cooperation with other stakeholders is key to achieve circularity. This key factor is represented in the framework in the cooperation with resources perspective. In this perspective, the cooperation between different actors for getting and exchanging resources is analyzed and measured. Again, just as cooperation and participation of different stakeholders was key for achieving closing a cycle four decades ago, it is key today to closing loops.

And finally the third key factor makes reference to the problem of rising costs for the glass industry. This specific key factor is not measured in the presented framework. But it does not mean that is not similar to today’s situation. One of the

main reasons for circular economy to be enhanced today is the future problem of resource scarcity. This scarcity will be the result of the increasing demand triggered by population growth and the finite supply of resources that will also lead to price fluctuations (Circle Economy et al., 2016). That is why Amsterdam has already started to prepare for this set of events. So while reviewing today's literature, the fact that finite resources are not taken as granted for the future and the fear of fluctuations on prices are leading governments to acting today.

One last contribution that this article makes to the today's situation is the notion that circular economy is something new, hot and trendy. In the Sustainable Amsterdam (2014) document it is even mentioned that the Netherlands is seen a circular hotspot and that the area of Amsterdam wants to become the front-runner in circularity (Circle Economy et al., 2016). This article argues that the idea of recycling and reusing old materials within the industry was adopted already before in the Netherlands while the German occupation during the Second World War. Because of big shortages during the war, the government decided to promote thrift among the citizens. The German model imposed, while they were occupying Western countries, was based on this idea of reusing and recycling absolutely everything that was possible. This was merely because Germany wanted economic independence and this required the provision of resources. Germans instructed housewives on how to separate materials and preserve them so later they could collect them and reuse them and reincorporate them into different industries. All materials were reused: metals, paper, new materials, old materials, food waste was collected for feeding dairy cattle and even human hair was collected for trading (Oldenziel & Veenis, 2013). Actually one way in which Dutch citizens began to oppose the Germans was by refusing to recycle materials. This led to citizens starting to learn and reuse the materials for their own consumption instead of giving them to the Germans. What they started practicing in their daily lives was the idea of "nothing could go to waste" (Oldenziel & Veenis, 2013, p. 469).

This historical stage that shows that in times of scarcity people tend to appreciate more what they have and add value to whatever they have. It might seem that that people tend to look for (new) alternatives while living desperate moments. The idea of reincorporating waste to biological and technical cycles is not a new practice in this country. In fact, it was a 'must' or 'survival' practice eighty years ago. Today there is environmental pressure to act. People are not waiting to follow and do what they are being told to, but citizens are starting to assume their

responsibility and act to change the world they are living in. There is a calling for a culture of thrift and reuse, and based on the plans of the municipality of Amsterdam and other stakeholders, it seems that this time is here to stay.

7. Conclusions

The main objective of this thesis was to develop a consistent framework for AMS that would be represented by a set of criteria to evaluate the performance of inclusive circular initiatives projects and start-ups in the city of Amsterdam. This framework was elaborated for AMS institute because there is a growing interest from this research institute on circularity, but this framework could be used by other research institutions or organizations. The circular economy approach has been set as one of the main goals regarding sustainability to achieve in the coming years in the city of Amsterdam (Municipality of Amsterdam, 2015). This opens doors for cooperation between different stakeholders, and the creation of public-private partnerships.

To answer the main research question: *what are the criteria needed to assess and communicate the performance of the initiatives, projects and/or startups in the city of Amsterdam in moving towards a circular economy?* looking back at the analyzed data and the framework elaborated in chapter 5 is essential. After analyzing the information obtained from the interviews, a set of criteria for measuring the performance of local circular initiatives, projects and start-ups, was proposed. These criteria is formed by four perspectives, which are: closing loops, resource cooperation, community, and awareness and behavioral change. These perspectives are relevant to today's situation in the Amsterdam region. Thus if there is an interest to measure the local projects, these four main perspectives or categories need to be taken into consideration. By using the framework elaborated in chapter 5 and measuring the perspectives, it is also possible to communicate the results within different groups of stakeholders. The framework could be used in such a way that once that the results are obtained they can be easily communicated to other people by using the exact same diagram that was shown in chapter 5.

To answer the first sub-research question: *What are the key indicators/ measures needed to evaluate the performance of inclusive circular projects at a neighborhood scale in in the city of Amsterdam?*, reviewing table 4 is necessary. The framework that was elaborated suggests possible measures to be used in order to measure the performance of local circular initiatives, projects and start-ups. These measures

are proposed based on the information collected. The table also attempts to show examples of answers to these measures that were mentioned throughout the interviews. It must however be tested to see if the criteria is indeed consistent and valid.

