Msc. Thesis SEPAM

Supporting knowledge management within municipalities and CJG's with Web 2.0 technologies

Exploring opportunities to contribute to knowledge management bottlenecks

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Preface

This research project has been conducted to fulfil the final graduation requirement and finalises my master Systems Engineering, Policy Analysis and Management at the Delft University of Technology. This report has been written as part of my internship at Alares, a consultancy firm located in the Hague. Besides this report, a scientific article has been written, which can be found in Appendix 1.

During the eleven months this graduation project took I had the opportunity to experience the consulting world and at the same time carrying out my research. I did an extensive literature research, interviewed around 20 people and spoke to even more people about Web 2.0 and knowledge management. Furthermore, to experience the usefulness of Web 2.0 I used various Web 2.0 technologies to support this research project. RSS, weblogs, Twitter and del.icio.us were used to search for currently relevant information, Google Books for access to books that were not available in libraries, Skype was used for internal communication, Prezi, an online presentation tool was used for the final presentation and a lot of other tools for small tasks supporting certain parts of this research.

This graduation project has been a valuable experience in which I learned more about the subjects of this research, but also about myself. I will never forget the struggles and the times the research focus was changed again. Several people supported me during the struggles, stimulated me with new ideas and constructive feedback and contributed to this report. I would like to take this opportunity to thank them. I want to thank my first supervisor Jolien Ubacht for all her support, input and feedback on documents during the research. Constructive discussions with and purposeful feedback from her solved many of the struggles during the research. I want to thank Marijn Janssen and Mark de Bruijne as members of the research commission for their guidance and feedback on certain parts of the research.

I want to thank my external supervisors Ed Magnée for giving me the opportunity to graduate at Alares and for his valuable insights, Ralph Boeije for his support and time during the research project and Wendy Hildebrand for her assistance on operational matters. Moreover, I want to thank all Alares colleagues who supported me and were so kind to answer my questions. Last but not least, I want to thank my parents and my friends for their support during this research project.

Alex Verheij

Rotterdam, April 2010

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Summary

This research started with the understanding that municipalities are modernising. Societal problems become more complex with many involved and well-informed stakeholders and multiple overlapping, interconnected subsets of problems that cut across various policy domains and levels of government. To solve these complex problems, municipalities increasingly participate in networks to execute public policy in collaboration with external stakeholders. Networks for instance are increasingly used to improve the quality of public policy. Within networks, such as safety houses and Centres for Youth and Families (in Dutch: Centrum voor Jeugd en Gezin (CJG)), the municipality has another, more governing, role opposed to the traditional bureaucratic role.

With the rapid developments in the information technology sector, knowledge has become easier to generate, store and share and consequently knowledge management has become more important. The increasing importance of knowledge and the speed of development in the IT area have enabled new organisational structures within government to execute public policy. We expected that knowledge management differs within these organisational structures. Web 2.0 was proposed as a set of technologies with unique characteristics, which provides an opportunity to contribute to knowledge management and cross-agency collaboration. The objective of this research is therefore to provide recommendations that present the contribution of Web 2.0 technologies to knowledge management within municipalities and within CJG's. The municipality and the CJG were chosen as case studies as they present two extremes on a range of agency types to execute public policy. Based on the research objective and the above presented choices, the main research question we seek to answer in this research is:

What can Web 2.0 technologies contribute to knowledge management within municipalities and within CJG's?

We answer this question through a theoretical and empirical analysis of knowledge management and Web 2.0 within municipalities and CJG's.

Theory

We started this research project with a discussion of Web 2.0. Although scholars have not yet agreed on a standard definition, we choose for this research the following definition: "*Corporate Web 2.0 can be defined as the transformation of the social and technological aspects of the new internet into business, leading to a redesign of existing business processes or even to an evolution of new business models"* (Stocker et al., 2007). This definition incorporates the social, the technological and the business aspects of Web 2.0.

We found that traditional knowledge management systems are applied to explicit knowledge, while Web 2.0 technologies enable the sharing of informal and tacit knowledge. In other words, Web 2.0 technologies have other functionalities compared to the traditionally used technologies, like e-mail and the Intranet.

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The next step was to analyse the connection between Web 2.0 and knowledge management for municipalities. We found that three back-office domains of municipalities could benefit from the use of Web 2.0 namely, regulation, cross-agency collaboration and knowledge management. With the focus on knowledge management and the modernisation of municipalities in this research project the knowledge management and cross-agency collaboration domains were of value for this research. Regulation falls outside the demarcation of this research as the focus of regulation differs from the focus of this research project.

Several Web 2.0 technologies were identified that have the ability to contribute to knowledge management within municipalities and CJG's. Chui, et al., (2009) ordered the contributions of seventeen Web 2.0 technologies in five categories: broad collaboration, broad communication, collective estimation, metadata creation and social graphing. Each of these five categories houses between two and five Web 2.0 technologies.

Within the theoretical analysis of knowledge management we discussed the complex nature of knowledge and the different features of tacit and explicit knowledge. Explicit knowledge can be communicated with words or in writing and can be formalised, while tacit knowledge is embodied in the human mind and cannot easily be separated and transferred. To effectively deal with the diversity in knowledge features, organisations need a variety of knowledge management approaches. With the focus on municipalities in this research project, a definition was found that is aimed at knowledge management within public organisations. McNabb (2007) defines knowledge management as: "a dynamic, evolving set of interacting existing and new technologies, practices and procedures that employ technology and social interaction in the delivery of public services." Besides the focus on public organisations, the last definition also focuses on social interaction and technology, which are both important when managing tacit and explicit knowledge.

A knowledge management model was found in McNabb's (2007) work, which presents the knowledge management mechanisms in public organisations. The mechanisms enabling knowledge management are knowledge development, knowledge transfer and knowledge sharing, leading to individual and organisational learning. We choose to leave individual and organisational learning outside the demarcation of this research project. We used this knowledge management model to structure the empirical analysis of knowledge management within municipalities and CJG's.

Practice

The knowledge management bottlenecks were found after the analysis of the interviews and were combined to more generic knowledge management bottlenecks. On the basis of the interviews we concluded that knowledge management within CJG's was hindered by:

- by the lack of network knowledge and socialisation among CJG partners
- fragmentation of knowledge among CJG partners
- the absence of a system to combine the diverse output of registration and signalling systems of CJG partner organisations
- the difficulties with vertically integrating operational knowledge to strategic levels and vertically integrating strategic knowledge to operational levels

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On the basis of the interviews we concluded that knowledge management within municipalities was hindered by:

- by the lack of required competencies of civil servants to search and find knowledge in currently used systems
- by the strategic use of knowledge by civil servants on operational and strategic levels
- Knowledge management within municipalities is hindered by the lack of incentives for using knowledge management
- by the absence of strategic attention for knowledge and knowledge management
- by the lack of initiatives that transform the newly created tacit knowledge into explicit knowledge.

The presented bottlenecks have been validated in two steps with experts. First, the initial bottlenecks were discussed with two experts in the field of knowledge management. In addition, both experts had relevant work experience within municipalities and CJG's. Next, the bottlenecks have been adjusted and combined to generic bottlenecks and again been discussed by the same two experts. The validated generic bottlenecks have been used in the analysis of the contribution of Web 2.0 technologies, which is presented in the next section.

Theory and practice

The analysis started with the selection of a Web 2.0 technology from one of the categories of the Web 2.0 model that proposes the optimal contribution to the bottleneck. In addition, a second category and technology were chosen, which support the (first) optimal tool. The results of the analysis are validated by experts in a validation session and are presented in Figure 1.

After validation we found that several Web 2.0 technologies contribute to knowledge management bottlenecks within CJG's. Wikis, shared workspaces and blogs contribute to multiple bottlenecks within CJG's. The contribution of these technologies to knowledge management matches with communicative and collaborative practices within CJG's. Furthermore, social mapping supported by social networking technology and blogs were validated as contribution to providing insight into the relationships within the network increasing the network knowledge of professionals and furthermore stimulate socialisation among CJG professionals. We find collaboration within CJG's an important point of interest as the existence of the CJG is based on collaboration between the partners. Our proposed technologies can enhance collaboration by strengthening the relationships and trust among partners and professionals.

Within municipalities several Web 2.0 technologies contribute to knowledge management. After validation by experts wikis, social networking and microblogging contribute to two different bottlenecks, while blogs were even agreed to contribute to three different bottlenecks. We found that within municipalities there is no knowledge sharing culture. Consequently, we proposed Web 2.0 technologies that mainly focus to contribute to collaborative and communicative practices. Shared workspaces, ratings and videocast technology are also presented as contributions to knowledge management and are specifically focused on

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one or two of the bottlenecks. Overall, shared workspaces integrated with blogs, microblogging and/or wikis contribute most to the knowledge management bottlenecks within municipalities. We believe that our findings contribute to knowledge management within municipalities by giving civil servants tools to collaborate and to communicate.

