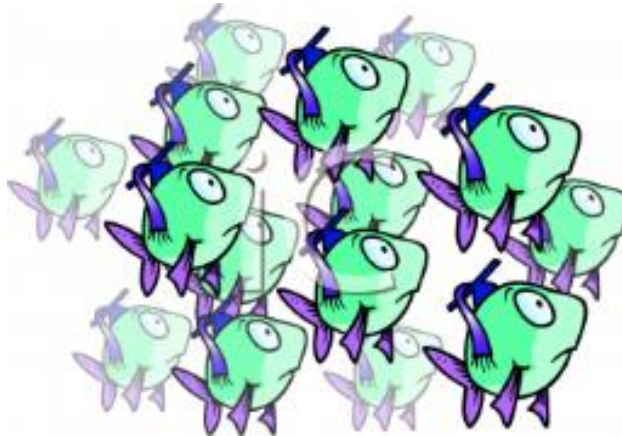Master thesis

Collaborative IT decision making

Exploration of facilitating collaborative IT decision making as a co-operative association in the public sector

Author
Lisa van der Quast

TUDelft
Delft
University of
Technology

Challenge the future

"Als je ^{los} laat, heb je twee handen vrij."
Loesje (1983-2015)

COLLABORATIVE IT DECISION MAKING

Exploration of facilitating collaborative IT decision making as a co-operative association in the public sector

Personal details

Author: Lisa van der Quast

Student number: 1510975

Telephone number: +316 37 46 96 45

E-mail: l.vanderquast@student.tudelft.nl

Study program

Study program: System Engineering Policy Analysis and Management

Department: Policy Organization Law & Gaming (POLG)/Information & Communication

University: Delft University of Technology

Graduation committee

Chairman: Prof. dr. ir. Marijn Janssen

First supervisor: Dr. ing. Bram Klievink

Second supervisor: Dr. Joris Hulstijn

Supervisor Midwaste: Dr. Ad-Willem Schilperoort

Graduation organisation

Midwaste

Co-operative association in the Waste Sector

Schieweg 99

2627 AT Delft

Tel: +31 015 251 1950

Challenge the future

This page intentionally left blank

Preface

Dear Reader,

This report is the result of my graduation research. Writing this thesis as the completion of my studies in Delft was interesting, fun, and sometimes difficult at the same time. The subject of collaborative IT decision making is very interesting to me and I really enjoyed getting into it. The level of complexity of IT decision making for waste collection organizations was even higher than I initially estimated. This complexity makes it challenging to give a valuable advice. I hope this thesis can contribute to success in collaboration initiatives by Midwaste and hopefully leads to more attention and research on co-operative associations for IT decision making in the public sector.

There are several people I would like to thank for their guidance and support. First of all, my supervisors from the TU Delft. As my first supervisor, Bram Klievink frequently gave valuable advice and presented a critical view on my work to keep me focussed. Also the feedback of Joris Hulstijn and Marijn Janssen helped me improve my thesis. I would like to thank my supervisor from Midwaste, Ad-Willem Schilperoort, for his practical input. A special thanks goes to the interviewees of the 12 waste collection organizations that participated in my research, for their information and insight in the IT decision making process.

On a personal level I want to thank all the colleagues at Midwaste for a great time during my internship. I would like to thank my parents, brother and sister for supporting me during my entire studies. Paal Centraal, Graaskalf, Tarantula and JC Woest, thank you for giving me an opportunity to let of some steam. And last but not least, Rick, thank you for making me laugh and relax during long periods of hard working.

Lisa van der Quast

This page intentionally left blank

Executive Summary

For every section of the thesis a short summary is given.

Introduction

In the Netherlands, a study on the success of IT decision making in the public sector shows that most public organizations are unable to develop effective IT solutions (Rijksoverheid, 2014). Collaboration between public organizations may provide the possibility to share in-house IT knowledge, lower the costs for outsourcing and may provide insights in best efforts for designing interfaces between IT solutions. Collaborative IT decision making is therefore being explored for its potential to create synergy effects in the public sector.

The co-operative is a popular and persistent type of collaboration (Bosma & De Jonge, 2014). Around the 3000 co-operatives are economically active in the Netherlands wherein almost the half is less than 10 years old (Van Bekkum, 2013). In collaborative IT decision making co-operative initiatives are still limited (Gemeenten, 2015). A reason for this might be because of the characteristics of IT decision making in the public sector. It is still unknown which role the co-operative association has when achieving successful collaboration in IT decision making. The aim of this study is to explore the role a co-operative as facilitative leader for collaborative IT decision making in the public sector. Main focus will lie upon how IT managers can be persuaded to join the collaboration initiative of the co-operative. Research question is:

> **Which role has the co-operative association when achieving collaboration in IT decision making between public organizations?**

Theoretical framework

According to literature is facilitative leadership a critical ingredient to inter-organizational collaboration (Ansell & Gash, 2007). The facilitator's role is to ensure the integrity of the consensus-building process itself. A facilitative leader need to start the collaborative process with creating shared goals, shared power and mutual trust (Kloth & Applegate, 2004). The cooperative association is a type of facilitative leadership (Bosma & De Jonge, 2014). According to literature is the cooperative achieving inter-organizational collaboration by aiming for change, organizing capacity and economic capacity (van Oorschot, de Hoog, van der Steen, & van Twist, 2013). However, achieving this might be difficult when designing collaboration in IT decision making. This is because the organizations all have a different sense of urgency in IT decision making. The main reasons for this is that the organization are part of a network and not hierarchy. So the range of intervention might be limited because of the characteristics of a network: variety, closedness and mutual dependencies (Bruijn & Heuvelhof, 2009). Therefore, the co-operative need to base the collaboration initiative upon a bottom up mechanism. The members of a cooperative association need to be responsible for the direction of collaboration. Collaboration will only exist if the members agree upon the direction. With this, members immediately attain value from participating in the cooperative association. In collaborative governance one of the main knowledge gaps identified is how the facilitative leader could create a shared understanding between parties. Assessing the three theories above it becomes clear how the cooperative will not design the collaboration and then try to create a shared understanding, but rather design a collaboration that will take the differences and similarities in goals into account. A method for creating shared understanding.

Table 1: Combination of the three theories

Three pillars of the co-operative	Network theories	Inter-organizational collaboration
Is saying that…	*is dealing with…*	*while creating…*
Aiming for change	variety of parties	shared goals.
Organizing capacity	closedness	mutual trust.
Economic capacity	mutual dependencies	shared power.
(van Oorschot, de Hoog, van der Steen, & van Twist, 2013)	(Bruijn & Heuvelhof, 2009)	(Kloth & Applegate, 2004)

Method & Material

The research strategy will be case study research and all units are considered in the natural context to develop and validate a theory. These research units are the 13 waste collection organizations that are members of Midwaste. Because of this relative small number of research units there is strong focus on in depth information. Midwaste will not be considered as a single case study, but rather as a comparative case study. The subject of interest is why a waste collection organization that is member of Midwaste prefer individual IT decision making. How could Midwaste persuade the IT manager in collaboratively go into IT decision making. To do so the research knows two phases. In the first phase all subjects are being assessed independently of each other. And in the second phase will the results of the separated studies be combined and correlated in order to obtain a structure and well-founded picture. All persons interviewed are carefully selected by Midwaste. According to Jurgen de Jong and Ad-Willem Schilperoort will this be the contact persons for IT decision making inside the organization. Therefore, most likely is that these people also will participate in the possible collaborative IT decision making between the members of Midwaste.

Background

A society produces different kind of waste streams. This waste is offered by households or companies. The municipalities are responsible for the waste collection of households. In 2020, 75% of the waste disposal of households in the Netherlands need to be recycled (Stichting vervoeradres, 2012). This number can be achieved if the municipality makes it easier to separate waste. Every municipality is free to arrange the waste collection in the way they think is best. The average municipality want to keep influencing the performance of waste collection and make their own decisions. With a contract period of 5-10 years to a private organizations no big innovations or change will be made. Also there will be little to no space for the social character of waste collection. Waste collection is a public utility and includes a close relationship with the citizens of the Netherlands. Midwaste emerged from an initiative of a number of waste and cleaning companies in 2001. The successes and proven value to members in early 2009 led to the creation of a separate division for trading activities (Midwaste, 2015). Besides the bundling of waste streams is Midwaste also known for its joint purchasing of goods, project initiating, knowledge sharing and the cooperative idea. The main activities include stocktaking, negotiating, making contract agreements and performing the administration. This allows the contracting parties, collectors and processors to fully concentrate on their core business. In 2012 an effort was made to start collaborating in IT decision making within the cooperative Midwaste. Midwaste actively involved themselves with the project LZP (Midwaste, 2015). The main goal of LZP was to improve the communication between all organizations within the supply chain of waste management. Meaning that all forms required during the collection, transport and disposal of waste needed to be digitalized.

Empirical data

The empirical data is presented in three parts. First part is about the mutual dependencies of the waste collection organization. Most important mechanisms identified are the partnership with the software provider, shared IT infrastructure with the municipality and role in an user group with other IT managers. Thus, for Midwaste it is difficult to involve the right person and compete with this lock-in effect. Second part is about the closedness of the IT manager towards Midwaste. Every members is member for a different reason. The experience an IT manager has with collaborating influences the reputation of Midwaste. Some IT managers are never been involved in a collaboration effort. Amount of experience need to be incorporated. This is because if the IT manager has never seen how collaborating in the co-operative is beneficial Midwaste will not know what to expect. And the third part is about future IT issues. Quickly it became clear that the IT managers differ in how they see the future of waste collection.

Analysis

Now it is possible to create a figure of all factors that influence the reason for preferring individual IT decision making above collaborative IT decision making. These will all lead to a certain willingness and readiness of IT managers to start collaborating. For all organizations were positive and negative aspects identified. These divide the members into three groups. See figure n.

Group 1 exists of the members that indicated to be ready, but not willing for collaborative IT decision making. These are the waste collection organizations that increasingly are depending on the partnership with their software provider. A software provider is anticipating on this to create user groups of their clients and provide information and discussion between them. With this the software provider reduces the time necessary for their clients and increase the possibilities for standardizing the software product. For the waste collection organizations it seems to cause a certain lock-in effect as they are not willing or able to change IT environment. Members part of this group may be vulnerable to this strategic behavior of software provider.
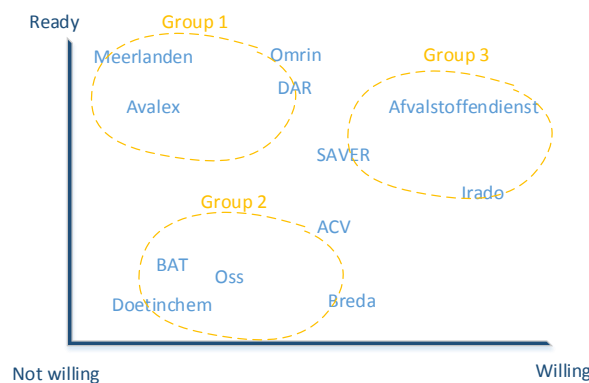
Figure 1: Willingness and readiness of members to start collaborating

Most organizations are Group 2 and are not ready and willing to start collaborative IT decision making. A characteristic of this group is that the waste collection activities are often small and simple. The number of trucks, employees and routes are almost all manageable manually. For these organizations the sense of urgency in IT decision making is not high enough to start collaborating. They see no role for Midwaste as cooperative to create synergy effects in IT decision making. However, the synergy effects for starting to collaborate will be the highest for this group. After all, they will be able to pull up to other waste collection organizations by considering best efforts and other insights in IT solutions. Then the IT managers will have the opportunity to share and discuss on the same level of IT decision making for waste collection. Instead with the municipality officials. Only a few organizations indicated to be both willing and ready, these are

part of group 3. These are the waste collection organizations that want to stay as independent as possible and not be part of any competing role and responsibilities. Either these organizations develop their own IT systems or are moving towards an architecture with a service bus and standardizes software solutions. Members part of this group are Saver, Afvalstoffendienst and Irado. They see the role of Midwaste differently as they want to stay independent and not become dependent on Midwaste either.

Conclusion

In the theoretical framework is defined that it is still unknown how a facilitative leader can create a shared understanding in collaborative IT decision making. The co-operative is well-known for its bottom up mechanism for achieving inter-organizational collaboration. The members together are responsible for the direction of collaboration efforts. Collaboration will only exist if the members agree upon the direction. But, because the mutual dependencies towards the software provider or municipality, the variety of IT issues and closedness towards the co-operative is too high not all members agree upon one direction for collaborative IT decision making. Considering this the co-operative need to start the collaboration effort with the most willing and ready members. During this effort the opportunity is given for other members to join the collaborative initiative. With this, the co-operative will achieve a shared IT vision between its members by use of process management: open discussion in multi issue game.

Reflection & Discussion

Most important limitations to case study research are the impossibility for statistics generalization, time and typical characteristics of Midwaste as co-operative. Therefore, the conclusion will only be used for theory development. By exploring the case study of Midwaste it was possible to formulate three directions for future research.

This page intentionally left blank

Table of contents

1. Introduction

This chapter introduces the research topic. In paragraph 1.1. a description of the current decentralization of government function is given where it will become clear how public organizations struggle to develop effective IT solutions. Paragraph 1.2. explores collaboration in IT decision making for its potential. This is done in specific for co-operatives. Finally in paragraph 1.3. the main research question will be defined. Following a short description of the report structure in paragraph 1.4.

1.1 Context: decentralization of government function

In the current political environment a decentralization of government function is taking place (Allers, 2010). Existing municipality tasks are subjected to increasingly stricter legislation. The municipality will gain more and more tasks (Van Aartsen, 2007). For example in the year 2015 municipalities will be responsible for youth welfare; work and income; care for chronically ill and elderly (Plasterk, 2013). Meaning, the municipality with more knowledge of local society obtains the opportunity to develop tailor made solution for its citizens in the social domain (Hupe, 2004). The municipality will function as first government. Therefore, municipalities need to ensure the development of public service delivery is of high quality and cost-benefit efficient.

Public service delivery could be made more cost-benefit efficient by using IT solutions. Moreover, IT solutions could support municipalities be accountable to the central government for service delivery and decrease the administrative burden. Good use of IT will increase the transparency of the municipality. Achieving both aspects could be problematic for municipalities. However, it is unclear what the exact influence is on IT decision making. At this moment most municipalities are unable to develop effective IT solutions (Tweede kamer der staten generaal, 2014). Using public tendering procedures, IT project are usually assigned to different software providers in different municipalities (Stuijts, van de Water, Vidal, & Ditters, 2012). Besides, with the increasing decentralization of governmental function, municipalities will aim for tailor made solutions. Because a tailor made IT solution may better fulfil all the rapidly changing process or policy requirements of the municipal public services. However the absence of IT knowledge and bargaining power often lead to failed IT projects. Municipalities are left with a chaos of IT systems and interfaces that are not functioning well. While costs for consultancy increases. Individually deciding upon tailor made IT solutions makes a municipality vulnerable. Therefore, up scaling governmental service delivery by achieving *collaboration between municipalities* is been pursued (Rijksoverheid, 2014).

The current situation of IT decision making in the public sector will become more specific when looking at the waste sector. The waste sector is also experiencing the increasing importance of good IT decision making. Collecting waste from households is one of the oldest task of the municipality. But changing rules and regulations are pressuring the waste collection organizations to increasingly separate waste. In 2020 at least 75% residual waste of households need to be recycled (Stichting vervoeradres, 2012). By developing effective IT solutions information on waste streams will become available to support the separation of waste. All current developments such as logistics without paper, route optimization, management dashboards, online web portals and going into the cloud will at the end contribute to an increased performance of waste collection organizations. However some (semi) public waste collection organizations still experience difficulties in developing or implementing effective IT solutions. Individually deciding upon these developments is risky.

Collaboration between municipalities may provide the possibility to share in-house IT knowledge, lower the costs for outsourcing and may provide insights for designing clear interfaces between software packages. Collaboration between municipalities is therefore explored for its potential to

create synergy effects in IT projects in the public sector. At this moment the central government is very supportive of cooperation between municipalities. For example the new public management thinking (1980) is replaced with new public governance thinking (2000). During the new public management movement, public organization were more focusing on the regulatory function of the market. The service delivery needed to be efficient, effective and subject to competition. Public service delivery was subject to privatization and service innovation became driven by customer demand. It is stated that 'addressing public issues is not naturally the task of public organizations anymore' (Bovens, 't Hart, & van Twist, 2007). But emphasizing the efficiency of public services is at the expense of public values such as equality and justice. Dunleavy argues that 'a public party is not similar to a profit making enterprise'. Therefore new public governance is becoming more popular. *Collaboration, coordination and participation* in different fragmented services leads to public private partnerships (PPP) in every sector (Dunleavy, 2005). Also the central government is lowering the barriers and increasing the opportunities for different types of collaboration (Rijksoverheid, 2014). Causing numerous initiatives for collaboration in the public sector (Gemeenten, 2015). However, only a fraction of those initiatives are in IT decision making.

1.1 Problem introduction

A critical ingredient to collaboration is the presence of a facilitative leader (Ansell & Gash, 2007). When facilitating collaboration in IT decision making complications arise as organizations are unwilling or unready to start collaborating. The willingness of organizations is caused by the characteristics of IT decision making. Information inside organizations tend to be confidential, have high integrity and always need to be available and accountable for (Bishop, 2004). Therefore organizations might be unwilling to share their sensitive cooperate information with others. The readiness of organizations is influenced by their history of IT decision making. Organizations chooses a certain direction in IT solutions that will cause differences of IT landscapes between the organizations. Every software package is bought at a different time and has varied duration periods. Then, it will be difficult to synchronize the IT decision making process for each organization. For every organization the integration of a new software package has a different sense of urgency and requires a different implementation.

When returning to the specific example of the waste sector a collaborative initiative could be identified. Midwaste is a co-operative association and active since 2001 (Midwaste, 2015). Midwaste is one of the facilitative leaders of inter-organizational collaboration in the waste sector. The thirteen members of Midwaste are all (semi) public waste collection organizations: Afvalstoffendienst 's-Hertogenbosch, ACV, Avalex, BAT, DAR, Meerlanden, Irado, Afvalservice Gemeente Breda, Omrin, Saver, Gemeente Oss, Gemeente Doetinchem and Cure (Midwaste, 2014). In the last ten years multiple waste collection organizations joined the co-operative association voluntary. Also, in the last year a big collaborative initiative is established in the bundling of plastic waste streams. The amount of trust towards the co-operative association is higher than ever. Therefore it is only a logical consequence that the members are frequently asking for more collaborative initiatives in new areas. One of these areas is IT decision making. Midwaste did start a collaborative initiative in IT decision making in the past. The project was called Logistics without Paper (Midwaste, 2015). The main goal of the project was to improve the communication between all organizations within the supply chain of waste management. Meaning that all forms required during the collection, transport and disposal of waste needed to be digitalized. But, the project did not set foot to the ground and after some efforts it was aborted.

1.2 Problem formulation

1.2.1 Knowledge gap

As mentioned before, the research will focus on co-operative associations in the public sector. With a case study research the waste collection organizations that are member of Midwaste will be

investigated. All findings in this research are specific for these particular organizations. However it might be possible to the generalize the findings to other (public) organizations. To give comprehensive advise about generalizing the findings, more extensive research is necessary. The possible application of the findings will be elaborated upon briefly at the end of this research. In Figure 2 represents how the situation should be comparable to other public service domains.
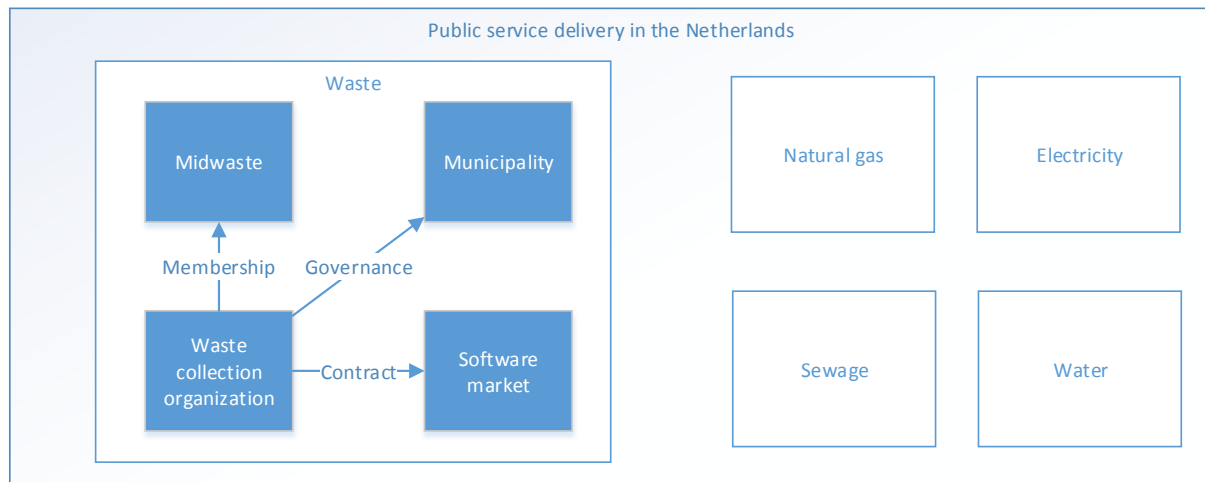
Figure 2: Positioning of research question

Public organizations are held accountable for the quality of public service delivery by the municipality. All IT investments will be traced by the municipality, province or central government. The amount of influence the government has on the IT decision making of public organization might differ. In some cases the public organization only need to report on their IT investments once a year, but in other cases the public organization has a shared IT infrastructure with the municipality. In the latter case the public organization is not fully free to decide upon what IT solutions to use. Managing the risk of IT decision making is an important task of the IT manager. Decreasing the risk is achieved by pressuring the relationship between an organization and software provider. More and more partnerships are rising in which the public organization tries to influence the software development agenda. When joining forces in a co-operative association influencing the development agenda might become more easier. But, the co-operative association need to compete with the current division of role and responsibilities. To do so the role of the co-operative association must be explored in more detail. The main research goal of this thesis is to start a discussion and explore the role of the co-operative association as facilitative leader for collaborative IT decision making between public organizations.

