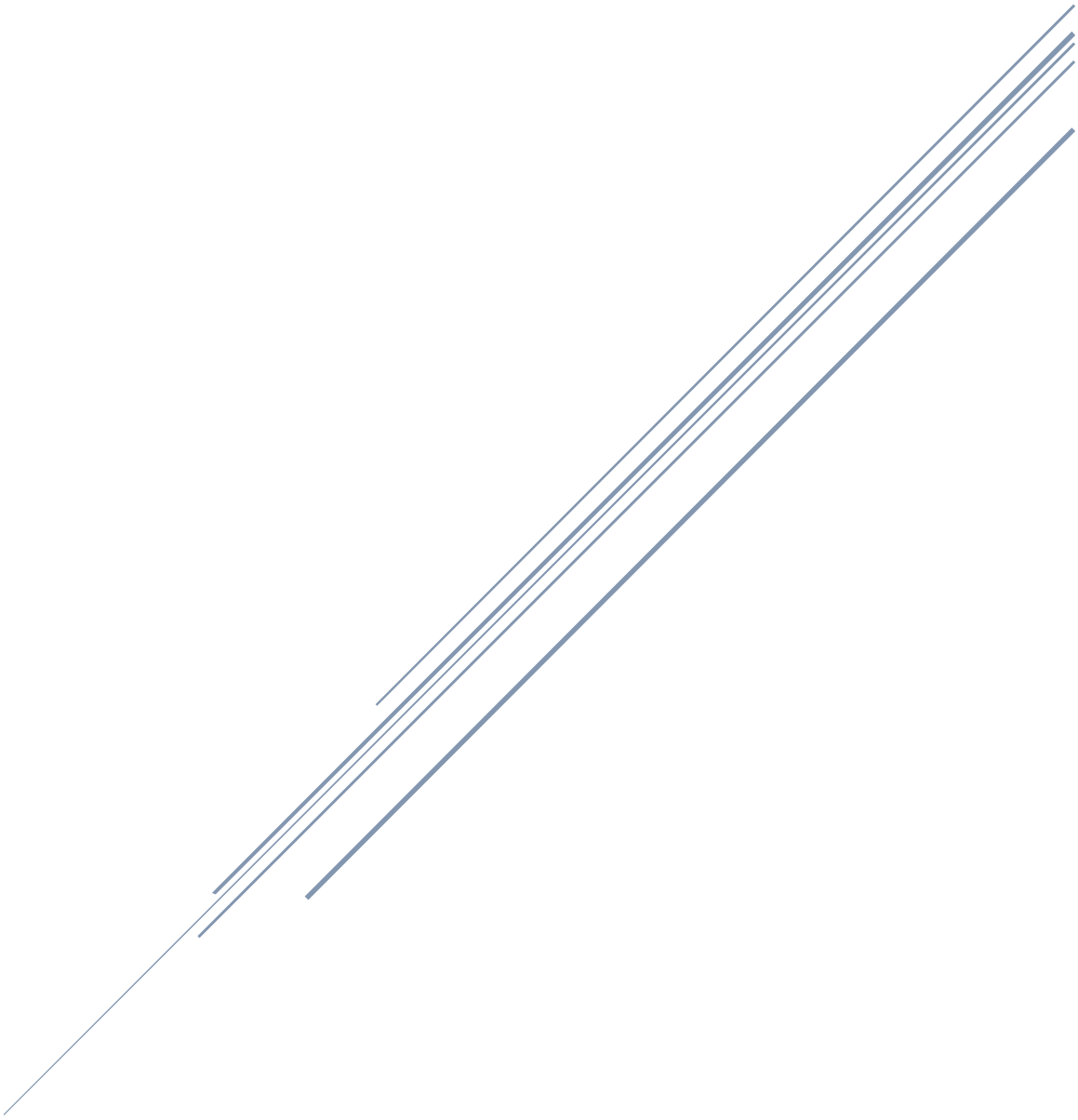
Paving the way to a circular economy

An in-depth look at knowledge sharing within the municipality of Apeldoorn



Thomas Johannes Müller Radboud University 17-08-2022

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An in-depth look at knowledge sharing within the municipality of Apeldoorn

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Nijmegen School of Management
Radboud University

Author
Thomas Johannes Müller
s1064051
thomas.mueller@ru.nl

Supervision
Thesis Supervisor: Dr. ir. Duncan Liefferink
Second Assessor: Dr. Sietske Veenman

Internship
Municipality of Apeldoorn
Supervisor: Carla Fransen

Radboud Universiteit

Preface

The paper you are about to read is the final assessment that will end my master's programme. The two years I have spent with this master programme, my life has significantly changed. I have grown to be more independent as I left the comfortable and more supporting environment of my bachelors' program. It has certainly been a challenge, but no achievement you can be proud of afterwards is without challenge, I have found. What could have been a writing and researching endeavour of six month, quickly became a challenge that would take over a year of my studying career. The pandemic offered challenges I would never have though I would have to deal with a I started studying at 18 years old. The online working environment was not something I thought I would have problems with at first, but not being able to work in an environment that was suitable to study in without having to out of my way to make it so, was indeed challenging. At the end of the day this is the thesis I have produced, and I have to say I am very proud to have completed such a massive undertaking and with results I am genuinely proud of.

To say I have finished this thesis on my own would be a disservice to the people that have helped me over the course of my thesis process. There are a lot of people who have supported me not only with kind encouragement but also with, most of the time, deserved harsh remarks on my slow progress. There are a couple of people I would like to specifically mention who have helped make this thesis what it is that you have in front of you today. First, my thesis supervisor from the Radboud University: Duncan Liefferink. I have always found myself to be hesitant to receive criticism on my work, as I more often than not, knew that my work was not perfect and that people would offer remarks that I might not be able to adequately process into my work. That they might just say that it just was not good enough and should not proceed or start over. Duncan offered a very nice environment where I felt safe to be criticised, and I am very grateful for that. Secondly, I would like to thank my contacts from the municipality of Apeldoorn: Carla Fransen, Adriaan Hellemans and Sander Lubberhuizen, who have been very accommodating and appreciative of my work. Finally, I would like to thank my parents and brother for being understanding and supportive throughout my process of writing this thesis.

I hope you enjoy reading this thesis and find the subject and results to be just as interesting as I found them. You might even learn something new!

Thomas Johannes Müller

17-08-2022

Abstract

With the Dutch government trying to further prepare society for a future in which the Netherlands has to conform to new sustainable societal standards, there come some new challenges. Product life cycles have to be extended to ensure waste is minimized, and in a lot of cases this calls for a transition from a linear to a circular economy. To ensure this transition, the Dutch institutions have set goals to reach 100% circularity in 2050, but the road to 2050 is not set in stone and how these circular goals are to be reached is questionable. The Environment Assessment Agency has coined a couple factors that are important to take into account when trying to achieve this particular societal transformation. In the case of local governments such as municipalities, knowledge sharing is a vital component accomplish the transition from a linear to circular economy.

By incorporating data from interviews and a content analysis, the current state of the knowledge sharing process within the municipality of Apeldoorn was researched. By incorporating various concepts from knowledge and knowledge sharing literature a conceptual model was formed to map the process of knowledge sharing. This conceptual model was the basis on which the questions for the interviews were made.

The results of this study showed that the municipality of Apeldoorn has some issues that stem from a lack of focus on tacit knowledge in the knowledge sharing process. As well as reduced identification with the work concerning the circular economy with people not directly involved in implementing it. Furthermore, management is not adequately voicing their expectations surrounding the niche of the circular economy, leading to uncertainty and a lack of trust that the work that is put into the circular economy is being prioritised as much as the goals set by the municipality need it to be. Finally, following the pandemic, informal coordination has been greatly reduced, which leads to a decrease in knowledge sharing.

Keywords: Knowledge sharing, circular economy, circular literacy, knowledge

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1. Introduction

In December 2019, the European Commission presented her plan for the trajectory that the European Union will take in the coming decades: The European Green Deal ((EGD) European Commission, 2019). In this report, the European Commission explains what steps the European Union will take in the next couple of years to ensure a transition towards a sustainable future. The policy document discusses multiple facets of the European society and economy, which will undergo drastic changes in the coming years. These changes will have to be implemented by the states that are part of the EU on a national level.

Within the Netherlands, sustainability already moved to the forefront of Dutch politics in the last decade, predating the EGD. After the previous national elections, the cabinet of Rutte III proclaimed they were the *greenest* government in Dutch history (Tielbeke, 2019). The main goal they used to justify this title was the goals of 49 percent emission reduction in 2030 (PBL, 2017). Critics in newspapers often stated that the cabinet did not live up to the self-proclaimed title (Straver & Markus, 2021). This was emphasised by the fact that the cabinet was sued by climate organisation Urgenda for failure to live up to the goals that were set concerning sustainability. A lawsuit which the state lost (Rechtspraak, n.d.).

Both the European Green Deal and the proclamation of "*greenest cabinet"* are examples which highlight that sustainability has become more important than ever. Sustainability itself is too vague of a concept to use within a policy document and has to be further elaborated on. In March 2020 the European Commission published a policy document which builds upon goals mentioned in the EGD: the Circular Economy Action Plan (European Commission, 2020). The Dutch government has issued a statement that they mean to achieve 100% circularity in 2050. Whilst both the EU and the Dutch government have set goals, the precise way to achieve those goals is still unclear. As was highlighted by the Urgenda Lawsuit, stating goals is one thing, but achieving them is something else. It has caused a bit of political unease within the local government and raised questions about the way these goals should be achieved, as local governments are in charge of carrying out national policy on a local level (MVO, 2019; own correspondence). Within the Netherlands, the government has asked the Environmental Assessment Agency (EAA) to produce a biannual rapport to review the progress within their country concerning the circular goals mentioned above. Most recently, the EAA produced a rapport in January 2021 in which they illustrated the progress the Netherlands had made (Environmental Assessment Agency, 2021). In this rapport, the EAA (2021) concluded that: "whilst there are signs of growth within the circular sectors of society, there is not a sign that the process seems to be accelerating" (pp. 27). Furthermore, the EAA highlighted several important factors which will be crucial in the coming years to promote the transition from a linear to a circular economy.

One of these factors was knowledge sharing. Municipalities stated that they felt that there was a lack of knowledge sharing within the municipality, which hampered the ability of the municipality to connect the right people and inspire and inform others (EAA, 2021). With an innovative concept such as the circular economy, sharing knowledge is essential as was reiterated by the trajectory of the niche within the theory of strategic niche management, which will be discussed in the literature study (Schot & Geels, 2008). Furthermore, sufficient knowledge sharing is important because reaching a consensus in terminology and approach is the best way to optimize the transition (Peralta, Luna & Soltero, 2020). Bolger & Doyon (2019) also state that lack of knowledge concerning the circular economy is one of the key barriers for the transition and that municipalities have to try to establish better communication and knowledge sharing to overcome this barrier. With this in mind, the EAA (2021) rapport stated that municipalities were not included in the data of knowledge sharing within the Netherlands that they used, which makes them more significant to research.

One municipality that has tried to develop itself within the subject of circular economy within the context of knowledge sharing is Apeldoorn. The municipality is a member of the clean-tech region. Which is a program that involves multiple Dutch municipalities as they try to foster a more sustainable region by sharing knowledge between them. Circularity is an important talking point within the clean-tech region, as is illustrated by the goal of the region to be the most circular region in Europe by 2023 (Clean-tech region, z.d.). Apeldoorn is also part of the CityLoops project, which is a knowledge sharing network between 7 middle-sized cities from across the EU (CityLoops, z.d.).

Through these networks and the expertise of their own employees, the municipality of Apeldoorn tries to achieve the goals set by the Dutch government as well as their own municipal leaders. Even though these networks show the government's willingness to innovate and be a frontrunner in the circular economy, the internal affairs did not seem to match the external networks. During a short internship within the municipality the situation became more apparent, as there were some problems with the implementation of circular policy. The implementation of policy to start the circular transition is a process that is still in the early stages as the municipality of Apeldoorn has appointed one person to assess the correct way forward, but the road ahead is still uncertain.

1.2 Research problem

According to the employees of the municipality of Apeldoorn, the biggest problem with the goal of transitioning from linear to circular is that there is not enough guidance on how to accomplish the goals set by the governments. The goals set are far in the future, but the road to these goals is still unclear and hard to grasp. So, the question was raised by the municipality: how can we best attain the goals set by the governments? Building upon the research done by the EAA knowledge exchange was identified as an important factor for municipalities when trying to attain the goals set by the government concerning the circular economy. However, knowledge exchange within the context of the Netherlands has to be researched more and the role it played was not defined enough (EAA, 2021). This research problem was formulated following talks that lead to an internship with the municipality of Apeldoorn to research this problem.