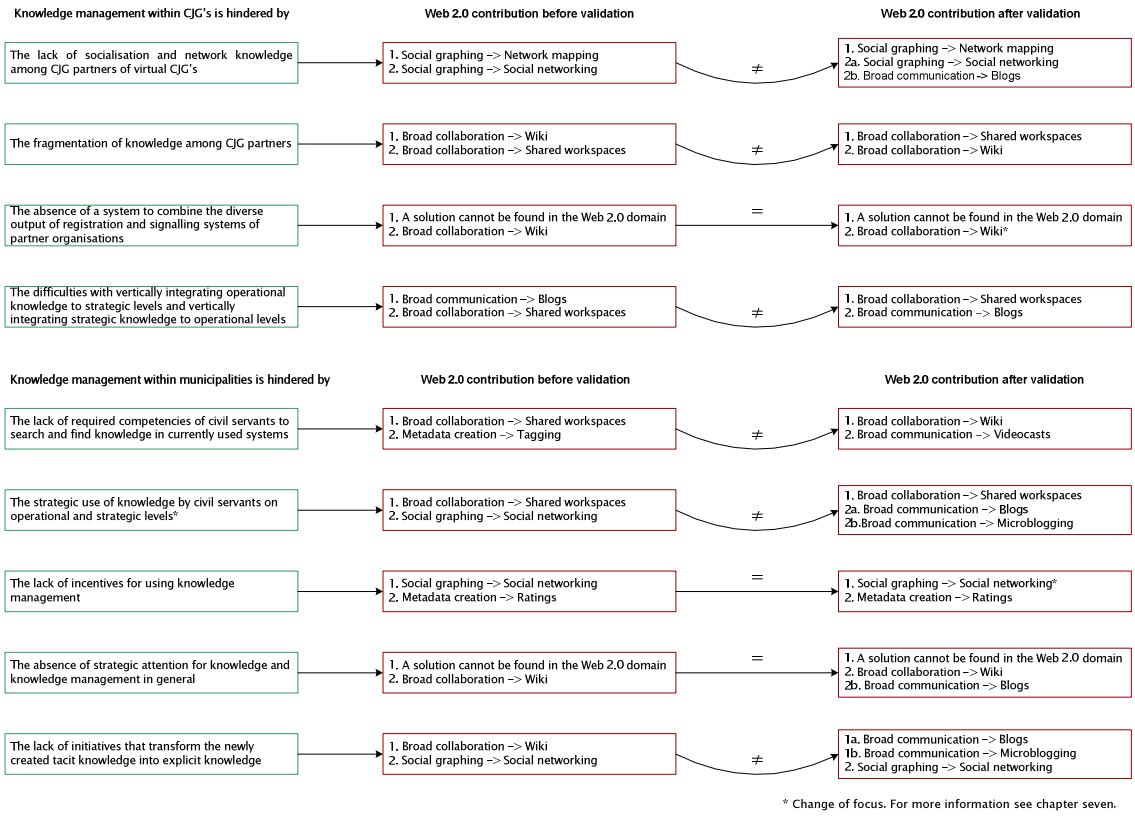

Figure 1: Web 2.0 technologies contribution to knowledge management bottlenecks

The proposed Web 2.0 technologies in both case studies present a balanced set with informal and formal technologies. The informal technologies, like blogs, microblogging and social networking are mainly focused on enhancing social interaction between co-workers on operational levels. More formal technologies, such as a wiki, have been proposed to contribute to more strategic matters. We conclude that formal Web 2.0 technologies suit better on strategic levels, while informal technologies fit better with conditions on operational levels.

Recommendations

1. Use a combination of Web 2.0 technologies to support knowledge management.
2. Implement Web 2.0 technologies in phases.
3. Actively stimulate participation.
4. Support from executives for Web 2.0 technologies within municipalities and CJG's.
5. Use the proposed Web 2.0 technologies complementary to currently used systems.

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1. Introduction

> *Sharing your knowledge.*
> *It's a way to achieve immortality.*
> **Dalai Lama**

1.1. The knowledge economy

The last decades knowledge has become more and more important for organisations. Since the middle of the twentieth century, labour- and capital-intensive industries have transformed into industries that rely on knowledge (Jashapara, 2004). Drucker (1969) was one of the first to elaborate on the knowledge economy. He foresaw that the civilian workforces of advanced, developed economies would consist of knowledge workers with knowledge as one of the central production factors, besides land, labour and capital goods.

Influenced by the rapid developments in the Information Technology (IT) sector Drucker's prediction came out (Drucker, 1988). With IT, information and knowledge became easier to generate, to share and to communicate with others. Employees of knowledge intensive organisations, for example in the high-tech industry or the corporate service industry, became knowledge workers. According to Weggeman (2000), knowledge workers use knowledge as production factor to exercise their job instead of (physical) labour and need to acquire this knowledge by learning. A practical definition is provided by Davenport (2005, p. 10): "Knowledge workers have high degrees of expertise, education or experience, and the primary purpose of their jobs involves the creation, distribution or application of knowledge. " This last definition will be used in this research when the term knowledge worker is used.

Knowledge workers can be found in various job categories, like legal, management, business and financial operations or medical practitioners (see for the whole list Davenport (2005, p. 6). Although conservative, Davenport shows that 28 percent of the American labour force falls within his classification of knowledge work. Less conservative classifications of knowledge work range from 34 percent till about half of the workforce (Davenport, 2005). The relative amount of knowledge workers in the Netherlands can be compared to the percentage found in the United States of America. In the Netherlands 3,3 million people are called knowledge workers, which represents 41% of the Dutch workforce (Centraal Bureau voor de Statistiek, 2004, p. 11).

The definition for knowledge workers used within this research also applies to civil servants working for the government. More and more knowledge is gathered, which is used by skilled and educated civil servants to come to policy and exercising their daily practices. The increasing importance of knowledge and the speed of development in the IT area have enabled new organisational structures within government. The development of modern information technology has made other types of management possible and allows for a greater range of agency types better tailored to specific responsibilities (Moon, 2002;

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OECD, 2005, p. 190). With the development of information technology and innovative management structures more market-style methods of service delivery should improve the quality of outcomes (OECD, 2005, p. 190). For example, on all levels of government, public organisations increasingly collaborate with external stakeholders in networks to execute public policy. The government is modernising.

1.2. The modern government

Along with the transformation of labour- and capital-intensive industries into industries that rely on knowledge, governments have changed their way of enforcing public policy. The traditional bureaucratic structure of public organisations worked well for the problems in the industrial age, when control and hierarchy were needed to solve problems. De Bruijn & ten Heuvelhof (2004) state that this view held until the sixties in the Netherlands. Since then the government became part of society, instead of watching over from above and the interests of involved stakeholders became important for successful implementation of public policy (de Bruijn & ten Heuvelhof, 2004). Today's problems are more complex and involve many well informed citizens and stakeholders with their own perceptions of the problem. Citizens and stakeholders expect that the government take their views and knowledge into account in public decision making (OECD, 2005, p. 30). Traditionally the government would enforce public policy to solve the problem, but in today's society enforcing public policy to solve complex problems can be counterproductive.

To face the complex problems of today, governments collaborate more and more with other stakeholders. Since the mid eighties, the Dutch government collaborates in public-private partnerships where private parties are involved with the execution of policy or the realisation of policy products and services (Klijn & van Twist, 2007). Within a public-private partnership costs, risks and revenues are divided between the participants. The driver behind a public-private partnership is creating a win-win situation for all participants with collaboration (Klijn & van Twist, 2007). Public-private partnerships mainly involve infrastructural and area reconstruction projects, which ends when the product or service has been produced. Other structures are needed when a complex problem needs constant attention and when the final result is not clear.

Complex problems that need constant attention are called 'wicked' problems by Weber & Khademian (2008, p. 336). First, they state that 'wicked' problems are unstructured as it is hard to identify and model causes and effects, thus adding complexity and uncertainty. Second, the wicked problem space comprises multiple overlapping, interconnected subsets of problems that cut across multiple policy domains and levels of government. Lastly, Weber & Khademian (2008) state that wicked problems are relentless. These problems are not going to be solved once and for all despite the best intentions and resources directed at the problem. To solve these so-called wicked problems, the government increasingly collaborates with external stakeholders in networks.

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Within these networks, it is harder for public organisations to use its hierarchical power. In a hierarchy, the superior has the information and power to steer subordinates. In a network, public organisation are equal to other stakeholders and therefore lose their hierarchical power (de Bruijn & ten Heuvelhof, 2004). Other types of steering are needed in networks as all stakeholders have their own interests and expertise. Furthermore, knowledge and the management of knowledge become more important within networks. Weber & Khademian (2008) state that a fundamental challenge to effectively managing any public problem in a networked setting is the transfer, receipt and integration of knowledge across stakeholders. This statement shows that knowledge management is needed in networks as knowledge management facilitates the transfer, receipt and integration of knowledge. Wiig (2002) even states that knowledge management becomes a new responsibility of the government to strengthen public service effectiveness and the society it serves. Although the last statement does not focus in particular on networks, it shows knowledge management is important for the government in today's society. For now knowledge management is described as the process of identifying and leveraging knowledge in an organisation to improve organisational performance (Alavi & Leidner, 2001). The steps and goals of knowledge management are discussed in more detail in chapter four.

The Dutch government is decentralised and consequently appears in various forms. In the Netherlands the most common layers of government are the central government, the provinces and the municipalities. When we talk about the government, all types of government can be meant. Therefore this research will delineate on one type of government to focus the research and the effort to come to more specific conclusions and recommendations. For this research Dutch municipalities have been chosen as subject of investigation. Although on all layers of government the described changes and modernisation can be found, municipalities often execute public policy that has been enforced by the central government.