1.2.2 Research questions
To give more insight in the situation and to present a possible solution, some (sub-) research questions are presented as a guideline for this research. The main question is:

> ***Which role has the co-operative association when achieving collaboration in IT decision making between public organizations?***

The research problem is: a co-operative association might provide the opportunity to public organizations to become less vulnerable for profit seeking software providers. However, IT managers inside the public organizations seem to prefer individually performing their IT decision making. Despite of the fact that IT managers experience no real competition with other members. It is therefore still unknown which role the co-operative association has when achieving successful collaboration in IT decision making.

1.3 Research method

To answer the research questions and gathering the required data a literature study combined with an explanatory case study of Midwaste in the waste sector are. With a case study it is possible to investigate the current lack of collaboration in IT decision making within a real-life context (Yin, 2009b). Activities include direct observation of multiple collaboration initiatives from Midwaste and interviews with the 13 members of Midwaste. During the case study knowledge on the role of a facilitative leader could be confirmed and/or expanded.

1.4 Report structure

The report has the following structure. Chapter 2 contains a theoretical framework that takes a certain perspective for finding the answers to the main research question. Both organizational theory and IT governance theory will be discussed. The three characteristics to network theory will formulate the sub-research questions. Chapter 3 describes the research method is more detail and discusses all limitations to the case study of Midwaste in the waste sector. Chapter 4 describes the background to the waste collection organizations and the co-operative association Midwaste. Then, Chapter 5 provides all empirical data collected in the case study. Chapter 6 discusses the willingness and readiness of members in Midwaste. At the end scenarios will be opted for the role of the co-operative in collaborative IT decision making. Chapter 7 is the conclusion with the answers to the main and sub research questions. Finally, in Chapter 8 the reflection elaborates upon the validity of the results and its scientific purpose.

2. Theoretical framework

The research problem is made very specific in the introduction, because of the case study on Midwaste in the waste sector. However the outcome and conclusion of the project will also be relevant in a broader scientific context. To do so a theoretical framework is created in this chapter. The theoretical framework will substantiate the main research question with certain concepts and relationships between them by using existing literature. The following concepts will be described: inter-organizational collaboration, facilitative leadership, co-operative (association), network theory, proximity and IT governance. Finally, the relationship between the concepts will formulate the sub research question.

2.1 Inter-organizational collaboration

Designing, developing and maintaining inter-organizational collaboration is a topic of organizational theory and is exercised by organizational development practitioners. Organizational theory is a loosely knit community of many approaches to organizational analysis. It is not a single theory and its themes, questions, methods and explanatory modes are extremely diverse. The theoretical framework knows a high heterogeneity. Claims, counterclaims and even greater differentiation in theory and practice have been developed. For organizational development practitioners this means that inter-organizational collaboration initiatives are easier to talk about than to implement. With the co-operative as subject to a case study it may be possible to investigate inter-organizational collaboration within its real life context. The co-operative is a practitioner of organizational development and their efforts in inter-organizational collaboration may contribute to knowledge and understanding on the current problems for achieving collaboration in IT decision making. In paragraph 2.1.2. an overview is given on existing literature that discusses the role of a co-operative association as a facilitative leader in inter-organizational collaboration in general.

2.1.1 Facilitative leader

Organizations are defined as social units of people that are structured and managed to meet a need, or to pursue collective goals. Between organizations different relationships occur or exist. Five types of relationships could be described: independent, coordinate, cooperate, collaborate and integrate (Kloth & Applegate, 2004). For successful collaborating the following topics need to be discussed. Shared goals, shared power (constellation of knowledge, skills, perspectives and other resources that are required to achieve the shared goals), shared view of legitimate interdependence (the parties really must be committed to the goals), mutual respect & trust (some partners have a history with one another and each need something to function as evidence of trustworthiness), shared control and shared accountability. See figure n for collaboration concepts.
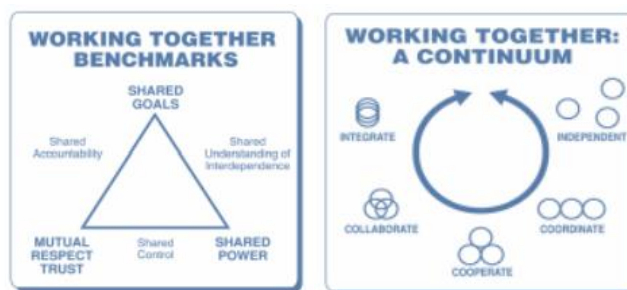
Figure 3: Inter-organizational collaboration (Kloth & Applegate, 2004)

In most literature leadership is seen as a critical ingredient to inter-organizational collaboration. Negotiations without facilitative leadership is sometimes possible, but the facilitative leadership is important for bringing organizations to the table and steering them through the collaborative process (Ansell & Gash, 2007). Facilitation is the least intrusive form of intervention; a facilitator's

role is to ensure the integrity of the consensus-building process itself (Vangen & Huxham, 2011). The facilitator only intervenes if the stakeholders cannot reach a consensus and will try to craft a solution with win-win gains (nonbinding arbitration). Leadership is crucial for setting and maintaining clear ground rules, building trust, facilitating dialogue, and exploring mutual gains. Thus, over the last two decades, a new strategy of governing called "collaborative governance" has developed. In Figure 4 the framework of collaborative governance is presented. The definition of collaborative governance is:

The processes and structures of public policy decision making and management that engage people constructively across the boundaries of public agencies, levels of government, and/or the public, private and civic spheres in order to carry out a public purpose that could not otherwise be accomplished

(Emerson, Nabatchi, & Balogh, 2011).
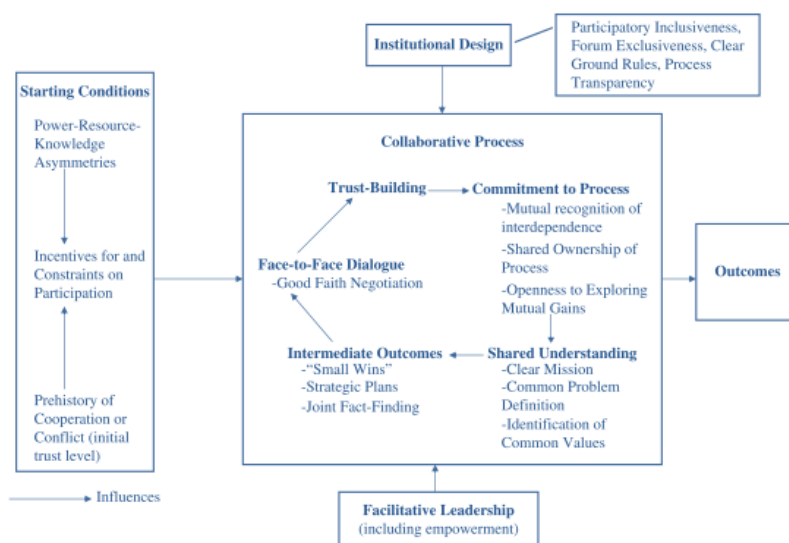
Figure 4: Collaborative governance (Emerson et al., 2011)

The facilitative leader might experience limited reach of intervention, because of the fact that the relational characteristics of organizations are not in the form of a hierarchy but rather in a network. Networks are characterized by great variety, closedness and mutual dependencies (Bruijn & Heuvelhof, 2009). Achieving inter-organizational collaboration in a networked environment can be quite complex. First, more variety means smaller reach of an intervention by an actor, because variety means that each party in a network is sensitive to a different type of intervention. Secondly, closedness makes it difficult to get the support by others because the intervention might get unnoticed, ignore, resisted, not fulfilled or not managed to reinterpret it. Thirdly, mutual dependencies causes that in some cases actors simply do not accept directives from the intervening actor as they are already depending on other actors.

2.1.2 The co-operative

In this research the co-operative will be considered for the role of a facilitative leader. The first revival of the co-operative in the Netherlands was in the insurance industry in 1719. Insurance companies seized the opportunity of collaboratively covering risks. Second revival was in the agricultural sector, farmers seized the opportunity for economies of scale when collaboratively sell or buy products (Bosma & De Jonge, 2014). Some of these co-operatives still exist. Around the 3000 co-operatives are economically active in the Netherlands. Together they own around the 111 billion euro turnover. This is 19% of the total BNP. The number of co-operatives are growing as

almost 50% is less than 10 years old (Van Bekkum, 2013). So, the co-operative association has a persistent popular design for inter-organizational collaboration in a networked environment.

The co-operative association is balancing between the relationship of cooperation and collaboration. The members either cooperate to meet a need in the marketplace by recognizing their distinct strengths. Or they collaborate when shared goals are identified that are best achieved by opening their organizational boundaries enough to share what might otherwise be considered proprietary information. Literature shows that the co-operative attains its strength because of three pillars: aim for change, economic capacity and organizing capacity (van Oorschot et al., 2013). At first, the co-operative is inspired by *drive for change*; they want to add something to their community; improve a certain condition or serve an interest that other parties do not value. Co-operatives can use pragmatic solutions to pressing problems. Co-operatives are operating in a system, but often strive to change that system as well. Secondly, the co-operative has to establish *economic capacity*. In order to achieve change a viable business model is needed. A co-operative can pool the investments of the members, can create a better market position than individual members have, and can decide to spend the profit on the things members find important. Thirdly, the co-operative could *organize capacity*. The co-operative can mobilize its members, organize involvement, and sometimes count on voluntary capacity of its members.
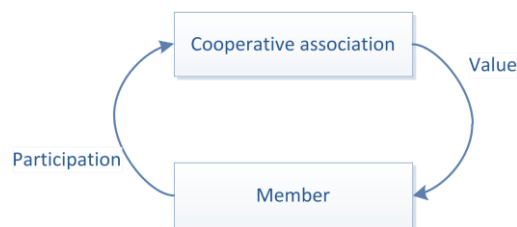
Figure 5: Interaction mechanism between co-operative and member

In Figure 5 is depicted how members immediately attain value from participating in the co-operative association. The co-operative is a very effective organization as little employees may create big profits for many members.

2.1.3 Proximity of the members
All theories discussed in paragraph 2.1.2. could be combined in one theoretical framework on how the co-operative association should facilitate inter-organizational collaboration. See Table 2.

Table 2: Combination of the theories

Three pillars of the co-operative	Network theories	Inter-organizational collaboration
Is saying that…	*is dealing with…*	*while creating…*
Aiming for change	variety of parties	shared goals.
Organizing capacity	closedness	mutual trust.
Economic capacity	mutual dependencies	shared power.
(van Oorschot et al., 2013)	(Bruijn & Heuvelhof, 2009)	(Kloth & Applegate, 2004)

Most important conclusion from the three theories combined is the bottom up mechanism of the co-operative is different from the more hierarchical approach of inter-organizational collaboration. The members of a co-operative association are responsible for the direction of collaboration. Collaboration will therefore only exist if the members agree upon the direction. But, when the collaboration is established it will become a persistent relationship between the members. Also, in collaborative governance one of the main knowledge gaps identified is how the facilitative leader could create a shared understanding between parties. Assessing the three theories above it becomes clear that the co-operative will not design the collaboration and then try to create a shared understanding, but rather design a collaboration that will take the differences and

20

similarities in goals into account. In that case it is important to know what differences and similarities are existing and how much the goals between the members may differ to have maximum synergy effects.

This latter dilemma is also known as the goal paradox. Too much homogeneity in goals can make organizations reluctant to cooperate and share information; too much heterogeneity leads organizations to seek different and sometimes conflicting outcomes (Vangen & Huxham, 2011). So the co-operative should design for a certain proximity between organizations. Proximity is a very popular concept in inter-organization collaboration. When proximity is used, what is often meant is geographically proximity. However, other forms of proximity such as institutional, organizational, cultural, social and technological proximity exist. Even though all of these dimensions of the concept of proximity refer to 'being close to something measured'. Many of the dimensions of the proximity concept are, however, defined and measured in many different (sometimes even contradictory) ways, show large amounts of overlap, and often are under- or over-specified (Knoben & Oerlemans, 2006). In Table 3 is listed how to measure the different types of proximity.

Table 3: Different meaning to proximity, adopted and rewritten to co-operative theory (Knoben & Oerlemans, 2006)

Concept	Meaning
Geographically proximity	Members that are close to each other in territorial, spatial, local or physical proximity.
Organizational proximity	Members whose interactions are facilitated by rules and routines of behaviour and that share a same system of representations, or set of beliefs.
Culture proximity	Members who have a common interpretation or routine which gives the same meaning to actions. (Knoben & Oerlemans, 2006)
Institutional proximity	Members that have the same humanly devised constraints that structure political, economic and social interaction.
Cognitive proximity	Members that perceive, interpret, understand and evaluate the world in the same way (Wuyts, Colomb, Dutta, & Nooteboom, 2005).
Technological proximity	Members that share technological experiences and therefore have the same anticipation on technological developments. (Tremblay, Klein, Fontan, & Roussaeau, 2003; Zeller, 2004).
Social proximity	Members that belong to the same space of relations.

2.2 Collaborative IT decision making

After defining the design requirements of inter-organizational collaboration as a co-operative association it is important to look at in what type of decision making the organization will collaborate. Information system (IS) research is a scientific field that defines a specific context in which organizations are able to realize greater value from IT decision making. IT governance is a complementary practise to IS research. Every organization has some form of IT governance as the most general definition is the process of making decisions about IT. Good IT governance ensures that IT investments are optimized, aligned with business strategy, and delivering value within acceptable risk boundaries (Symons, 2005). A more detailed definition is:

IT governance is not about what specific decisions are made. That is management. Rather, governance is about systematically determining who makes each type of decision (a decision right), who has input to a decision (an input right) and how these people (or groups) are held accountable for their role. Good IT governance draws on corporate governance principles to manage and use IT to achieve corporate performance goals (Symons, 2005).

In Table 4 is depicted how every major decision area could have a different type of IT governance archetype. IT governance considers five major types of decisions related to the management and use of IT in organizations. First, IT principles are about high-level decision related to the strategic role of IT in the business. Second, IT architecture includes technical choices to satisfy business needs. Third, IT infrastructure provides the foundation for the IT capabilities. Fourth, business application needs ensures the purchasing or internally development of IT applications. And fifth,

prioritizing and investing in IT such as project approval and justification techniques. Besides IT governance acknowledges six different type of archetypes. Listed from more to less centralized, these are: business monarchy, IT monarchy, federal, IT duopoly, feudal and anarchy.
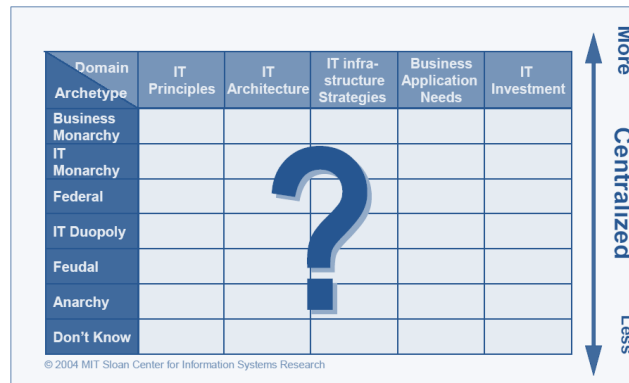
Figure 6: IT governance framework: who makes what decision (Symons, 2005)

IT governance has been developed for the private sector and is mostly suited for enterprises. However also in the public sector IT governance is becoming a crucial capability to create and capture IT value. The basic design gets an essential subset of proven IT governance principles, because public sector IT leaders and projects are often complicated by more extensive requirements and goals than occur in the private sector, including not only economic but also political objectives (Hoch & Payán, 2008). In Table 4 is shown how the drivers differ from each other.

Table 4: Difference between IT governance in Enterprises and IT governance in public sector

Drivers for enterprises	Drivers for public organizations
Strategic and performance goals	Leadership mandate
Organizational structure	Organizational structure
Governance experience	Decision-making process
Size and diversity	Mind-sets and skills
Industry and regional differences	Performance metrics
(Weill & Woodham, 2002)	(Campbell, McDonald, & Sethibe, 2010)

The role of legislature in IT governance in the public sector organizations is a recent question to research (Campbell et al., 2010). No comprehensive understanding on the exact influence is been achieved. IT managers of public organizations wishes to be able to go into IT decision making individually. However, practice shows differently. Most IT managers are part of complex hierarchical governmental decision making. With inter-organizational collaboration in IT decision making the IT governance of public organizations need to shift towards the IT manager to be part of the co-operative organization. To do so the facilitative leader needs to deal with competing role and responsibilities in the current IT governance of public organizations.

2.3 Research approach: network theory

For the co-operative association it is important to start the collaboration with organizations that experience a high proximity in IT decision making. Network theory provides the opportunity to say something about the proximity of the members to each other. The three characteristics of networks will be used to assess the members on proximity: variety, mutual dependencies and closedness. For every characteristic a sub-research question is formulated.

22

S1. Which differences in <u>the division of role and responsibilities</u> for IT decision making exist between the public organizations?

One of the reasons that public organization fail to provide effective IT solutions is the fact that they are lacking good IT governance (Tweede kamer der staten generaal, 2014). This means that the division of role and responsibilities for IT decision making is done incorrect. For the co-operative this means that it will be hard to find the right authority for collaborative IT decision making. So, if the roles are too strongly distributed it will be difficult to start inter-organizational collaboration. The co-operative need to know with whom to start collaborating. Network theory explains this complication by characterizing a network with the presence of mutual dependencies. The division of two dependencies are already identified in the introduction. One, public organizations are depending on software providers for effective IT solutions. Two, public organizations are depending on municipalities that are owner of the IT infrastructure. One part of the case study research will be to investigate current relationships of all members inside the co-operative. Members that experience same division of role and responsibilities might benefit from the same approach of the co-operative. They share organizational proximity.

S2. How will <u>the differences in the information need</u> of public organizations limit the intervention range of the co-operative?

The performance of public organizations will increase if IT is aligned with business goals (Bradley, Pratt, Byrd, & Simmons, 2011). But, because the municipalities have a lot of freedom to interpret legislation differences in implementation of legislation exist. Following differences in business goals, which will increase the differences in information need. For the co-operative this means that it will be hard to find the right direction of the collaborative IT decision making. The co-operative wants to know what the collaboration initiative will be. Network theory explains this complication by characterizing a network as having a great variety. However it is unclear what the importance of defining the direction of collaboration is. Process management claims that collaboration is more about how the organizations need to collaborate instead of the topic of collaboration. Another part of the case study research will be to investigate the future IT issues for the members of a co-operative. Members that experience the same IT issues might benefit from the same collaborative initiative. They share technological proximity.

S1. How will the willingness for collaborative IT decision making influence the closedness of members to the co-operative?

IT investments for public organizations have high costs and are for the long term. If the organizations make their IT investments on different moments in time, collaboration will be difficult. Changing IT landscape is something that is only done if really necessary and thus the rest of the time will the sense of urgency be not that high. For the co-operative this means that it will be hard to find the right moment in time to start the collaborative IT decision making process. The co-operative wants to know when the organizations will experience a high sense of urgency for collaborative IT decision making. Network theory explains this complication by characterizing the organizations as part of a network and experiencing closedness to each other. However, it might be fact that the sooner collaboration efforts start the better (Bruijn, Heuvelhof, & Veld, 2010). Organizations might only change in the opposite direction to each other when no unity is achieved. Members that experience the same willingness to start collaboration might benefit from collaborative IT decision making most.

3. Research method

After the selection of scope and defining the literature framework it is important to select proper research methods. In this chapter it is discussed which research choices are made during the collection, processing and assessment of data. For every design choice it is considered to which limitations this will lead.

3.1 Case study design

In Chapter 2 it is discussed that the co-operatives are a form of organization and coordination that have proven themselves, but it is still difficult for the co-operative to be useful in collaborative IT decision making in a complex public setting. This is evident in the low number of co-operatives that already play a significant role for collaborative IT decision making in the public sector. No empirical data could be found on the functioning of co-operatives in IT decision making for the public sector. Also, measuring factors such as trust and the commitment of members will be hard to quantify. Therefore, explorative research in the form of a case study is chosen to identify factors and relationships on the role of a co-operative in the public sector that wants to facilitate collaborative IT decision making (Woods, 2006).

In the waste sector Midwaste will function as a single case study for the research strategy. In chapter 4 it is described why Midwaste as a co-operative is an interesting case. Midwaste has indicated its willingness to start a collaborative initiative in IT decision making. With this the research not only has a scientific purpose, but also a societal relevance. In addition, Midwaste as a co-operative association is constantly tuning the interests and means of its members. To do so a lot of (informal) communication between Midwaste and members is required. This is done through phone calls, personal meetings and written e-mail conversations. The relationship between Midwaste and members could be defined as very close. Thus, getting support for this research plan was no problem and every IT manager contributed greatly to the data required. It is possible to investigate all units in the natural context (Yin, 2012).