1.3 Research aim

The purpose of this research is to gain insights into the process of the exchange of knowledge concerning the circular economy. These insights will be applied to the municipality of Apeldoorn. Communication and knowledge sharing within the municipality government itself will be reviewed. Thus, the municipality can gain insight on how to best effectuate the process of transitioning to a circular economy using knowledge sharing.

1.4 Research questions

Main research question:

"In what ways can the current process of knowledge sharing within the municipal organisation of Apeldoorn be improved upon to achieve the transition to a circular economy"

Sub research questions:

1. Which factors are deemed important within contemporary literature about knowledge sharing within the context of the circular economy?
2. What types of knowledge concerning the circular economy are prevalent within the municipality of Apeldoorn?
3. How is knowledge sharing concerning the circular economy currently conducted within the municipality of Apeldoorn?
4. What factors impede knowledge sharing concerning the circular economy within the municipal organisation of Apeldoorn?

1.5 Societal Relevance

In the last couple of years, the relevance of research regarding the circular economy within the Netherlands has increased due to a number of reasons. Firstly, the national government has stated that they aim to achieve 100% circularity by 2050 (Ministerie van Infrastructuur en Waterstaat, 2019). This means that knowledge about the circular economy and ways to improve the transition are valuable. Secondly, the increasingly large threat of climate change. Circular economy is a fundamental change to how society uses resources and can offer answers to the resource problem that the world is facing. (Schroeder, Anggraeni & Weber 2019). Finally, these problems have to be solved bottom up within the Netherlands due to the fact that the municipalities have the job of translating national policy on a local level. They often use their purchasing power to stimulate local circular initiatives and are vital to the circular transition which has been initiated by higher scales of government (Environmental Assessment Agency, 2021). Due to the importance of local government, pressure from plans by the national government and the increasing problem of climate change, a case study into the important facets of the transition to a circular economy is important to carry out. Knowledge exchange being one of these facts.

1.6 Scientific Relevance

Research about circular economy and exchange of knowledge have both been subject to studies (Kircherr, van Santen & Hekkert, 2017; Gil-Garcia, Chun & Janssen, 2009). But according to the Environmental Assessment Agency report of 2021 by no means do all local governments have worked out how to effectively handle the information presented to them. Furthermore, the same rapport states that it is not easily identifiable if the current degree of Knowledge sharing obstructs or is enough to enable the transition to a circular economy (Environmental Assessment Agency, 2021). This case study into the inner workings of the information handling within municipal government can offer more insight into this gap of knowledge within scientific knowledge. Furthermore, the relationship between knowledge sharing and the circular economy itself is an emerging problem and has to be researched more thoroughly, especially the influence of direct participants in its implementation (Atiku, 2020). In the case of the municipality of Apeldoorn, the people responsible for its implementation are the employees who will be the main focus of this research.

1.7 Outline

This research is split up in five different chapter. The first chapter is the introduction, which introduces the main and sub research questions along with the relevance of the research. The second chapter, the literature review, outlines the theoretical concepts that will be used and which were deemed unnecessary to be used in this research. The chapter is concluded with a conceptual model that will form the basis of the research. The third chapter will discuss the methodology of this research as well as operationalise the concepts discussed in chapter two. Chapter four discusses the results from the collected data, as well as answering the sub research question from chapter one. Chapter five will answer the main research questions as well as provide a theoretical and methodological reflection.

2. Literature review and conceptual framework

This research discusses in what way knowledge sharing can be better utilised to help the municipality of Apeldoorn transition from a linear to a circular economy. To answer the research question, a couple concepts will be taken from academic literature to further explain and define. It is necessary to elaborate on certain concepts to be able to answer the research question completely and thoroughly.
The central concept in this research is the circular economy. Where the term originated is unclear, but some say the spiritual beginning of the circular economy dates back to a report commissioned by the Club of Rome in 1972 called *Limits to Growth* (Winans, Kendall & Deng, 2017). The term has been adopted by policymakers, journalists and scientist alike and this has muddled the term to a certain degree. Terminology will be an important part of this chapter's discussion of circular economy as well as knowledge types that play an integral part in the transition.

Before further examining knowledge sharing, knowledge itself will be discussed. Knowledge is the object which is shared within the context of this research, but what is knowledge. Many categorisations are possible, but it is important to categorise knowledge when discussing its shareability.

Following knowledge itself is knowledge sharing. Knowledge sharing is a crucial factor in this transition, according to the Environmental Assessment Agency of the Dutch government (EAA, 2021). However, lack of relations between governments and companies and shortcomings in internal communications are some of the big inhibiting factors in implementing circular initiatives (Peralta, Luna & Soltero, 2020). This chapter will discuss factors that influence the sharing of knowledge, because to monitor or influence knowledge sharing in the context of this research it is important to know what influences the sharing of knowledge within organisations.

The last major model that this chapter will discuss is the change model called Strategic Niche Management (SNM). The impact that circular economy has on a society can be further examined through the context of change management. Change management can provide necessary context when researching a large societal change such as the circular economy, whilst having a managerial angle. It is important to include this managerial angle due to the fact that the research question contains a municipal focus. Knowledge plays an important part in some phases within SNM, which will be discussed more thoroughly further along in this chapter.

The chapter will wrap up with an overview of the discussed literature and a slight refocus on the core of this research. The remaining core literature will be presented in the form of a conceptual framework. This model will be used to answer the first sub-question to the main research question.

2.1. Circular economy

Within scientific literature the circular economy has been discussed by a number of researchers (Kirchherr, Reike & Hekkert, 2017; Korhonen, Honkasalo & Seppälä, 2018; Škrinjarić, 2020). The core of the circular economy states that our current economy is linear. Resources are made into products, which are used and then discarded (MacArthur, 2013). Most economies exhibit certain aspects of circularity through the use of recycling. Recycling extends the life-cycle of resources used in products by giving new purpose to the products and/or resources (Murray, Skene & Haynes, 2017). The ultimate goal of the transition from linear to circular is to preserve finite resources at our disposal and charter a course towards a more sustainable future (MacArthur, 2013). This is mostly the core of the concept, but within the scientific community there is some disagreement about circularity. The terminology itself has been up for debate so much so that

Kircherr, Reike & Hekkert (2017) analysed 114 different definitions to try to form a consensus. Kircherr et al. finds that there are a lot of disparities between different eras and publishers. They used a quantitative analysis to find similarities and came up with an all-encompassing term for circular economy.
"We defined CE … as an economic system that replaces the 'end-of-life' concept with reducing, alternatively reusing, recycling and recovering materials in production/distribution and consumption processes. It operates at the micro level (products, companies, consumers), meso level (eco-industrial parks) and macro level (city, region, nation and beyond), with the aim to accomplish sustainable development, thus simultaneously creating environmental quality, economic prosperity and social equity, to the benefit of current and future generations. It is enabled by novel business models and responsible consumers." (Kircherr et al., 2017, p. 229)

When circular economy is mentioned in this research. This is the definition that will be used. This definition was chosen over some of the alternatives, because it was formulated with the most extensive research method and it encompasses the most complete and thorough definition. Within this definition are a number of aspects which themselves have been the subject of study and warrants further explanation. The r-ladder, for example, which demonstrates different steps in the new economic cycle. These concepts are the basis for a circular economy (Winans, Kendall & Deng, 2017). This research will utilise 6 different types of r: refuse and rethink, reduce, reuse, repair and refurbish, recycling and recover. The 6R framework was chosen over some other frameworks such as the 4R system that the European Union uses, as the 6R framework is used in the Environmental Assessment Agency report that is one of the article that is the basis for this research (EAA, 2021).

2.2 Knowledge

Knowledge is the key to the circular economy transition for municipal governments according to the Environmental Assessment Agency (2021). Knowledge itself can be an intangible concept. Often knowledge is defined as "a combination of experience, values, contextual information and expert insight that help evaluate and incorporate new experience and information" Within the scientific community, two main types of knowledge are identified: tacit knowledge and explicit knowledge. The difference between these types of knowledge is the way it is gained and the ease in which it can be transferred (Smith, 2001; Zach, 1999). In academic literature, further distinctions can be made between certain types of knowledge. To name a few: structured knowledge, strategic knowledge, conceptual knowledge, procedural knowledge and metaknowledge (Jong & Ferguson-Hessler, 1996). These knowledge types can be crucial to certain research, but to sharing knowledge the most important distinction that can be made is the one between tacit and explicit, because the ease of shareability is where a lot of problems in knowledge sharing stem from. Namely, further in the literature review some more specific knowledge types are discussed such as the ones that are vital to circular literacy, but the conscious decision has been made to limit diversification of knowledge types to keep this research coherent.

Tacit and explicit knowledge is the categorization that is used most often when discussing knowledge sharing (Loebbecke, Fenema & Powell, 2016; Willem & Buelens, 2007 and Smith, 2001). The differences between these knowledge types mainly stem from the subjective nature of tacit knowledge. Tacit knowledge is knowledge that is formed while on the job and is harder to share among colleagues, as the experiences that led to the acquired knowledge play an important part in understanding it. Within organisations such as municipalities, tacit knowledge is more interesting and important to map out. As the ease with which explicit knowledge can be shared makes it that there is often more to be gained when trying to perfect the knowledge sharing process (Jong & Ferguson-Hessler, 1996 & Ipe, 2001).

2.2.1 Tacit knowledge

Tacit knowledge can be categorised as more practical and action-oriented knowledge or "know-how". This type of knowledge is mostly acquired from personal experiences and is more difficult to put into words than its more academic and technical counterpart, explicit knowledge (Leonard & Sensiper, 1998). Riding a bike is a commonly used example for tacit knowledge. It is learned through just doing and cannot easily be explained to someone who is learning to ride a bike (Smith, 2001). Tacit knowledge has multiple functions within an organisation. Problem finding and solving are made much easier by tacit knowledge. This means that through pattern recognition, experts have the upper hand when it comes to solving and finding problems. It can also be used to predict or anticipate problems that arise. Tacit knowledge in this context refers to hunches that experts have when presented with a new situation, because they understand at a more fundamental level how something works, they can predict issues that arise (Leonard & Sensiper, 1998). Tacit knowledge is not easily transferred to other individuals as it has a subjective nature, because each person has a different view of a situation and identifies patterns in a different way (Smith, 2001).

2.2.2 Explicit knowledge

As mentioned before, explicit knowledge is a more technical and academic form of knowledge or "know-what". It entails information found in sources such as academic papers or manuals, contrary to tacit knowledge which is transferred more from person to person. This type of information often requires some kind of education to process and learn. Most information children learn in school is also classified as explicit knowledge (Smith,2001). Due to its more technical nature, explicit knowledge can be codified and shared within the previously mentioned sources. The shareability of knowledge is not without investment. It requires infrastructure that contains the codified knowledge (Leonard & Sensiper, 1998). Google Scholar is such an infrastructure, for example.

The above-mentioned terminology of explicit and tacit knowledge is distinguished in theory but, according to Hungarian philosopher Michael Polanyi, knowledge resides on a spectrum of tacit and explicit. Tacit knowledge can be codified and made into explicit knowledge, but it is much harder to translate more subjective information or personal accounts into explicit knowledge (Leonard & Sensiper, 1998).

Knowing the different types of knowledge and the restriction when sharing knowledge, namely with tacit knowledge, can help identify problems in the municipality of Apeldoorn. When tackling the difficult task of economic transition, both know-how and know-what are important sources of information. Furthermore, the two types of knowledge complement each other to form a complete context of reality, so both types of knowledge are important (Kamaşak, Bulutlar, 2010). Now that the concept of knowledge has been discussed, this chapter will discuss what kind of knowledge is important to the circular economy specifically.

2.2.3 Circular literacy

Zwiers, Jaeger-Erben & Hofmann (2020) coined the term circular literacy. They understood the importance of being on the same page, much like Kircherr, Reike & Hekkert (2017) when they made an analysis on the terminology of the circular economy. When trying to foster change on a large scale, it is important that all stakeholders know what the end goal is and how to get there. Zwiers et al. (2020) proposes three knowledge categories that are important when transitioning to a circular economy: system knowledge, target knowledge and transformation knowledge. This framework was chosen as it builds upon the basic

building blocks of tacit and explicit knowledge with knowledge types specific to the circular economy. As oppose to Atiku (2020) who expresses the importance of knowledge management to attain a circular economy but does not go beyond explicit and tacit knowledge. This operationalisation of knowledge within the context of circular economy can be useful when trying to optimize the transition, and will therefore be used in this research.