Regarding the second sub-research question: *how can the criteria be brought together in a consistent and understandable framework?*, it will be necessary to look at the process of elaborating the framework. First, the theory selected was essential to have a good base to begin the research. The Balanced Scorecard together with the Circles of Sustainability approach, were key components since the beginning. They did not only help to set the theoretical framework but also helped to operationalize concepts and elaborate the questionnaire. Second, the information obtained from the participants was crucial for defining the perspectives but also to narrow the perspectives down. If the framework from chapter 2 is compared to the framework presented in chapter 5, it can be seen that the second framework is more specific and tailored to what the current situation in Amsterdam is. And third, elaborating a simple and understandable diagram helps to visualize and put together the framework.

Because citizens have already started with different initiatives, projects and start-ups that contribute to circularity, this thesis proposes the need for measuring their performance regarding closing loops. This is necessary for recognition on their efforts in reaching the transformation into a circular city goal. It is not only the task of the municipality to transform the city but also from its citizens. And today, in Amsterdam this has become a reality. A combination of different stakeholders, including small initiatives, projects and start-ups, are partnering to work on a common goal. One of the conclusions that can be made is that the community is helping in this steering of society towards specific goals. Networks and partnerships are being created for reaching shared goals. But besides recognizing their role, by measuring the performance of the active and current projects, there can be room for reproducing and up-scaling some of these projects to contribute to the transformation of the city into a circular one.

Just as the example discussed on the glass recycling containers, there is power through bottom-up initiatives that are able to tackle a common problem by involving the community. And this power does not end at the local level, but once in while they are able to change the entire country's system.

8. Recommendations

After presenting and discussing the framework, in this section some recommendations on how to use the framework in future research are suggested.

SPECIFIC MEASURES

The first recommendation is to select or develop specific measures that suit the particular interests of the researcher. By doing this, more accurate and relevant results could be obtained. Also, once that the measures are selected it would be possible to decide if the framework would be applied to individual projects and give them their results and use them for research; or decide if a comparison between the different projects will be made. If so, a scale to score would need to be elaborated and assigned to the measurements from the projects to compare the scores.

COMMUNICATE THE RESULTS TO HELP THE ONE THAT IS BEEN EVALUATED TO REACH THE MISSION

This framework is not meant to be exclusively for the use of AMS. It was elaborated thinking of their role as a research institute and as promoters of seeing the city as a laboratory in which different groups of people can experiment and learn from it. This framework could be used by other platform groups or even by an individual project. One of the most interesting and valuable features of conducting the performance measurement is that it can be communicated whether a project is indeed moving towards reaching their goal or not. One recommendation for using the results from this framework is to communicate the outcome to the different stakeholders involved.

By having this information, future decisions can be made in order to change their strategy. The fact that people were open and willing to collaborate on this research shows that they are interested in the topic. If performance evaluation is conducted, the projects involved can get feedback on their performance and can individually evaluate themselves and decide on what to change in order to improve their performance.

RECOMMENDATIONS FOR AMS

AMS is a research institute that works on developing an understanding of the city and designs solutions for the challenges regarding the themes of: water, energy, waste, food, and data and mobility (AMS, 2014). AMS acknowledges the need for cooperation between knowledge institutes, companies, cities and citizens.

By using this framework for evaluating the performance of circular economy initiatives and projects, AMS could:

- Get an insight on what these initiatives and projects are doing well and achieving, so this can be reproduced and up-scaled in other areas and projects in the city.
- Connect and enhance cooperation between different stakeholders.
- Be aware of where in the city flows are being altered by circularity. It could be that if they are aware of the initiative in the city they can later map this information and locate where in the city are circular activities been realized? For example in this neighborhood, along the street organic waste is being collected and compost is being made. Where is this compost going inside the city?
- Detect and decide on funding for research that could not only benefit the initiatives and projects but also more people in the city. For example if some initiative are having problems in achieving their mission, because the regulations are affecting directly their strategy, they can conduct research and because of the strong connection between AMS and the municipality, try to find solutions to this particular obstacle.
- Get an insight of the challenges that citizens are facing in achieving circularity. These challenges might not be exclusive for a particular initiative or project, but it might be what more stakeholders are facing in the city.