The thirteen waste collection organization that are member of Midwaste will be considered as parallel research units inside the single case study design. Because of this relative small number of research units there is strong focus on in depth information (Gomm, Hammersley, & Foster, 2000). The subject of interest is why a waste collection organization that is member of Midwaste are or aren't willing and ready to collaborate in IT decision making. Individually they will provide insights in the opportunities for Midwaste to support the waste collection organizations in their IT decision making which will be described in chapter 5. Together they will form a theory in which role the co-operative should have in collaborative IT decision making which will be described in chapter 6. The separated studies on the research units will be combined and correlated in order to obtain a structure and well-founded picture. This is named a comparative case study (Goodrick, 2014).

Figure 7 is a graphical representation of the comparative single case study design. On the left the single case study of Midwaste with its twelve different research units is depicted. On the right there is the comparative mechanism of the twelve different research units.
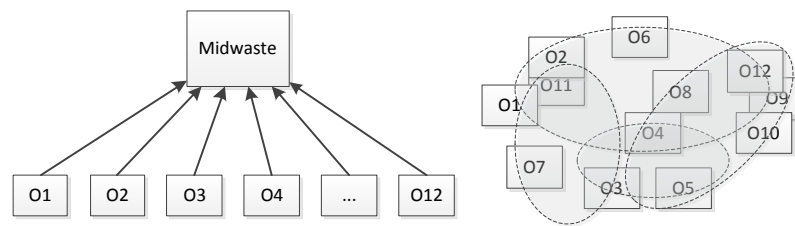
Figure 7: Comparison of subjects in case study

One of the main limitations to case study research is the limitation to validate the results. In the ideal situation the researcher is able to control every part of the research situation so that the real underlying theory will be tested. In contrast to the case study, that are well known as a research situation where the number of variables of interest far outstrips the number of data points and in which boundaries between context and phenomenon tend to be blurred (Yin, 2009a). In the paper of (Gibbert & Ruigrok, 2010) is the natural science model applied to the case study. The natural science model describes four criteria that research should fulfil. These are construct validity, internal validity, external validity and reliability (Eisenhardt, 1989; Lee, 1989; Yin, 2012) .

First, construct validity is about the extent to which a study investigates what it claims to investigate. Only a study with well-considered set of actions will lead to valid answers. In case study research there are different ways of looking at the research situation. By triangulation and achieving a clear chain of evidence valid answers will be derived. Second, internal validity is about finding real causal relationship between variables and results. Here, the issue is whether the researcher succeeds to construct a plausible causal argument that is strong enough to defend the research conclusions. Another case in which to test the developed theories is needed. Also all cases of data are to be included in the first research. Third, external validity is about the belief that theories must be shown to account for phenomena not only in the setting in which they are studied, but also in other settings. Case studies not allow for statistical generalization, but do account for analytical generalization. The rational for selecting the case study need to be clear, see chapter 9 for this rational. Fourth, reliability refers to whether other researchers arrive at the same results if they follow the same research steps again. So, for achieving valid answers in case study research it is important to consider the right decisions during the data collection and data analytics process. The following paragraphs lists the decisions made.

3.2 Data collection

Data in the case study method are collected by multiple means and may consist of qualitative and quantitative data (Gibbert & Ruigrok, 2010). Individually interviewing the IT managers in combination with context analysis of textual material from online questionnaire, website, annual reports and newsletters will enable the usage of several sources. This is also called the triangulation of sources which is an effective instrument for gaining an overall and holistic picture of the research object that will ensure the construct validity of the results.

In this research the focus will lie upon qualitative data collected through interviewing the IT managers of the members of Midwaste. All persons interviewed are carefully selected by Midwaste. According to Jurgen de Jong and Ad-Willem Schilperoort, employees of Midwaste, these persons will be the contact persons for IT decision making inside the organization. Therefore, most likely is that these people also will participate in the possible collaborative IT decision making between the members of Midwaste. For achieving internal validity the research needs to clarify whether the IT manager is speaking from personal considerations or on behalf of the entire organization. If the IT manager is personally involved in a power struggle with Midwaste the answers might become biased. Also subjects might see the research primarily as either aiding or damaging their interests, and respond accordingly. Therefore, all interviews will be critically

25

assessed by additional resources. With this, the actual behavior of these members will properly contextualize the answers of the IT managers.

Table 5 lists all persons that are interviewed during the research. No strict interview protocol was maintained and new questions were always formulated and asked when triggered by enthusiasm. With this more sensitive in-depth information could be collected and no tunnel vision was maintained. Minimum time of an interview was 45 minutes, but because of the improvised questions some interviews run up to more than 90 minutes.

Table 5: List of interviewed IT managers

Date	Person	Organization	Function
2014, December 17	Dick Janssen	Meerlanden	Manager finance and control
2015, January 5	Frans Mol	Saver	Manager finance and automation
2015, January 6	Nathan Brouwer	Breda	Process analyst
2015, January 8	Aelse Ruiter	Avalex	Head innovation & projects
2015, January 12	Christiaan van Grunsven; Randle Tai Woei	BAT	Manager finance; Functional application manager
2015, January 13	Jan Beijert	Omrin	Head IT
2015, January 15	René de Cocque; Roland van Doormalen	Afvalstoffendienst	Program coordinator; Business application process manager
2015, January 20	Harry van Montfort	DAR	Business controller
2015, January 21	Gerard den Bode	Doetinchem	Team leader waste
2015, January 22	Jacques Bootsman	ACV	Manager finance and IT
2015, January 29	Anita Minderman	Oss	Application manager
2015, February 6	Erik Gouw	Irado	Facility manager
2015, February 17	Claudia Vermeulen	Dimpact	Marketing coordinator, strategic advisor
(N/A)	Marcel Scheltenaar	Cure	Head of the company

Appendix I lists all questions asked. None of the interviews had the exact same questions. None of the interviews included all interview questions. However, to make sure all important concepts of the research question were discussed during the interviews a well-defined focus needed to be identified on forehand (Hannan, 2007; Jacob & Furgerson, 2012). This follows from the introduction and literature framework. The literature framework describes that the role for a co-operative in collaborative IT decision making will be assessed based upon network theory. Therefore, the three characteristics of networks will be used to formulate the main topics for the interviews. These are:

1. IT environment and the characteristics of person or organization with a strong focus on relations. At this moment the members have been responsible for their own IT decision making for years. Because of this the IT manager has become part of some kind of division in role and responsibility. This division may cause mutual dependencies and influence the opportunity for collaborative IT decision making.
2. Collaborative IT decision making in co-operative association. It is given that the IT managers are part of the co-operative network (for a while). They experience the collaboration efforts of Midwaste and take position in this. For defining the role of a co-operative it is interesting to collect opinions of the IT managers on collaborative IT decision making. If these opinions are rather negative this will mean that the members stay closed towards facilitative leadership in IT decision making.
3. Future IT issues for the waste sector. In a co-operative the members are responsible for steering collaboration effort. By discussing future IT issues in waste collection it will become clear in what direction the organization is moving. If this direction differs a lot from others great variety is observed.

All questions will eventually say something about the role of Midwaste in collaborative IT decision making. How, what, when and with whom could collaborative IT decision making be established.

The answers of the IT manager is the result of underlying factors. These underlying factors are important for developing theory. Therefore, prompts will be used to identify the underlying factors. Subtopics in these prompts are the speed, responsibilities, costs, difficulties, organizational environment, political environment, economic environment and future direction of IT decision making in the waste sector. Also questions about Midwaste will be asked. Finally, when the IT manager prefers individually going into decision making it is important to ask more about the dependencies of the waste collection organization towards the software provider or municipality.

3.3 Data assessment

The IT manager will be sequentially visited at the main office of the associated waste collection organization. Two main advantages are identified. One, by visiting them at their own office data collection through interviewing will be as unobtrusive as possible. The IT manager will be able to show if necessary the characteristics of the IT department and it is possible to get a feeling for the organizational culture. Also they will feel comfortable and more generous in answering sensitive questions. Two, because the duration of the data collection is over a month it will be possible to develop the theory along the way and adapt the interview questions by becoming more informed. The quality of the data collected during the interviews will increase over time. See Figure 8 for the sequential order in which the IT managers are visited. This might influence the quality of data collection in the first interviews as valuable time from the IT managers is needed to get informed. Therefore, if necessary the first IT managers need to be contacted again in case of missing information. To make good use of the sequential character of the interviewing process it is important to do the data processing accurate. This means no more than one interview a day and every interview got a transcript. The transcripts were imported in Atlas.ti in which it is possible to process and assess qualitative data. Reactions to the prompts used were coded and sorted. After every interview notes were taken to preserve all insights found on theory development during the interviewing phase. These notes reflected upon whether the right focus of the research was chosen and sometimes lead to new interview questions. See Figure 8.
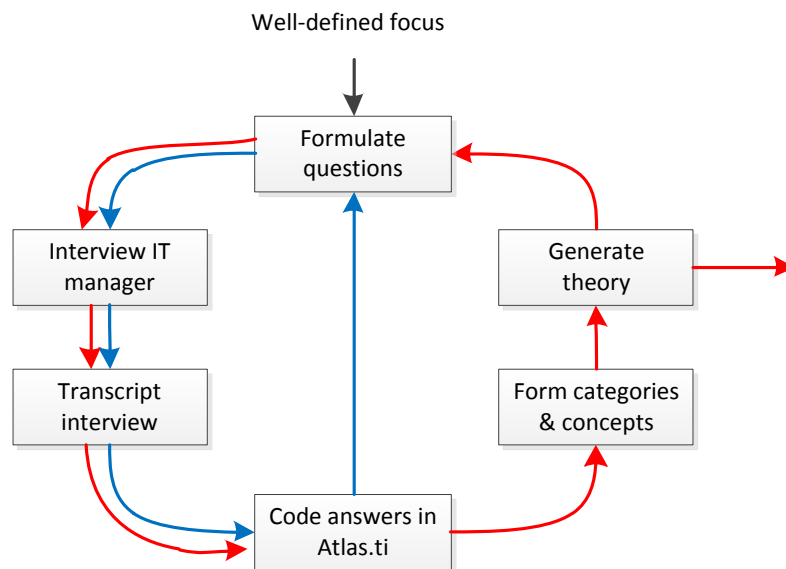
Figure 8: Extended research flow diagram

At the end of the data collection phase the coded answers will be organized in categories and concepts. The comparative case study enables to identify relationships between the categories and concepts. It emphasizes comparison within and across contexts. For example, if multiple IT managers say something about an underlying factor that increases the fact that waste collection organizations prefer individually going into IT decision making this factor need to be part of some

27

kind of relationship or mechanism between concepts. There are two things that the IT managers binds: they all are member of Midwaste and decide upon what IT solutions are supporting the waste collection process. What the IT managers thinks and says about these two topics are comparable to each other.

Next step is to make the results generalizable for other situations. The developed theory for Midwaste its members in the waste sector might be generalizable for co-operatives in the public sector or in general. For example, it might be applicable to the case of Dimpact. Dimpact is a co-operative association specialized in collaboratively purchasing IT solutions for municipalities, see appendix II. However, as statistical validation is not possible with a case study it might be only possible to achieve some kind of analytical validation. The data assessment phase therefore need to have a strong focus on theory development. It must be assumed that the role of the co-operative in IT decision making is a path that is not so much about 'getting it right', but more about getting it 'differently contoured and nuanced'. In the case study of Midwaste, there are many overlapping truths operating at different levels and constantly subject to change (Woods, 2006). At the end of the research the results are not the proven truth but might use as theory to test or apply to alternative situations. Or the results might contribute to part of a research program (Gomm et al., 2000). How these limitations are reflected in the results of the research is discussed in Chapter 8.

4. Background

In this chapter, the history, relevant data and context of the waste collection organizations operating in the co-operative association of Midwaste will be presented. Paragraph 4.1. will give a brief overview of the tasks and core values of waste collection organizations in the Netherlands. Then in paragraph 4.2., the emergence of the co-operative association Midwaste in the waste sector will be described. Finally in paragraph 4.3. it will be clear what the current role is of Midwaste as a co-operative association.

4.1 Waste sector

A society produces different kind of waste streams. Some examples are solid waste, wood, plastic, glass, asbestos, foam and oil. This waste is offered by households or companies. Currently five different methods for taking care of the waste streams are in use: prevention, recycling products, recycling materials, incineration and depositing. In 2020, 75% of the waste disposal of households in the Netherlands need to be recycled. The central government is the regulating authority for waste disposal and pressuring municipalities for increasing the amount of recycled and prevented waste (Stichting vervoeradres, 2012). Two main reasons for this could be identified.

First, in the Netherlands the municipalities are responsible for the waste collection of households. The amount of unsorted waste offered by the inhabitants is equivalent to 5 kilogram a month. This number can be reduced if the municipality makes it easier to separate waste. For example, by collecting more types of waste separate. It also helps if citizens and companies know more about how to separate waste. Besides that the waste collection organization need to responds to many (governmental) initiatives to separate certain waste streams.
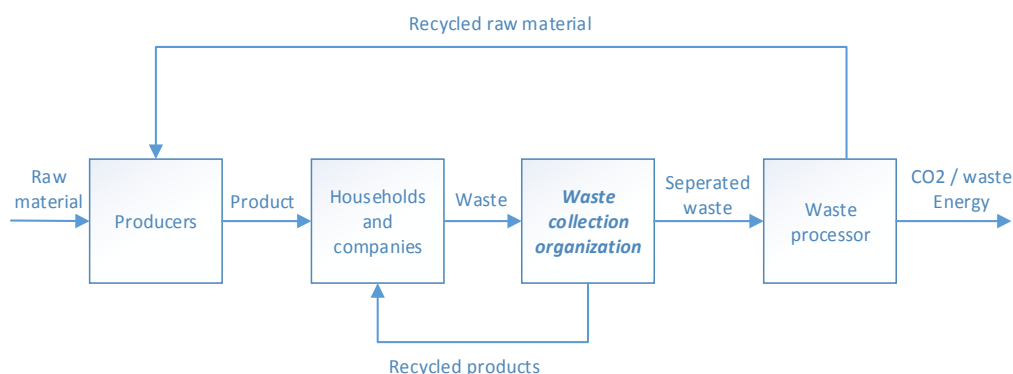
Figure 9: Supply chain of the waste cycle

Second, the recycling of waste is not the full responsibility of the municipality. In Figure 9 the chain of waste disposal is depicted. Besides the waste collection organization also the producer, households/companies and waste processors could make an effort to separate or recycle waste. Therefore, the most important thing is agreement within the chain of waste disposal. A waste collection organization can separate the waste of households in several fractions, but if there is no market for it and one or multiple streams end up at the landfill or an incinerator, every effort is unnecessary. If an organization ask the resident to make a certain effort in separating waste they should have it arranged in the back office. To this market mechanism must be given more attention in the coming years (Wassink, Robaard, & Boonzaaijer, 2007). Because the range of intervention is much higher for municipalities than private organizations it is a logical consequence that the central government is pressuring the municipalities.

Every municipality is free to arrange the waste collection in the way they think is best. The following types of organization could be identified:

1. Municipal service is when a service agency is working for a municipality to provide a certain public service. In the Netherlands the mayor and city councillor are responsible for the strategy and maintaining the public services in a municipal service. Also, the city councillor is the administrative head of a municipal service and delegates this to the director of a service.
2. Municipal service 'buurgemeenten' is the same as the first type, but now more than one municipality have the same service agency to provide a certain public service.
3. Partnership of municipalities is an organization that executes waste collection activities in multiple municipalities. The municipalities that are client of the organization could be the shareholder and influence the strategy of the organization. But, in other case the municipalities are just client.
4. Government company is different in the fact that the strategy of the public service is not determined by the municipality. But, the waste collection organization has its own management and director that decides the strategy. Only the performance is measured and the City Council could pressure the organization by threatening with a tendering procedure in which also profit seeking companies could participate.
5. Private company is when the municipality is tendering the waste collection to one profit seeking organization. The City Council only has a contract with performance arrangements and a price for waste collection as leverage.
6. Combination of companies is when a municipalities is tendering the waste collection to multiple profit seeking organizations.

In the 80's the privatization of the waste sector led to a heated discussion. As many companies and municipalities did not agree with the fact that waste collection should be a task for the private sector. This appeared to be a successful concession, because at the moment is 80% of the waste collection from households done by a government (dominated) organization. See Figure 10.
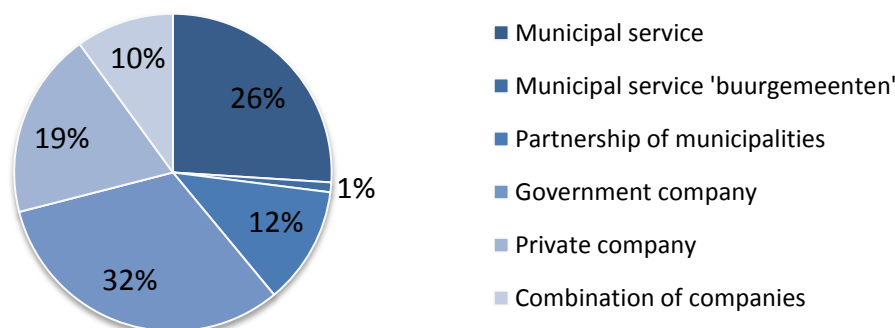
Figure 10: Division of types of waste collection organizations

The following two reasons for municipality and company could be identified (Dekkers, 2006). First, the average municipality wants to keep influencing the performance of waste collection. With a contract period of 5-10 years to a private organizations no big innovations or change will be made. Also there will be little to no space for the social character of waste collection. Waste collection is a public utility and includes a close relationship with the citizens of the Netherlands. Besides the waste collection organization could function as a sheltered workshop/training company for disabled and low skilled people. Second, for existing private waste processing organizations the movement of privatization could provide extra competition. Processing is often a business transaction and consists of private parties. If private organization could enter the waste collection market there is also the risk they will involve themselves in waste processing activities.

With mostly government dominated waste collection organization the absence of competition in the waste sector is a logical consequence. Inside the municipality only one organization is appointed to do the waste collection of all households. For example there is the trend of regionalization of waste collection. Smaller municipalities seek for partnerships with larger neighboring municipalities. This is because up scaling waste collection could bring benefits to the organization. The same trucks and employees could be used for longer waste collection routes. Also, processing bundled waste streams will be more due to the valuable larger volume. However, there is a maximum scale to a waste collection organization before it becomes inefficient. Paul de Bruin state that the perfect scale is between the 60.000 and 100.000 households (Dekker, 2004). In Figure 11 it becomes clear that in our case study 6 à 7 organizations are larger than suitable. Also, two organizations are smaller than suitable. The impact an organization size has on the success of collaboration will be discussed in chapter 5.
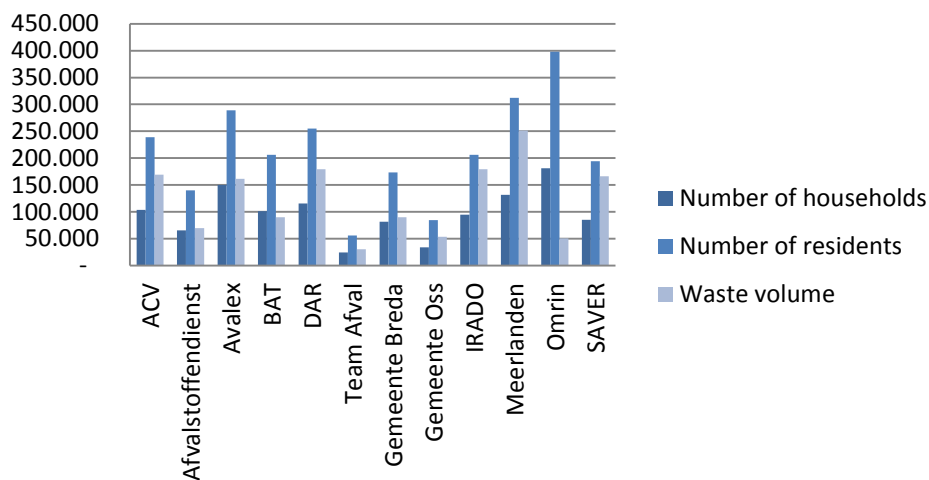
Figure 11: Scale waste collection organizations

So, because most waste collection organizations have a geographic monopoly, there is an incentive to start collaborating and not competing. It should even be easy to start collaborating. Midwaste is a co-operative association in the waste sector and functions as the perfect example of what collaboration might achieve for local authorities. There are opportunities for sharing procurement, knowledge and innovation. Also, establishing shared services in HRM, material maintenance and IT may be possible. After all, the government dominated waste collection organizations have many similarities when it comes to processes and activities they are involved in.

4.2 Midwaste

Midwaste emerged from an initiative of a number of waste and cleaning companies in 2001. Midwaste was aiming for change by creating a new balance between the small, regional waste collection services. Their main goal is to join forces and operate on a larger scale towards the market. The successes and proven value to members in early 2009 led to the creation of a separate division for trading activities (Midwaste, 2015). Advantages of bundling waste streams to the members are:

- Decreasing workload, because collectors and processors don't need to make individual agreements.
- More trust, because the processors are assured of a greater continuity.
- Cost savings, because of the optimization of logistics.
- Cost savings, because more volume leads to more efficiency in sustainable separation and processing.