System knowledge is a type of knowledge that helps provide stakeholders with an understanding of the natural, social and technological systems that are important when trying to achieve a transition to a circular economy. Circular economy in and of its own is a difficult concept, so having system knowledge can help navigate the complexity of this subject and to help understand the importance of certain aspects of the circular economy. System knowledge refers to both the current economic situation and the circular economy, because an understanding of both is important. (Zwiers, Jaeger-Erben & Hofmann, 2020). Attaining uniform system knowledge is important to further transformative change in a society, because a lack of understanding by certain parties could lead to wrong priorities. System knowledge would be something that the government disseminates among stakeholders to ensure everybody can contribute to the process because they are knowledgeable on the subject.

Target knowledge pertains to knowing the targets that have been set. It also involves developing goals that consider sustainability when being formulated and contain desirable futures that take all parts of society into account. This requires participation of policy-makers, stakeholders and civilians (Zwiers, Jaeger-Erben & Hofmann, 2020). Target knowledge is important to municipalities because it is always important to understand the influence of certain goals on parts of society that may not directly pertain to the subject matter. Contemporary society is very interwoven and due to this fact some actions may influence certain facets that might not have been taken into account at first. Furthermore, target knowledge, similar to system knowledge, needs to be uniform to have the most advantageous outcome.

Transformation knowledge is meant to guide stakeholders towards the targets. It pertains to ways transformative change can be initiated on a systemic level. Transformation knowledge is the more practical know-how and correlates most with the tacit knowledge. To utilise this knowledge fully there has to be communication between the employees who have the practical know-how and the employees who have to shape policy to better implement that practical transformation knowledge into policy (Zwiers, Jaeger-Erben & Hofmann, 2020).

2.3 Knowledge sharing

As mentioned before, sharing acquired explicit or tacit knowledge to further the transition from linear to circular economy is vital to the economic transformation that is starting in the Netherlands right now. Municipalities and provinces indicate that there is more need for knowledge sharing initiatives (EAA, 2021). The goal of these initiatives would not only be to inform, but also to inspire companies to follow suit and conform to the futuristic new standard of circular economy (EAA, 2021). To improve the knowledge sharing infrastructure, this part of the literature review will focus on knowledge sharing. Knowledge sharing within scientific literature often discusses the knowledge sharing within an organisation to improve productivity or innovation (Cabrera & Cabrera, 2002). When governments become involved, the knowledge sharing often revolves around intergovernmental sharing or sharing within the same government (Gil-Garcia, Chun & Janssen, 2009). This part of the literary framework will borrow from both organisational and governmental knowledge sharing to create a framework to tackle the research question with.

Ipe (2001) identifies a couple of important factors that influence knowledge sharing: nature of the knowledge, motivation to share, opportunity to share and the culture of the work environment. Ipe's model is geared towards private sector organisations. Willem & Buelens (2007) carry out similar research, but focussed on interdepartmental knowledge sharing. There are some small differences, the main one being that Ipe takes into account the nature of knowledge, something that literature on knowledge states is important to bear in mind (Jong, Ferguson-Hessler, 1996). Secondly, Willem & Buelens further diversify some of the aspects of the main facets that Ipe uses. Opportunities to share has been divided into multiple forms of communication, and the motivation to share has also been divided up. This research will use Ipe's model as a basis and borrow certain factors from Willem & Buelens to deepen the already present concepts of Ipe.

2.3.1 Nature of Knowledge

The nature of knowledge has been touched on before. The distinction of explicit and tacit knowledge is important when discussing knowledge sharing (Smith, 2001). Explicit knowledge lends itself more to being shared, but further distinction can be made between explicit knowledge that is context dependent or more general. Rationalised knowledge is context independent knowledge and can be readily shared among stakeholders. Embedded knowledge is more context dependent, which means it is not as widely applicable as rationalised knowledge and thus is not shared as easily (Weiss, 1999). This distinction will not be used further, as it is only marginally different as the distinction between explicit and tacit knowledge. Furthermore, the value that knowledge has to an individual or organisation contributes to the perceived value of sharing that knowledge (Ipe, 2001). This refers back to system knowledge within circular literacy. Knowledge can be perceived as important due to system knowledge and therefore be more readily shared.

The nature of knowledge can also be expressed in the value or power of certain knowledge. Perceived power or value in knowledge can lead to hoarding of knowledge and thus inhibits sharing (Ipe, 2003; Wang & Noe, 2009). Employees might feel that they can be one step ahead of competitors within the organisation and not be keen to share their findings on certain subjects. The value of knowledge is something that plays a large part in competitive environments (Ipe, 2003). The public sector traditionally is not as competitive as the private sector (Cabrera & Cabrera, 2002). People are not working against colleagues to get clients or trying to outdo each other to get certain tasks. This means that the perceived value of knowledge to be used for one's own benefit is reduced, but not entirely absent.

2.3.2 Motivation to share

Motivation to share can be divided into two main categories: internal and external factors. Internal factors are tied to the perceived power that comes with sharing that knowledge and the reciprocity that comes from the other party involved in the sharing process. Another important factor in the internal motivation within governmental workers specifically is the identification with the work they do. This loosely translates to taking pride and satisfaction from the work they do. Within the public sector, identification is often lower than in the private sector, due to the final product being more difficult to identify with and a lack of observable relation between personal contributions and the final product (Willem & Buelens, 2007). Due to the nature of the circular economy, this may prove to be different as most people working on this subject might identify with the cause of sustainability.

External factors are the trust and power dynamics with supervisors or fellow employees. Trust with supervisors is expressed as employees' belief in their supervisors being knowledgeable on subjects that

are being discussed with them (Wang & Noe, 2009). Trust in supervisors is further improved by the size of the power discrepancy that exists between a supervisor and an employee. When the perceived power discrepancy is small, knowledge sharing happens more. This is because employees feel more at ease with their bosses (Ipe, 2003). Trust in colleagues is also construed as the degree to which they trust their colleagues' expertise.

Motivation is classically caused by incentivizing certain behaviour. Pay increases or bonuses when making a certain number of sales, for instance (Cabrera & Cabrera, 2002). When concerning knowledge sharing, the influence of extrinsic rewards or incentives has proven to be mixed and inconclusive (Wang & Noe, 2009). The fact that extrinsic rewards are normally not present in the lesser competitive culture of the public sector makes it that these types of incentives will not be a part of this research (Wee, Hagoort & Annema, 2001). Encouragement to share knowledge is more likely to be present within a public sector and also influences knowledge sharing (Willem & Buelens, 2007). This type of incentivisation is more relevant for this research.

2.3.3 Opportunity to share

Opportunities to share are both formal and informal in nature. Formal opportunities can include training programs or information sharing systems. Willem & Buelens (2007) further expand upon the formal sharing opportunities by stating that there are also formal unplanned opportunities to share information, which has proven to be the most important to knowledge sharing. Formal planned knowledge has the least impact on knowledge sharing within the public sector. Informal opportunities to share mostly stem from personal relationships or being in the same social network. These types of informal opportunities are classified as unplanned meetings or discussions, but more so as communication that happens in a casual non-working environment. While formal opportunities can provide knowledge sharing, informal knowledge sharing is where most transactions of knowledge take place (Ipe, 2003).

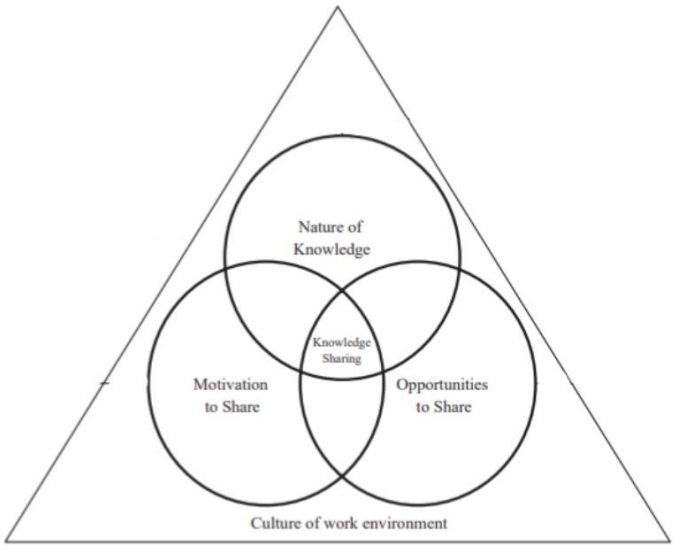
2.3.4 Culture of work environment

Culture of work environment is something that influences the three factors mentioned above. To improve or change factors that influence the nature of knowledge, motivation to share or opportunities to share, the culture of work environment has to change (Ipe, 2003). Culture within an organisation is defined as a pattern of basic assumptions that shape the perceptions and behaviour of the employees (Ipe, 2003). For instance, if someone assumes that their boss would not listen to their council, they would be less inclined to share information with them. Although culture of work environment is a broader and vaguer than some of the other factors discussed, it is still important to discuss when trying to answer the research question. The knowledge levels within an organisation influence the culture of the work environment, as well as the perceived knowledge of other employees influences how colleagues view each other (Ipe, 2003)

Another way to view culture within a work environment is the culture that is influenced by a person's ethnic or geographical origin. Within multinational organisations culture can be a barrier that inhibits optimal knowledge sharing. Some cultures do not respond as well to the way people from other cultures communicate and share knowledge. This can be because of the directness of some other cultures, for instance (Wang & Noe, 2009). These factors are important to keep in mind when discussing knowledge sharing within supranational organisations. Because this research uses one municipal government as part of its case study. These cultural barriers are not likely to play a part in the knowledge sharing process and as such will not be used further.

Figure 1 illustrates this model of knowledge sharing and can be a starting point to improve knowledge sharing within the municipality of Apeldoorn. The factors discussed above will be the building blocks that are used in the analytical framework at the end of the chapter.

Figure 1: Factors that influence knowledge sharing between individuals in organisations



Source: Ipe, 2003 p.35 (simplified)

2.4 Strategic Niche Management

Changing from a linear to a circular economy is a large-scale transformative change in society. Knowledge sharing plays a part in this societal change within the theory of Strategic Niche Management and that part will be used within this research. To fully understand a smaller part of a theory, it is important to discuss the theory wholly, which will be done below. Strategic Niche Management was developed to guide innovations that had a socially desirable goal (Schot & Geels, 2008). Switching from a linear to circular economy to bring about more sustainable development is such a goal.

Within Strategic Niche Management there are three main processes: shielding, nurturing & empowerment. The shielding process of Strategic Niche Management (SNM) consists of creating a protective innovation niche within a protective space to ensure it can compete with mainstream practices. Nurturing means protecting innovation through supporting its development. This can occur in two different ways. Voicing expectations can give direction to the niche and gather more support and resources. Secondly, networking is another way to nurture a niche. Networking constitutes the gathering of resources through knowledge networks (Martiskainen, 2017). The importance of knowledge networks lends itself to this research and will be discussed more thoroughly below. Empowerment follows after nurturing and allows the innovation to break from its protective space and allows upscaling (Schot & Geels, 2008).

Circular economy is in the nurturing phase of SNM. Circular activity is on the rise and the protective space has been established. This protective space takes the form of subsidies, mostly. As mentioned above, knowledge networks and subsequently the sharing of knowledge within those networks are important facets of the nurturing phase. Voicing expectations could also be construed as knowledge sharing. To voice

expectations, is to emphasize what the future has in store for a niche in the instance of Martiskainen (2017). Furthermore, by advocating for a niche, you give it validity and can make it leave the protective space sooner. For the municipality of Apeldoorn, those expectations are full circularity in 2050. By sharing these goals actively, it could help to assert the niche of the circular economy and nurture it into the final phase of the strategic niche model. Voicing expectations is a concept that complements target knowledge, which was mentioned above. By advocating for certain goals, knowing what these goals are and how to attain them, one can achieve these goals more easily (Zwiers, Jaeger-Erben & Hofmann, 2020; Martiskainen, 2017).