UPSCALING

Some of these initiatives are working on up-scaling. An example of this is Buurtcomposter. Because this initiative was so well received and executed, civil servants who noticed this success are planning on up-scaling this idea and make a pilot project in Amsterdam East. For example, by using this framework it would help the initiative to develop a clear mission and strategy, think of what they could change before up-scaling. Once that they would measure its performance, they could realize what they would do the same and what they would change for the next project. That's why awareness and behavioral change is so important. In 10 years when people will want to measure and evaluate the performance of initiatives and projects, this perspective will probably be different. Hopefully in 10 years from now, people will have developed a sense of responsibility for waste and designing out waste will be part of daily activities.

According to some of the interviewees, awareness that will lead to the right change in attitude and practices is needed. Creating this sense of responsibility is necessary before up-scaling a project and dragging more people into it and managing more inputs and outputs. Because how would you communicate to the people what the objective is? How will you make sure they will separate food correctly? How are you going to communicate which stakeholders are participating and funding this project? Are they going to participate if the municipality is managing the final output?

If this framework is applied to an initiative they could also track down the learning points and adjust the strategy for future projects. For example: roles of different stakeholders could be analyzed to decide on whom to partner up for next projects. And maybe not even to decide which stakeholders would be nice to include, but which actors are essential to include and to develop a relationship with, e.g. the municipality. In cooperation, financial support can also be detected. Which partners have given money for this project? Would they be willing to sponsor a larger project?

As it was mentioned in the discussion, for this framework to be validated and especially to acknowledge the causal relationships, the framework would need to be tested. After being tested, further changes could be made to make the framework more precise and consistent.

Future research

As it was seen during the data collection phase circularity is still a new approach that is being applied and since most of the projects are pioneers, they still have a lot to learn. Future research can focus on the success factors of local and inclusive circular projects at a city level. Research can also be conducted on the obstacles and challenges that are been faced by the projects. By looking at the obstacles presented in chapter five, some aspects can be further researched with the aim of overcoming the barriers that today these projects are facing and make it more realistic to move towards a sustainable Amsterdam in which circularity plays an important role.

Another important research that can be conducted in the future is the role that these projects are having at a city level and even at a national or international scale in this move towards reaching circularity. For example, Taste before you Waste started in Amsterdam and the initiative has been copied in another three Dutch cities and soon will go international; Buurtcomposteren started in a street in Amsterdam East and right now there are plans of reproducing this initiative in other neighborhoods in the city of Amsterdam; Restaurant Instock has already been featured in international media. These examples show that there is potential of researching not only the role, but also the impact that these projects have at local, national and international scale.

And last but not least is to research the importance of these initiatives in changing the rules. Some examples given in this research show that bottom-up initiatives are able to penetrate the policy system at different levels. How and why are these local circular initiatives influencing from the bottom to the top is a topic that could continue to be researched.

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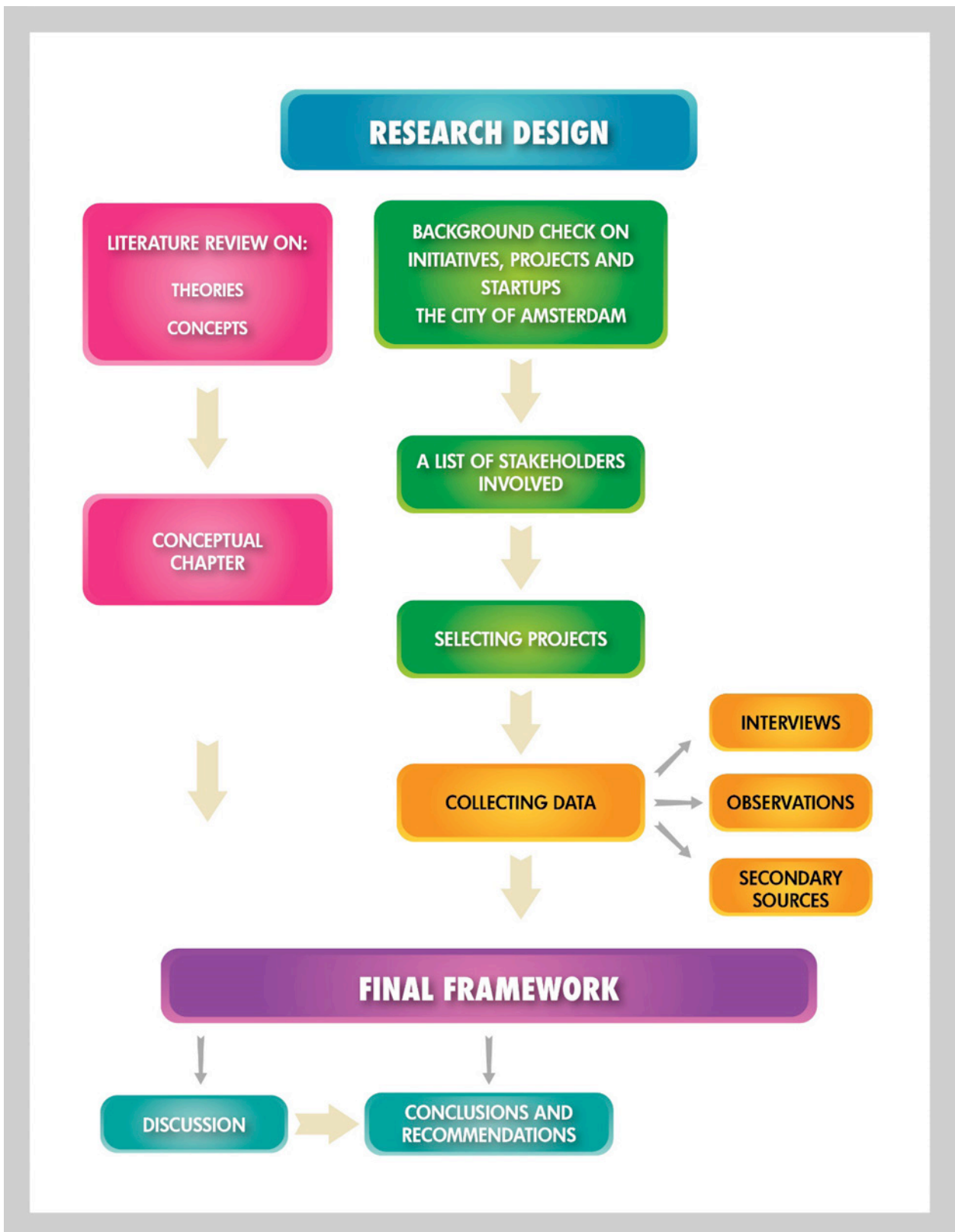
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Appendix I. Research design