1.2.1. Safety houses

The above showed that knowledge management is needed to solve public problems in networks to transfer, receipt and integrate knowledge between stakeholders. Furthermore, it showed that public service effectiveness can be strengthened by knowledge management when used by government. An example of a network in which the municipalities participate and collaborate with external stakeholders are the recently initiated safety houses (in Dutch: Veiligheidshuizen).

The goal of the safety houses is to contribute to the objective to decrease criminality, domestic violence and nuisance with 25 percent and to decrease recidivism. To reach this goal municipalities, police forces, national prosecution office, the council on child protection, after-care and resettlement organisations and welfare organisations collaborate in order to effectively adjust preventive and repressive measures to counter criminality (Ministerie van Justitie & Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2010). Besides these organisations, other organisations that are relevant for the local situation can join the safety houses. Together these chain partners provide an integral individual and/or district directed approach to counter crime issues. Within this network of organisations, municipali-

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ties have in cooperation with the national prosecution office a governing role. Furthermore, municipalities and provinces provide funds to the safety houses.

1.2.2. CJG's

Another recent example of the modernisation of the government is the implementation of Centres for Youth and Families (in Dutch: Centrum voor Jeugd en Gezin (or abbreviated CJG)). By the year 2011 every municipality has to have at least one CJG, in which they collaborate with external stakeholders to advise and support parents, kids and youth till 23 years with questions about growing up and raising (Programmaministerie voor Jeugd en Gezin, 2007). Dutch municipalities have a governing role within this network and are responsible for the result, while external stakeholders are responsible for the actual execution of the public policy. The characteristics of a CJG and the role municipalities serve within these networks are interesting for this research project, because it is a currently relevant example of the modernisation of the government. The characteristics and core tasks of a CJG are explained in the next section.

Core tasks of CJG's

A CJG presents an easy accessible and recognisable, central point for parents, children and youth (-9 months till 23 years) for (Programmaministerie voor Jeugd en Gezin, 2007):

- Questions about growing up and raising children.
- Adequate and suitable care.
- Coordination of care.

The Program ministry for Youth and Family has, in cooperation with GGD Netherlands and the Association of Dutch Municipalities (in Dutch: Vereniging van Nederlandse Gemeenten), designed a base model for Centres for Youth and Family (in Dutch: Centrum voor Jeugd en Gezin or CJG) (Programmaministerie voor Jeugd en Gezin, 2007). The base model defines the core tasks of the CJG. The base model of CJG's contains five tasks, which are recorded in the Wet maatschappelijke ondersteuning (Wmo) (Rouvoet, 2007). These tasks are:

- *Provide information and advice*. This function foresees in the provision of voluntary information (instruction) as well as answering specific questions of parents and youth.
- *Observation.* The early observation of youth and parents with problems is important as well as the connection of signals of all involved organisations.
- *Mediation to care*. This function foresees in the mediation of care to the entire local and regional supply.
- *Light pedagogical care.* The provision of educational support and light support to parents and families with problems or the threat of future problems.
- *Coordination of care.* The organisation and combination of care when several organisations are involved with assisting youth or families.

Every municipality has to have an operational CJG in 2011, which provides the above functions. In this manner in 2011 a nationwide coverage of CJG's exist. Municipalities are free to shape the organisation to their demands. Consequently the structure of CJG differs. Some

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municipalities choose to initiate a virtual CJG without physical access points. Within a virtual CJG professionals of partner organisations remain to work on their own site instead of in a physical location of the CJG. Many municipalities however, initiate several physical CJG locations. For instance the municipality of Apeldoorn has already four physical CJG locations and has a goal to initiate a physical location in every district of the city. These differences in structure are important to distinguish for the discussion of the knowledge management bottlenecks. Within virtual CJG's for instance, collaboration is managed differently as in a physical CJG. The next section discusses the involved organisations and how collaboration is managed between these organisations.

Network of organisations

A CJG is composed of several organisations from which a few are the core partners. The core partners are prescribed by the base model and can be found in every CJG. These core partners are youth health care 0-19 years (in Dutch: Jeugdgezondheidszorg or JGZ), infant welfare centres (in Dutch: consultatiebureaus) and municipal health service (in Dutch: Gemeentelijke Gezondheidsdienst or GGD). In addition, according to the base model the CJG should be linked to the Dutch youth care agency (in Dutch: Bureau Jeugdzorg or BJZ) and the teams for care and advise (in Dutch: Zorg- en Adviesteams or ZAT) (Programmaministerie voor Jeugd en Gezin, 2008). Besides these core partners, a municipality has the liberty to invite local and regional organisations that can add value to the CJG. Examples of such organisations are day-care centres, general practitioners, obstetrics, police or judiciary (see (Programmaministerie voor Jeugd en Gezin, 2008) for a complete list of local organisations that can be added to the CJG). Besides the listed organisations, municipalities have the right to invite private organisations with commercial interests as well. Figure 2 visualises the network of organisations of CJG Lelystad.

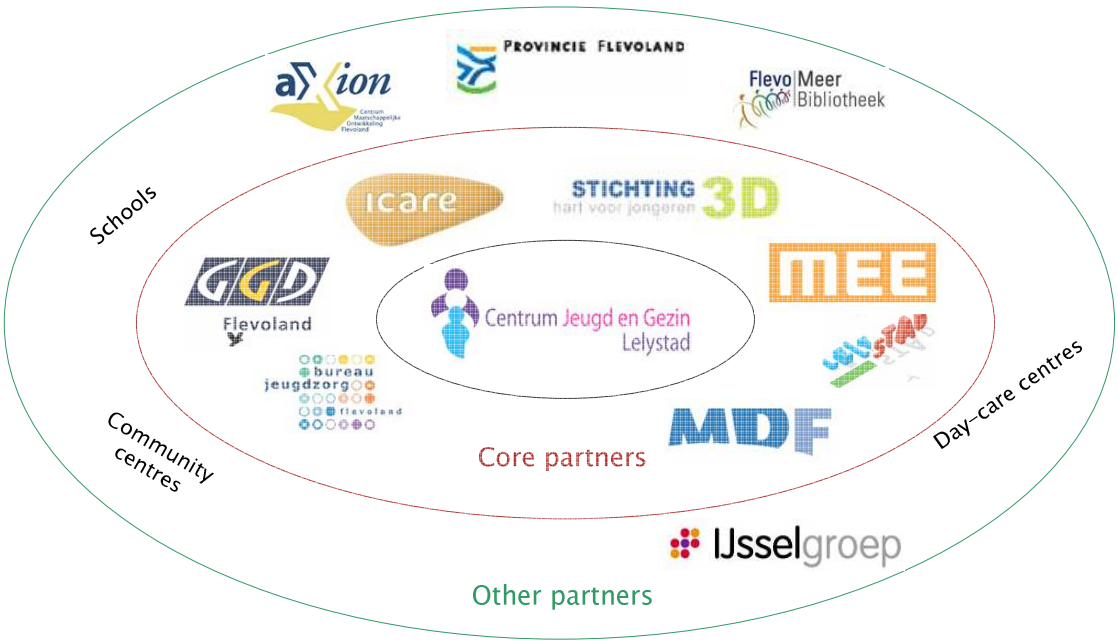

Figure 2: Stakeholders CJG network

Collaboration within the CJG between the partners is based on a covenant. The covenant records the informal and formal agreements between the partners. Although covenants are 'soft agreements', they stabilise the collaboration efforts in the network and consequently create a collective focus to solve problems (Peereboom, 2008). The municipality has in this network of organisations a governing role. The partners have the experience and expertise to execute the functions of the CJG, while the municipality governs the processes. Although the partners have experience and expertise, the CJG requires an approach that differs from the traditional approach. The focus of a CJG is to provide care to the entire family and not only to a child or young person, which can be derived from the slogan 1 family, 1 plan. This however, conflicts with the traditional provision of care of the partner organisations, which is mainly focused on the child or young person.

Dynamics within a CJG

The above shows that the dynamics within a CJG are very different than within a municipality. The role of municipalities is very different too in these networks and represents the modernisation of the government. Within a CJG municipalities have to collaborate with the other partners and manage entire processes instead of small parts of the process. Consequently, knowledge management becomes more important too. The next section discusses knowledge management within municipalities.

1.3. Knowledge management within municipalities

In contrast to research on knowledge management in general or knowledge management use in private organisations, knowledge management within public organisations, has not seen wide attention in the academic world (Edge, 2005; McNabb, 2007; Syed-Ikhsan & Rowland, 2004). Although many concepts are the same, the use of knowledge management within public organisations and private organisations is substantially different on a number of aspects. For instance, private organisations are competing with other organisations on a market, while for public organisations development and governance of public policy is much more important (Riege & Lindsay, 2006). Consequently, knowledge management in private organisations has other goals than knowledge management in public organisations. Within private organisations knowledge management should lead to competitive advantage (Drucker, 1988; Nonaka, 1991), while in public organisations the goal of knowledge management is to improve the effectiveness of public policy (Cong & Pandya, 2003; Riege & Lindsay, 2006) and eventually to strengthen the society it serves (Wiig, 2002).