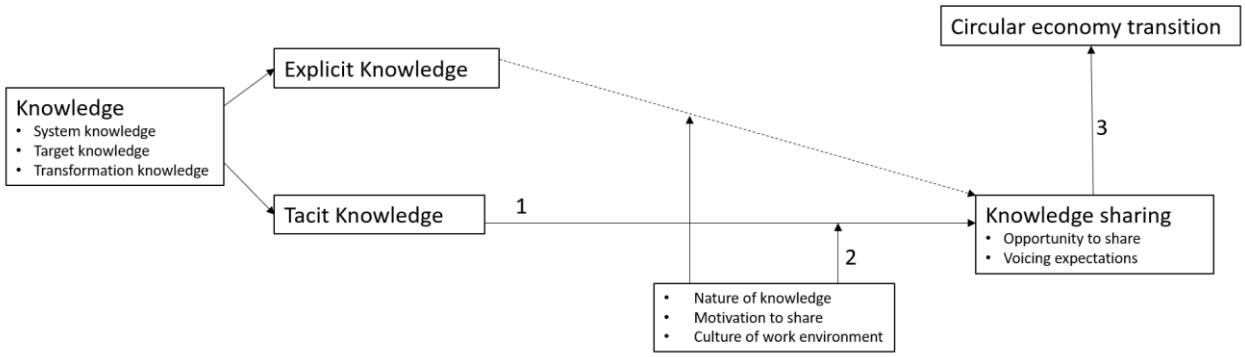
The second form of the nurturing phase is networking. Networking allows information and experiences concerning the niche to be shared. The knowledge that is most important within these knowledge sharing networks is often tacit in nature. Making it harder to share the knowledge effectively (Martiskainen, 2017). Local governments or municipalities can function as intermediary organisations to these knowledge sharing networks. By enabling these networks and subsequently gathering information from the networks, municipalities are able to establish guidance and standards for other and future participants (Geels and Deuten, 2006).

2.5 Conceptual model

The purpose of this research is to gather knowledge concerning knowledge sharing and its impact on the circular economy transition. The theoretical literature which was presented in this chapter discussed the circular economy, knowledge and knowledge sharing extensively. The most important assets of which are compiled in the conceptual model in figure 2. This model gives an overview of the factors that influence knowledge sharing and what types of knowledge have been identified to be important to the transition. This conceptual model can be used as the basis for the start of the empirical research of this paper.

The conceptual model starts with knowledge in the broadest sense, which is split into explicit and tacit knowledge. Tacit knowledge is said to be the main contributor to knowledge sharing even though it is harder to codify and to share (Willem & Buelens, 2007; Zwiers, Jaeger-Erben & Hofmann, 2020; Martiskainen, 2017). The three main forms of knowledge that are important to the circular economy transition knowledge sharing are taken directly from the Zwiers, Jaeger-Erben & Hofmann (2020) article. This relation is represented by line 1. The crux of this research are the factors that influence knowledge sharing itself, meaning that these elements could cause knowledge sharing to be greatly impeded if they are not present or implemented the wrong way. These factors are a mix taken from Ipe (2003) and Willem & Buelens (2007) and Martiskainen (2017). This relation is represented in line 3 of the conceptual model. These factors mediate the relation between tacit knowledge and knowledge sharing. Some factors represent the knowledge sharing process itself. Opportunity to share and voicing expectations are factors to express how knowledge sharing takes place and as such are a sub category within knowledge sharing in the conceptual model. There is also a dotted line between explicit knowledge and knowledge sharing, that is because explicit knowledge is shared within organisations and not displaying a line would not represent the reality of the situation in the correct way. The line is dotted because explicit knowledge plays a smaller role in this research, because it is more easily shared within an organisation. This means that the main focus of the research will be on tacit knowledge, but explicit knowledge cannot be dismissed wholly (Jong

Figure 2: Conceptual model knowledge sharing in the circular economy transition



In what forms these factors are prevalent in the knowledge sharing within the municipality of Apeldoorn will determine the conclusion of this research. The underlying thought of this research is that knowledge sharing plays an important role within the circular economy transition. This relation is represented in line 2 (EAA, 2021; Peralta, Luna & Soltero, 2020).

This conceptual model can also be used to answer the first sub-question of this research: Which factors are deemed important within contemporary literature about knowledge sharing within the context of the circular economy? Within contemporary literature, the distinction between explicit and tacit knowledge is very important. Both in terms of shareability and ease of which it can be codified. Specifically, when looking through the lens of the circular economy, types of tacit knowledge are identified which can help identify where there are meaningful gaps in knowledge within an organisation. These knowledge types are system knowledge, target knowledge and transformation knowledge. Furthermore, in the conceptual model the five main influencing factors of knowledge sharing that this paper will use have been identified. These factors are a little abstract and will be further operationalised in the next chapter, which will also lay the groundwork to answer the next three sub questions.

The final three sub questions will be answered with data gained by methods explained in the next chapter and will be answered in the fourth chapter. The second sub question: 'What types of knowledge are prevalent within the municipality of Apeldoorn?', will be answered by using data gained from the concepts concerning knowledge. These are: the three knowledge types that constitute circular literacy, tacit & explicit knowledge and the nature of knowledge. Next, the third sub question: How is knowledge sharing currently conducted within the municipality of Apeldoorn, will be discussed by giving a framework of how knowledge is shared through opportunities and voicing expectations, because these factors give the best overview of the main knowledge flows within the organisation. Finally, the last sub question: What factors impede knowledge sharing within the municipality of Apeldoorn? Which will address most of the factors mentioned within the conceptual model and indicate where there is friction that inhibits knowledge sharing, because impediments can be caused by most factors mentioned above.

3. Methodology

The theoretical portion of this research is now finished, and the empirical part can start. Through academic literature, certain important concepts have been identified and can now be explored in the case study of the municipality of Apeldoorn. Before the data can be collected and results can be presented, it is necessary that the choices that were made concerning research philosophy, research approach, research strategy, methods, data collection and validity & reliability of the research are explained. These steps are necessary to adequately substantiate the choices made in this research. Within the section on data collection, there will also be an operationalisation of theoretical concepts discussed in the previous chapter.

3.1 Research Philosophy

Within the scientific community, research philosophy has been discussed since the beginning of modern science. Questions like: what is knowledge? How do we perceive reality? These are questions that every scientific researchers have to ask themselves at the beginning of their research. Ontology deals with the question of reality, namely how one understands reality. Epistemology handles the knowledge within that reality, what constitutes valid knowledge and how it can be obtained (Guba & Lincoln, 1994).

3.1.1 Ontology

As mentioned above, ontological studies concern themselves with reality. This research uses a constructivist ontological paradigm as a basis for its views. This means that reality is not objective, but rather subjective. Reality is a mental construct that varies between people and cultures, and could also vary depending on their social standings. Consequently, reality could alter for people themselves over time when they as a person change. This constructivist paradigm means that this research accounts for the fact that there is not a singular reality (Van Thiel, 2014). Qualitative research methods lend themselves very well to this world view and can help reconstruct the reality that is painted by the actors from the municipality of Apeldoorn. The decision for qualitative research methods will be elaborated further in the corresponding part of the methodology chapter.

3.1.2 Epistemology

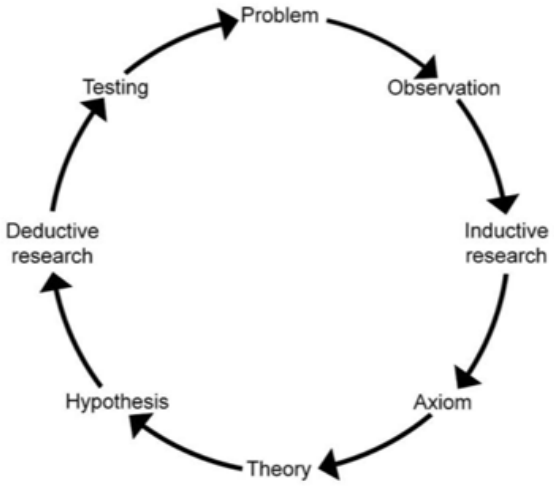
The study of knowledge, epistemology, which tackles questions like: what constitutes knowledge? What is the truth? Plays an important part in every scientific research. This research takes an interpretive epistemological approach to knowledge. This means that knowledge itself, same as reality, is always viewed through subjective interpretations. As was mentioned in the last chapter, a lot of research has been dedicated to the conceptualisation of the circular economy. Researchers have their own interpretations and perceptions on what constitutes the circular economy. This research acknowledges this fragmented & subjective nature of knowledge and has chosen research methods accordingly. Qualitative research methods are suitable to tackle the interpretive approach to knowledge (Van Thiel, 2014).

3.2 Research Approach

Within scientific research, there is a split within research. On the one hand, there is inductive research. This type of research starts with a problem. The problem can be a gap in knowledge or a more practical problem. Subsequently, inductive research tries to establish a new theory to tackle, explain, or solve the problem presented. Alternatively, there is deductive research. This type of research starts with a theory already in place and tries to test this theory by formulating and testing hypotheses. These two forms of research are not as separated as one might think, as they are a part of the same empirical cycle. This cycle can be viewed in figure 3.1 (Van Thiel, 2014). This research has the most characteristics of inductive

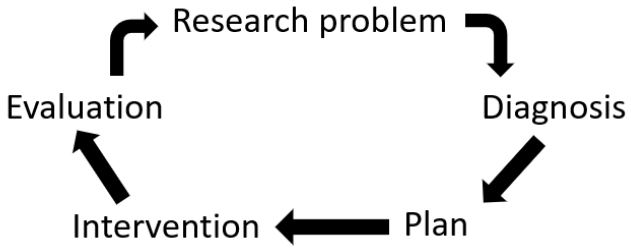
research, as it starts with a practical problem and uses empirical data to construct axioms concerning the municipality of Apeldoorn. However, it stops short of creating theory, which leads to another approach to research: the regulative cycle. This approach was defined by Van Strien (1997) and is often used in research that takes place in public administration and public management (Van Thiel, 2014). Within this context, the regulative cycle has less priority on constructing and testing models and more on fixing practical problems. Which causes the regulative cycle to be a better fit for this research, as it focuses on a practical problem in public administration. An adaptation of Van Strien's cycle can be viewed in figure 3.2. This research follows the first three steps of the regulative cycle. First, the research problem has been defined in chapter one. Next in the diagnosis phase of the research, with the theoretical bases of the previous chapter, data will be collected through means that will be discussed below. This data will be analysed by the theoretical context of the previous chapter. From this diagnosis, a prescription will be devised that will be presented in the conclusion as a plan to tackle the research problem. The intervention and evaluation phases of the regulative cycle are not a direct part of this research, but can be taken up by the municipality.

Figure 3.1: The Empirical Cycle



Source: Van Thiel, 2014

Figure 3.2: The regulative cycle



Source: adopted from Van Strien, 1997

3.3 Research Strategy

The research strategy defines the structure of the research. Certain strategies lead to the use of certain methods, which will be talked about further down. A research strategy can also be defined as a research methodology. The choice of a strategy is guided by two main factors. First, the subject of the study itself, which translates roughly to the research problem. Second, the body of knowledge that already exists that is related to the subject. The existing knowledge influences the number of units that are available to research. When one can research more units, it influences the research strategy that is chosen (Van Thiel, 2014).

3.3.1 Case Study

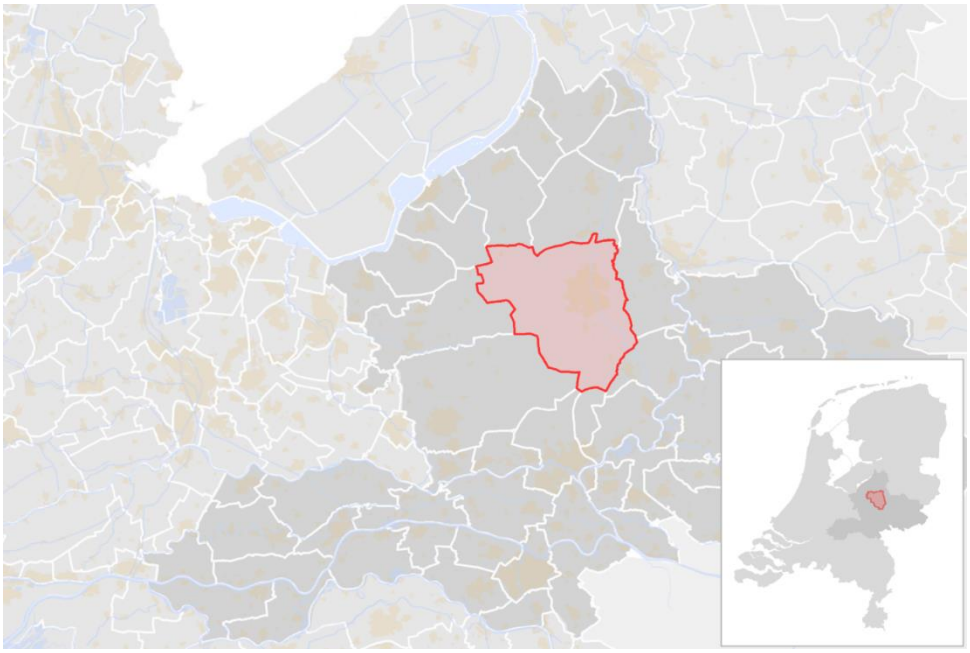
The research strategy that was chosen for this research is the case study. This decision was made due to the applied nature of the research, the focus on topical events from everyday life, and the relative uniqueness of the case in question. These characteristics lend themselves to the case study research

strategy (Van Thiel, 2014). The case study research strategy generally focuses on one or several cases of almost anything. In this case: research problem surrounding the process of knowledge sharing within a municipality and its relation concerning the circular transition. This research problem affirms the applied nature of this research, as it calls for a solution to a particular problem in a specific context. This aligns further with particular characteristics of a case study, as they focus more on depth than breadth (Van Thiel, 2014). A lot of knowledge about a singular case is necessary to solve the problem, as opposed to less knowledge about a lot of cases. The research focuses on the topical events within a municipality, such as the way they conduct their work within the organisation. Thirdly, this research also lends itself to the case study strategy because it handles a relatively unique case. The organisational structure of a municipality might not be unique, but problems within these organisations can be. Due to the impact of individuals on a relatively small organisation and the way it differs due to both the geographical and societal context the municipality is in; its uniqueness lends itself to the use of the case study strategy. This uniqueness also influences the transferability of the research, which will be discussed in full further below, but in short: case studies have more internal validity than internal validity due to their low number of cases and focus on depth rather than breadth. Due to the organisational similarity with other municipalities, however, some findings could be generalised depending on the results of the research. The choice for a *single* case study was made following the way the research problem came forth from an internship within the municipality in question. Furthermore, the research question did not lend itself to a comparative *multiple* cases study, because it concerns a problem within a particular municipality. Following this, the choice was made to focus on a single case.