31

Besides the bundling of waste streams Midwaste is also known for its joint purchasing of goods, project initiating, knowledge sharing and the co-operative idea. The main activities include stocktaking, negotiating, making contract agreements and performing the administration. This allows the contracting parties, collectors and processors to fully concentrate on their core business.
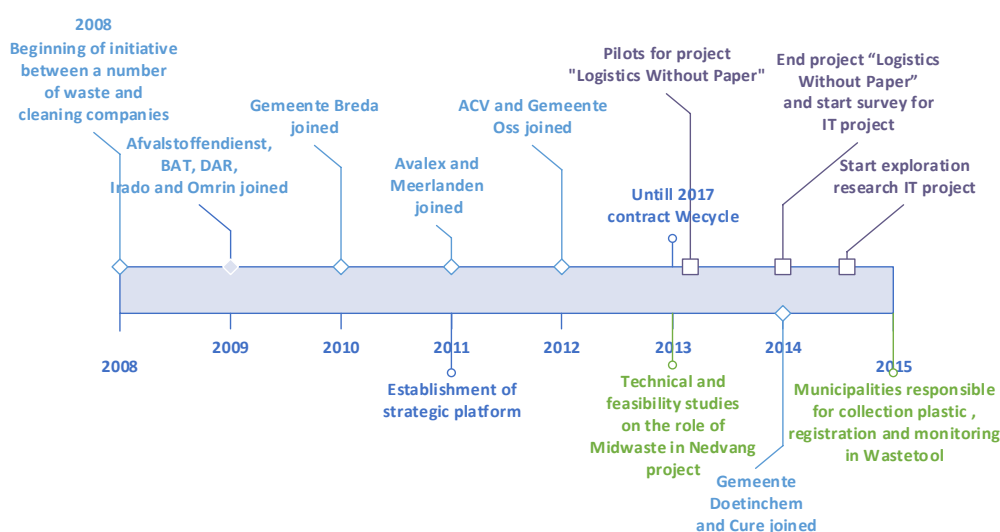
Figure 12: Timeline for Midwaste

At this moment, Midwaste include 13 different members. Every member is a government dominated waste collection organization. The main reason for this is that profit making companies are competing for their market share and will create distrust between the members of Midwaste. Also, differences in organizational and political environment will make it more difficult to achieve a shared strategic direction for its members as Midwaste. The members together collect the waste of 2,8 million households in the Netherlands. In Figure 12 is shown how the different members joined forces in Midwaste.

Further growth opportunities for Midwaste do have their pros and cons. In the Netherlands there are certainly a few government dominated waste collection organizations left that would benefit from a membership to Midwaste (Rijkswaterstaat, 2014). For Midwaste being successful in collaboration is very useful. As with a bigger and bigger co-operative more bargaining power towards the market is being achieved. The pursuit to cooperate more and have a higher impact force in the future (Midwaste, 2015) is a logical consequence. However, a high risk is associated as a co-operative association may indeed not grow indefinitely. Two consequences could be identified. First, growing bigger the workload will be higher as more members will have their own problems and questions for Midwaste. This workload will be distributed on several people and make the individual expertise less. The overview could be lost. Second, growing bigger will influence the speed of decision making within the co-operative as consensus of more members is needed. This needed consensus will decrease the speed of decision making and the members will feel like their voice is lost in the mass. Therefore more cooperation with a higher impact force could be seen as a dilemma. One will be at the expense of reaching the other.

4.3 Waste collection organizations

The main activities of waste collection organizations are comparable. In Figure 13 is depicted in what order the activities happen. First the waste collection organization communicates to the citizens when and where waste is being collected through the use of a waste calendar. Then if the citizen wants to separate their waste this is supported with different kind of containers or plastic bags. After this the waste is either collected from the households with trucks and garbage men or retrieved from the 'milieustraat' where citizens bring the waste on their own. For collecting the

waste the (optimized) route, garbage men, truck driver and truck need to be scheduled. When a truck is full or finished the waste will be weighed at an 'overslag station' and (at the end) will be registered in the system of the organization.
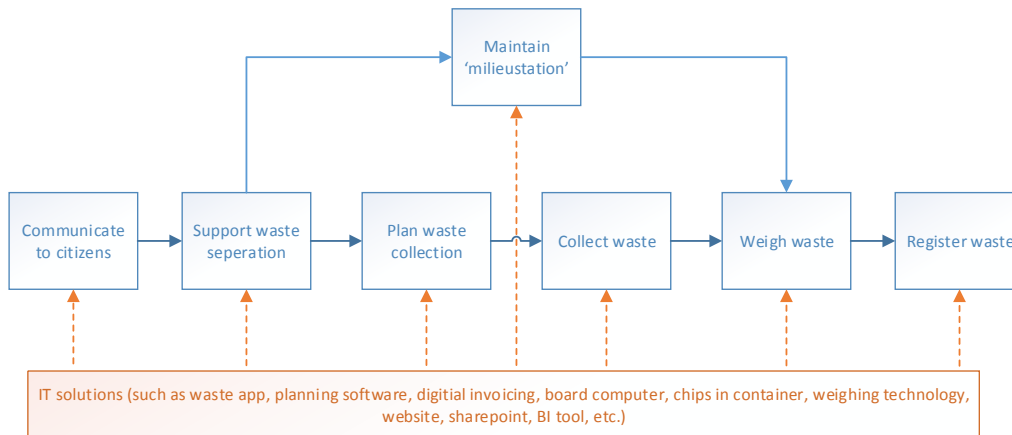
Figure 13: Main activities for waste collection organizations

Waste collection organizations have contracts with waste processors. Waste processors used to be public utilities, but are now mostly commercial businesses. Market mechanisms ensure that waste can be processed at the lowest price possible. Government supervision is therefore quite intensive and ensures that commercial parties are reserved to the agreements made. Waste processors receive the waste from waste collection organizations. The waste is then recycled, sorted, incinerated or landfilled. Today there is money in waste as waste becomes raw material. By selling the sorted waste to producers (they re-use the raw material) or energy supplies profits can be made. Also, landfilling is often by law and regulation not a good option anymore. So, the waste collection organizations should be rewarded for the delivery of separated waste to the waste processors. In that case the waste processors don't have to make the effort, but do get the returns on separated waste. Higher performance in sustainability and cost reduction go side by side according to Paul de Bruin (Dekkers, 2006). Besides waste collection as core business there are also other activities such as:

- BOR ('beheer openbare ruimte')
- 'ongediertebestrijding'
- 'zout strooien'
- 'sociale werkplaatsen'

4.4 Midwaste as facilitative leader in IT project

Households in the Netherlands pay a monthly 'Diftar' (ROVA, 2014). Diftar stands for differentiated tariffs for the disposal of waste. Per household it is registered how much and how often waste is collected by waste collection organizations. So, the more waste a citizen produces the higher the waste levy will be. Conversely, separating waste or offering less waste will cause a lower waste levy. With this measure, the government is incentivizing separating the waste streams. These regulatory developments are pressuring the waste collection organizations to register the collection and processing of different waste streams.

To manage the registration, collection and processing of different waste streams multiple IT software packages are available in the software market. However, the collaboration between the waste collection organizations in IT decision making processes is limited. Midwaste is facilitating collaboration in different project that will support the waste collection organization with fulfilling changing law and regulation. Multiple projects are initiated in recent years (Midwaste, 2014; Nedvang, 2014; Wastehub, 2014; Wecycle, 2014). The outcome of these projects may depend on

the role IT has. The projects Nedvang and Wecycle included a small IT component and were successful. On the other hand, the project "Logistics without Paper" (LZP) included a large and complex IT component and was not successful. The differences between these projects make the case of Midwaste in the waste sector very interesting.

In 2012 an effort was made to start collaborating in IT decision making within the co-operative Midwaste. Midwaste actively involved themselves with the project LZP (Midwaste, 2015). The main goal of LZP was to improve the communication between all organizations within the supply chain of waste management. Meaning that all forms required during the collection, transport and disposal of waste needed to be digitalized.

LZP became a more difficult project than anticipated. After several successful pilots, the treatment and processing organizations showed they liked to contribute to this initiative. However, the main barrier turned out to be the lack of on-board computers and a missing link with ERP software packages on the side of the waste collection organizations. In 2013, significant steps have been made for this purpose and it is expected that the problems will be solved. It is also made possible to place the weight in a digital platform that is intended for the visualization of the precise location of each waste stream (Midwaste, 2014). In 2014, LZP yet came to an end when Midwaste defined a new project.

To provide a solution to the absence of on-board computers and the missing link with ERP software a more general "IT project" was initiated. With this Midwaste intended, partly based upon the interests of a few members, to conduct a survey for its members exploring joint opportunities in the IT domain. Both ERP packages for primary and IT solutions for secondary business processes will be looked at. Hence, a further investigation will be carried out to look how the members could work together best. After the survey in 2014, no initiative was further started. Reason for this might be the lacking sense of urgency.

When comparing the success of the LZP project to the Nedvang project a great difference in sense of urgency is identified. For the Nedvang project the sense of urgency was high, because a political change would soon happen. In 2015, every member of Midwaste will be made responsible for the collection, sorting and transport of plastic waste to the processor. Also, the waste collection organization will obtain the freedom to commercialize plastic waste in their own benefit. These two developments combined made the value and urgency of collaboration in an instance clear to all members. Organizing capacity and economic capacity was very simple for Midwaste. For the LZP project, that happened together with the Nedvang project (see Figure 12), the value and urgency of collaboration was less clear to the members. Some members needed to make serious organizational change or investments before synergy effects could arise (for example on-board computers or new ERP software modules).

During the interviews some IT managers brought the topic up and argued that if Midwaste insisted with the project it might have been a success. Some argued that in advance they did not join to project because "I don't believe that is the future direction for IT use in the waste collection industry" (Jansen, 2014). Other still see it as a big opportunity for collaboration as they individually don't have the bargaining power to standardize interfaces with the waste processors (den Bode, 2015).

5. Empirical data

During the interviews multiple reasons were provided by the IT manager for the fact that facilitating collaboration in IT decision making between waste collection organization is difficult. Organizations and their IT managers may prefer to perform the IT decision making individually and without any influence from the co-operative. In this chapter is all in-depth information retrieved from the interviews listed and assessed as relational mechanisms for the IT manager in waste collection organizations.

5.1 Part 1: mutual dependencies for IT manager

During the interviews it quickly became clear that there are great differences in role and responsibilities of the selected person in the organization. One signal was the function description given at the beginning of the interview, varying between "Manager Finance" to "Functional and Application Maintainer"

Table 5. Another signal was the way they were answering the questions during the interviews, varying between very technical to very managerial. The IT manager is dealing with its own set of complex relations. By individually speaking to and assessing the situation of the IT manager in the waste collection organizations the most important relational mechanisms were found, see Figure 14. Every relationship will be described in the following sections.
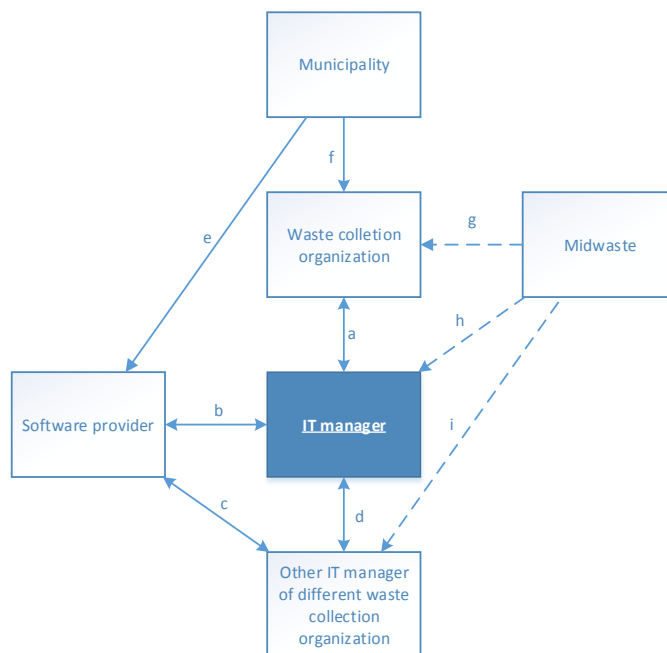
Figure 14: Relationships between important entities seen from the (interviewed) IT manager

5.1.1 IT manager within waste collection organization (line A in figure 14)

The type of role and responsibility within the waste collection organization seem to be influencing the overall choice in architecture of IT environment. Most public organization using IT solutions decide upon 'doing it yourself' or 'hiring someone' and having 'tailor made solutions' or 'standardized IT solutions'. In Figure 15 there is depicted that the waste collection organizations member to Midwaste all have different type of IT solutions.
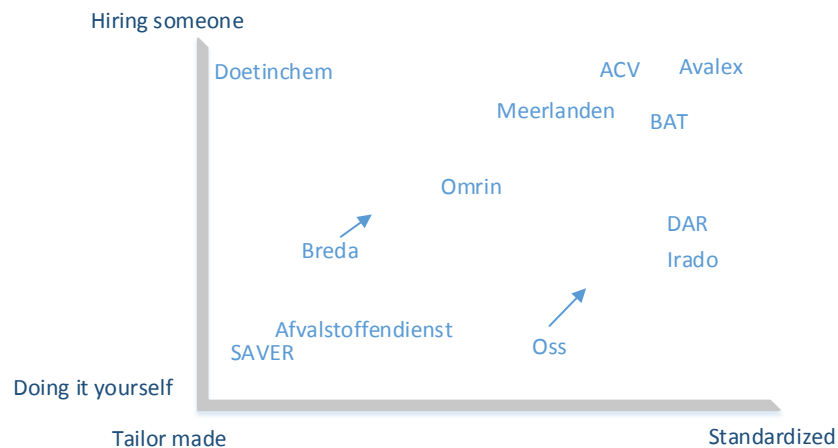
Figure 15: Landscape general types of IT decision making

In the upper right corner are the organizations that doesn't have a lot of internal IT expertise. It is a logical consequence that the main task of an IT manager will be to purchase IT systems. For smaller waste collection organizations this might lead to the centralization of all procurement activities by one person. In the lower left corner are all the organizations that have tailor made solutions developed by the IT manager. For these IT managers the main activities will be to design, develop and program IT solutions. Smaller waste collection organization might profit as the complexity of IT management is not that big and internally developing IT solutions is cheaper. Organizations sometimes changes the role and responsibility of their IT manager. A lot of effort will be put into this, which will decrease the sense of urgency for starting to collaborate in IT decision making. For example the organizations ACV and Gemeente Oss. Jacques Bootsman is an interim successor to the prior Finance & IT manager at ACV. The predecessor of Jacques was responsible for all procurement activities of ACV, but got a burnout last year. It was too much work and the overall IT architecture became a tangle of IT systems as each had its own function. Now ACV has decided to split the function of IT and finance. Not until the new IT manager is fully informed will new IT decision making happen (Bootsman, 2015). Also Anita Minderman at Gemeente Oss is part of organizational change. The predecessor of Anita did develop a tailor made IT solution for Gemeente Oss. With him leaving all knowledge is lost. Anita is originated from the procurement department of Gemeente Oss and interested in a standardized solution with the adoption of extra modules for more activities. With these two organizations shifting to the upper right corner an increasing need for standardized solutions seems to be evolving.

For an IT manager in the upper right corner the most difficult task is to develop and manage the interfaces between different software solutions. An all-in-one solution that supports the full waste collection process is therefore very attractive. At some point the software market responded to this need by using terms like hybrid, next level and 'totaaloplossing'. But most IT managers already know that the all-in-one solution is still absent in the waste collection industry. So the most logical thing to do is designing the interface one to one. But, if this happens too often the overall IT architecture will soon become a mess. It is for example impossible to upgrade the used software packages to the newest version. IT manager that are looking for a new method in designing interfaces between IT solutions are making use of the service bus. This method is already identified at two different public waste collection organizations. What most interesting is the difference in how both organizations discovered the method and start implementing it. One hired an external IT expert that has provided them with some insights on how to arrange the different software solutions to let them communicate successfully. This is done by using the market standard for an integrated platform MyESB (My Enterprise Service Bus), see Figure 16. Every other software solution part of the IT architecture of Irado will be connected with this ESB. Now, Irado can use the most suited software for every part of their business strategy. While the other

organization developed a tailor made software solution on their own that will function as centralized database that communicates with all other databases through a service bus. These two organizations both have a very mature IT vision that is been developed from a different origin.
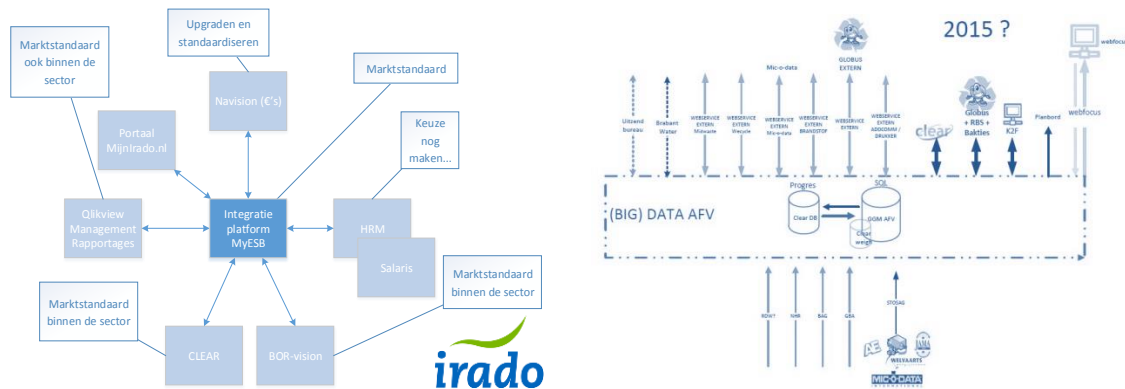
Figure 16: Enterprise service bus solution adopted from Irado/Afvalstoffendienst

5.1.2 IT manager to software provider (line B in figure 14)

Since 2015, a movement is happening in which the waste collection organizations are sharing an increasing dissatisfaction about their ERP solution and software provider. For some of the organizations this was the opportunity to make the transformation towards a complete new ERP environment. Examples are ACV, Avalex, DAR and Irado. Other organizations are still in the orientation phase for a new ERP solution. Examples are Gemeente Oss and Gemeente Breda. In Table 6 is pictured how the IT decision making processes are evolving in the waste collection sector.

Table 6: Moments of last decision making in industry specific ERP solution with collared similarities

Year (1995-2016)	95	96	…	04	05	06	07	08	09	10	11	12	13	14	15	16
ACV															GMT	
Afvalstoffendienst												Globus (GMT)				
Avalex															Pieter Bas	
BAT	GMT															
DAR														GMT / Pieter Bas		
Gem. Doetinchem										SPITS (Access)						
Gemeente Breda					Combitour											
Gemeente Oss	GMT															
Irado															GMT	
Meerlanden											GMT					
Omrin								Pieter Bas								
SAVER										BAS (MS Dynamics)						

IT managers need to fulfil the information need of the municipality, citizens and management. If the ERP solution does not support this information need the dissatisfaction increases. The IT manager may decide upon a change in IT environment by making IT investments. IT investments are long term investments and a public organization does not simply make the change towards a new IT environment. To limit the probability of dissatisfaction the risk may be transferred to the software provider. Therefore, an increasing demand towards a pro-active software provider instead of a passive software provider is perceived in the waste sector. A passive software provider only starts developing or solving if the client has requested or experienced a problem with current IT solutions. For this an offer is made and numerous consultancy hours are spend that increases

the costs over time. With the possibility that the IT solution is still not working efficiently at the end of the development and implementation process. Gemeente Breda still has a 60-70% working ERP solutions with daily 10 crash notifications. Besides, Irado did not have a social binding with one of the software providers during the tendering process. The company presentation was lacking detail and it seemed if they would leave the company after the implementation. Also, DAR was aiming for a kind of flexibility and streamlining in the billing process that most of the software providers could not achieve with their software. The software therefore did not received a lot of positive references of similar Dutch waste organizations. This is in contrast to the pro-active software provider who will keep track of changing law- and regulation and future developments of their target audience. With this, innovative IT solutions will be offered to the clients without the constant search of opportunities to influence the development agenda of the software provider. For example Erik Gouw of Irado had good experience with a software provider that really speak the same language as Irado.

A pro-active software provider is preferable as most government dominated waste collection organizations don't have the time, money, expertise and bargaining power to influence the development agenda. However, the lacking pro-active attitude of software providers was a very common thing in the waste sector for years. Most ERP solutions were standardized for multiple industries and exploited to more than one countries at the same time. Due to this software providers will standardize their products, methods and processes as much as possible to save resources. Custom made IT solutions often evolve in time and money consuming projects with increasingly conflict between what the software provider develops and the client wants. And at the end the client is leaving with a rather negative attitude towards the software provider. But, before becoming a standardized IT solution for a specific industry in the Netherlands a lot of process knowledge about the clients is needed. Therefore, software providers seems to be equally dependent on the commitment of waste collection organization as client to their IT solution.

Members looking for this pro-active software provider are in most cases also the first to adopt new IT solutions. Members then will function as testing ground in which the following trade-off need to be made. Being the first to adopt or help developing a new IT solution on the one hand means receiving extra attention from the software provider. For the software provider the success of the pilot project is equally important, because it will function as guideline for all future clients. So they will make a bigger effort for less or same budget as for the second movers. Also with all process knowledge required for developing the IT solution the first mover has extra bargaining power. Thus the IT solution will be developed exactly how the client wishes to. On the other hand the organization will experience teething that may harm the performance of the core activities in waste collection. Also, the development process will take longer and could increase the costs of IT for the organization. Besides, there is still the risk that the software provider leaves the market. Avalex experienced this before the current IT solution. Avalex invested a lot of money in the all-in-one solution Waste & Recycling of Prologa. Prologa adapted the software to Dutch law and regulation (van der Beek, 2010). But the project failed and all investment costs were lost.