The knowledge management literature that is available mainly focuses on the public sector in general (Cong & Pandya, 2003; Riege & Lindsay, 2006) on the central government (Manovvarian & Kasaei, 2007; Wiig, 2002) or on specific public organisations (Edge, 2005; Pee & Kankanhalli, 2008; Rubenstein-Montano, Buchwalter, & Liebowitz, 2001; Syed-Ikhsan & Rowland, 2004). Finding literature with knowledge management in municipalities as research focus has failed. This is remarkable as municipalities are the cornerstone of society and are, for many citizens, the representation of government. Furthermore, in 2015 municipalities are the gateway for almost all questions of citizens, companies and institutions

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about government. Consequently, the municipality becomes the counter for the entire government (Overeem, de Voogd, & Minderhoud, 2007). Most citizens do not interact directly with central government, while the opposite is true for municipalities. When citizens deal with the government, many will interact with the municipality and in the future this interaction will only increase. The next section explains in more detail the drivers behind knowledge management in municipalities.

1.3.1. Drivers behind use of knowledge management within municipalities

The first driver to use knowledge management within municipalities is that processes become more knowledge intensive. Problems or issues within society become more and more complex, with many stakeholders and multidisciplinary content, for example managing problems with youth that disturb the public order. Weber and Khademian (2008, p. 336) call these unstructured, multidisciplinary and relentless problems, 'wicked' problems. To manage these problems public organisations require knowledge from different departments and actors. This knowledge is generated within their own organisation, but is also transferred to their organisation from partnerships with external stakeholders. The purpose of partnerships with stakeholders is the facilitation of effective transfer of scientific and socially based knowledge from these stakeholders to government.

To create public policy, this knowledge should be captured and used within public organisations (e.g. within its processes, practices and culture) (Riege & Lindsay, 2006). Riege & Lindsay (2006) add that these partnerships are especially useful in the knowledge construction phase and for society's perceptions about the quality of public policy. Active involvement of stakeholders in the early steps of policy making generates a lot of knowledge, which can be used to steer public policy in a direction that has more support. Over time, problems and actors change, which increases complexity. When problems or actors change, perceptions change, which requires new knowledge. This knowledge used in these knowledge intensive processes is not always authentic. In other words, the knowledge used for different situations can be duplicated or adjusted to use again. If this is not possible new knowledge should be generated by the municipality and the stakeholders. The use of knowledge management prevents knowledge evaporation and reinvention.

The increased transparency of municipalities presents the second external driver to use knowledge management. Transparency is presented as an external driver as municipalities cannot completely influence this driver. Citizens and stakeholders are better informed about public policy and public services due to the media and the internet, which public organisations more transparent. As municipalities become more transparent to the outside world, citizens question decisions or the lack of decision-making and demand from public organisations that they provide their information sources (Riege & Lindsay, 2006). Riege & Lindsay (2006) add that with knowledge management municipalities improve their accountability as everything is stored and accessible across the organisation. An additional advantage of knowledge management related to the above is that citizens needs can be fulfilled faster (Pee & Kankanhalli, 2008), can be individualised and simultaneously improve cost-efficiency (Riege & Lindsay, 2006).

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An internal driver for the use of knowledge management within Dutch municipalities is human resource related. The ageing of senior civil servants presents the biggest issue in this category. For instance, around 35% of the civil servants working for municipalities is older than 50 years (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2007) and will retire in the next decade or shortly after. With the retirement of so many senior civil servants a lot of political and organisational knowledge is lost if it is not shared and integrated. It is of strategic importance to store and integrate this knowledge in the organisation. This knowledge is the product of decades of experience and is not easily transferred to younger generations civil servants. To facilitate the transfer of this tacit knowledge, which resides in the heads of older civil servants, to the new generation civil servants, knowledge management can be used. Besides knowledge retention, Pee & Kankanhalli (2008) state that knowledge management also fulfils other human resource management needs, such as employee training and career development.

The above knowledge management drivers apply most to this research. Although many more drivers for knowledge management can be discussed (la Grange, 2008; Pee & Kankanhalli, 2008; Wiig, 2002), the presented ones are most important as they relate to the topics that are discussed in this research.

1.3.2. Knowledge management issues within public organisations

The structure of municipalities causes some unique challenges to overcome regarding knowledge management. Liebowitz & Chen (2003) present three reasons for this. Firstly, it is difficult to encourage knowledge management and sharing, because only limited financial rewards/incentives can be provided. Secondly, the structure of public organisations is entitled as hierarchic and bureaucratic with many organisational layers, which causes lengthy procedures and makes sharing of knowledge harder. Thirdly, within public organisations knowledge is power, which makes civil servants reluctant to share.

The first issue relates to how employees of public organisations are reviewed. Their annual job performance review is based on other aspects of their job and not on knowledge sharing within the organisation. Therefore promotions or (financial) incentives cannot be based on the standard procedures in place, which hinders sharing of knowledge. In addition, resources for financial rewards for sharing knowledge are limited within municipalities (Yao, Kam, & Chan, 2007). With no incentives in place it can be argued that civil servants do not see the value of sharing their knowledge. As sharing knowledge takes time and resources, civil servants have to work harder in the same time to get things done. An additional problem is the difficulty with measuring the success of knowledge management (de Jong, Kruiter, & Reith, 2007). When it is ambiguous if the knowledge management initiative is a success or a failure, it is even harder to decide how to reward civil servants.

The second issue is the hierarchic and bureaucratic structure of municipalities. Within this bureaucratic structure, civil servants must complete paperwork for even the most trivial tasks. Efforts to build a culture of knowledge sharing can be hampered by this, as civil servants may perceive knowledge management initiatives as a lot of extra work (Yao, Kam & Chan, 2007). However, knowledge management also involves the codification of explicit

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knowledge, which is enhanced by the structure of public organisations. Various formal procedures within an bureaucracy are in place to systematically record documents and decisions to ensure that important values like transparency, legal security and equality of rights are guaranteed (Bekkers & Breed, 1999, p. 38). They add that civil servants are confined to their job definition, which prevents creative and independent thinking.

The third issue regarding knowledge management and knowledge sharing within municipalities is the organisational culture. Cultural barriers hinder knowledge management and knowledge sharing as many civil servants perceive that knowledge is power. Many civil servants still think that the knowledge they possess is tied to their function in the organisation and that sharing this knowledge would jeopardise their current position and future promotions (Liebowitz & Chen, 2003). In combination with the lack of rewards for knowledge sharing and the bureaucratic structure of these organisations, this culture is not easily changed.

These three issues hinder the application of knowledge management within municipalities. It is desirable to solve these issues when a municipality implements and uses knowledge management. Civil servants should be motivated and rewarded to share their knowledge with others, instead of hindered by the bureaucratic structure of their organisation.

1.4. Introducing Alares

Knowledge work and knowledge workers are also found in the consultancy industry. This research project has been executed with the support of the employees and resources of a consultancy firm situated in the Hague, the Netherlands. Alares is a young, dynamic and fast-growing consultancy firm, which advises public and private organisations about innovation, information, organisation and knowledge management. In their advice, Alares focuses on the alignment of technological systems, employees' competencies, organisational culture and organisational issues. Alares' services are focused on four industries, namely the care sector, the government, service industry and the educative sector.

Of the 20 employees working for Alares, around 90% can be entitled as knowledge workers. Their knowledge and expertise of IT, innovation or organisational change processes are the reason they are recruited. The diverging backgrounds of the employees increase diversity and their knowledge and expertise is combined by working in project teams. To support the work of the project teams, an extensive Intranet has been set up to improve knowledge sharing and collaborative processes. Within Alares, the consultants refer to the knowledge environment instead of the traditional Intranet. When we use knowledge environment in this research project, we refer to an extensive Intranet as used by Alares. The knowledge environment of Alares provides the employees all sorts of functionalities, such as wikis to structure formal knowledge during projects, blogs to share formal and informal knowledge with other colleagues, version control of document to improve collaboration between team members and all traditional basic functionalities an Intranet provides. The knowledge environment is heavily used by all employees and is updated often with new features. Lately, all activities of Alares employees on Twitter, a microblogging service on the internet, are pro-

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jected on the main page of the Intranet. With a glance on the main page of the Intranet, an employee can see what fellow colleagues are doing, where they are or what they working on. Besides the support to projects, the Intranet is used to transfer knowledge by blogging. All employees blog on news items they find, interesting people they have met or events they attend. Besides the more formal blogs, informal blogs are facilitated too on the Intranet.

Social interaction is also facilitated and stimulated by the way of working. At Alares none of the consultants has a fixed room or desk to work on. The flexibility to work on different desks can mean that a consultant works everyday besides another consultant. Without walls it is easy to ask or discuss something with a colleague, which increases social interaction. When colleagues are busy the Instant Messaging service Skype is used to communicate. With Skype e-mail traffic between colleagues has decreased and furthermore, colleagues are not disturbed when they are busy as they can answer later. In addition, the interaction on the Intranet intensifies social interaction in real life and vice versa. Knowledge management is important for a knowledge-intensive firm as Alares. Besides the internal use of knowledge management, Alares also advices clients on knowledge management.

With their expertise on knowledge management and their clients in the public sector they are the perfect partner to support this research. Moreover, the innovative way of working within Alares presents an example of an organisation that works intensively with Web 2.0 technologies. Their experience with and expertise on Web 2.0 technologies supports this research project. The original assignment from Alares was rather broad defined as how Web 2.0 or social media can enhance or improve knowledge management. This assignment has been used as basis and has been demarcated through the research.