3.3.2 Apeldoorn

The choice for the municipality of Apeldoorn came forth from the internship, which led to the construction of the research problem that this research is based upon. Apeldoorn is a city within the Dutch province Gelderland. It lies within a similarly named municipality, which is used as the case for this research. The municipality has 165.610 inhabitants as of April 2022 (municipality of Apeldoorn, n.d.). Apeldoorn is a city on the rise with a bigger increase in inhabitants over the last couple of years than the national average. It is seen as the capital of the Veluwe national park, as the municipality borders large parts of the famous Dutch nature park. The city is also part of two major initiatives that focus on sustainability and circularity: the national Clean-tech region and the international project CityLoops. These two projects are indicative of the progressive vision within Apeldoorn, and it further illustrates their commitment to circularity and sustainability. This makes Apeldoorn an interesting case study as they have made the first steps in the transitional process by aligning with these projects and thus are a hub for circular activity. But the transferability of these ambitions to internal progress is still lacking. The city also houses some interesting places for tourists, such as the Apenheul Zoo and *The Loo* national park with a palace on it where the king spends his winters.

Figure 3.2 Map of the Municipality of Apeldoorn



Source: CBS, 2016

3.4 Methods

Choosing the right methods for research goes together with choosing the right type of approach. The two are interlinked. The number of units that can be researched for instance also heavily influences the type of methods one chooses, because if there are too many units to research, certain methods are not feasible to carry out.

3.4.1 multi-method approach

This research will make use of a multi-method approach in the form of interviews, content analysis and observations. The interviews will be conducted with employees of the municipality of Apeldoorn. These interviews will be semi-structured and follow the operationalised topic list that will be discussed in 3.5. Semi-structured interviews were chosen, because it allows for more flexibility when certain topics are broached that need elaboration. This research depends on the knowledge of the respondents, so it would risk the loss of important data if deviation from the prepared question was not possible. The content analysis will be taking data from existing communications that the municipality releases, such as a seminar on circular economy, municipal policy paper on goals and aspirations and memo's concerning circularity. Observations will be made during passive presence in an exploratory meeting that will be attended. It is a monthly update meeting that the project leader of the circular economy presides with varying members of different departments that give reports on circular projects and give feedback on the progress of the transition. This consultation will be used to get a general feeling for the progress and process in Apeldoorn and will complement the other methods in several ways. Firstly, the observation can lead to more in-depth interviews when actual examples from recent meetings can be cited. Secondly, giving interviews can cause the interviewees to give desirable answers and by making observations during meetings certain answers can be called into question or discussed further. This multi-method approach also influences the validity of the research, which will be discussed further down.

3.5 Data sampling, operationalisation & analyses

The most important part of the research is the data that is used to answer the research question posed in the introduction of this thesis. *In what ways can the current process of knowledge sharing in the municipality of Apeldoorn be improved upon to achieve the transition to a circular economy?* The way in which data is selected was explained in the method part above, but the case selection and the type of data that was collected will be explained now. After that, the concepts of the theoretical study will be operationalised into more concrete topics that will form questions to be used in the interviews.

3.5.1 Data Collection & case selection

As discussed in the beginning of this chapter, this research lends itself mostly to a qualitative approach. Most of the data that will be collected will be qualitative in nature due to the ontological and epistemological basis the research has. The interviews that are done, are used to collect primary data directly from the actors who perform knowledge sharing. The content analysis uses existing communication and rapports and policy papers from the municipality, which can also be seen as primary data. This communication cannot be shared due to the private nature of the communication. Furthermore, most communication that is referenced in this research will be described and used in the analysis but will not be present to view in the research. The communication was not meant to be viewed by the public because of the inherent nature of the communication. This data will be used as a supplement for the data from the interviews.

The policy papers consist of two multiyear program budget (MPB), the previous one that ran until 2021 and the current one in use that runs until 2025. These budgetary reports feature goals and ambitions of the municipality and are an interesting source of policy communication. Furthermore, two pieces of more specialised policy paper will be used. One concerning a specific real estate project in the city and an administrative agreement, which illustrates the road to 2030 for the municipality (Municipality of Apeldoorn, 2017; Municipality of Apeldoorn, 2018; Municipality of Apeldoorn, 2021).

The selection of interviewees in this research was done through non-probability sampling. Non-probability sampling means that interviewees are chosen based on their ability to contribute to the case. This sampling method was chosen, because there is a very specific type of case that this research needs: people working within the municipality of Apeldoorn that are involved in circular economy policy (Van Thiel, 2014). Selecting certain employees of the municipality of Apeldoorn was done by purposive sampling. People were selected based on their expertise in connection to the circular cause, so people who were part of the circular taskforce within the municipality were approached. These people were selected through the project leader of the circular economy within the municipality. That person leads a group of interested, motivated and knowledgeable people to try to and get the municipality on track towards the goals the municipality has set for themselves concerning the circular economy. Other experts include a communications expert and people involved in Cityloops. In table 1 the functions of the interviewees can be seen.

All the interviews of the participants were used in the research through the method discussed further below, except for the interview with the communications advisor on sustainability in Apeldoorn. The recording data of this interview was corrupted. This meant that it was not possible to make a transcript of this particular interview, it is still listed because the notes of the interview do remain, and her insight helped with the formulating of some answers to the research questions. At the beginning of each interview, there is an introduction. This will discuss all the relevant information that participants have to know before getting interviewed and ask any practical questions such as function and their role in the organisation. This is the type of data that does not have a lot of influence on the results of the study and

mostly functions as a backlog for personal information about the respondents. Besides the general information, permission to record the interview and use names or their function within the organisation will be explicitly talked about. Relevant information at the start will also contain information about the research so that interviewees are aware of the basis of the research. At the end of each interview the interviewees will be asked if they have something they want to contribute, as it is always important to ask the participants if they want to talk about certain things that were not mentioned, because they are experts in their field. It is important to ask for their insight and opinion.

Table 1: Interviewees

Function in municipality
Project supervisor: *Energiek* living
Project supervisor: real estate
Director of public space
Project supervisor: spatial planning and realisation
Strategic subsidy advisor and project supervisor Cityloops
Project leader Circular economy
Communication Advisor Sustainability

3.5.2 Operationalisation

In preparation of the data collection, the abstract concepts from the academic literature must be made more concrete. To assist in this process, an operationalisation took place. This means the (abstract) concepts used in this research were translated into concrete questions that could be asked during the interviews. The concepts will be taken from the conceptual model presented in chapter 2. The conceptual model provides an overview of the most important concepts, according to theory, for researching what influences knowledge sharing. Also, the knowledge types that are most important to the circular transition. This operationalisation resulted in an interview guide that can be found in appendix 1.

The concepts that will be operationalised and used in the interview or the content analysis are as followed:

- Nature of knowledge

The nature of knowledge that is shared in the municipality of Apeldoorn is an important facet towards optimising the knowledge sharing capabilities of the municipality. By analysing the existing communication within the municipality and looking for the three knowledge types that Zwiers, Jaeger-Erben & Hofmann

argue leads to circular literacy: system knowledge, target knowledge & transformation knowledge, as well as the prime distinction within knowledge discourse: tacit and explicit knowledge. These types of knowledge have been discussed in chapter 2 and will form the basis for the analysis of the data collected through communication of the municipality, such as the seminar and policy papers.

The distinction between tacit and explicit knowledge lies within the practical and the abstract. When concerning tacit knowledge, it is important to keep in mind that it entails process knowledge and knowledge that is not easily codified. It concerns knowledge that is gained while on the job. Explicit knowledge entails the knowledge mostly shared within the policy papers. It is most likely more general, easily codified knowledge. It is not context dependent, something that tacit knowledge is.

System knowledge discusses the current knowledge about the system Apeldoorn functions in. To measure this type of knowledge, it is important to ask about their job and how it relates to circularity. When people talk about their job description and how certain aspects of the job relate to circularity, they can demonstrate system knowledge. Target knowledge can be measured by asking about goals within the municipality and looking at goals concerning circularity from the policy papers. Transformation knowledge discusses the more practical know-how concerning the means which have to change or where change must happen for the transition to take place. This type of knowledge will be measured by looking for concrete plans for change within the municipality and asking about examples when interviewing.

- Motivation to share

The first couple of the interview questions ask about the motivation to share within the municipality of Apeldoorn. The theories of Ipe (2003) and Willem & Buelens (2007) argue that there are a couple factors which are important to the motivation of employees to share information. The power dynamic within an organisation for example. Which means the relation with a supervisor is important to ask about. Identification was also an important part of the motivation to share. Willem & Buelens argue that identification is low within governmental work. By asking about how important people find their work and what sacrifices they make, this concept can be tested. Trust is something that is hard to ask about directly in an interview. So, by asking about the knowledge distribution between colleagues, some information can be gathered about this subject. As trust between colleagues can stem from the perceived expertise or knowledgeability of colleagues. Comfortability also plays a part in trust, which is translated to the way people feel around their colleagues. Finally, there are incentives to share. Within governments there is not the same type of incentivization as with the private sector, but employers can still encourage knowledge sharing. So that is what will be discussed (Cabrera & Cabrera, 2002).

- Opportunity to share

Willem & Buelens (2007) illustrate three main types of opportunities within government to share information. Formal systems, which are the rules and standard procedures. These rules and standard procedures will be operationalised to mean if there are guidelines for employees when they are participating in meetings. Lateral coordination, which is unplanned communication in a planned environment. Which constitutes most interactions that employees will have with each other? Finally, informal coordination is the talks people have outside of work-related events and constitute personal networks with colleagues. This will be measured by discussing whether or not the interviewees have informal contact with their colleagues, what forms this contact takes and how often. In the interviews, there will be a specific focus on what types of coordination people experience within their working life and what type of sharing opportunity they themselves find to be most productive and favourable. This

coordination is then further categorised by horizontal and vertical, meaning with people of the same hierarchical level and people on different hierarchical levels. There are also forms of one-sided knowledge sharing that constitute training or lectures which employees can follow on their own initiative, which do not function on any hierarchical levels.

- Voicing Expectations

Voicing expectations is a way in which leaders within a community, in the context of this case the leadership of the municipality, can help a niche develop and become mainstream. Voicing expectations can be construed as the way in which goals are being articulated by leadership. Expressing ambition is a way in which this can be measured. The process of voicing expectations is complete, however, when these articulated goals are also known with the people who have to carry out these ambitions. This means that familiarity with goals also is important to take into account when discussing voicing expectations in the context of a niche (Martiskainen, 2017).

- Culture of work environment

Ipe (2003) talks about the culture of the work environment as the context in which the three factors that are mentioned above function. It is not necessarily something in and of itself, but rather something that is shaped by the characteristics of the three other factors: opportunities to share, motivation to share and nature of knowledge. This manifests itself in the way employees perceive their working conditions. This can thus be measured by asking what employees think about their working conditions and adding to the conclusion by taking into account the previous factors. Furthermore, the internal thought process that leads to knowledge sharing and the average perceived knowledge in the work force is attributed to the culture of the work environment.