Therefore, the client and software provider need to aim for a partnership in which they continuously exchange process knowledge and best efforts for improving or developing the IT solution. The IT solutions need to support the waste management processes in the best possible way now and in the future. With this necessity the relationship between the software provider and client gets much tighter. An examples will illustrate this relationship. Omrin has made a big change when their organizational environment also changed. "In 1999 some extra cleaning activities where assigned to Omrin. At that moment we wanted software that could support both. Before and after the weigh bridge. So a part for transport, waste collection and cleaning. I had a personal relationship with the owners of Pieter Bas Automatisering (PB) and approached them to create an all-in-one solution for the waste sector. I asked them if the development of such a solutions fits in the strategic vision of PB. In that case we would provide the process knowledge and they would

built the software. It needed to be a IT solution in line with the market, because I believe in that case the product will improve over time and the costs will decrease as much it gets more clients" (Beijert, 2015).

However, van Montfort elaborated upon the fact that dissatisfaction of employees to the software provider sometimes may be unjustified. "In 2005 DAR started working with JD Edwards. This is not branch specific software, but should be able to work in the waste collection industry. However, the software never was a success for DAR. The main reason was, because the employees did not respond to the changes in management required for JD Edwards. Roles and responsibilities became less and less clear. Control moment were not integrated and at the end of the process still a lot of mistakes need to be corrected. Almost 70% of the invoices needed to be corrected manually. Also truck drivers went without a 'begeleidingsbrief' and at the spot improvised their own document. But, what happened was that everyone started issuing the software system instead of their own habits. People are the hardest to change and it would never socially be accepted if we moved forward with JD Edwards. In 2014 we terminated JD Edwards and started with a new system, but this was not directly to blame upon the old software. Now, I try to include some change management together with the implementation" (van Montfort, 2015).

5.1.3 Other IT manager to software provider

All IT managers together form the market demand in IT solutions that support the waste collection process. In the past a lot of different IT solutions existed. Currently big players from the German, French and British market left the market for waste management in the Netherlands. This is because waste collection organizations prefer to have multiple references from similar waste organizations. For this a pro-active software provider is needed that has a development agenda according to changing rule and regulation from the Dutch government. And because the total waste collection industry has not a big market share, only limited software providers will exist. Therefore a movement towards a market duopoly is happening. Only few software providers will be able to establish enough partnerships to be profitable. See Table 7 for graphical representation of this development. In the most left column all ERP solutions that are named during the first and second survey are listed, accompanied by the concerning software provider. In the most right column the members are listed that are still using that ERP solution.

Table 7: Division of used branch specific ERP software

ERP solution	Provider	Members
Clear	GMT	ACV, Afvalstoffendienst, Irado, BAT
Clearweigh	GMT	X
Clear.net	GMT	DAR
AfvalRIS	GMT	Gemeente Oss, Meerlanden
A2B logistics	GMT	X
Waste Insight	Pieter Bas	Avalex, Omrin
PB4All	Pieter Bas	DAR
IVU Waste	Combitour	Gemeente Breda
SAP	Aepex	Meerlanden
MS Dynamics Navision	Prodware	Saver, Irado
Exact Globe	Exact	DAR
Groenvisioen	Infogroen	Irado, Meerlanden
Microsoft Access	Microsoft	Team Afval
DMS	Open Sesame	X
Oracle	JD Edwards	X
Prometheus informatics	Raet	X

Thus at this moment waste collection organizations indicate that only two software providers with a sector specific IT solution remain. These are GMT and Pieter Bas. Also almost every member indicates that this is too little. Numerous waste collection organizations that recently performed a tendering process elaborated upon the fact that only 2 or 3 software providers satisfied their

requirements. In that case some IT manager are afraid that the software provider will become too powerful. With nothing to choose from a decrease in bargaining power for the IT manager is happening. Also with nothing to choose from the lock-in effect is much higher as changing towards another IT solutions for waste collection organizations is not possible. GMT is for example pooling similar clients into user groups to create a lock-in effect. In this user groups experiences will be exchanged and opinions collected. GMT tries to meet the need of their clients by involving them in the design and development process. Short term effects of these user groups are satisfied clients, but it is unknown what the future will bring for this duopoly of software providers. The IT managers that understand the need for bargaining power in a co-operative association will rather involve themselves in collaborative IT decision making than the IT managers that listen to commercial talk of the software providers.

5.1.4 IT manager to other IT manager

A lot of IT managers do have mutually contact. In Figure 17 is shown which organizations has contacted each other over the past year. Multiple reasons for contact are named during the interviews. For example when recommended by the software provider to see how the IT solution works in practice. In this case the software provider appoints a certain waste collection organization to be a showpiece to the others. This organization is a showpiece, because of having the largest implementation of the IT solution. However the organization will not have a totally objective view of the software market. Another reason to contact each other is to bundle the purchasing efforts of an IT solution. In this case the organizations seem to contact the organizations that have great similarities in activities or IT environment. A good example are the organizations of Gemeente Oss, Afvalstoffendienst, etc. who wanted to collaborative decide upon the provider of an 'afvalstoffenapp'. Despite of the similarities they failed to agree upon the collaboration effort as every organization wanted to have the app custom made look and feel. Another reason for contact that jet has to come is organizing themselves in an user group. The IT manager of DAR states that he is looking for waste collection organizations with similar IT environment to organize themselves in an user group. With this user group he wants to establish a greater bargaining power towards the software provider. Collaboratively influencing the development agenda and having purchasing advantage. Some IT managers don't have contact with other IT managers. Gerard den Bode of Gemeente Doetinchem never had any contact with other IT managers. Reasons for this may be the short duration of membership to Midwaste or deviating organizational activities/structure of Gemeente Doetinchem. The latter case may be hard to start with collaborating as the reaction of the IT manager may be unpredictable.

Figure 17: Map of relationships of Midwaste members

5.1.5 Municipality to software provider

Municipalities have the freedom to decide upon the implementation of policy. Because of this there are a lot of differences in the organizational structure of waste collection. The governance structure varies between a department of the municipality to a municipal private company. In the last case the IT decision making seems to be quite centralized with only one or two persons operating in the IT department. The persons referred to are called application manager, functional manager or finance & IT manager. If this person makes the final decision, IT decision making should be rather quick and simple. But in most cases the person responsible has to report or get approval from the higher manager. In the most critique scenario the waste collection organization does not have its own IT department but is sharing the IT infrastructure with all other public services of the municipality. In that case all hardware is provided by the municipality. Also, when new sector specific software is purchased it first need to be approved and installed by the IT application manager of the municipality. Sometimes more than one governmental department will use similar software. A good example is Gemeente Breda. Nathan de Brouwer talks about recent IT decision making on planning software for both the municipality and the waste collection organization. This means that all public services of the municipality need to use the same planning software: swimming pool, library, passport issuance, waste collection, etc. Thus the planning software needed to fulfil requirements for scheduling swimming instructors and scheduling trucks for waste collection. 'The software purchased will probably not provide the type of flexibility the waste collection department wishes. So that if on Monday the waste will be collected from the household this is possible with different timetables, employees, routes and quantities. Therefore, the swimming pool will plea for different software than the waste collection department. And the departments that have similar goals will bond together for more bargaining power (Brouwer, 2015)' An endless internal strife erupts. When this is the case the IT manager involved in the Midwaste co-operative doesn't have full responsibility on IT decision making. This will slow down the process or opportunities as the municipality need to agree as well. Gemeente Breda is a member that will benefit a lot from collaboratively IT decision making with Midwaste as facilitative leader. Then, Gemeente Breda will finally be able to go to other organizations that has the same process level.

5.1.6 Municipality to waste collection organization

In section 5.1.5. is described how the organizational structure of waste collection might vary between a department of the municipality and a municipal private company. Other organizational differences exist in number of municipalities served by the waste collection organization, number of households included in the waste collection route and kind of activities, see Table 8.

Table 8: Organizational characteristics members

Name	BOR	Municipalities	Organizational structure	Shared IT
ACV	0%	4	Government company	Yes
Afvalstoffendienst	0%	7	Municipal service 'buurgemeenten'	Yes
Avalex	0%	6	Collaboration municipalities	No
BAT	0%	1	Municipal service	Yes
DAR	45%	7	Government company	No
Gem. Doetinchem	0%	1	Municipal service	Yes
Gemeente Breda	0%	1	Municipal service	Yes
Gemeente Oss	0%	2	Municipal service	Yes
Irado	50%	3	Government company	No
Meerlanden	20%	9	Government company	No
Omrin	0%	16	Government company	No
Saver	10%	4	Government company	No

For the waste collection organizations that are small in number of municipalities and households the overall IT decision making is very slow because of the possible take-over/merging into another waste collection organization. In that case no big IT changes will be made as the future is

uncertain. Gemeente Oss experienced this slow decision making for 10 years long. Anita (Minderman, 2015) explains: "Before I came here for 10 years nothing happened. This was because of the political doubts about whether the waste collection organization of Gemeente Oss will stay this way. But, at the moment we became independent a lot of movement was happening. New IT solutions were being purchased and developed. For now, there is still the possibility of merging with Gemeente Den Bosch, because of the idea we are too small. I think as long as we have 6 waste trucks driving 5 days a week the organization Gemeente Oss is not too small". In Table 9 are all organizational characteristics that makes the organization vulnerable for a political instable climate depicted. Saver and Gemeente Breda already are acting upon this vulnerability. So now, both are approaching surrounding municipalities for merging. Already waste trucks are lend to each other and price deals are made. "We want to have a solid future together" (Brouwer, 2015).

5.2 Part 2: closedness towards Midwaste

5.2.1 Midwaste to IT manager

Each IT manager has a different relationship with Midwaste. This relationship is either good or bad and will influence the willingness to participate in collaboration efforts in IT decision making. In most cases is the reputation of Midwaste is based upon the experience of an IT manager. That means whether the IT manager already has been involved in other collaboration initiatives of the co-operative and if there is actual involvement in meetings and projects. Experience is important, because of two reasons: First, the IT manager already has seen how collaborating in the co-operative is beneficial. Second, Midwaste knows what to expect of the IT manager when he/she is involved in a collaboration initiative. Experience can be measured by the duration of the membership and function of IT manager. For example a financial manager that is already member of Midwaste for multiple years has possibly also been involved in prior projects of the co-operative such as bundling of waste streams.

Reputation of the co-operative will determine whether the IT manager think Midwaste should involve themselves in collaborative IT decision making. Reputation is about the way the IT manager sees the co-operative. The membership of an organization has an initial reason, but this could be in conflict with reasons for collaborative IT decision making. Some IT managers explain how the co-operative should stick with what they do best. For becoming a member to the Midwaste co-operative the initial reason had in most cases something to do with bundling waste streams and gaining the market advantages of big mass. For IT decision making it is sometimes unclear how it will be beneficial for the members and in that case IT managers think Midwaste should stay with 'what they know best'. During the interviews some IT managers responded really positive on the question whether the waste collection organizations should collaborate and others were more conservative, see Table 9.

Table 9: Experience of IT managers with collaboration

Member	Since	Being previously involved?
ACV	2012	I'm an interim manager and been here for 2 years. My substitute is already here. It is uncertain whether I will be still working in the waste sector next year.
Afvalstoffendienst	2009	We've been involved in numerous meetings with Midwaste. But these meetings are all about finance and not sharing the IT vision for waste collection.
Avalex	2011	I'm also involved in other platforms that have something more to do with IT than Midwaste. STOSAG from the NVRD. With Midwaste I most talk about financial business.
BAT	2009	I was temporary seated at the 'controllers meeting' of Midwaste. During this period I was also involved for the directors meetings. It is not nice to have a hidden agenda. So now we have divided the responsibilities towards Midwaste over more than 1 person.
DAR	2009	I have contact with Midwaste through the controllers meetings and together

		with BAT and ACV we've had a collaborative insurance for the waste trucks.
Gem Doetinchem	2014	I've had no contact with Midwaste in IT decision making. Disadvantage for small organization is that I don't find people that have time to keep in touch with Midwaste. For most collaboration initiatives we are too small.
Gemeente Breda	2010	Is been involved in numerous initiatives with Midwaste.
Gemeente Oss	2012	I have had no contact with Midwaste jet.
Irado	2009	Irado was involved in the first line of clients to Midwaste. Our director has a very good relation with the director of Midwaste. But I myself recently had no contact with Midwaste.
Meerlanden	2011	Unknown relationship with Midwaste.
Omrin	2009	I'm one of the IT managers that always starts or initiates a collaboration effort. At this moment I'm also involved in the NVRD platform. STOSAG working group: twice the steering group, twice working group.
Saver	2009	Unknown relationship with Midwaste.

5.2.2 Midwaste to other IT manager

IT manager might be less willing to collaborate when he/she thinks the collaboration will fail, because other waste collection organizations are too different. This is also called trust. For measuring trust, signals as which type of collaboration is preferred and the number and height of barriers to overcome are been searched for. The following barriers were named by the IT managers: differences between the organizational structure of the organization, unstable political climate, presence of competition between members, IT as an organizational specific task, etc. The preferred cooperation type will show how far the IT manager is willing to go in collaborating. This could vary from only sharing knowledge which is the most safe form of collaboration and is already happening a lot. Towards establishing a shared service centre at Midwaste in which Midwaste will gain a lot of power because of the ownership in sensitive information streams. In the latter IT managers are in most cases not really IT experts as they want to see less IT management at their own organization. Only focus on core activities of waste collection.

5.2.3 Midwaste to waste collection organization

Members of Midwaste can always decide upon not participating in the initiatives of Midwaste as not all initiatives will be beneficial for the organization. The goal of Midwaste is to overall create synergy effects for its members. So, with collaboration in the 'kunststoffenproject' members with benefit a lot and with 'klein chemisch afval' other alternatives are cheaper. Organizations that participate in both projects for the collective good are also probably willing to start collaborating in an IT project in which it is unclear whether it will become beneficial.

Last is the role of the organization in the co-operative. Some organizations only collaborate when it will be beneficial. Collaborating in IT decision making may be unbeneficial for some organizations in the beginning as the less matured organizations need to pull up to a certain level. In that case the IT manager is not willingly to collaborate in IT decision making, see Table 10.

Table 10: Opinions Midwaste members

Organization	Attitude towards collaboration (Quotes from interviews)
ACV	The more the better. It is nice to share information with organizations that have the same vision or goals. Midwaste should start small and only involve the organizations that are interested. The rest will follow as the initiative becomes profitable for all to be involved in. Midwaste might even become a shared service centre. For now it is important to create a shared vision within the co-operative. Where do we all want to be in 5 till 10 years?
Afvalstoffendienst	What if we all bring together 200.000 euros and Midwaste would be the director. Than we would all have a good IT solution. However municipalities will not let the waste collection organizations just spend 200.000 euro and other waste collection organizations already perhaps has recently spend numerous amounts of money. So it will not work. That is why I think Midwaste should become a central database, nothing more than a server. I want to load my data directly from our IT environment. Midwaste should not involve themselves in the front end. Midwaste just need to say in which way the data need to be delivered. For this it is important to establish synergy. A shared vision and agenda in what we will invest in. So, how does the IT situations looks like in 5 years.
Avalex	Collaboration is on the same level of knowledge sharing and no more, because we are all too different. For example we take care of our own HRM and finances. Others don't. Not one organization has the same field of

43

	players. In the activities that are similar, collaboration initiatives already exists such as EPA and STOSAG. These initiatives are from NVRD. Midwaste should not take over the work of the NVRD. The strength of Midwaste is collaborative purchasing resources and knowledge sharing. So containers, trucks and waste could be bundled. But IT is too organizational specific. I don't see any problems in current IT decision making. With the procurement process the competition is pressuring each other. The costs we made are not that high.
BAT	For us it is hard to start collaboration, because of the level of development we are involved in. Tailor made solutions always requires our full attention and only if another organization is at the same moment making the same decision as us collaboration would be possible. That's why we would like to see a platform in which we all share knowledge, best efforts and ideas. Even visit each other at one moment. I always have been in favour of sharing knowledge. But, more than that will be way harder as the IT decision making is depending on organizational and political mechanisms.
DAR	I think there is a lot of trust between the members. Also I see synergy effects if we collaboratively purchase goods. However for IT decision making I don't see how it will become successful. Almost two years ago I remembered filling in a form for collaboration in IT decision making. At that point I already spoke about the naïve intention of Midwaste that if they know what everyone wants they are able to decide upon the IT investments of all members. It is way more complex than that. Every organization needs to define its own mission, vision and strategy in IT decision making. Midwaste should therefore stay as a powerful purchasing organization and not facilitator of IT.
Gem Doetinchem	An opportunity for Midwaste could be 'logistics without paper'. Something that we don't have the bargaining power in to convince the processors in using. Midwaste may be able to achieve this.
Gemeente Breda	Really positive towards collaboration. We want to pull our organization up to the level of the other members of Midwaste. First we need to start with knowledge sharing to find synergy effects. After a while we can expand the collaboration efforts in something more. At this moment I don't even know who is doing what.
Gemeente Oss	Collaboration is good to share knowledge. I like someone to communicate to. Tips and tricks. I am part of the user group of GMT, but without GMT we could talk about purchasing advantage and include also other software providers solutions. More honest comparison.
Irado	We recently have made an IT investment for 5 years. So for now we are not changing the IT environment. At this moment we are trying to outsource more and more of our IT activities. We want to focus on our core activities only. Therefore, I am very positive towards collaboration in Midwaste. My advice for Midwaste would be to pool the members with the same software provider and start hosting the licenses in a shared service centre. In that case Midwaste visits GMT and Pieter Bas once and then close the contract for all members. That is much more efficient as no individual conversations are needed anymore, also for the software providers. The biggest challenge for Midwaste is harmonizing the field of players.
Meerlanden	The main goal of Midwaste is trading in waste streams. This is something they are really good at. Collaborating in IT decision making would be very difficult. IT decision making is so company-specific and not something you can uniform. Every member has different speed and issues. We don't need to push this. My advice is to organize a strategic platform in which IT managers can share their IT development agenda for the next 5 years. Develop together and ask the software market for a solution. Important is to select the topics.
Omrin	I've been employed in the waste sector for over 22 years. I know everyone and who to contact and I only contact people that have similar problems and organizational environment. I am also part of the NVRD. Midwaste tries hard, but every time the collaboration effort fails. This I do through the platform of NVRD. Getting really personal. If an initiative will emerge from Midwaste I will certainly participate. But if this is the same in NVRD than I will participate in the NVRD as this is more broad implemented.
Saver	The members are very stubborn organizations. I don't want Midwaste to evolve in a knowledgebase with too much overhead. I already know who to contact. Besides Midwaste should keep in mind that the organizations are at different levels and phases. Therefore, start with a specific problem. Every member will participate in a purchasing advantage. However I don't see collaboration in IT decision making become a success.

5.2.4 Sub conclusions of part 1 and 2

It is now possible to give a summary of the relational mechanism for the IT manager subject to Midwaste, waste collection organization, municipality and software provider.

a. IT manager to the waste collection organization. The IT manager is operating within the IT department of the waste collection organization that might exist of 1 to 4 persons. Also, great differences are noticed in the background of the IT managers (for example an interim consultant or head finance & IT). Because of limitations in time, money and other resources an IT manager decide upon tailor made or standardized IT solutions. The IT manager will prioritize these limitations. Some IT managers think tailor made solutions will require a constant development effort that besides has the risk of losing the person with all knowledge on the IT solution. Others think that being dependent on a software provider will cause high costs in the future as a certain lock-in effect is created.

b. IT manager to the software provider. Most IT managers are choosing for an externally developed IT solution. So, instead of the old buyer-seller relationship the IT manager is more and more aiming for a partnership with the software provider. For successful

44

development of an IT solution both IT expertise and expertise of the waste collection process is needed. A lot of personal attention is required. Besides, the IT manager want to influence the development agenda of the IT solution by providing knowledge of the waste sector. Therefore, an pro-active software provider is chosen based upon a good reputation and references of other waste collection organizations.

c. Other IT manager to software provider. Because of the increasing demand for standardized IT solutions, the small market of waste collection organizations will be served by a duopoly of the software providers: PieterBas Automatisering and GMT. These two software providers profit when more and more waste collection organizations adopt the same IT solution. Therefore in user groups IT manager are actively being involved in the development process of the IT solutions, causing a lock-in effect.

d. IT manager to other IT manager. Some IT managers already contacted each other for exchanging knowledge and expertise on existing IT solutions for the waste sector. No IT manager seem to behave strategically or have problems with sharing knowledge. However, the intensity of these relationship seems to be higher between IT managers with similarities in organizational structure, stadium of IT decision making and type of IT solution. In some cases the software provider is responsible for this relationship as they advise them to take a look at a practical example of their IT solution. Also, the IT managers might meet each other as member of alternative collaboration initiatives of other branch associations in the waste sector.

e. Municipality to software provider. Waste collection organization might share their IT infrastructure with the municipality. In that case IT decision making is slower because all adopted IT solutions need to be approved or even shared with the municipality. Industry specific IT solutions may not be suitable to other public service delivery of the municipality. However it might increase the service delivery of the waste collection organization considerably.

f. Municipality to waste collection organization. All municipalities in the Netherlands have the freedom to decide upon how they arrange the waste collection process. Causing differences in type, size and activities performed. With these characteristics a different kind of information need is present per waste collection organization. The smaller the waste collection organization, the lower the information need seems to be.

g. Midwaste to waste collection organization. Every member has a different reasons for the membership. With this reasons they start playing a certain role within the co-operative association. Some members are more actively involved than others and function for example as testing ground.

h. IT manager to Midwaste. All IT managers have some kind of reputation towards Midwaste as a co-operative association. Some IT managers are not involved in any collaborative initiative by Midwaste and don't see the possibilities of collaborative IT decision making.

i. Other IT managers to Midwaste. Towards another IT manager a certain amount of trust is present. This is influenced by feeling in advance of IT development.