Appendix II. Questionnaire for interviews

Time of interview:

Place

Date:

Interviewee:

Position of interviewee (functions/tasks): Owner of Dutch weed burger

Ranking exercise:

1. Could you please, tell me about how did the idea start?
2. How is related to citizen participation?
3. Follow up: How is it related to other actors? E.g. local government, private actors, foundations?
4. How does this initiative/project/start-up contribute to circularity?
5. Do you think helps to define the city's identity and citizen engagement?
6. Would you consider the as contributing and enhancing circularity in the city?
7. What have been the challenges to overcome in achieving circularity?
8. Would you say there are external (public-private actors) that have helped to achieve/contribute to circularity?
9. Do you consider this project/initiative/start-up successful in achieving circularity? Is it closing loops? Why or why not?
10. According to you and your experience what elements would you consider as crucial for evaluating your project/initiative/start-up in terms of circularity?

Appendix III. Ranking exercise for interviewees

Please rank the following statements. 1 being the most important and 5 being the least important

The circular initiatives/projects/start-ups should:

_____ **contribute to a better quality of the environment.** There is no waste and no emissions. The biological nutrients are not toxic and can safely re-enter the biosphere. Damages are reduced regarding food and mobility. Externalities are managed regarding land use, air, waste, noise pollution and release of toxic substances. E.g. the initiative/project start-up minimizes the quantity of extraction of natural resources which also helps minimizing emissions.

_____ **contribute to participation of different stakeholders.** It promotes the involvement and participation of public-private partners. Information is shared and exchanged between different actors which are walking towards the same goal. E.g. the initiatives/projects and start-ups serve as platforms in which different groups of people get together to share ideas and common goals/interests.

_____ **enhance participation of the community and neighbors.** It brings together locals to work together and reach for common goals in order to make the neighborhood a better place to live in. Citizens become aware of the struggles and challenges that the community and environment are facing and change their behavior in order to have a positive impact on them.

_____ **contribute to an economy** in which lower losses make the system more efficient and create an optimal usage of resources, and creates new business opportunities and economic activities in the city. Waste is designed out. Technologies and processes use renewable or better performance sources. Products are leased, rented or shared when possible. There is a need to think in systems (connect systems). Prices are transparent and take into account externalities. Contribute to having diverse business models.

_____ **contribute to enhancing culture and defining the city's identity.** Damages are reduced to areas such as: mobility, shelter, education, health and entertainment. The project/initiative and/or start-up helps defining the

city's identity as a circular city and/or resilient city. It also promotes art and culture among the citizens. E.g. by giving workshops about urban agriculture, people start growing their own vegetables which reduces transport from other cities, contributes to better health from citizens and makes the city look more beautiful.