3.5.3 Data analysis

The data analysis will be performed on the data sets of the interviews collected during the research. These data sets are transcripts made of the recording of the interviews and they are imported to *ATLAS.ti,* which is a specialised tool to analyse qualitative data sets. In *ATLAS.ti* a code tree was made which is derived from the operationalisation that happened above. This code tree can be found in appendix 2. By linking certain passages to the operationalised concepts, the questions that were posed in the introduction can be answered on the basis of the codes from the *ATLAS.ti* tool.

The second, albeit smaller part of the data analysis that was done during this research, concerns the analysing of the communications of the municipality of Apeldoorn. A large piece of communications concerning circular economy is a lecture organised by the project leader on circular economy within Apeldoorn. This lecture is used as a basis for introducing employees within the municipality to the concept of the circular economy, and it is referenced on their own platform below news flashes about the circular economy (Municipality of Apeldoorn, 2021). The before mentioned policy papers will also be discussed in the context of the appropriate sub-questions. They will be used to strengthen arguments made by interviewees, as well as function as more concrete examples of the types of knowledge used by the municipality.

3.6 Reliability and validity of the research

In scientific research, the reliability and validity of research are important to the integrity of the research. Reliability entails the accuracy and the consistency of the measured variables within research. When the accuracy and the consistency are higher, there is less chance the results are merely coincidental. Accuracy refers to the measurement instruments that are used in research. In the case of this research, the

measurement instruments are interviews and content analysis. These instruments measure concepts from the conceptual model, which can be found in chapter 2. The instruments should capture these concepts as accurately and precisely as possible to achieve high accuracy (Van Thiel, 2014). The second building block of reliability is consistency, which is harder to achieve than accuracy. This is due to the fact that this research concerns itself with people and people are not consistent when gather data directly from them, especially when the data is subjective in nature. This research has done a couple of things to improve reliability. To improve accuracy, a multi-method approach has been chosen, consisting of interviews and content analysis. Furthermore, all data that was collected from interviews is stored and can be reviewed to check its reliability and together with the interview questions and coding scheme be used to better understand the process that was followed. Due to the fact that some of the data used in the research is inaccessible inter-personal communication, the reliability of the research is diminished somewhat.

Validity determines how well the results of a study are represented by the data that would be gathered from similar interviewees from outside the research. Validity can be split up in two basic parts. Internal validity, which refers to the degree to which the researcher effectively measured the effect they tried to research. This is influenced by a proper operationalisation of the concepts researched in the study and by whether the presupposed relationship between the variables within the study actually exist (Van Thiel, 2014). In the case of this research this concerns the relationship between knowledge sharing within the municipality of Apeldoorn and the implementation of the circular economy. The second component of validity is external validity, which concerns the degree to which the research can be generalized (Van Thiel, 2014). To ensure the internal validity of the research an extensive operationalisation of the concepts was done earlier in this chapter and the relationship between the two concepts was confirmed by earlier research (Atiku, 2020; EAA, 2021). To generalize the findings of a case study is challenging, as the case is often unique, and the results are context dependent. For this study, the case is the municipality of Apeldoorn, so findings could be generalised to apply to different municipalities and similar organisations. Those cases might not have all the same problems or processes as the municipality, but within the Netherlands there is considerable overlap in the way municipalities are organised and run. This means that these findings could prove useful to other organisations as well.

4. Results

In the previous chapter, the method of this study was discussed. The following chapter will discuss the results of the data gathered using the aforementioned methods. These results will be used to answer the sub questions posed in the introduction of this research. The first sub question was answered in the literary review and the conceptual model and was the basis for the methodological chapter. The remaining three sub questions will be answered in this chapter. This will be done by first discussing the types of knowledge that are present in the municipality, which will answer the second sub question: What types of knowledge are prevalent within the municipality of Apeldoorn? Next, the third sub question: How is knowledge sharing currently conducted within the municipality of Apeldoorn? Will be discussed by giving a framework of how knowledge is shared through opportunities and voicing expectations. Finally, the last sub question: What factors impede knowledge sharing within the municipality of Apeldoorn? Which will address most of the factors mentioned within the conceptual model and indicate where there is friction that inhibits knowledge sharing and how some factors facilitate knowledge sharing.

4.1 Knowledge within the municipality of Apeldoorn

The first sub question that will be discussed within this chapter concerns the knowledge types that are prevalent within the municipality. This question will be answered by using a mix of quotes and analysis from the interviews and some insights gained from studying communication within the municipality. This question helps focus on the knowledge types that are important when discussing the transition to a circular economy: system-, target- and transformation knowledge. Furthermore, tacit and explicit knowledge will be discussed, as tacit knowledge is most important within the context of knowledge sharing in organisations. So, a lack of tacit knowledge sharing could be an issue. Also, explicit knowledge although it is viewed as less important in knowledge sharing as a whole, is also important because of the complexity of the terminology of the circular economy

4.1.1 Tacit & Explicit knowledge

When discussing knowledge, the first distinction is the one between tacit knowledge, which originates from hand-on experience and is harder to share and codify. Explicit knowledge, which is knowledge learned in school for example and is more easily shared and codified. Looking at the knowledge in the municipality of Apeldoorn, a couple of things stand out. First, the focus is more on explicit knowledge than tacit knowledge within the seminar. The seminar is the prime example of communication concerning the circular economy within the municipality of Apeldoorn (Municipality of Apeldoorn, 2020). This seminar starts with a lecture on what the circular economy is. It discusses the theory behind the concept extensively. It is clear and easily understandable, a prime example of correctly shared explicit knowledge. The seminar falls short when trying to focus more on the practical. Tacit knowledge is something that is hard to quantify and more difficult to share because it entails the more practical knowledge gained while on the job. The title of this seminar: circular economy from theory to practice, seems to indicate that it would focus more on the practical. It mentions for instance a street within Apeldoorn which the municipality plans to renovate using only circular material or a newly renovated headquarters which was built using building blocks of the circular mentioned during the first part of the seminar. Where it falls short is that these are examples, not know-how knowledge gathered on the job. Which is what is necessary to have successful knowledge sharing within an organisation. Another example which is indicative of the lack of shared tacit knowledge is a memo shared by one of the people within the inner circle of the circular economy taskforce. It is a chart with examples of ways the circular economy is implemented in her specific field. The goal of this memo was to motivate people to do the same within their respective field. This illustrates that what is shared is more often explicit examples rather than what

they learned on the job that could help people achieve the same success. This contradiction is further illustrated by the interviews.

"*They [project evaluations] do not happen often enough. They are not recorded correctly…feedback is not delivered enough. It is structured to do so, those project evaluations, but in practice it does not happen*." - Project supervisor spatial planning and realisation

Evaluation is the basis for learning about process, which is where tacit knowledge has a lot of its basis. This could indicate that there might be less tacit knowledge in the municipality. This is further evident in the different policy papers where knowledge is mentioned. The municipality only talks about the projects they have done or that are happening. They state ambition to get knowledge from them, but give no framework of how, and it is important to be specific. This is because the evaluation process, which could yield tacit knowledge, has been said to be lacking within the municipality. So, specifying how to gain knowledge from sources is important, because ambition and action are two separate things.

"*I think [technical knowledge] is very essential, because so much that is organised is dependent on technical actions. So, somebody has to see what technical actions are required and how it could be done in a different way. And that is something that is [difficult] for people who are behind a desk all day, they think more in processes and less about technical actions or what has to happen outside*"- Director of public space

4.1.2 Circular literacy

The three knowledge types of circular literacy are all apparent within the municipality of Apeldoorn. System knowledge or the capability to understand complex systems is the foundation for the circularity transition. The stepping-off point before you can begin to figure out how to move forward. During both the seminar and further communication concerning the circular economy, the municipality displayed extensive knowledge of their systems within the municipality as well as from the systems that the municipality is intertwined on the outside.

"When I am looking for a particular piece of knowledge, I mostly know somebody who has the expertise I am looking for." - Strategic subsidy advisor and project supervisor Cityloops

"*If you are looking at knowledge flow or information interactions that are taking placet here, then you almost always have to facilitate that [yourself] and ask point-blank: are there things we should know? Do we have to know this or that? Is there anything else you want to share….if you want to know, and you ask, they will tell you, but not the other way around*" - Strategic subsidy advisor and project supervisor Cityloops

Although this illustrates the knowledge level in the municipality is high, it also illustrates a deeper problem with knowledge sharing within the municipality. That someone has to search for knowledge more than it comes to the person without them actively asking for it. Meaning that that most of the time important information is not shared is not shared proactively, but rather ad hoc. Transformation knowledge, the knowledge on how to innovate the current practises, is also present with employees. Employees displayed impressive knowledge of certain transformative projects, such as the Bokashi initiative, which is a certain type of compost that can be made in a circular process. Or how to go about starting an initiative to implement circular charging stations for electric cars. It was not the transformative knowledge that held them back, but something more widespread within the municipality than the individual or collective knowledge levels. The goals that are set by the municipality and the government, something that has to do with target knowledge, the ability to formulate relevant goals.

"*The only concrete goal that has been set is: 25 percent circular purchasing in 2023. It was 10 percent last year, the difficulty lies in the fact that it is not very easy to quantify."* - Project leader circular economy

Most employees of the municipality are aware of the goals that have been set, at least the people who are directly involved with the circular economy, but these goals themselves are the problem. In what way exactly will be discussed further down in the part about voicing expectations. In short, the vagueness of the goals is holding the municipality back from making the right improvements concerning the circular economy. It means that the target knowledge is not substantial enough within the municipality.

"Perhaps [the municipality] should try to formulate the goals better… right now nobody gets judged on it when you do not stick to it" - Project supervisor real estate talking about the goals set by the municipality

The goals and target knowledge is a central part of the problems within Apeldoorn concerning circular economy. Setting abstract goals like 25% percent circular purchasing brings forth a problem. The interpretation behind 25% is not thoroughly defined. This means that employees do not fully understand what it means to have 25% circular purchasing. These goals stipulate a disconnect between leadership who set the goals and employees who have to achieve the goals.

Within the policy papers that discuss the multi-year budgets there is not any specific attention to the circular economy except for half a page and here it is presented under the header of reducing resource usage. They give only two indicators by how they want to measure the progress on the transition to the circular economy, both of these indicators deal have to do with household waste which is only a very small part of the circular economy transition. Household waste is only 71 kilotons of the total 1.455 that Apeldoorn produced in 2020 for example. Two indicators also are not a lot when compared to other topics like reduction of carbon emission, which has 17 indicators. When disregarding the two indicators on household waste, they have zero indicators on measuring progress concerning the circular economy. The discrepancy between emission and circularity is stark, as emission reduction has some indicators that are tangible goals such as certain projects they want to finish or measures they want to take, the 'circular' indicators boil down to keeping an eye on household waste flow. This further exemplifies a lack of target knowledge, something that will be discussed when talking about voicing expectations.

4.1.3 Conclusion

Having discussed the knowledge types present within the municipality, we can answer the second sub question of this research: What types of knowledge are prevalent within the municipality of Apeldoorn? It is clear that sharing of tacit knowledge or the know-how is lacking within the municipality. Practical knowledge is seen more as examples and less as knowledge gathered while on the job. Furthermore, target knowledge can be greatly improved upon. System and transformation knowledge is something that is sufficiently available within the municipality, but employees are not incentivised or guided enough for the knowledge to reach the right people on its own.

4.2 The conducting of knowledge sharing in Apeldoorn

Next, it can be discussed how the knowledge types mentioned above are shared within the municipality. This research identifies two main ways to share knowledge internally as to more easily categorise and present the data that was gathered. First, there is communication on a horizontal level, which consists of meetings between employees on a similar level. There is also communication on a vertical level between supervisors or the municipality as an organisation on the one hand and employees on the other hand. Horizontal communication will be mainly discussed through the opportunities to share or gather knowledge that employees get. As well as the guidelines that are part of the formal systems within the

municipality. The vertical communication is discussed through the voicing of expectations of supervisors or the municipality. Finally, the opportunities for employees to gather knowledge or skills externally, meaning from sources other than their fellow employees or supervisors will be discussed.

Something that became apparent during the first interview, and which has influenced both horizontal- and vertical communication, is that the municipality recently underwent a reorganisation. Every employee that was interviewed, spoke about the reorganisation in an increasingly critical way. It has caused the sharing of knowledge within Apeldoorn to be much more difficult than it used to be, because employees had to adapt to the new organisational structure.

"I think it is a weird situation, but oh well, we have been working like this for half a year" - Project supervisor: spatial planning and realisation

4.2.1 Horizontal communication

Horizontal formal meetings often happen within the municipality. It differs per person, position and department. People attached to the same project have meetings at a regular interval. The same can be said for the people who work in the circular economy workgroup. Due to the reorganisation, there have been some difficulty among employees to find the right people due to departments being reorganised.