5.3 Part 3: variety in future IT issues

In most waste collection organization IT is seen as supportive not as leading. Management or strategic goals influence the direction of IT decision making. During the case study five important IT issues were identified: logistics without paper, route optimization, management dashboard with BI tools, new communication channels towards clients and going into the cloud. Every waste collection organization has estimated the important of these issues in the future differently. In the Table 11 is depicted which organization named what IT issue.

	Route optimization	Logistics without paper	Going into the cloud	Management dashboard	Communication channel
ACV			X	X	X
Afvalstoffendienst				X	
Avalex				X	X
BAT				X	X
Cure					
DAR	X				
Gem Doetinchem		X		X	
Gemeente Breda	X	X	X	X	
Gemeente Oss	X				X
IRADO	X		X		
Meerlanden		X		X	
Omrin	X	X			
SAVER	X	X	X		

Every IT issue and the role of Midwaste will be discussed in the following sections.

5.3.1 Route optimization

The first important IT issue is the route optimization, also called dynamic waste collection. Main costs of waste collection are the maintenance of garbage trucks and employment of garbage men. More optimized routes will decrease the number of routes, frequency of waste collection and total costs for the members. Waste collection in general could be more efficient as full containers will to be emptied on time and half full containers will be left for another week. Also, specific areas in the municipality are more difficult to reach during certain times. For example the area around a school when children are crossing the street during school hours. Not collecting the waste in that period may improve the safety of the citizens. The introduction and popularity of underground containers makes this possible. These underground containers are bigger than the mini roll containers and don't need to be emptied every week. With a chip measuring the degree of filling and exchanging real time information to the planning department it would be possible to optimize waste collection.

At this moment the IT managers of Midwaste are exercising route optimization in many different ways. Some IT managers need a higher span of control. For example, DAR's IT manager Harry (van Montfort, 2015) would like to see more supervision on the performance of his truck drivers. "Now, truck drivers get a paper with addresses and take the route they decide upon, all tacit knowledge. They know where to be at 12 'o clock to get a coffee or can of coke, but otherwise they do what they want. With track and trace and on-board computers it is already possible to see where they have driven, but DAR is not a big brother and watching the truck drivers 24/7. With route optimization through on-board computers and logistics without paper (in paragraph 5.3.2.) we are able to have a much better control." Other IT managers have more trust towards their truck driver and use them as input for the route optimization. For example, Christiaan (van Grunsven, 2015) from DAR tried a software tool that failed. "The change of containers was a good opportunity to recalculate the waste collection route with route optimization software. GMT gave us a piece of software, but after a while it became clear that the software was not fulfilling its purpose. So at the end, we used the truck drivers opinion and experience to decide upon the routes. We went from 75 to 64 routes." And again other IT managers don't see the purpose for complex route optimization software. For example, Anita (Minderman, 2015) from Gemeente Oss state that "the routes only change once a year and is easy to assess based upon historical information from the weighting system (which container was congested at the time of emptying and which was half empty)".

Collaborating on this issue will ensure high savings for in the waste collection organizations. Thus, most organizations are already implementing board computers and chips in (underground) containers. However, software providers in ERP solutions will also developed this functionality.

With the lock-in effect of software providers the co-operative have difficulties in achieving synergy effects in route optimization. They might be too late. The organizations that have many routes already are successful in route optimization and the other don't see the need for route optimization. Besides, there is still no functioning IT solution for route optimization.

5.3.2 Logistics without paper

The second IT issue is having logistics without paper. This was the first attempt for collaboration facilitated by Midwaste but failed, see Chapter 4 for more insights. Every truck need to possess a 'begeleidingsbrief' during the transport of waste. Dutch law defines what format the paper 'begeleidingsbrief' has. Law also provides the opportunity to obtain permission for the use of a digital medium, such as an on-board computer, PDA, mobile phone, tablet. The NVRD has actively involved themselves, in the past couple of years, in developing an open IT-standard for the exchange of information that is legally required to be incorporated in the 'begeleidingsbrief'. Also called the EBA (elektronische begeleidingsbrief). This is a logical consequence of the development towards the digital 'begeleidingsbrief'.

Some of the members are actively involved in achieving logistics without paper. Aelse (Ruiter, 2015) from Avalex and Jan (Beijert, 2015) from Omrin are both member of the NVRD and are really optimistic about the EBA. "The EBA is the next project of the NVRD. Before, they had success with STOSAG. STOSAG was about the standardization of chips in underground containers. Prior to the standard not every chip was compatible with the readers on the waste trucks. STOSAG guarantees the reduction of lock-in effect and improves the freedom of choice for supplier. Causing more competition and lower prices for the waste collection organizations." However, Gerard (den Bode, 2015) from Gemeente Doetinchem experiences the success of standardization differently. "Our organization is already working with a digital 'begeleidingsbrief', but what we often see is that the processors are not supporting this digital format. For one or two processors we work without paper, this is only 10% of the total 'begeleidingsbrieven'. I think this is because the processors have a complex and slow decision making processes. Therefore, they are not really mature enough for adopting the standard or willing to make a big investment. Alone I don't have the bargaining power to influence the decision making of a processor. Together with Midwaste it could be demanded in the contractual phase."

But, Midwaste might experience the same complexity of logistics without paper as the organizations do. IT managers have a negative experience with this topic, because of failure in prior initiative. A role for Midwaste might be to be a representative for the organization during the EBA project of NVRD.

5.3.3 Going into the cloud

The third IT trend is going into the cloud. When going into the cloud, information required for core activities in waste collection is no longer stored and maintained internally, but located externally at a third party. For this some parts of the physical infrastructure of the waste collection organizations need to be relocated. The members of Midwaste don't share the same feeling on a future for Midwaste involving themselves in the IT issue of going into the cloud. An example is the different between Frans Mol from Saver and Erik Gouw from Irado.

Frans Mol from Saver indicates that they are momentarily digitizing the workflow of invoices (Mol, 2015). After that Frans likes to look at opportunities for cloud solutions. Security is the most important issue for him. How to guarantee the availability of information at all times. But, this is at this moment also not fully secured so why not trust a third party that is more experienced with IT solutions. I didn't ever consider the possibility of a shared service center. In that case we will also sharing our processes. At this moment I cannot think of a party that is trusted and capable enough to bundle the services of the waste collection organization. Erik Gouw from Irado explains that they already went through a re-organization (Gouw & van der Drift, 2015). Support is now

being outsourced to another external party. There is no IT department at Irado anymore. Only management. This means that if there is something wrong with the computers or software, the employees need to call an external employee to solve it. This solution might be a little less service, but will aim for cost savings in the end. The storage of information and having IT support is a location based activity. Most IT managers would like then to be close to their organization. It is not a coincidence that the external party of Irado for IT support is in the same village.

Before the interview, Irado came to Midwaste with the question if other members already had some experience with going into the cloud. They wanted to have a small survey within a small time frame. Irado wanted to decide quickly upon whether to invest in going into the cloud and on what solution. During the interview Erik talks about Midwaste its opportunity for becoming a shared service center. Midwaste will then function as third party for locating the required information on all waste collection processes. Both, Frans and Erik see a role for Midwaste as trusted third party. However, other IT managers might be less interested in going into the cloud. For example the organizations that share their IT infrastructure with the municipality. In that case the waste collection organization is limited by the opinion of the municipality. Within the municipality the need for securing data is high as a lot of sensitive information about citizens is produced. When bundling all this information the privacy might be harmed.

Most organizations are interested in this topic and still looking for a solution. Although it might be a location based activity. Irado still wanted to have the support department close to them. The privacy issues are important although Midwaste might find a possibility to become an operational organization to storing data provide services, such as a shared service center.

5.3.4 Management dashboard with Business Intelligence

The fourth IT development is because of the need for standardized management reports. The municipalities are responsible for the collection of waste from households. Some municipalities are too small to do it themselves. They will not be able to achieve the quality of public service delivery that is needed. Waste trucks need to be used five days a week. When standing still, waste trucks will only cost money. So municipalities will join other municipalities to obtain a certain economies of scale. In this situation the waste collection organization has to start reporting its performance to different municipalities. Reporting to the municipality is always different and is an administrative burden for the IT manager. Some want to have a report every four months and some every five months. Also the municipalities may ask for different key performance indicators. Therefore, IT managers are aiming for a standardized management report that is accepted by all municipalities. This is possible with an online management dashboard. With Business Intelligence real time information is extracted from data flows and an online management dashboard is created that is accessible 24/7. Omrin is already developing this tool inside the organization with 1 person creating BI reports. They internally organized a data warehouse. Rene (de Cocq, 2015) from Afvalstoffendienst is very interested, but still looking for a tool. Harry van Montfort is interested in the representation of Key Performance Indicators (KPI's) that will turn red if a negative result is perceived. No other IT managers were interested.

However, every IT manager should be interested in an online management dashboard. This is because "the IT manager can improve the business processes easier if more information on KPI's is available" (Beijert, 2015). These can be communicated towards supervisors, municipalities and Midwaste. Midwaste is involved in the collection of data on waste streams such as plastic, paper, 'witgoed', 'bruingoed', electronic waste and chemical waste. René de Cocque sees an opportunity for Midwaste to become a shared service center by achieving collaboration on this IT issue. Midwaste should not involve themselves with the back end of waste collection, but make agreements about the way of data exchange. For example, all need to deliver data according to the XML standard. Then, it makes no difference which ERP solution is at the back end, because the

organizations all have the same 'afvalstroomnummers'. Midwaste will become part of the management dashboard.

So, most organizations still not adopted a IT solution to the need. Omrin is an exception and might be consulted for insights. Although it will be more interesting for bigger organizations as they have more municipalities to report to. Besides it is not a stand-alone IT issue, because information will be extracted from the ERP solution. Midwaste may be able to expand data collection task on the different waste streams by becoming an online portal.

5.3.5 Communication channel

The IT managers identified two types of (new) communication channels during the interviews. First, there is the development of new communication channels internally. Also called a content management system. Employees in the waste collection organizations are mostly e-mailing information to each other. But, with an e-mail the representation of information may be unclear or incomplete. Besides, e-mails may get lost or cause double work. Therefore, Omrin decided upon a new radical method for communication internally and implemented SharePoint. Now, all needed information for the waste collection process is published in SharePoint. The information is accessible for all employees and there are no secrets anymore. At the beginning a lot of employees were against the idea of transparency: "it took me a long time to convince the employees and remove the fear for negative consequences of transparency" (Beijert, 2015). Other IT managers didn't seem to be involved and interested in this IT issue. Perhaps this content management system is only interesting for the large waste collection organizations. For smaller organizations the re-organization might not be worth the effort. Re-organization issues always take a long time and are really intensive. Actions needed might be too company specific to start a collaboration effort in. Also it might be difficult to catch up with organizations already implementing a content management system.

Second, there is the development of new communication channels towards citizens. Almost all organizations indicate that they have adopted a type of waste app or are changing the website. Citizens need to be informed about waste collection. Previously this was communicated through the use of a paper waste collection calendar that was distributed among the households. Once a year it was possible for the organization to make changes to the time and location of waste collection. Now with the waste app or website, the waste collection process will be more dynamic. New locations to hand in different waste streams can be added to the map in the waste app or website. Also users of the app may be notified about the waste collection on the next day with a SMS. Overall the service delivery will improve. Gemeente Oss introduced the waste app recently. They chose Addcom as service provider: "the personalized app cost us a little extra, because we wanted to have a certain look and feel" (Minderman, 2015). Other organizations tried to get the software provider of the ERP solution developing a waste app. GMT did not answer to this need, but instead offered to be the connection between three developers of different waste apps.

So, it is a stand-alone IT issue that only need a connection to the ERP solution. Both IT issues have multiple solutions to choose from causing a leverage to negotiate. Also, a waste app is for every size waste collection organization interesting. But, most organization already decided upon and implemented the waste app. Content management system is only for larger organizations that think re-organization is worth the effort. The waste app is often personalized. Organizations prefer an individual look and feel. Implementation trace of a content management system is long and caused big differences in maturity. Midwaste will become mediator between software providers and members in this IT issue.

6. Analysis

In the previous chapter there is described how every waste collection organization has developed its own network of mutual dependencies, closedness and variety for IT decision making. These characteristics will influence the success of collaborative IT decision making. Therefore, Midwaste need an approach for dealing with these characteristics. In this chapter there will be explained what general approach Midwaste may use to develop, compare and anticipate on willingness and readiness of members for collaborative IT decision making. At the end the approach will be discussed in the light of two different scenarios.

6.1 Type of members

All factors identified in part 1, 2 and 3 of the empirical data are combined in Figure 18. The figure shows technical, political and organizational characteristics that might lead to the preference of individually going into IT decision making. This is besides the main characteristics of information sharing such as confidentiality, integrity, availability and accountability as the trust is high and the amount of competition is minimal between the organizations. These factors indicate the willingness and readiness of members to collaborate.
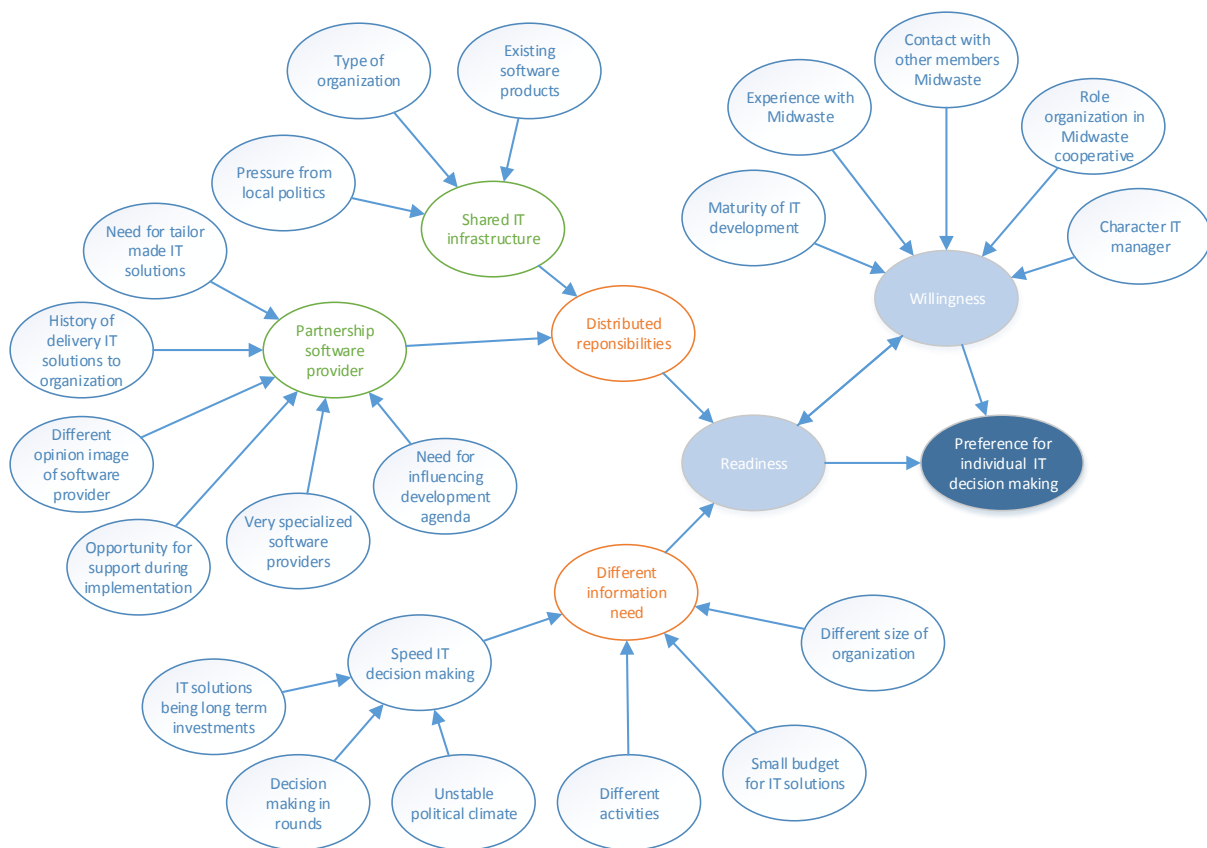
Figure 18: Factors influencing the choice of individually deciding upon IT solutions

What is become clear is the fact that the IT manager all have a certain willingness and readiness to start collaborating. A difference is identified in dreams and real demand from management. Some IT managers have a real inspiration to think about collaborative IT decision making, but will not get the support from own management. The willingness and readiness of members are two different things and need to be considered separately as well. A remaining question is which approach the co-operative role should take for dealing with the willingness and readiness of its members.

50

6.1.1 Group 1: Ready, but not willing

In general for facilitating collaborative IT decision making applies that the responsibilities an IT manager has towards the municipality and the software providers limits the freedom of decision right. Therefore, the co-operative should design for some kind of threshold for participation. Members that share the IT infrastructure with the municipality should first become independent. It is noticeable that public organizations that have their own full responsibility on IT decision making did made the transformation towards a working ERP solutions much earlier. Public organizations that are influence by an unstable political climate still have to decide upon ERP solutions.

The first group are mostly the waste collection organizations that increasingly are depending on the partnership with their software provider. A software provider is anticipating on this to create user groups of their clients and provide information and discussion between them. With this the software provider reduces the time necessary for their clients and increase the possibilities for standardizing the software product. For the waste collection organizations it seems to cause a certain lock-in effect as they are not willing or able to change IT environment. Members part of this group are *Omrin, Avalex, Meerlanden, DAR*. It is still unknown how the duopoly of the software market for waste collection will negatively influence the price and quality of IT solutions. The members part of this group may be vulnerable to this strategic behavior of software provider. DAR has already seen this vulnerability and is trying to create an independent user group of GMT without involving the software provider. This may also be an opportunity for Midwaste to involve themselves in the IT decision making of their members.

6.1.2 Group 2: little willingness and not ready

Currently a lot of members are already consulting each other about IT solutions. Almost every member to Midwaste has responded positive towards the idea of knowledge sharing in IT decision making. No big efforts has to be made by Midwaste to establish knowledge sharing as already a lot of trust is present between IT managers of the Midwaste co-operative. However, a lot less members are willing to aim for more extensive forms of collaboration. These forms are:

- Strategic platform for sharing knowledge and best efforts on IT solutions with each other.
- Projects based upon future IT issues such as 'logistics without paper' or 'going into the cloud'.
- Collaboratively hire IT experts for the development, implementation and maintenance of IT solutions.
- Collaboratively choose a bargaining position towards the software provider and start influencing the development agenda. Such as aiming for mobile solutions.
- A joint procurement procedure for buying standardized IT solutions.
- Collaboratively become owner of IT solution by aiming for central database in waste streams.

The second group are the waste collection organization that are dependent on the governance mechanisms of the municipality responsible. Thus, not only the IT manager is responsible for IT decision making, but also the municipality. In this situation the speed of the IT decision making is influenced by the stability of the political climate. If there is the possibility that the municipality will merge together with another municipality the IT decision making will come to a halt. Members part of this group are *Gemeente Doetinchem, Gemeente Oss, ACV, Gemeente Breda, BAT*. Another characteristic is that the waste collection activities of these members is often small and simple. The number of trucks, employees and routes are almost all manageable manually. For these organizations the sense of urgency in IT decision making is not high enough to start collaborating. They see no role for Midwaste as co-operative to create synergy effects in IT decision making. However, the synergy effects for starting to collaborate will be the highest for this group. After all, they will be able to pull up to other waste collection organizations by considering best efforts and other insights in IT solutions. Then the IT managers will have the opportunity to share and discuss

on the same level of IT decision making for waste collection. Instead with the municipality officials. Only Gemeente Breda and ACV see the opportunity for collaboration differently. Both are very willingly to start collaborating in IT decision making. However it is uncertain whether the IT managers will stay and be able to make a change in the current division of role and responsibility of the shared IT infrastructure.

6.1.3 Group 3: Willing and ready

The third group are the waste collection organizations that want to stay as independent as possible and not be part of any competing role and responsibilities. Either these organizations develop their own IT systems or are moving towards an architecture with a service bus and standardizes software solutions. Members part of this group are *Saver, Afvalstoffendienst and Irado*. They see the role of Midwaste differently as they want to stay independent from software provider and municipality. Midwaste is for them is a possibility as waste collection organizations together to become independent from political and organizational influence.