1.5. Conclusion

With the rapid developments in the information technology sector, knowledge has become more important and easier to generate, store and share. Citizens and organisations have become well-informed and demand more from the municipality. In addition, societal problems have become more complex. Today's problems involve multiple stakeholders and multiple overlapping, interconnected subsets of problems that cut across various policy domains and levels of government. The complexity of these problems forces municipalities to rethink how public policy should be executed.

The rapid developments in the information technology sector not only made knowledge more important, but also supports the execution of public policy in other organisational structures. With the development of IT, more market-style governance can be used by municipalities to execute public policy. Networks for instance are increasingly used to improve the quality of public policy. Within these networks, such as the safety houses and CJG's, the municipality has another, more governing, role opposed to the traditional bureaucratic role. It is expected that knowledge and knowledge management are different too in these municipalities and networks. As academic attention lacks on this subject, this presents an interesting research focus.

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2. Defining Web 2.0

> *The gap between the knowledge and the seeker of knowledge is getting narrower due to the implementation of new Web 2.0 tools.*
> **Javeed Ahmad Rah (2010)**

2.1. The rise of Web 2.0

The past decade blogs, wikis, RSS and mashups have enriched the web, which transformed from a static collection of webpages to a collaborative network of applications, tools and people. These applications and tools empower users and become valuable as more people participate. The online opinion of individuals has become valuable for other individuals and for companies. Some call this empowerment of individuals on the internet the groundswell (Li & Bernoff, 2008), others describe it as wikinomics (Tapscott & Williams, 2006), but most use the term Web 2.0. O'Reilly was the first to talk about these developments on the web at a conference and called it Web 2.0. Since then the term Web 2.0 is widely used at the internet and by other media. Nonetheless, scholars cannot agree on a standard definition of Web 2.0 (Madden & Fox, 2006).

O'Reilly (2006) has since then defined Web 2.0 as: "*Web 2.0 is the business revolution in the computer industry caused by the move to the internet as platform, and an attempt to understand the rules for success on that new platform. Chief among those rules is this: Build applications that harness network effects to get better the more people use them*". While the term Web 2.0 is widely used, the definition of O'Reilly is as said not a standard yet. The last sentence of the definition focuses on the applications, while Web 2.0 involves much more than applications that harness network effects.

Technology is just the enabler of the power of Web 2.0. The use of these technologies by an increasing number of people makes Web 2.0 powerful (Li & Bernoff, 2008, p. 11). Hoegg et al. (2006, p. 13) have tried to incorporate both the technological and social aspects in their definition of Corporate Web 2.0: "*The philosophy of mutually maximising collective intelligence and added value for each participant by formalised and dynamic information sharing and creation.*" Important in the last definition is the focus on sharing collective intelligence, which is one of the most important concepts of Web 2.0 (Wijaya et al., 2009, pp. 9–10). While being important on the internet, this concept can also be valuable for organisations.

Another definition of Corporate Web 2.0 is: "*Corporate Web 2.0 can be defined as the transformation of the social and technological aspects of the new internet into business, leading to a redesign of existing business processes or even to an evolution of new business models"* (Stocker et al., 2007). This last definition describes Web 2.0 as concept and focuses on the transformation of social, business and technological aspects of Web 2.0 into the organisation. This focus is important as it presents Web 2.0 as more than an additional technology or tool. It presents Web 2.0 as a social technology, which transforms business

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processes and could lead to new business models.[1] This last definition will be used in this research as it incorporates the social, the technological and the business aspects of Web 2.0.

Although municipalities cannot be compared with organisations, the above definition of Web 2.0 provides the best description of how municipal Web 2.0 should be defined. In addition, this definition is valuable as the government is changing as was described in section 1.2. For example, the participation of municipalities in networks can be seen as a new business model of the government to execute public policy. In this way Web 2.0 can support these new business models or make the redesign of existing processes easier. The above shows that there is no uniform agreement on how Web 2.0 is defined. Furthermore, the analysis shows that Web 2.0 cannot be defined as a set of tools and applications, as technology is just the enabler of the power and value of Web 2.0. Web 2.0 is a term that incorporates various functionalities that define the developments on the internet of the last decade. These functionalities are important to understand, as they deliver the true value of Web 2.0 on the web.

According to Boulos & Wheeler (2007) Web 2.0 stands for making online connections and social interaction. They state that collaboration, flexibility, the architecture of participation and interactivity are important functionalities of Web 2.0. What is missing in these four functionalities is the ability to gather, to share and to use knowledge of all users of the Web 2.0 application. Other scholars have mentioned this functionality though in their description of Web 2.0. Hoegg, et al. (2006) discuss maximising collective intelligence, transparency of the information creation and sharing processes and network effects as fundaments of Web 2.0. Collective intelligence is defined by Hoegg, et al. (2006) as: *"the interactive exchange of information and the continuous development and maintenance of a group opinion is described as the process of collective intelligence. The result of collective intelligence can be a commonly accepted opinion or commonly accepted content (that is not modified or criticized) but it can also occur indirectly as a presented selection of information."* As can be seen from the above definition, collective intelligence serves multiple purposes. In line with the subjects introduced in the introduction this functionality corresponds to a large extent with the goals of knowledge management. More on the correspondence between knowledge management and Web 2.0 can be found in the next section.

[1] An example of a new business model can be found on Twitter. Twitter is a microblogging service that is increasingly used as marketing channel, where users can broadcast what they are doing in 140 characters. Some active Twitter users state that their sales have increased after using Twitter. An example of an active user is Petra de Boevere (@slijterijmeisje at Twitter) who owns a liquor store and actively participates on Twitter, giving advice about liquor to people and broadcasts what she is doing. She claims that her presence has increased her sales and that 20% of her total sales can be directly related to Twitter (Blom, 2009).

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2.2. Web 2.0 for knowledge management and cross-agency collaboration

Many of the current knowledge management initiatives have been focused mainly on technology. Systems that are currently used to transfer and manage knowledge typically fall into two categories, namely channels and platforms. Examples of the first are e-mail and instant messaging. Examples of the second are intranets and information portals (McAfee, 2006). While these systems are widely used, Davenport (2005) found that knowledge workers are dissatisfied with the available systems. Davenport (2005) shows that 26% of the respondents stated that e-mail was overused in their organisation, 21% felt overwhelmed by e-mail and 15% of the respondents stated their productivity decreased due to e-mail. Moreover, another research shows that only 44% of the respondents found it easy to search and find something on the intranet (McAfee, 2006). These traditional technologies fail to function as proper knowledge management systems, as knowledge cannot be easily captured, shared and applied to knowledge work (Davenport, 2005). Furthermore, in-house experts are hard to find with the currently used systems (Nevo, Benbasat, & Wand, 2009). Web 2.0 technologies have however appeared, which can support knowledge workers in their daily work.

Osimo (2008) found that certain domains of the front-office and back-office of government can be supported by Web 2.0 solutions. According to Osimo (2008) the front-office can be supported with Web 2.0 solutions on the domains political participation and transparency, service provisioning and law enforcement. These domains have an external focus and will therefore not be used in this research. The back-office domains that can be supported by Web 2.0 solutions are regulation, cross-agency collaboration and knowledge management. For this research the domains knowledge management and cross-agency collaboration are relevant, while regulation falls outside the scope of this research.

The first relevant domain is knowledge management, which is mentioned explicitly as one of the domains that can be supported by Web 2.0. Osimo (2008) states that traditional knowledge management systems are applied to structured or explicit knowledge, while Web 2.0 technologies enable the sharing of informal and tacit knowledge. In other words, Web 2.0 technologies cover another part of knowledge management, than the traditional knowledge management technologies. Consequently, Web 2.0 technologies complement knowledge management technologies in the back-office of municipalities.

The second relevant domain is cross-agency collaboration as in networks municipalities collaborate intensively with public and private stakeholders. Osimo (2008) presents an example of a wiki where analysts of various agencies collaboratively work on intelligence reports. A wiki is a Web 2.0 technology that is best known from the online encyclopaedia Wikipedia. On a wiki every user can add or edit the content that has been created. In cooperation with other users, content like intelligence reports can be produced on the wiki. A wiki is just one of the examples to support cross-agency collaboration and knowledge management. Many more Web 2.0 solutions are available on the internet to support the two discussed relevant domains. Section 2.5 explores these technologies in more detail.

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These two domains are also found in a report of the OECD (2005) on how to modernise the government. The OECD stresses the importance of new tools as governments increasingly collaborate with internal and external stakeholders. More specifically they state that knowledge management tools are needed to allow governments to draw upon, update and share information while incorporating new information from internal and external stakeholders (OECD, 2005, p. 38). These statements are in line with the arguments of Osimo (2008) and present the connection between Web 2.0 and knowledge management. The incorporation of internal and external stakeholders' knowledge can be facilitated by the use of Web 2.0.

Web 2.0 technologies have the potential to knit an organisation together and manage knowledge in formerly impossible ways (McAfee, 2006). Web 2.0 technologies enhance social interaction and drive collaborative practices across various levels of the organisation. The value of these tools and applications becomes greater with each additional user, because of the additional intelligence and knowledge each user shares. Bughin, Manyika & Miller (2008, p. 3) have researched for which purpose organisations use Web 2.0. Their research shows that organisations mainly use Web 2.0 tools to manage knowledge, to foster collaboration and to enhance the company culture. These purposes are also useful for municipalities. The next section presents the current use of Web 2.0 within municipalities.