"*I always experience the same thing after a reorganisation, the dust has to settle, so to say. I do miss guidance. There are so many ambitions that we have to live up to and our management wants to give guidance on so many topics. That a subject like circularity gets overlooked a bit."* - Director of public space

The reorganisation makes it hard on some people, and they miss guidance. This influences trust that employees have, which will be discussed further below. Another facet that has had a big impact on communication is the COVID-19 pandemic. Due to people largely working from home, a large source of communication has been removed from the equation. The informal contact that a lot of people had with colleagues has virtually disappeared.

"*I do think [the loss of informal meetings] is a shame. You obviously try to substitute it with a video screen or through the phone, but then you have to go looking for it. When meeting by the coffee machine, you are not looking for information or looking to share, but you find it anyway"* - Project supervisor: real estate

As mentioned in chapter two. Informal communication is often the most effective in sharing knowledge. Due to the pandemic, this crucial source of knowledge within an organisation fell through, and it definitely has had a negative impact on quality and quantity of knowledge sharing within the municipality. Moreover, informal communication is where, in some networks, the most tacit knowledge is shared (Ngah & Jusoff, 2009). This could be a contributing factor to the lower degree of tacit knowledge that is being shared in the municipality.

4.2.2 Vertical communication

The vertical line within an organisation is usually there to get everybody on the same page. In line with strategic niche management, to voice expectations for a niche is to make it have a future (Martiskainen, 2017). Within the municipality of Apeldoorn, the goals set by management of the municipality are very vague, but it plays a big part in the reason why the circular economy has trouble lifting off the ground within the municipal organisation.

"I have been saying it multiple times, there has to be a clear statement from politicians and management, and now, well, there is none" - Project leader circular economy

When voicing expectations, the facilitating parties have to set clear goals to achieve. In this case, the municipal government has set goals for the municipality to manage a certain amount of circular purchasing as a municipality. However, every single employee that was interviewed stated that the wide interpretability of the goals was detrimental to the achieving of said goals.

"*As long as you keep it vague, you can still pivot … it is essentially the whole problem they do not want to commit. As long as you don't commit, well yeah, then you will never start down the path you might wish to take. Then you can always say: 'we tried to do it in a sustainable fashion, but oh well, we did not succeed'."* - Strategic subsidy advisor and project supervisor Cityloops

The indicators from the policy paper were mentioned before. The discrepancy with emission was mentioned. There were a lot more indicators than for the circular economy, you could even argue there were none, the vagueness is perhaps on purpose. As was mentioned above by an employee, and it is something that perhaps is more indicative of government as a whole: when keeping the interpretation of goals abstract, for instance using a percentage to quantify a society wide transformation of the economy, you give yourself more wiggle room to function. This makes it harder however for people who might not be expert on the circular economy to work on the transition. One employee said he saw the circular goals more as a *best effort obligation* than a goal to be achieved 100% of the time. Most employees that are directly involved in getting the circular economy to lift off within Apeldoorn do try to meet these goals, whether or not they are vague, but due to the vagueness the interpretation of how to achieve them can be hard for some and leads to an inability to work on them.

"Those abstract goals … they are implemented in our own multi-year budget programme. Consequently, it is very hard to translate them into concrete goals, because the goals are very abstract. How are you going to translate them into concrete measures? I think that is something every municipality struggles with." - Director of public space

Another facet to vertical communication besides the direct goals and voicing of expectations is the communication between supervisors and employees. Following the reorganisation, managers were restructured to have a lot of people working under them. They are a lot less hands-on, which might be to the liking of some employees, but it was stated that these managers mostly have less of an idea what is happening in their department. This is something that influences the culture of the work environment, that will be discussed during the answering of the final sub question.

4.2.3 Gathering of knowledge

One small piece of the puzzle concerns the degree of which employees can gather information from sources other than their direct colleagues. As was said before, colleagues are a valuable source of information, but they have to be reached and found. An easier way of gathering knowledge concerning a difficult subject like the circular economy would be seminars and lectures. When asked about it, all employees mentioned that they felt that if they wanted to, the municipality would facilitate extra lectures or seminars. Even Though they also mentioned finding the circular economy a challenging subject to grasp, but because it is not something that management encourages, consequently it is not something many employees make a use of.

The municipality also has its own communication platform called A-net. It is another way for employees to stay in the loop and gather information about certain topics or the ongoing projects within the municipality. This type of knowledge sharing might offer some benefit, but it is more akin to headlines of a new article and does not offer substantial information to contribute to knowledge sharing is the way that would improve people's understanding of the circular economy, for example.

"There is something on A-net. But [the interviewer] should look on A-net, if you think that is an appropriate knowledge exchange level. … There is some knowledge being shared, but if it actually stimulates knowledge sharing?" - Strategic subsidy advisor and project supervisor Cityloops

4.2.4 Conclusion

Having discussed the current way knowledge is shared, the third sub question can be answered: How is knowledge sharing currently conducted within the municipality of Apeldoorn? Most employees share knowledge between themselves in normal meetings. Which most people find to be functioning well. The reorganisation has caused the day-to-day to become more difficult, which is most likely for a short period of time. Due to the Covid-19 pandemic, the informal meetings have almost disappeared which has caused the amount of moments people can actively share knowledge to decrease. The goals formulated by the municipality can be interpreted in too many ways, which causes confusion and inaction. The vagueness affects knowledge sharing because when there are no concrete guidelines to achieve goals. This leads to employees either feeling like it is not important or do not know how to discuss the goals.

4.3 Impediments to knowledge sharing

The final piece of the puzzle will discuss factors that impede knowledge sharing within Apeldoorn. In the two subchapters above, certain factors were already discussed, such as nature of knowledge, opportunities to share and voicing expectations. These factors will be repeated in the conclusion of this subchapter. To answer the final sub question: What factors impede knowledge sharing within the municipality of Apeldoorn? The remaining factors of the motivation to share knowledge and the culture of the work environment will be discussed. By discussing these factors, there will be a complete overview of the way knowledge sharing is done within the municipality and where major improvements can be made. This information can be used to answer the research question in the next chapter.

4.3.1 Motivation to share knowledge

To share knowledge within an organisation, employees have to be incentivised to do so. This incentivisation can be internal or external. Internal motivation has to do with identification with the work that people do. Trust in colleagues and supervisors also plays a part. External motivation can be construed as the incentives people experience to share knowledge, by a supervisor for instance. As was mentioned in chapter two, identification is something normally not associated with work in the public sector. Identification with the work people do for circularity within Apeldoorn does not seem to follow the same school of thought.

"*It is somewhat of an inner drive. I always say my mission is that everybody lives healthy and sustainably with his or her own body and mother earth. That is something I want to commit to. I have been busy with energy transition for a while in my work and as project manager with climate adaptation."* - Project leader circular economy

All employees that were interviewed expressed to varying degrees, but without fail, an intrinsic motivation to work towards the circular economy. The mindset within this group is that sustainability and the circular

economy are vitally important topics to discuss and work on. This helps the knowledge sharing within this particular group. This mindset is not widespread within all layers of the municipality. As mentioned before, the goals set for the circular economy are vague, and most of the people interviewed stated that the municipality considered other issues to be more important.

"Our management is less concerned with that. With circularity. They are very busy with realising ambitions in the field of housing for instance or energy transition, dealing with energy and heat. I think the focus is very limited, on circularity itself or on reuse." - Director of public space

The lesser focus on circularity also has an influence on the culture of the work environment within the municipality that will be discussed below. It also influences the knowledge sharing within the municipality, because trust in the supervisors or in this case the organisation as a whole decrease. This decrease in trust negatively influences knowledge sharing. Another facet to the motivation employees feels to share the knowledge they have is the extent to which they are encouraged to do so by supervisors or the organisation.

"*I do think [knowledge sharing] can be stimulated more, I think a lot of [information] stays within the department. I do think it is too bad that more people are not aware of what we are doing here."* - Project supervisor: real estate

Being aware of what is going on in other departments is vital information to employees. First, it saves time when starting up a new project, to know where to find certain information or to already know the basics about a certain project or process. But it is also part of the mindset within the municipality. Knowledge sharing is not being actively incentivised by supervisors, which was corroborated by multiple interviewees.

"*No, that is something that comes more from an intrinsic motivation*" - Director of public space when asked about how to municipality encourages knowledge sharing

Trust is another aspect that influences motivation to share. Within the municipality, trust in colleagues is apparent. All employees were positive about their colleagues and reaffirmed the belief that their colleagues had satisfactory expertise and knowledge. Trust is further emphasised by employees when talking about managers. They feel safe around their managers and believe that managers are genuine in their motives to help their employees. This type of trust has more to do with if they feel safe than if they feel like their supervisor is actively involved with their subject. The reorganisation that was mentioned before did have a negative impact on the trust employees had in managers in particular.

"*Because I never really know where my manager is. If we look at the new structure of department managers, I can expect almost nothing from a manager because he/she sometimes has 70 people working under them. And even then the only thing you can expect from a supervisor is a: hey guys, are you already busy with knowledge exchange?"* - Strategic subsidy advisor and project supervisor Cityloops

The fact that employees were worried about the workload of managers within the municipality could translate to the employees being less inclined to share knowledge with the municipality because managers were often too busy to engage with them on a level that was satisfactory to them. Managers were often busier with processes within the municipality and were not viewed as being knowledgeable on most subjects, which is something that decreases trust.

"[supervisor name] has 50 or 60 people in their team. When I need him, I will send him a text and I will get a response days later… with big teams [supervisors] are mostly working on big abstract outlines and you have got a human resource management job too. " - Project supervisor: *Energiek* living

4.3.2 The work environment of the municipality of Apeldoorn.

As was mentioned in chapter two. The culture of the work environment of an organisation is something that is influenced by the aspects that make up said work environment. In this case, the last couple of pages have been dedicated to explaining various aspects of the culture within the municipality. These findings will be summarised in this part.

Within the municipality of Apeldoorn, there is a very knowledgeable culture. Most people have considerable knowledge in their field of expertise, but more often than not, people tend to be more reactive in their knowledge sharing than proactive, as was mentioned before. There is trust in colleagues to have knowledge, but active sharing of that knowledge is not something that happens a lot within the municipality.

"*Instead of cross contamination [of knowledge] you have to ask about it. The knowledge management is reactive. It all goes a bit slower*." - Strategic subsidy advisor and project supervisor Cityloops

The commitment to the circular economy has been discussed above, but can be discussed a bit more in the context of the work environment it creates. The interviewed employees feel that due to the lower commitment to the circular economy that the organisation and their supervisors do not prioritize the work that is delivered surrounding circular economy or that nothing is done with the input they deliver. This caused there to be a more negative work environment, which has a negative effect on the knowledge sharing that occurs within the organisation. People feel less supported and feel that their work is not a priority.

4.3.3 Conclusion

Within this chapter, all facets that influence knowledge sharing have been discussed. The final sub question: What factors impede knowledge sharing within the municipality of Apeldoorn? Can be answered.

A lack of focus on tacit knowledge when knowledge is being shared within the municipality impedes the expansion of the pool of knowledge surrounding the circular economy. Know-how is shared far less than the explicit knowledge. The recent reorganisation also heavily impeded the quality and ease of knowledge sharing. Some of the trouble the reorganisation brings will ebb away as time passes, but aspects like the size of departments is something that will probably continue even after the dust has settled. The goals and commitment to those goals from management and the municipality as a whole is something that has had a huge impact on the clarity surrounding the circular economy. This lack of clarity has often been mentioned to be a huge impediment to the work that is being done on the circular economy. Knowledge sharing is also not something that employees are actively incentivised to do or have any structural guidelines as to how to go about doing. The people that are working directly on the circular economy are doing mostly through an intrinsic motivation which leads to strong identification with their work. This is not something that was visible throughout the organisation. If more employees from outside the directly involved group saw the importance of the circular economy, it would contribute greatly to the knowledge that was being shared concerning the circular economy.

5. Conclusion and discussion

In the last couple of years, the circular economy has moved to the forefront of the political stage. Supranational, national and local governments all have committed to the transition from a linear to circular economy to decrees waste and thus create a more sustainable future (European Commission, 2020). The Environmental Assessment Agency (2021) has stated that for local governments, knowledge sharing is an important tool to foster the transition to a circular economy. The goal of this research was to assess the current knowledge sharing process within the municipality of Apeldoorn and diagnose in what ways knowledge sharing can be improved upon. To achieve this goal the following research question was formulated: "In what ways can the current process of knowledge sharing in the municipality of Apeldoorn be improved upon to achieve the transition to a circular economy" The second chapter of this research has formulated the framework in which the research question can be answered. This conceptual framework described five main factors that influence knowledge sharing. With the results of the previous chapter the final step of the regulative cycle that this research handles can be taken: to make a plan with which to improve the process of knowledge sharing in Apeldoorn. The plan will consist of a couple of recommendations that are derived from the researched factors within the municipality.