See Figure 19 for the graphical representation of the three groups.
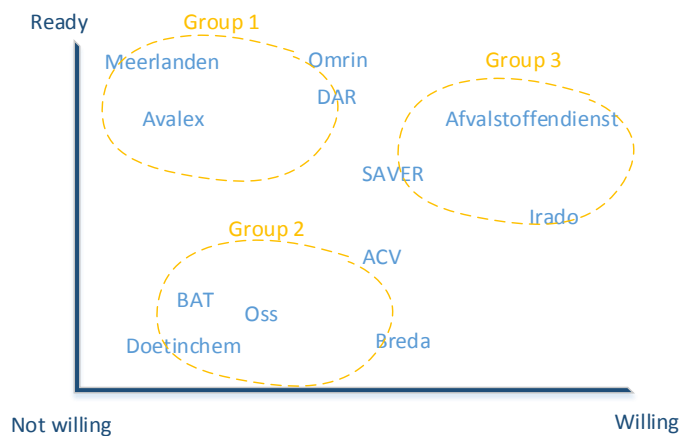

Figure 19: Division of groups

6.2 Future scenarios

The attitude of the three groups are reflected in the two scenarios that are mentioned by the IT managers. At the end it will become clear how Midwaste might be able to involve all groups for collaborative IT decision making. The role they will take in this.
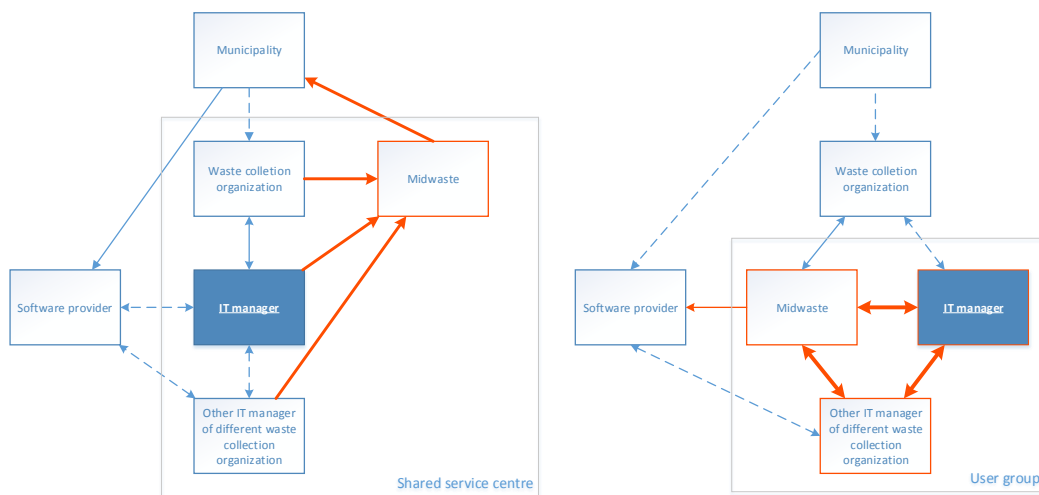

Figure 20: Future scenarios for Midwaste

52

6.2.1 Scenario 1: collaborative purchasing IT solutions in user group

One of the strengths of Midwaste is bundling the demand of members and involving themselves in collaborative purchasing activities. This is an expertise already present inside the Midwaste co-operative. A possible scenario for the role of Midwaste is therefore collaboratively purchasing IT solutions. In this scenario Midwaste will become a mediator between members and software provider. Midwaste will receive requirements of all members at once and then make a deal with one or multiple software providers. After this deal personal attention may be provided to the members for implementing and giving support to the IT solution. Future IT issues that could be solved with this scenario are route optimization (introduction of the software and board computer), logistics without paper (software for digital billing) and alternative communication channel. Also the software provider may be interested in this scenario as they too only want to make the agreements once. This need for standardizing their IT solutions is depicted in that fact that GMT already organizes user groups for exchanging knowledge. Midwaste may adopt this part of GMT. However it is unknown how much the software provider benefit from claiming their consultancy hours. In that case they will not participate in such a collaborative initiative.

In general there are two types of IT solutions for (waste collection) organizations. On the one hand there is the 'big' IT solution that supports the primary process. Also called the ERP solution. On the other hand there are the 'small' IT solutions that support the secondary processes such as the waste app, SharePoint, click view, timewize, etc. Most IT managers didn't see any quick profit making for collaboratively purchasing 'small' IT solutions as those are bought for almost nothing. For the 'big' IT solutions they see some opportunities, but it will be difficult because the IT decision making processes might differ in speed, direction and responsibility. ACV, Gemeente Breda, Irado and DAR has indicated a positive attitude towards this scenario. The most important promise for collaboratively purchasing IT solutions might be the possibility for cost savings. A co-operative association might persuade their members to join the initiative by mentioning cost savings. An example is given for every group identified during the relational analysis, see Chapter 5.

First group are the members that have a close partnership with the software provider. These members want to influence the development agenda of the software provider. For now, the presence of multiple software providers will ensure enough competition during the procurement process to keep the prices of IT solutions low. However when the duopoly of GMT and PieterBas Automatisering becomes reality the market power of the software provider is too high and the prices may start rising. By joining forces against the software provider new bargaining power is ensured for the members. Second group are the members that share their IT infrastructure with the municipality. In this case the political climate increases the demand to achieve greater value from IT investments. No long term investment is been made easily.

6.2.2 Scenario 2: Midwaste as shared service center

The waste collection organizations seem to be pursuing integration among functional application that support data flow among the business units and have a common interface among the modules. The prior stove-pipe systems and databases are old-fashioned, because when data need to flow from department to department, data must flow slowly in batches and often need to be repackaged and even manually re-entered because of the differences in format, platform and data meaning among the functional departments. Therefore, a centralized data source shared among the functional department is needed. As this will ensure the reduction of errors associated with repackaging data (confidentiality), all data representing the single truth (integrity) and the rapid and seamless access to data (availability). The IT manager need to decide upon all investments needed to make the transformation to a distributed client-server architecture with more and more commercial off the shelf (COTS) software modules with graphical development tools. Instead of a

centralized mainframe platform with tailor made software systems. For this an ERP (Enterprise Resource Planning) system is adopted. An ERP integrated all departments and functions across an organization onto a single computer system that aims to serve practically everyone's particular needs.

In this scenario Midwaste will become the centralized data source every waste collection organization needs. For IT issues such as going into the cloud and the standardization of reporting this may provide a solution. Afvalstoffendienst, ACV, Gemeente Breda and Irado has already indicated their willingness to invest resources in this scenario.

7. Conclusion

During the research process functioned Midwaste as case study for co-operatives in general. The main research goal of this thesis is to explore the role of a co-operative in collaborative IT decision making in the public sector. In this chapter the main and sub research questions will be answered based upon results from the case study. At the end of answering the main research question a short generalization towards co-operatives in the Netherlands will be given. In the next chapter will be reflected upon limitations to this answer.

7.1 Sub research questions

During the interviews it quickly became clear that most IT managers prefer individually going into IT decision making, because they see too many differences between the waste collection organization. In the sub research question below it will become clear how the organization differ from each other. These sub research questions are based upon the three characteristics of networks: mutual dependencies (S1), variety (S2) and closedness (S3).

S1. Which differences in <u>the division of role and responsibilities</u> for IT decision making exist between the public organizations?

Members of Midwaste have three different ways in dividing role and responsibilities for IT decision making. These are caused by the difference in organizational and political influence to the waste collection organization. First are the waste collection organizations that have a close relationship with the software provider. A partnership is established based upon the search for pro-active software provider that develops industry specific IT solutions. As IT investments are long term investments it will be difficult for Midwaste to persuade the IT manager to switch to another IT solution. Second are the waste collection organizations that share an IT infrastructure with the municipality. The IT solutions need to be approved by the municipality or even shared with the municipality. It might happen that Midwaste makes an agreement with the IT manager of a waste collection organization that is not approved by the municipality. Third are the waste collection organizations contacting other IT managers. These IT managers are looking for positive references of the software provider. Because of this only two software providers remain: GMT and Pieter Bas Automatisering. GMT is already responding to this need by organizing user groups in which best efforts and future developments will be discussed between clients and software provider. In this situation there will be nothing left to choose from, causing less bargaining power for Midwaste as mediator between software provider and members.

S2. How will the differences in the information need of public organizations limit the intervention range of the co-operative?

The members of Midwaste are all similar when looking at the core activities. Each member is part of the logistic chain of waste management and is responsible for the collection of waste from households. Also, each member has the same sequence of activities for the waste collection such as communicating waste collection to citizens, supporting waste separation, planning route waste collection, maintaining 'milieu station', collecting waste, weighing waste and registering waste. However after comparing the information need of the waste collection organizations to each other differences are found. Topics in IT decision making that are mentioned during the interviews are logistics without paper, route optimization, going into the cloud, alternative communication channel and standardization of reporting. Every topic has its own sense of urgency per organization. If Midwaste decides too early in the process upon the kind of IT decision making topic members will leave the collaboration initiative. An example is provided in the previous attempt by Midwaste to start collaborating in Logistics without Paper. Multiple organizations did not join the initiative, because they didn't see this as the right future for IT solutions in the waste

sector. Therefore, collaborative IT decision making should be established based upon process management not project management. In process management the focus lies upon how the organizations need to collaborate instead of on what the organizations need to collaborate. The information need is not a criteria in which the co-operative may start collaborative IT decision making. S1 and S2 will contribute to the readiness of members to start collaborating.

S3. How will the willingness for collaborative IT decision making influence the closedness of members to the co-operative?

Midwaste has an important facilitating role for collaboration initiatives in the waste sector for years. By aiming for economies of scales in bundling waste streams, purchasing containers to collect waste and other activities Midwaste delivers direct profits to its members. More and more members join the Midwaste co-operative and a lot of trust between the members is already present. It is a logical consequence that the members are increasingly interested in the possibilities for collaborative IT decision making. All members seemed to be willing for sharing knowledge in IT decision making. However, when talking about more extensive forms of collaborative IT decision making the opinions of the IT managers started to differ. The following types of attitude were identified. First, because of having no experience it is not clear to the IT Manager how the organization could benefit from collaborative IT decision making in Midwaste. In this case it will also be unclear to Midwaste what to expect from the behaviour of the IT manager. Second, because of a certain stubbornness the IT managers only see differences between the members. Often they talk about being more advanced than others and already having a well-functioning IT solution. In most cases the organizations don't mind sharing the information to others. Third, because of seeing synergy effects to collaborative IT decision making a certain openness of the IT manager to Midwaste is encountered. In the first two types of attitude trust need to be regained. The collaborative IT decision making will have the highest chance of success when starting with the most willing members.

7.2 Main research question

Combining these answers together will form the answer to the main research question. So the answer for the main research question will be.

> ### Which role has the co-operative association when achieving collaboration in IT decision making between public organizations?

While assessing the current IT decision making process of waste collection organizations it became clear that Midwaste will not achieve successful collaboration for the members by just choosing a certain IT issue. "Collaboratively purchasing IT solutions by identifying all requirements and needs of the members is a rather naïve idea. As all IT managers need to experience and identify their own IT issues before becoming successful in IT management inside organization" (van Montfort, 2015). The longer it takes to achieve unity between the members in IT decision making the more different IT landscapes will arise the less easy it will be to find similarities between organizations. This fact became clear while discussing the future IT issues with the IT manager. No consensus is to be found in the best future direction on IT decision making. Therefore the role of the co-operative facilitating collaborative IT decision making need to be according to process management. Not in what, but how the organizations need to collaborate. The answer to this is found in assessing the dependencies and closedness of the IT manager in the co-operative. The dependencies will influence the readiness and the closedness will influence the willingness. Because of the rich character of the willingness and readiness of members, see answers to the sub research questions, it was difficult to group the members. Still three groups were defined. Group 1 is ready but not willing. Group 2 is not ready and not willing. Group 3 is ready and willing.

Midwaste should listen to the group that is willing and ready. These members discussed the following two different scenarios for Midwaste as facilitative leader.

First, Irado is changing their IT landscape in a service bus with multiple standardized IT solutions. For every functionality of the waste collection organization they will use the most suitable IT solution. Irado elaborates upon Midwaste being the middle party between member and software provider. In that case the software provider don't need to speak to the 13 members individually, but makes the deal with Midwaste. At this moment Irado is placing more and more aspects of their IT environment outside the organization. For this they are looking for an organization that is trusted enough to handle their IT decision making. So Irado may stick to their core activities. In this Midwaste may obtain a mediating role between waste collection organization and software provider. Other organization that might join soon are the members that are client at GMT. For example DAR has experienced the benefits of having a user group and is already planning to create one without the software provider. To have more influence on the development agenda of the software provider and bargaining power to compete with the non-governmental clients of GMT. Second, Afvalstoffendienst beliefs that Midwaste need to become a shared service center in which they centrally operate a database for registering and communicating information on the different waste streams in the Netherlands. In this case all members have the freedom to decide upon their own IT infrastructure, but will standardize their communication streams towards Midwaste. Midwaste may support the rest of their collaboration initiatives with the information attained from this IT solution. In this scenario Midwaste obtains a more operational task.

So, either Midwaste becomes a mediating partner or an operational partner to their members. For both a barrier could be identified. Mediating between software provider and waste collection organization might fail if the current division of role and responsibilities still prove too strong. Recently a lot of members did change their IT environment. Perhaps it is too late or too soon to start intervening as co-operative. Operationalizing a central database at Midwaste might have a low feasibility as it is not the core activity of the co-operative. For this a lot of external expertise need to be purchased.

7.3 Design principles

In the theoretical framework is defined how it is still unknown how a facilitative leader can create a shared understanding in collaborative IT decision making. The co-operative is well-known for its bottom up mechanism for achieving inter-organizational collaboration. The members together are responsible for the direction of collaboration efforts. Collaboration will only exist if the members agree upon the direction. By performing case study research of a co-operative facilitating collaborative IT decision making it is possible to identify best efforts in creating a shared understanding. The following design principles may be used in future research:

a. Involve a small group of members. When the initiative starts small and in phases it is easy to keep the overview; learn and adapt from mistakes without having a high impact; there is always the possibility other organizations will join the collaboration later on in the process as the unity increases . The co-operative chooses to either start with one member, cluster members based upon characteristics or listen/act for all members at the same time. An effective strategy would be to start small with the members that are most willing and ready towards a collaboration in IT decision making.

b. Start with a multi issue agenda. Assess the amount of shared IT vision present in the network. If there are too many different directions to IT decision making it will be necessary to first create a shared IT vision. There are different types of involvement in the co-operative: affectively involved (instinctively), involved based on calculation (economic benefit), imperative involved (no alternative) and normative involved (norms and values) (Bosma & De Jonge, 2014). Important to get the members start participating. The type will influence the demand and commitment to the process of collaboration. A strategy will be to

involve the IT managers in an open discussion about overall IT decision making process. With this the co-operative will involve every member.

c. Aim for a long term duration of the collaboration effort. Identify the competing dependencies of members. Because of the relationship some members have with the software provider or municipality they have no intentions in switching to another software provider. But, perhaps on a long term when the collaborative initiative promises to be successful the members will join.

8. Discussion & reflection

This chapter will reflect upon both content and process of this research. In the first paragraph it will become clear how the findings contribute to the knowledge and common understanding of the initial problem. For this, the main findings are considered in the light of the actions taken for achieving validity. These are construct validity, internal validity, external validity and reliability. See chapter N. In the next paragraph it will become clear whether the research steps are followed in proper order. The consistency of the line of argumentation need to be substantiated with the thoroughly execution of the research steps. Also, societal relevance and the scientific relevance will be discussed. At the end recommendations for future research will be given considering this limitations of the research content and process wise.

8.1 Reflection on content

The main finding of this research is that collaborative IT decision making is difficult to achieve, because of the differences in speed, distribution responsibilities (both relationship software provider to member; municipality to member) and information need. Therefore Midwaste should not too soon decide upon the direction for collaborative IT decision making. Instead Midwaste should start creating a shared vision with the members that are most willing and ready. For now, these organizations are ACV, Afvalstoffendienst, Irado and Saver. The role of the co-operative will be facilitating dialogue and debate. But if they really want to matter in the future they need to exploit their operational task as shared service center. This finding is based upon all results in a case study in the waste sector. Activities included an open in-depth interview with 13 IT managers, online questionnaire about the current IT landscape, internet search on other actors in the waste sector and literature review on successful collaboration in IT decision making. Beneath is reflected upon the validity of the content resulted into the main finding.

The 13 IT managers together represented the whole environment of collective IT decision making for Midwaste. So all real causal relationships will be found if data from all IT managers is collected. The online survey form only got 10 out of the 13 responses. This was not a problem as the missing data was collected through the in-depth interviews. Also, the questions formulated in the beginning provided enough input to achieve complete interviews immediately. No IT manager needed to be contacted again. In the end 12 of the 13 IT managers were interviewed. It was not possible to reach out to the IT manager of Cure, because of time limitations. Cure is similar to other semi large governmental companies in the waste sector such as Saver and ACV. Some insights into the behavior and characteristics were found as other IT managers mentioned Cure. This was not enough to include Cure in the empirical data chapter and it might be a limitation to the results for Midwaste. However, because of the similarities to other members for the scientific purpose of this research the 12 interviews were enough to find the real causal relationships. The internal validity of the research proofed to be strong enough.

The research claims to investigate collaborative IT decision making inside the co-operative association in real life context. Result is a promising overview on all actors that need to be involved during the collaboration. With the online questionnaire it was possible to create a chart for the a-synchronized IT decision making process and location on the graph of IT architecture (tailor made versus standardized AND outsources versus self-built). This overview is also used as input for the interviews. With the interviews every side to the story of Midwaste was elaborated upon. Then assessing the relational characteristics why IT manager prefer individually going into decision making was done with the triangulation of sources. The interviews are combined with more objective data. The size, activities, environment, behaviour and type of organization were compared to data collected from websites, flyers and publications. With this the construct validity is kept. However, an unexpected result of the research was the maturity of collaboration in IT decision making in the waste sector. At the beginning of the case study is elaborated upon how

Midwaste tried to establish collaboration in IT decision making with the project logistics without paper. Though this project was not really matured in the end. Only few organizations were involved in the negotiations and as time and resources diminished the efforts stopped. So none of the IT managers interviewed actually experienced collaborative IT decision making. Therefore, a lot of interview questions did not got answered. Causing the important decision of changing the main research question from 'how to facilitate collaborative IT decision making' to 'why is collaborative IT decision making complex'. There was no evidence found in how the organizations will react to collaboration. This might be a limitation to the construct validity.

Something that turned out to be more difficult than expected was the scope and terminology used by the IT manager when discussing the problem of IT decision making in the waste sector. In the transcripts of the interviews it is shown that the IT manager was speaking most of the time. Being a good listener is important in case study research. No strict interview protocol was maintained and new questions were always formulated and asked when triggered by enthusiasm. With this sensitive data could be collected. The minimum time of an interview was 45 minutes, but because of the improvised questions some interviews run up to more than 90 minutes. A good thing as more and more experiences and examples were given by the IT managers. For documenting the interviews, all mp3 files got a transcript and code file in Atlas.ti. The transcript is to ensure that no information is lost and the Atlas.ti file ensured the docility of the information for answering the main research question (Atlas.ti, 2015). However, because of this method the IT managers sometimes got carried away and discussed topics extensively that were not of interest to the scope of the research. Some interviews became unreadable massive documentation. Terms were used interchangeable. Also because the IT managers attain a lot of work pressure, they might have answered in a socially desired way. Then, the answers only include that what they think is best and not that what is really happening in the waste sector. Meaning that when reproducing the research other results may be obtained. A limitation was the well-defined scope to begin with. To improve the reliability of the research after the transcription of the interviews it was important to think of a way in rightfully representing the massive documentation. Thus, the way this research is presented in the report is not the actual order of research steps taken. Representing the empirical data for every relational mechanism separately is not how the interviews were intended. However it did made the overall structure of the report more clear to the reader. Besides Also, the full transcript will be saved and it will be possible to go back to the origin of the information when another view on the theory is needed.

Last but not least is the weakness of case study research when generalizing the findings to other situation. Also called the external validity. To achieve this the co-operative Midwaste need to be representative for all other co-operative associations. But, this will be hard as there are many types of different co-operatives. These differences are partially based upon the type of members part of the co-operative and partially based upon the type of collaboration aimed for in the co-operative, see Figure 21. A good example of a totally different co-operative association is Flora Holland in the floriculture supply chain. Their mission is to maintain an open marketplace where suppliers of floriculture products and their customers can meet to do business (Floraholland, 2015). Most members of Flora Holland are small individual growers. The total number of members is over 5.000. Because of this there isn't the opportunity to listen to all opinions and interests before choosing a direction. A total different role for Flora Holland as co-operative might be necessary.
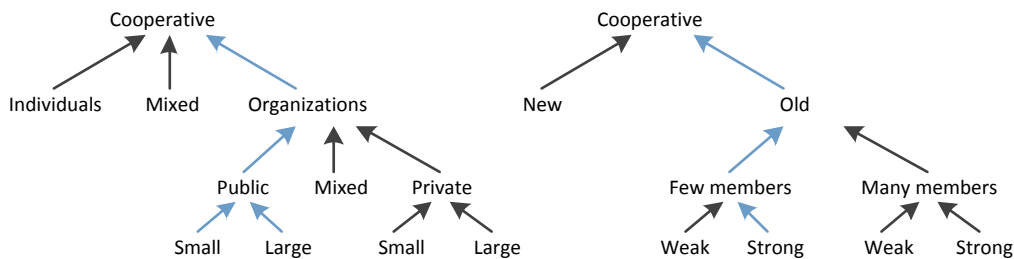
Figure 21: Characteristics of the co-operative (left is type of members; right is type of collaboration)

So the findings in this research will only be generalizable for public service delivery by co-operative associations. In the Netherlands all public organizations have a certain level of freedom. This is resulting in the distribution of responsibilities in IT decision making, described during the case study of Midwaste in the waste sector. By assessing the 'human' side of this issue, interviewing the IT manager, this case study might be used to be compared to other public service delivery such as natural gas, electricity, water or sewage.