2.3. Web 2.0 in practice

Web 2.0 has advanced the internet in many ways and has the potential to do the same for organisations. Especially knowledge intensive and collaborative processes can benefit from these new technologies. McKinsey explored for which purposes (private) organisations use Web 2.0. Their research shows that organisations mainly use Web 2.0 technologies to manage knowledge, to foster collaboration and to enhance the company culture (Bughin, et al., 2008, p. 3)). Another more recent survey among 1700 executives around the world from McKinsey (Bughin, Chui, & Miller, 2009)shows that Web 2.0 technologies are used internally by organisations to increase the speed of access to knowledge (68% of the respondents) and to increase the speed of access to internal experts (43% of the respondents). Although these results are based on private organisations, Web 2.0 technologies can be used within municipalities for the same reasons.

With the modernisation of the government as described in previous sections, Web 2.0 could enable new knowledge management practices and provides an opportunity to public organisations to improve their knowledge management (Osimo, 2008). However, dynamics within municipalities and networks differ from those on the web. For instance, the number of employees of a municipality is limited between tens and thousands of civil servants, while on the internet there is a potential of hundreds of millions of users. The limited number of users has consequences for the use of Web 2.0 technologies as many will not participate. A rule that is often cited when this limitation comes up is the participation inequality or 90-9-1 rule, which states that in most online communities 90 percent of users never contribute, 9 percent of users contribute little, while only 1 percent of the users account for most action (Nielsen, 2006). Due to the scale of the internet and the amount of users using popular Web 2.0 technologies, the participation inequality rule is not a big issue. In a mu-

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nicipality however with 1000 or less employees, participation needs to be higher to get useful results. Chui, et al., (2009) state that successful participation needs grassroots activity and subsequently support from the executive levels of the organisation. Moreover, executives should serve as role models for others and evangelise the use of the Web 2.0 technologies.

Another difference is that protecting and securing internal information on Web 2.0 environments is much more important for municipalities than on the internet (Matuszak, 2007). When Web 2.0 technologies on the internet are used, municipalities depend on the security measures of the provider of the technology. However, more and more Web 2.0 technologies are developed that can be used within the secured network of the organisation. Several organisations supply wiki technology or integrated packages with various functionalities for organisational use. The disadvantage is that they are often not free of charge in contrast to the free technologies on the internet, but security can be managed in-house.

The last difference we present here is that the bureaucratic structure of municipalities can collide with the functionalities of Web 2.0 (Verweij, 2009). When implementing Web 2.0 in municipalities, many of such issues are expected to emerge. The organisational structure of municipalities can have a large impact on the use of Web 2.0. An overview of current literature on the use of Web 2.0 in municipalities is presented in the next section. As Web 2.0 is still in its infancy within municipalities, scholars have not yet written many scientific contributions on this subject. Therefore more practical literature will be discussed here to present the current Web 2.0 use within municipalities.

2.3.1. Web 2.0 and municipalities

Scientific contributions of scholars on the use of Web 2.0 have increased, but has until now not been focused in particular on the public sector or more specifically on municipalities. This absence of academic literature has not prevented civil servants from using Web 2.0 within their organisations though. In the Netherlands enthusiastic civil servants have started with using Web 2.0. Various initiatives have been and are started within Dutch ministries, municipalities and other public organisations. One man in particular, Davied van Berlo, has challenged civil servants to try and use Web 2.0 in their organisations. By now he wrote two practical books on the subject (van Berlo, 2009a, 2009b), actively propagates his message on an internet-based platform[2], conferences and meetings and can be seen as the pioneer of the use of Web 2.0 within the public sector. According to van Berlo (2009b) the government has no choice regarding the use of Web 2.0. The society has already adopted many of the Web 2.0 tools and underlying philosophy and citizens will expect that the government increasingly uses Web 2.0 too. Van Berlo (2009b) shows how to support the implementation of Web 2.0 within public organisations and how to create an environment where Web 2.0

[2] Davied van Berlo started an internet-based platform based on Ning technology. The platform is called Ambtenaar 2.0 and can be found on http://ambtenaar20.ning.com/. Content is daily refreshed and the platform has currently more than 3000 members.

empowers the civil servants. From his viewpoint it would help if the government becomes a more transparent, networking organisation centred around civil servants.

An example of a Web 2.0 project within the government is BDplaza, a social networking environment of the Dutch Tax Administration. This social networking site is only accessible for employees of the Dutch Tax Administration and has 9000 members, which converse on a diverse range of internal topics. Furthermore, they can create groups of interest to converse about more specific topics. The transfer of knowledge between co-workers is stimulated, because of the informal, networked setting of the social network (van Berlo, 2009b). Van Berlo (2009b) distinguishes three areas where public organisations can contribute from the use of Web 2.0:

- The relation between citizens and government.
- The internal organisation of the government.
- The way of working of civil servants.

The bullets show that Web 2.0 can contribute to public organisations on very diverse levels and areas of the organisation. The first bullet is clearly an external process, while the last two bullets are focused on the internal organisation. Furthermore the bullets differ in scope. The first two bullets are on a higher scope level than the way of working of civil servants, which has a more narrow focus compared to the other bullets. The first two bullets are defined at the strategic or tactical level, while the last bullet is clearly on the operational level. These distinctions are important as they influence the conditions to the potential contribution of Web 2.0.The next sections discuss the bullets in more detail.

2.3.2. The relation between citizens and government

The relation between citizens and government can be improved with Web 2.0. Van Berlo (2009b) discusses the need for more openness of information and data and transparency of public tasks to provide citizens the opportunity to participate. Citizens trust in public organisations increases when public organisations are open for ideas and suggestions. Van Berlo (2009b) notes that trust is important if public organisations want citizens to participate in their problems. Furthermore, citizens have to be treated as equal peers with insight into information and knowledge that is gathered by public organisations. Web 2.0 offers opportunities to improve openness and collaboration and to remove barriers to participate. In this way Web 2.0 provides opportunities to improve the relation between citizens and the government.

Frissen (2008) has also researched the relation between citizens and government. She has observed the movement of Web 2.0 on the web and describes how this can change the relation between citizens and the government. She discusses how citizens could participate in public processes and support public organisations by using Web 2.0 applications. Furthermore, she remarks that the power of Web 2.0 is to open up the user created value, which is hidden as tacit knowledge in the social networks of users. This statement is important, as tacit knowledge is hard to transfer and redefines social and technical aspects of organisations. She presents the following characteristics of Web 2.0:

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- Openness
- New, more active roles for participants
- Maximal exploitation of 'user contributed value'
- Networks as driving force

Before the Web 2.0 era, the relation between citizens and government was already a topic discussed by scholars. Research on this topic has been covered by e-participation literature. E-participation enables citizens to use Internet tools, mobile communication or other technologies to participate in public processes. In this way it is similar to the use of Web 2.0 to improve the relation between citizens and government. As the relation between citizens and government is covered by literature on e-participation and the fact that this aspect has a different scope compared to the two other bullets discussed by van Berlo (2009b), it falls outside the scope of this research. The next two discussed areas complement each other and fall within the scope of this research.

2.3.3. The internal organisation of the government & the way of working of civil servants

To improve the relation with citizens, the internal organisation of municipalities has to support external initiatives. What works internally is easier to use externally. However, the characteristics of Web 2.0 as described in the previous section (Frissen, et al., 2008), conflict with the characteristics of municipalities. Van Berlo (2009b) mentions three aspects of municipalities that need adjustments to really benefit from Web 2.0.

The first aspect that is mentioned is openness. To improve the relation between citizens and government, it was discussed that openness is an important aspect. This also applies to the internal organisation. When civil servants are open about what they do and create towards fellow civil servants, collaboration becomes easier (van Berlo, 2009b). Documents can be shared on a central place then, instead of mailing it to a certain group of people. The value of sharing documents openly with all civil servants can be unexpected support from colleagues one never thought of to approach.

The second aspect that is mentioned is networking. For civil servants it becomes increasingly important to network. Communication and collaboration with external stakeholders for instance, requires from civil servants that they maintain relationships with their contacts. Internally they work increasingly in different teams to execute tasks and projects. To fulfil these tasks collaboration with different people, colleagues and organisations is key (van Berlo, 2009b). To know with whom civil servants need to collaborate to come to best result, they need to activate their network. Maintaining an active network adds value as not all knowledge that is needed can be found in the internal organisation. The value of networks and networking is to know who you can ask for specific knowledge or for a favour.

The third aspect mentioned is the empowerment of civil servants. In the traditional bureaucracy a civil servant has a task for which he needs knowledge. This knowledge is given to him by someone higher in the chain of command. Next, the civil servant executes its task with the provided knowledge. With this way of working only a fraction of the potential

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of civil servants is utilised (van Berlo, 2009b). To tap from this potential, civil servants should have the possibility to show themselves and their knowledge.