5.1 Conclusion

Not all influencing factors mentioned in the previous chapter impose the same number of limitations on the process of knowledge sharing. The conceptual model shows the facets that are considered to be important to knowledge sharing and knowledge concerning the circular economy. In the empirical part of this research, these facets were measured and researched. Not all elements mentioned in the literature, were as prevalent in the empirical data. The aspects mentioned below emerged as relevant for the circular transition in Apeldoorn. Presented below are the factors that were observed to have the largest negative influence on knowledge sharing:

- Clarity of- and commitment to goals concerning the circular economy
- Lack of sharing of tacit knowledge within the organisation
- Weak identification from the organisation to the circular economy
- Lack of informal coordination
- Lack of trust in organisation after reorganisation

5.1.1 Goals

Through voicing expectations, goals can be set for a niche to help it progress and become mainstream. Within the municipality of Apeldoorn, certain goals have been set by the municipality, concerning the circular economy. These goals, however, fail to offer concrete handles for employees to effectively achieve the goals set by the municipality. To ensure that the set goals will be achieved, the goals have to be more concrete. The current goal, 25% of purchases must be circular, leaves too much over to interpretation. First, what this means has to be made clearer, as there is confusion on how to achieve the goals. Furthermore, instead of having an overarching goal, to commit to making certain planned projects circular might also prove to be effective in making goals more attainable. Moreover, even though these goals were set, they were often not prioritised within the municipality. Some issues like the housing crisis or the energy transition were given priority. To help the circular economy move to the forefront of the municipality's priorities, the people responsible for the circular economy should try to make it so that the circular economy gets intertwined with the projects that are prioritised. The idea of a circular economy is something that, if implemented to the fullest, will have to be engrained in every layer of the municipality. Issues like the housing crisis and the energy transition are projects that lend themselves well to also fostering progress for the circular economy.

"*I don't believe in circular policy. I'd rather see that we just do it. Circularity should be like breathing. It should just part of it*" - Project supervisor: *Energiek* living

5.1.2 Tacit Knowledge

Knowledge has been at the forefront of this research, and it has become clear that even though there is a lot of knowledge concerning the current system, target knowledge and certain tacit knowledge is still lacking within the municipality. The circular economy is a new and complicated subject. The best way to integrate it in projects is something that is not clear to all employees. There is a lot of knowledge that is lost during the project due to the focus not being with evaluation. Making evaluation a priority within the municipality could prove beneficial to tacit knowledge sharing within the municipality. Furthermore, explicit knowledge is often shared where tacit knowledge, although harder to share, would prove more useful. For instance, when trying to share how the circular mindset was implemented in each employee's respective field of expertise.

5.1.3 Identification

Identification is important within a workplace to provide internal motivation to work on certain subjects. Intrinsic motivation is something that people that were directly involved with the circular economy had. A strong belief that the circular economy and sustainability are part of the future of the municipality and should play an important part in the policy of the government is present with the interviewees. This is not something that is necessarily true for the whole municipality. If more employees identified with the cause of the circular economy, they would most likely more actively share knowledge concerning the circular economy, as they would view it as more important. This is something that also coincides with the previous point on voicing expectations. When leadership does not seem to prioritise the circular economy, it is hard for employees to feel strongly about a certain subject. Identification is also something that can be fostered by creating a sense of importance. This is something that can be recognised when comparing the circular economy with the housing crisis. Whereas the housing crisis is something that is seen as a problem throughout the whole municipality, circularity is not on a lot of people's minds. A solution to this problem could be more active sharing of prioritisation by leadership within the municipality to make it so that people feel motivated to work on the transition from a linear to a circular economy. Making goals more concrete and making past work feel more important could also contribute to making the circular economy feel more important.

5.1.4 Informal coordination

The second to last factor that was mentioned was the lack of informal coordination. Before discussing possible ways to increase this type of communication, it is important to mention the larger societal context that this research took place in, the COVID-19 pandemic. Informal communication is something that is very important to knowledge sharing. Whilst there are certainly ways to increase this type of direct employee to employee interaction, such as more organised activities outside work or organise special work retreats to help bonding between colleagues. However, it might well be that society has changed permanently. That this form of communication has played a part in the past, but will be less impactful for an organisation that can function in a hybrid form. It is important for organisations to realize the impact that the pandemic has had and will have on intra-organisational communication. Whilst it might be true that informal communication is something that will not be the same in the future. It is still important that there is a baseline of familiarity between employees. Having at least one physical meeting a month or every two months will still give people the opportunity to have that informal communication and have a basic form of familiarity with colleagues.

5.1.5 Trust

When discussing the lack of trust, there are two ways to interpret it. Trust in supervisors and trust in the organisation as a whole. Leadership having too many people working under them for employees to have the feeling they can have firm grasp on the subject matter is something that can be solved by another reorganisation to make the departments smaller again. This is not a likely scenario. As one employee pointed out, the municipality has chosen for management that helps with the process and is not as involved in the subject matter. With a subject as complicated and new as the circular economy, it is important that perhaps there is someone with expertise on the subject matter that can advise people on how to tackle certain problems concerning the circular economy. There are credible experts in the field that can function in a certain capacity for a short duration to answer process questions for the municipality, as was suggested by one employee. The latter half of lack of trust concerns the organisation. This is something that again is influenced by the lack of commitment to the circular economy. The employees do not feel supported by management in their effort on the circular economy, because it seems that the priority more often than not lies somewhere else. By having leadership, be it from the political or from administrative branch, commit to the circular goals, employees would feel much more represented and trust in the organisation would improve.

5.1.6 Conclusion

Having discussed all the major factors that were identified in the previous chapter, the research question: "In what ways can the current process of knowledge sharing in the municipality of Apeldoorn be improved upon to achieve the transition to a circular economy" can now be answered. These are the main suggestion on how to improve the knowledge sharing process:

- Have leadership make more concrete goals and committing to those goals.
- Making more use of tacit knowledge within the organisation by focussing on project evaluation.
- Trying to have identification with the circular economy be more organizational wide. Not only with the direct core of employees focussed on the circular economy.
- Hiring an expert to advise on implementing the circular economy.

5.2 Discussion and reflection

Now that the research question has been answered, the following part of this chapter will reflect on the outcome and the methods used in this research. First, there will be a theoretical reflection in which the literature that was used in chapter 2 and the findings presented in chapter 4 will be compared. Secondly, a methodological reflection will take place, which will discuss the possible limitations to the reliability and methods chosen within this research. This part will conclude with some recommendation for future research, as well as discuss the degree to which the results could be generalised.

5.2.1 Theoretical discussion and reflection

The basis of this research was the combined work of knowledge sharing literature Ipe (2003) and Willem & Buelens (2007) as well as a portion of the strategic niche management from Martiskainen (2017). Finally, the work of Zwiers, Jaeger-Erben & Hofmann (2020) which discussed certain knowledge types that were important to consider when trying to transition to a circular economy. All of the literature on knowledge sharing dates from before 2020 and as such, has not incorporated the new style of working that many employees deal with post-corona. The way people interact and share knowledge has changed radically, and as such the literature has not accounted for this. It would be interesting to see how literature on knowledge sharing in the future takes these new working conditions into account and how it transforms knowledge sharing in the workplace.

Identification is something that Willem & Buelens (2007) do not associate with governmental work. This is something that contradicted the findings of this study. Whilst this might be the case for governmental work that is less centred around something that employees feel idealistic about, in the case of the circular economy and the municipality of Apeldoorn there was considerable identification with the work that they were doing. This was however not the case with management who felt less idealistic about the circular economy and as such showed less identification with the work on the circular economy.

Voicing expectations and trust were factors that were deemed important in the knowledge sharing literature. The lack of trust in the organisation and subpar voicing of expectations could prove an influence on the identified problems with knowledge sharing within the municipality of Apeldoorn. It is not possible to speak of a direct link between the two, however, as this type of research does not lend itself to speak of causal relations between two specific factors but more of a general outlook on the knowledge sharing process.

The literature also spoke of ways for employees to gain knowledge, such as trainings or seminars. A seminar was discussed as a part of the knowledge sharing process, but employees stated that no one partook in training or courses to further understand the circular economy, even though the complexity of the subject did cause a certain disconnect between employees.

5.2.2 Methodological discussion and reflection

For this research, interviews were performed and data was analysed, whilst data was abundant after performing the interview. The nature of the research led to time restraints and a focus on the internal communication and knowledge sharing of the municipality of Apeldoorn. It is possible that contractors or partners of the municipality would have interesting insights into the knowledge sharing process between the municipality and external businesses. This is something that future research could explore. Furthermore, qualitative knowledge does lend itself to researching these intricate and subjective cases, but quantitative research could offer interesting insights in the interplay between all the concepts mentioned in the conceptual model. Through making future research into this subject qualitative, insight on the influence each individual concept has on knowledge sharing could be achieved. This research could be done across different municipalities as to further improve generalisation efforts.

The generalisation of this research will be talked about last. Apeldoorn is a municipality with its own interplay between colleagues and between subordinates and management. Its societal and geographical setting is also unique in its own right. As such, the whole research cannot be generalised to be used by other municipalities, but parts of it can. Lessons can be drawn from the problems and challenges identified in Apeldoorn and be used to more quickly identify problems in other municipalities. The advice at the end of 5.1 can be used in every municipality that identifies the same problems as Apeldoorn within their own organisation.

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Appendix 1: Interview questions

The questions are in Dutch because the interviews were all conducted in Dutch.

Voorafgaand:

Kort toelichten onderzoek; rol van kennisdeling binnen de circulaire economie a.d.h.v. artikel PBL.

Toestemming vragen gebruik naam en organisatie

Toestemming vragen voor het opnemen gesprek

Zou u uzelf kunnen voorstellen

- Toespitsing CE

Identification

Wat voor belang hecht u aan het werk dat u doet?

Bent u wel eens bezig met de circulaire economie buiten werktijd?

- Kent u mensen die dat wel doen?

Voicing Expectations

Welke doelen worden er vanuit de gemeente doelen gesteld met betrekking tot circulaire economie?

Zijn deze doelen bekend bij andere afdelingen?

Zijn deze doelen bekend bij mensen buiten de gemeente bijvoorbeeld bij bedrijven?

Motivation to share (Trust)

Hoe is de werksfeer binnen de afdeling?

Hoe is de kennis verdeeld binnen de afdeling? Hebben mensen hun eigen expertise of is er meer gedeelde kennis?

Hoe is het samenwerking met collega's buiten uw afdeling?

Hoe is de samenwerking met uw leidinggevende?

- Op welke manieren heeft u contact?

Nature of Knowledge

Zijn er zaken die de optimale communicatie tussen u en uw collega's belemmeren?

- Wat voor zaken zijn dit?

- Hoe zit dit met externe partijen?
- Ziet u hier een oplossing voor?

Incentives

Wordt het uitwisselen van kennis met collega's gestimuleerd?

§ Ja: op welke manier?

§ Nee: Ziet u dit als een gemis?

Wordt vanuit de gemeente het delen van kennis met bedrijven uit de regio gestimuleerd?

§ Ja: op welke manier?

§ Nee: Ziet u dit als een gemis?

Opportunity to share. (Type of coordination)

Zijn er vanuit de gemeente richtlijnen/procedures waaraan communicatie moet voldoen.

§ Ja: op welke manier?

§ Nee: Ziet u dit als een gemis?

Op welke momenten vindt er tussen u en uw collega's communicatie plaats

§ Formeel/informeel?

§ Waar hecht u meer waarde aan?

Zijn er georganiseerde momenten waar u zelf kennis kan opdoen en/of uitwisselen? Denk hierbij aan congressen of Webinars.

Eigen toevoegingen

Zijn er nog specifieke dingen die u kwijt wilt met betrekking tot circulaire economie en kennisdeling binnen de gemeente Apeldoorn?

Bedanken.

Appendix 2: Coding tree

- Function
    - Within Municipality
    - Focus on circularity
- Type of knowledge
    - System
    - Transformation
    - Target
    - Embedded
    - Tacit
    - Explicit
- Motivation to share
    - Identification
    - Trust colleagues
    - Trust managers
    - Incentives
- Voicing expectations
    - Goals
    - Familiarity with goals
- Opportunities to share
    - Horizontal
        - Formal
        - Informal
        - Guidelines
    - Vertical
        - Formal
        - Informal
        - Guidelines
- Interesting additions