8.1.1 Scientific purpose

At the beginning of the study it was unclear how inter-organizational collaboration and IT decision making relate to each other. State of the art in inter-organizational literature suggested that the role of a co-operative as facilitative leader is based upon aiming for change, economic capacity and organizing capacity. However, no literature is been found on the role of co-operatives in IT decision making. In facilitating collaborative IT decision making co-operatives are involving themselves in a whole new type of network. For this it is important to deal with the existing variety, mutual dependencies and closedness of public organizations interacting with the IT sector. The case study was about the unique situation of Midwaste in the waste sector and made it possible to investigate the phenomenon in a real life setting. Also, because Midwaste was facilitating collaboration for more than 15 years the results will go beyond general difficulties such as the sensitivity of information sharing. A lot of trust was present and no real competition between the members was happening although collaborative IT decision making was still not achieved. All IT manager interviewed were really committed to the research and contributed greatly to the discussion on the role of Midwaste. The size of the interview transcripts was around the 100 pages long and is not included in the thesis. So, the scientific purpose of the research is as follows: before the co-operative might become an effective facilitative leader for collaborative IT decision making in the public sector they need to take care of the factors found during the case study research. These developed scenarios might function as input for future research.

Therefore, collaboration should be established based upon process management not project management. In process management the focus lies upon how the organizations need to collaborate instead of on what the organizations need to collaborate. Up until now there is reasoned how organizations all have different willingness and readiness to collaborate. By choosing the organization that is most willing and ready to collaborate the chance of the collaboration initiative becoming a success is the highest. A small collaborative initiative will be pursued. When the initiative starts small and in phases it is easy to keep the overview; learn and adapt from mistakes without having a high impact; there is always the possibility other organizations will join the collaboration later on in the process as the unity increases (Bruijn et al., 2010).

8.1.2 Societal purpose

For the societal purpose two different purposes could be identified: the research may function as guideline for Midwaste in achieving collective IT decision making in the waste sector or the

61

research may function as guideline for the central government to promote collaboration initiatives in IT decision making in the Netherlands. Both will be explained.

One, how may the research be used by Midwaste that is looking for collaboration opportunities in IT decision making? The main question from Midwaste was with whom, when and about what to collaborate? All three questions are discussed during the interviews. The longer it will take creating a shared IT vision, the more differences will rise between the members and the harder it will be to achieve unity in the far future. However at this moment Midwaste does not obtain the needed IT expertise to follow the actions in collaborative IT decision making. Midwaste is a co-operative association with 12 full time employees. Most work is on the bundling of different waste streams. Only 3 FTE's are available for project management. In the near future will the project managers at Midwaste be occupied with projects that include the bundling of small chemical waste and textile. Only minimal work force will remain. It is therefore important to get a full time employee specialized in collaboration and the IT domain. The next step will be to present the findings to all IT managers together to provoke them for discussion. See Figure 22.
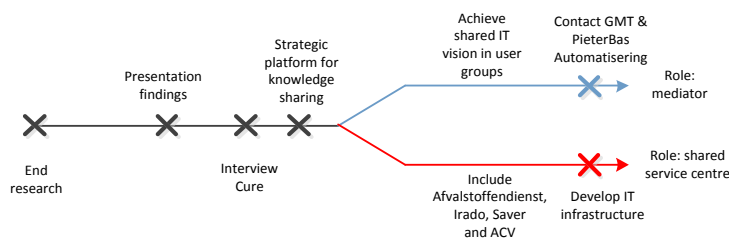
Figure 22: Steps for Midwaste

Two, how may the research fit in the policy of the Dutch central government that is promoting collaboration? In general there are two types of collaboration initiatives in the Netherlands: top down and bottom up. Currently most initiatives have a top down mechanism. For example the central government is creating a top down mechanism for municipalities, provinces and water authorities to work together in public structures by approving more forms of collaboration in the 'wet gemeenschappelijke regelingen' (WGR, 2015). The law is since January 1th 2015 effective. Another example is GEMMA which is a collaboration initiative of KING municipalities and the 'Vereniging voor Nederlandse Gemeenten' (VNG). GEMMA is a reference architecture for local authorities to design their information services. With this a top down mechanism for standardization is created (Kwaliteits Instituut Nederlandse Gemeenten, 2015; Rijksoverheid, 2015). But, a bottom up type of collaboration might be even or more effective in achieving good IT decision making in the public sector. The VNG is keeping track of all collaboration initiatives that are characterized as bottom up. This is represented in a databank for sharing knowledge on best practices of cooperation between local authorities (Vereniging van Nederlandse Gemeenten, 2015). Dimpact is found in this databank. Dimpact is a co-operative association that wants to achieve collaboratively purchasing, implementing, maintaining, hosting, innovating and sharing knowledge within the domain of ICT (Vermeulen, 2015). Dimpact is a real bottom up practice for collaboration. The findings of this research may be used by the central government to promote more or support the bottom up practices for collaboration in IT decision making.

8.2 Reflection on process

Two problems were encountered during the execution of the research process. First, finding the right scientific approach. This was difficult as the research is driven by specifics of the case organization. Midwaste identified the problem of collaborative IT decision making in its organization and contacted the TU Delft for a graduating student as intern. Midwaste had already an idea about how the research process should look like. For example they wanted to know in what IT solutions are used by the members and what future scenarios are foreseen by the IT

managers. It took some time to formulate a research problem that was interesting from a scientific perspective as well. After this was found it was possible to interview the IT managers with the questions Midwaste wanted and I wanted. Second, finding the right presentation for the results. This was difficult as case study research tend to include massive unreadable documentation. In this case it is about the 12 interviews with the IT managers. All together 120 pages of interview were produced during the research. These needed to be merged down to 15 pages empirical data. This was a very labor-intensive task and it took a long time to finish as it was important not to lose any important data. Because of this there was some time trouble at the end. Midwaste wanted to see some results, but not all scientific parts were finished jet.

8.3 Recommendations

All findings during the case study research can be applied to Midwaste in the Netherlands. This limitation causes a need for future research. The following three directions for future research could be identified.

- Scenario planning. A limitation to the research was how experienced the IT managers were with collaborative IT decision making. This was misjudged at the beginning. The research might be extended by use of comparative case studies. For example by including Dimpact. Dimpact, the co-operative association for collaboratively purchasing software for municipalities, is much more matured in IT decision making. They already successfully achieved collaboration and possible scenarios could be explored. It should become more clear what resources the co-operative in general could use to organize capacity, aim for change and achieve economic capacity. With scenario planning the two opposed scenarios: shared service center and mediator between software provider and member need to be investigated.
- Quantitative research. A limitation is differences in the characteristic of the co-operative. The case study was about a co-operative with already a lot of trust, few members and all acting in the public sector. Therefore it is unknown if the theory might be applied to other co-operatives. Statistical generalization is at this moment impossible and it may only be applied to Midwaste in the waste sector. For it to become a generic theory more quantitative research is needed.
- Alternative research. Another limitation to the research was the time. Therefore some leads could not be followed up. For example a very interesting finding was the shared IT infrastructure with the municipality. Some members needed to share their IT solutions with other departments of the municipality. Causing a very slow and cumbersome decision making process with IT solutions that are not really effective for waste collection. The freedom of an IT manager inside public organization might be explored to get an understanding on the effectiveness of IT decision making in the public sector. With more freedom and less supervision the IT managers might find more creative solutions or take more initiative. Also with more freedom higher educated IT managers may be attracted to the job. For this new case study research will be proposed that include comparative cases. With a survey it will be possible to reach out to multiple IT managers in public organizations in the Netherlands. What do they need for effective IT decision making?

Literature

Allers, M. (2010). Het dogma van decentralisatie.   Retrieved 3th February, 2015, from http://www.binnenlandsbestuur.nl/ruimte-en-milieu/achtergrond/achtergrond/het-dogma-van-decentralisatie.158162.lynkx

Ansell, C., & Gash, A. (2007). Collaborative Governance in Theory and Practice. *Journal of Public Administration Research and Theory, 18*(4), 543-571. doi: 10.1093/jopart/mum032

Atlas.ti. (2015). Analysis tool.   Retrieved 25th April, 2015, from http://atlasti.com/product/features/

Beijert, J. (2015). ICT situatie Omrin. In L. van der Quast (Ed.).

Bishop, M. (2004). *Introduction to Computer Security*: Addison-Wesley Professional.

Bootsman, J. (2015). ICT situatie ACV. In L. van der Quast (Ed.).

Bosma, M., & De Jonge, E. (2014). *Publiek geheim, de cooperatie in beweging*. Amsterdam: Frissewind BV.

Bovens, M. A. P., 't Hart, P., & van Twist, M. J. W. (2007). *Openbaar bestuur: beleid, organisatie en politiek*. Alphen a/d Rijn: Kluwer.

Bradley, R. V., Pratt, R. M. E., Byrd, T. A., & Simmons, L. L. (2011). The role of enterprise architecture in the quest for it value. *MIS Quarterly Executive, 10*(2), 73-80.

Brouwer, N. (2015). ICT situatie Gemeente Breda. In L. van der Quast (Ed.).

Bruijn, D., & Heuvelhof, T. (2009). Management in networks.

Bruijn, D., Heuvelhof, T., & Veld, I. t. (2010). Process management.

Campbell, J., McDonald, C., & Sethibe, T. (2010). Public and Private Sector IT Governance: Identifying Contextual Differences. *Australasian Journal of Information Systems, 16*(2).

de Cocq, R. (2015). ICT situatie Afvalstoffendienst Den Bosch. In L. van der Quast (Ed.).

Dekker, H. C. (2004). Control of inter-organizational relationships: evidence on appropriation concerns and coordination requirements. *Accounting, Organizations and Society, 29*(1), 27-49. doi: 10.1016/s0361-3682(02)00056-9

Dekkers, H. (2006). Afval is een maatschappelijk vraagstuk.

den Bode, G. (2015). ICT situatie Doetinchem. In L. van der Quast (Ed.).

Dunleavy, P. (2005). New public management is dead: Long live digital-area government. *Journal of Public Administration Research and Theory, 16*(3), 467-494. doi: 10.1093/jopart/mui057

Eisenhardt, K. M. (1989). Building Theories from Case Study Research. *The Academy of Management Review, 14*(4).

Emerson, K., Nabatchi, T., & Balogh, S. (2011). An Integrative Framework for Collaborative Governance. *Journal of Public Administration Research and Theory, 22*(1), 1-29. doi: 10.1093/jopart/mur011

Floraholland. (2015). Ons cooperatief bedrijf.   Retrieved 25th April, 2015, from https://www.floraholland.com/nl/over-floraholland/ons-cooperatief-bedrijf/

Gemeenten, V. v. N. (2015). Databank praktijkvoorbeelden: van en door gemeenten. Retrieved February 27th http://praktijkvoorbeelden.vng.nl/

Gibbert, M., & Ruigrok, W. (2010). The "what" and "how" of case study rigor: Three strategies based on published work. *Organizational Research Methods, 13*(4), 710-737.

Gomm, R., Hammersley, M., & Foster, P. (2000). Generalizability and the single-case study. In R. Donmoyer (Ed.), *Case Study Method: Key Issues, Key Texts* (pp. 45-69). London: SAGE Publications ltd.

Goodrick, D. (2014). Comparative case studies *Methodological Briefs Impact Evaluation* (Vol. 9). Florence: UNICEF Office of Research.

Gouw, E., & van der Drift, W. (2015). ICT situatie Irado. In L. van der Quast (Ed.).

Hannan, A. (2007). Interviews in Education Research. Retrieved 14th April, 2015, from http://www.edu.plymouth.ac.uk/resined/interviews/inthome.htm#10

Hoch, D., & Payán, M. (2008). Establishing good IT governance in the public sector. *Transforming government*, 45-55.

Hupe, P. (2004). De werkvloer van de Wet maatschappelijke ondersteuning: Over regeldruk en gemeentelijke beleidsvoering [Press release]

Jacob, S. A., & Furgerson, S. P. (2012). Writing Interview Protocols and Conducting Interviews: Tips for Students New to the Field of Qualitative Research. *The Qualitative Report, 17*(6), 1-10.

Jansen, D. (2014). ICT situatie Meerlanden. In L. van der Quast (Ed.).

Kloth, & Applegate. (2004). Interorganizational Collaboration.

Knoben, J., & Oerlemans, L. A. G. (2006). Proximity and inter-organizational collaboration: A literature review. *International Journal of Management Reviews, 8*(2), 71-89. doi: 10.1111/j.1468-2370.2006.00121.x

Kwaliteits Instituut Nederlandse Gemeenten. (2015). Over KING. Retrieved January 29th, 2015, from https://www.kinggemeenten.nl/secties/over-king/over-king

Lee, A. S. (1989). A scientific methodology for MIS case studies. *MIS Quarterly, 13*(1), 33-50.

Midwaste. (2014). Jaarplan.

Midwaste. (2015). Projecten. Retrieved March 3th, 2015, from http://midwaste.nl/projecten

Minderman, A. (2015). ICT situatie Gemeente Oss. In L. van der Quast (Ed.).

Mol, F. (2015). ICT situatie SAVER. In L. van der Quast (Ed.).

Nedvang. (2014). Over ons. Retrieved 5 November, 2014, from www.nedvang.nl

Plasterk, R. H. A. (2013). *Kamerbrief aanpak decentralisaties op terrein van ondersteuning participatie en jeugd*. Den Haag.

Rijksoverheid. (2014). *Q&A Intergemeentelijke samenwerking*. Den Haag.

Rijksoverheid. (2015). GEMMA voor gemeenten. *Eén digitale overheid: betere service, meer gemak.* Retrieved 4th February, 2015, from http://www.e-overheid.nl/onderwerpen/over-de-e-overheid/architectuur/nora-familie/gemma

Rijkswaterstaat. (2014). *Afvalstoffenheffing 2014*. Utrecht: Rijkswaterstaat.

ROVA. (2014). Diftar. from http://www.rova.nl/rova/dienstverlening/diftar

Ruiter, A. (2015). ICT situatie Avalex. In L. van der Quast (Ed.).

Stichting vervoeradres. (2012). Transport van afval.

Stuijts, M. A. J., van de Water, J. C., Vidal, M. J., & Ditters, Y. A. (2012). VNG Model Inkoop en aanbestedingsbeleid.

Symons, C. (2005). IT Governance framework: beste practices *Helping business thrive on technology change*.

Tremblay, D., Klein, J., Fontan, J., & Roussaeau, S. (2003). Territorial proximity and innovation: a survey in the Montreal region. *Revue d'Economie Regionale et Urbaine, 5*, 835- 852.

Tweede kamer der staten generaal. (2014). Parlementair onderzoek naar ICT-projecten bij de overheid.

Van Aartsen, J. (2007). De eerste overheid *Gemeentewet en grondwet*. Den Haag: VNG-Commissie.

Van Bekkum, O. (2013). De opmars van de tweede generaties cooperaties.

van der Beek, P. (2010). Afvalbedrijf gebruikt specifiek ERP-pakket SAP.   Retrieved 25th April, 2015, from http://www.computable.nl/artikel/nieuws/erp/3221773/1276992/afvalbedrijf-gebruikt-specifiek-erppakket-sap.html

van Grunsven, C. (2015). ICT situatie BAT. In L. van der Quast (Ed.).

van Montfort, H. (2015). ICT situatie DAR. In L. van der Quast (Ed.).

van Oorschot, K., de Hoog, J., van der Steen, M., & van Twist, M. (2013). The three pillars of the co-operative. *Journal of Co-operative Organization and Management, 1*(2), 64-69. doi: 10.1016/j.jcom.2013.10.002

Vangen, S., & Huxham, C. (2011). The Tangled Web: Unraveling the Principle of Common Goals in Collaborations. *Journal of Public Administration Research and Theory, 22*(4), 731-760. doi: 10.1093/jopart/mur065

Vereniging van Nederlandse Gemeenten. (2015). Samenwerken - ICT.   Retrieved 4th February, 2015, from http://praktijkvoorbeelden.vng.nl/databank/gemeentelijke-samenwerking/samenwerking-ict.aspx

Vermeulen, C. (2015). Kenmerken van cooperatieve vereniging Dimpact. In L. van der Quast (Ed.). Delft: TU Delft.

Wassink, G., Robaard, A., & Boonzaaijer, G. (2007). *Honderd jaar heren van de reiniging*. Brielle: CommunicatieProducties.

Wastehub. (2014). De afvalwereld verbonden.   Retrieved 5 November, 2014, from www.wastehub.nl

Wecycle. (2014). Midwaste geeft intentie af over afgifte e-waste door 85 gemeenten.   Retrieved 5 November, 2014, from http://www.wecycle.nl/nederlands/consumenten/nieuws/midwaste-geeft-intentie-af-over-afgifte-e-waste-door-85-gemeenten.html

Weill, P., & Woodham, R. (2002). Don 't Just Lead, Govern: Implementing Effective IT Governance. Cambridge: Massachusetts Institute of Technology.

Wet gemeenschappelijke regelingen (2015).

Woods, P. (2006). Qualitative analysis. *Study Guide for E835 Educational Research in Action.* Retrieved 14th April, 2015, from http://www.edu.plymouth.ac.uk/RESINED/Qualitative%20methods%202/qualrshm.htm#3

Wuyts, S., Colomb, M. G., Dutta, S., & Nooteboom, B. (2005). Empirical tests of optimal cognitive distance. *Economic behaviour & organization, 58*, 277-302.

Yin, R. K. (2009a). Case study research: design and methods. *Applied Social Research Methods Series, 5*.

Yin, R. K. (2009b). *Case study research: design and methods* (Vol. 4th edition). California: Sage.

Yin, R. K. (2012). Designing case studies *Case study research* (Vol. 5): SAGE Publications, Inc.

Zeller, C. (2004). North Atlantic innovative relations of Swiss pharmaceuticals and the proximities with regional biotech arenas. *Economic Geography, 80*(1), 83 -111.

Appendix I   Interview questions

Characteristics about the person and organization

- Please introduce yourself and tell us more about the organization?
- What are the key activities performed by the organization?
- In what way does or doesn't the organization experience competition from other private/public organizations in the area?
- How many municipalities are served by the organization and what differences are there between them?
- how would you describe the culture of the waste sector?
- Is the political situation of the organization stable?
- Competition?

IT environment

- How would you describe the IT environment of your organization?
- How would you define the maturity of the organization?
- What developments within the IT domain did the organization go through?
- How many employees does the IT department has?
- Is the IT infrastructure shared with the municipality? On what level?
- Which influence does the DIFTAR has on IT governance?
- Are the costs an important aspect of the IT governance of the organization? Why?
- Who is you software provider?
- How would you describe the relationship with the software provider?
- Why did you choose for this software provider?
- Is the software market for waste collection organizations changing? In a good way?

Collaboration

- Do you see opportunities for collaborating in IT governance between Midwaste members?
- Why is collaborating between Midwaste members difficult?
- How different are the members of Midwaste?
- What kind of advantage will the Midwaste members gain by collaborating in IT governance?
- How do you think the cooperation should look like?
- Which are important steps to be taken before successful collaboration is possible?

Cooperative association

- Why is the organization member of Midwaste?
- With which other members of Midwaste does the organization had contact about ICT in the recent years?
- Which role does the organization has in Midwaste?
- What position does Midwaste need to take in collaboratively IT governance?
- What first step need to be taken?

Future

- What future challenges will the organization need to overcome in IT governance?

Appendix II   Comparison to other co-operative

Dimpact is a good example of a successful inter-municipal IT partnership in the Netherlands. The primary task of all 400 municipalities in the Netherlands is fulfilling their public services towards citizens, companies and chain partners. "IT is just supportive to these public services. Therefore IT development for municipalities is a task that should not be performed by the municipalities. However commissioning IT is difficult. By joining forces Dimpact will take care of all communication towards IT suppliers. Dimpact bundles the IT demand of municipalities and develops standardized IT solutions; a solid core and a local flexible shell. Municipalities are able to make adjustments and optimal reuse the joint investment, knowledge sharing and trends (Vermeulen, 2015)." The co-operative is founded in 2007 with only 5 municipalities linked. Now, almost 15 FTE is being deployed to direct the IT development of 34 municipalities. To do so "Dimpact explores developments in rural services (such as changes in law and regulation or decentralisation of governmental task) and analyses the impact of these developments on municipalities. Then Dimpact translates the bundled demand in vision and program of requirements to find IT solutions in the software market. At the end Dimpact will function as a contract holder on behalf of the municipalities or represent and negotiates a purchase advantage (Vermeulen, 2015)."

Even though the foundation of IT usage is similar for every municipality. Reality shows a more complex situation. The following is defined by Vermeulen (2015). Achieving a shared vision across all Dimpact members could be an obstacle for collaboration. Because municipalities are experiencing many little differences and are not having the same IT maturity. In that case the prioritizing of IT investments by the municipalities differs. Also, some municipalities are too much focused on the maintenance of their exotic tailor made solutions. In this situation there is too little attention to the standardization of IT solutions. Dimpact raises awareness on the need for standardization by sharing knowledge on the application of IT solutions in other municipalities. With best practices and a business case the municipality gets to experience how much resources a tailor made solution will cost. Also when a municipality takes another perspective to an IT solution they need to wonder whether this is possible and how they actually differ from the other municipality as they act in the same national environment and serve the same citizens. For a lot of municipalities Dimpact could be an eye-opener.

Thereby, with achieving multi-tenancy and the ability to customize a lot of municipalities could have their own organizational environment. So, local flexibility is desirable without losing the standard. Multi-tenancy is an architecture in which a single instance of a software application serves multiple customers. Each customer is called a tenant. Tenants may be given the ability to customize some parts of the application, such as color of the user interface or business rules. For this the importance of good contract management is arising. Municipalities need to have a good contract to improve their bargaining position.

So even more important than technological design is the fact of achieving leadership. Everyone has some opinion on the newest IT solution. But, increasingly the IT systems will take over the job of executive officers. IT development is therefore a sensitive topic when the business case is: more IT less people. On regular base municipalities forget to make the corresponding organizational change with IT development. Knowledge and skills of users is too low and functional application maintenance is insufficient being operated.