Besides support of the municipality, civil servants need to know their own qualities to empower themselves. If the municipality wants to utilise the full potential of their employees they need to release some of the formal structures common in bureaucracies. Civil servants need to have the possibility to use internet-based tools to support their work and empower themselves. The bureaucratic structure of municipalities is hard to compare with the above mentioned aspects. Web 2.0 supports openness, networking and empowerment, while a typical bureaucracy stimulates none of these aspects. This difference between a bureaucracy and the concept of Web 2.0 presents the reason to mention Web 2.0 as an opportunity for public organisations. In addition, public organisations are increasingly collaborating in other governance structures like networks with external stakeholders. This modernisation of a bureaucracy can be supported by the use of Web 2.0. The next section presents an overview of Web 2.0 technologies.

2.4. A Web 2.0 categorisation model

As described in section 2.1, Web 2.0 as concept entails more than the technologies however, without the underlying technology Web 2.0 would not exist. Technology is a substantial part of Web 2.0 and is therefore presented in this section. The selection of Web 2.0 technologies has been based on a part of a Web 2.0 model (Chui, et al., 2009). We only use this part to present the Web 2.0 technologies that are currently used and relevant for this research project. Figure 3 presents the part that is used in this research and categorises seventeen Web 2.0 technologies into five categories. Although this categorisation presents the personal vision of Chui, et al., (2009), the presented categories are logical and present an almost complete overview of current technologies. Chui, et al. (2009) state that new technologies continue to appear and disappear as the internet evolves and therefore the model is presented as an overview of Web 2.0 technologies and categories that is currently relevant. The complete model can be found in Appendix 2.

Web 2.0 technologies	Description	Category of technology
Wikis, commenting, shared workspaces	Facilitates cocreation of content/applications across large, distributed set of participants.	Broad collaboration
Blogs, podcasts, videocasts, peer to peer	Offers individuals a way to communicate/share information with broad set of other individuals.	Broad communication
Prediction markets, information markets, polling	Harnesses the collective power of the community and generates a collectively derived answer.	Collective estimation
Tagging, social bookmarking/filtering, user tracking, ratings, RSS[1]	Adds additional information to primary content to prioritize information or make it more valuable.	Metadata creation
Social networking, network mapping	Leverages connections between people to offer new applications.	Social graphing

Figure 3: Categorisation of Web 2.0 technologies (Chui, et al., 2009)

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A Web 2.0 technology that is not presented in Figure 3, but is relevant for this discussion is microblogging, which has seen a dramatic increase of users since Twitter started. To stay with the model, microblogging is categorised as a broad communication technology. One of the presented technologies will not be used in the analysis as it is redundant with some of the other functionalities. The commenting technology from the broad collaboration category has no additional value as commenting is mainly a part of other technologies. For example, weblogs provide a commenting functionality, but commenting as stand-alone technology can hardly be found. Therefore commenting as technology will not be used further in the analysis. Microblogging and the other Web 2.0 technologies are discussed in detail in the next section.

2.5. Web 2.0 technologies and categories

Figure 3 presented the technology categories and Web 2.0 technologies. This section shortly discusses the Web 2.0 technologies. The description of categories of technologies can be found in the middle column of Figure 3. In addition, microblogging is presented as a technology in the broad communication category.

2.5.1. Broad collaboration

Wiki

A popular technology is a wiki. Wiki is the Hawaiian word for quick or hurry and refers to the way content can be made visible. Every user of a wiki can add or revise articles that have been created. Wiki technology tracks revisions to articles, which can be viewed by all users. Users have to reach consensus on the content of the articles as no editorial oversight or approval exists within the basic functionality. In cooperation with other users articles can be produced about virtually anything and articles and themes can be linked easily. Navigating through linked articles is easy as wiki technology uses HTML. Ebersbach, et al. (2008) have come to the following definition of a wiki: “A wiki is web-based software that allows all viewers of a page to change the content by editing the page online in a browser. This makes wiki a simple and easy-to-use platform for cooperative work on texts and hypertexts.” A well known example of a wiki is Wikipedia, where more than eleven million users have created three million articles and have edited these articles more than 350 million times.

Shared workspaces

Shared workspaces are virtual spaces, where documents can be stored and shared with colleagues or friends. As these spaces are virtual, everyone with access to the shared workspace and to internet can manage projects and collaborate. An example of shared workspaces is based on a product of Microsoft called SharePoint Services. The shared workspace of Microsoft provides various functionalities like, a documents library, a tasks list, a mem-

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bers list and an email notification if anything changes in the shared workspace.[3] With shared workspaces contributors always work on the latest version of a document and can comment on it or can change the document immediately.

Shared workspaces are however much broader used than the above description. For example, the shared workspaces Overheid 2.0[4] used by public organisations provides many more functionalities than the shared workspaces of Microsoft. The workspace of Overheid 2.0 provides civil servants wiki, blog, RSS and microblogging functionality on one platform. As the mentioned functionalities are presented here as stand-alone technologies, a shared workspace will be used in this research as a platform where civil servants can store and share documents, manage projects collaboratively and communicate.

2.5.2. Broad communication

Blogs

Weblogs or blogs are websites where regularly new content is placed around a certain topic. New blog entries can be placed by one or multiple authors and are called often called blog posts. Blog posts are usually displayed in a reverse chronological order and can contain text, pictures, video's or other content related to the topic (Murugesan, 2007). The goals of weblogs vary, as some blogs are informing and others are more personal. In general the goal of a weblog is to inform the readers of the blog on a certain topic, which may be a specific niche or the writer's personal activities. Most weblogs provide the possibility to comment on the posted content of the writer, which creates interaction between readers and writers. This interaction elaborates the discussion and creates two-way communication. Other features that are generally found on weblogs are permalink (permanent link), post date, category and/or tag and a trackback and pingback function (Murugesan, 2007).

Microblogging

Just like blogging, microblogging is about broadcasting messages or tweets to the public. The success of microblogging can be accounted to Twitter, which provide users the possibility to broadcast what he or she is doing at the moment in 140 characters. As with blogging, microblogging intentions can range from professional to personal. Private organisations already use microblogging as an additional channel for customer service and to present news. But microblogging can also be useful for internal purposes. As an additional communication channel it can save emails to co-workers. Furthermore, knowledge is shared fast and in a convenient way. For internal purposes there are already closed microblogging technologies that do not broadcast tweets in the public domain.

[3] For more information see http://office.microsoft.com/en-gb/help/HP010414561033.aspx.

[4] For more information see http://www.overheid20.nl

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Pod- and videocasts

Pod- and videocasts are discussed simultaneously as they have the same goal and effect, only with other output. Podcasts are audio recordings of interviews, talks or lectures in a format that can be processed by MP3 devices and computers (Anderson, 2007). Podcasts with video are called videocasts and deliver video-on-demand clips that can be played on a PC or any handheld that is suitable for playing videocasts (Anderson, 2007). With RSS feeds (discussed in section 6.3.4) integrated in the pod- and vodcasts, subscribers of the RSS feed automatically receive new updates.

Peer-to-peer

Peer-to-peer networking is a technique for efficiently sharing files (music, video or text) either over the internet or within a closed set of users (Bughin, et al., 2008). With peer-to-peer technology files are distributed across many machines, while traditionally files were shared on one machine. Peer-to-peer technologies like BitTorrent and Kazaa gather bits and pieces of a file from many machines and assemble them to the original song, video, document or any other form of content.

2.5.3. Collective estimation

Prediction and information markets

Prediction and information markets are often called and described in the same way (Surowiecki, 2004). Both markets use the power of collective intelligence. Collective intelligence can be described as any system that attempts to tap from the expertise of group to make decisions (Bughin, et al., 2008). Consequently, with prediction markets technology, the user has the possibility to use all the collective intelligence of a group to make decisions. Furthermore, this group can even predict better than an individual or even an expert (Surowiecki, 2004).

Polling

Polling also uses the collective intelligence of a group only in another way. Opinion polls present a series of questions from which generalities can be exposed on a certain group of people. Opinion polls can have a completely random sample, but can also target a specific group. According to Surowiecki (2004) polling questions differ from those asked in prediction markets. An example of a polling question would be: 'Who will you vote for', while the question in a prediction market would be: 'Who do you think will win the election'.

2.5.4. Metadata creation

Tagging

A tag is a keyword that is added to a digital object (e.g. a website, picture or video clip) to describe it, but not as part of a formal classification system. Content can be tagged with a variety of words, categorising the content in more than one way. Adding tags to content

creates metadata, with which the content is easier to find. A collection of (personal) tags is called a tagcloud.

Social bookmarking

Social bookmarking or filtering allows users to store, organise and manage their favourite websites on a remote service and share them with other users (Anderson, 2007). In essence, social bookmarking uses the same concept as regular bookmarking, however sharing bookmarks with other users creates a social aspect. Furthermore, social bookmarking services like Delicious lets users tag their bookmarks. Users of social bookmarking services can search on tags to find relevant bookmarks of other users.

User tracking

User tracking is a technology that follows the movements of an user on a website. The users' movements on the website are tracked and stored on their computer in an unique cookie. Every time an user returns to the website, the cookie identifies the user to the website. The information contained in the cookie can be used by the website to generate content that appeals to the user's needs. A clear example of a website utilising user tracking is Amazon.com.

Ratings

With ratings users can vote on content on websites. Ratings can be integrated for instance on a weblog or social network and create metadata, as other users can select content based on the ratings. Ratings technology also appears as main purpose on websites. Typical rating websites lets users vote on pictures or other content.

RSS

Really Simple Syndication or RSS in short is a technology to get regular updates of topics or websites of interest. These regular updates are called feeds and can be read in a RSS or feed reader in a web browser or application. When a new update is placed on a website an update is sent to the RSS reader. A user sees the feeds of his subscribed sites the next time he opens his RSS reader. The feed is a standardised XML file format, which allows viewing the information in many different ways. With RSS it is easy to keep up-to-date on any topic of interest without having to browse every website.

2.5.5. Social graphing

Network mapping

Network mapping or social network analysis is a technology to map and measure social relationships between people. Network mapping presents people or organisations as nodes and the relationships as arcs. The arcs can present various kinds of relationships between the nodes. With network mapping technology informal relationships can be formalised.

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Social networking

Social networks support the use of self-generated user profiles to help facilitate and mediate social interactions. Typically, social network users share details about themselves, search for others with similar interests, exchange messages, and work together (Yehuda, 2008). Examples of social networks are Hyves and Facebook. On these social networks, users can connect with friends and build social relationships, but also express themselves by personalisation of and adding content to their homepage. Examples of social networks with a specific focus are Myspace, LinkedIn, but also Ambtenaar 2.0. On these social networks people come together and link with each other when they share a particular interest. On Myspace this interest is music, on LinkedIn more business related networking takes place, while on Ambtenaar 2.0 civil servants connect and discuss how to use Web 2.0 technologies in public organisations. Nowadays it is relatively easy to start a social network, with for example Ning technology.

2.6. Conclusion

This chapter introduced Web 2.0, a development of the past decade that transformed the internet from a static collection of webpages to a collaborative network of applications, tools and people. Although scholars have not been able to agree on a standard definition of Web 2.0, it was shown that enthusiastic civil servants of various public organisations already use Web 2.0 in practice. For municipalities, Web 2.0 provides an opportunity to improve their knowledge management as scientific contributions of scholars show that Web 2.0 technologies can contribute to knowledge management. Osimo (2008) provides six domains of public organisations, which can benefit from Web 2.0, from which two are interesting for this research. The back-office domains that are interesting for this research are knowledge management, but also cross-agency collaboration. Cross-agency collaboration becomes more important as public organisations increasingly execute public policy in non-traditional ways. Cross-agency collaboration is important when municipalities execute policy in networks. With the contribution to knowledge management and cross-agency collaboration in mind, Web 2.0 presents an interesting research focus.

Furthermore, several Web 2.0 technologies were introduced based on a Web 2.0 categorisation model. This model presents several Web 2.0 technologies divided into five categories. The presented technologies are used in chapter six to analyse the contribution of Web 2.0 technologies to knowledge management within two case studies. With this choice, the focus of this research project is on the technology of Web 2.0 and less on the other aspects that were presented in this chapter. This choice is further explained in the next chapter, which presents the research design.

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3. Research design

> *If we knew what it was we were doing,*
> *it would not be called research, would it?*
> **Albert Einstein (1879-1955)**

3.1. Problem area

The developments in the IT sector made it easier to generate and share knowledge and to communicate with others. Consequently, knowledge as production factor became more important. With the increasing importance of knowledge, the labour force in the Netherlands increasingly consists of knowledge workers (Centraal Bureau voor de Statistiek, 2004). Knowledge workers can be found in a wide variety of job categories, like legal, management, financial operations, but also within municipalities. Within municipalities, civil servants are working on solving complex or wicked problems, for which they need expertise, skills and knowledge. Today's societal problems become more complex as many well-informed citizens and stakeholders are involved with their own perception of the problem. Stakeholders and citizens expect from the municipality that their interests are taken into account in public decision making (OECD, 2005).

To accommodate the interests of citizens and stakeholders, public policy made to counter wicked problems is more and more executed outside the traditional organisational structure of a municipality. Instead of executing public policy within the bureaucratic structure of a municipality, other organisational structures are used to solve wicked problems. Two examples were given on central government enforced laws on the implementation of safety houses and CJG's. We focus here on CJG's, where municipalities have to collaborate with external stakeholders to advise and support parents, kids and youth till 23 years with questions about raising kids and growing up. Within a CJG professionals of various stakeholders work together to execute public policy, while the municipality has a more governing role. To enhance collaboration between stakeholders and on an operational level between professionals, knowledge should be exchanged. With the municipality in a governing role within this network, one of their tasks is to enhance collaboration between the stakeholders and consequently manage knowledge.

The above presents the main reason to investigate the use of knowledge management within municipalities. The increasing importance of knowledge within society, municipalities and networks requires a municipality that manages its knowledge. The manifestation of municipalities in networks only increases the demand for knowledge management as civil servants need to collaborate with professionals of external organisations. However, there is a lack of research on knowledge management within the public sector and more specifically within municipalities. Research shows that the goals of knowledge management within public organisations are to improve the effectiveness of public policy (Cong & Pandya, 2003; Riege & Lindsay, 2006) and eventually to strengthen the society it serves (Wiig,

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2002). Research on the actual use of knowledge management within municipalities lacks and presents the second reason for this research.

An opportunity to intensify and enhance knowledge management within municipalities and networks is based on developments on the internet. The past decade various technologies have enriched the web, which support collaboration and knowledge sharing. These technologies have characteristics that stimulate social interaction, making them different from traditional knowledge management technologies. Although many different technologies exist, often they are mentioned by the generic term Web 2.0. Web 2.0 technologies have much in common with knowledge management, which has been shown in chapter two. This relation with knowledge management and the fact that Web 2.0 technologies have been successfully used on the internet to collaborate and share knowledge make them an interesting addition to this research. This research project specifically focuses on Web 2.0 technologies and less on the other aspects of Web 2.0, which is explained in section 3.4.2.

3.1.1. Reasons to carry out this research

Based on the discussed problem area, the reasons to carry out this research are as follows:

- Knowledge management becomes more important as societal problems become more complex and municipalities increasingly collaborate with external stakeholders in networks to execute public policy.
- Although knowledge management has been extensively studied by scholars, a knowledge gap exists on the use and benefits of knowledge management within municipalities.
- Web 2.0 technologies present an opportunity to contribute to knowledge management.

These three reasons provide the motive to carry out research in this area. The reasons to carry out the research project are visualised in Figure 4.

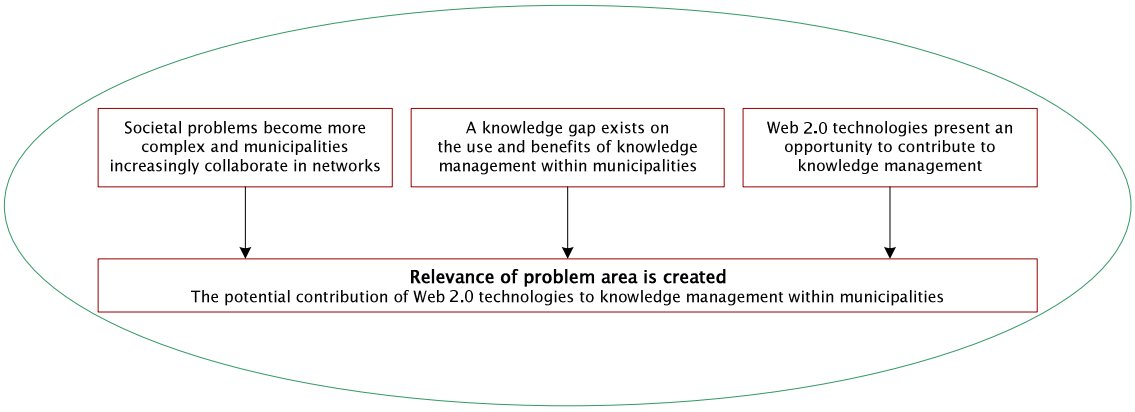

Figure 4: Problem area of the research

3.2. Research objective and relevance

The main goal of this research is to explore how and which Web 2.0 technologies contribute to knowledge management in municipalities. As public policy is increasingly executed outside the bureaucratic structure of a municipality, we will research an additional organ-

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isational structure for this exploration. As the introduction already discusses, networks are increasingly used to execute public policy in collaboration with external stakeholders. A network has been chosen to present the modernisation of municipalities. More specifically, the earlier introduced CJG has been chosen as case study within this explorative research. The selection of networks and more specifically the CJG is explained in section 3.4.2. This research project has the following main research objective:

Provide recommendations that present the contribution of Web 2.0 technologies to knowledge management within municipalities and within CJG's.

These recommendations support knowledge managers and decision makers at municipalities and CJG's in taking decisions on the use of Web 2.0 technologies in their organisations to enhance knowledge management. This research presents concrete knowledge management bottlenecks that benefit from the use of Web 2.0 technologies. This research is relevant as society increasingly uses Web 2.0 technologies and become well-informed citizens. These citizens demand that organisations work open and transparent as they are used to on the internet. With the internal use of Web 2.0 technologies, municipalities and CJG's can set the first step in satisfying these societal demands.

3.3. Research questions

The research focuses on how Web 2.0 technologies can contribute to knowledge management within municipalities and within CJG's. Web 2.0 has the potential to support municipalities with their current knowledge management practices. Based upon the research objective the main research question can be formulated as:

What can Web 2.0 technologies contribute to knowledge management within municipalities and within CJG's?

To answer the main research question three sub-questions have been formulated. The first sub-question will present the current literature on knowledge management in municipalities. Latter sub-questions will be based on the findings of this research question.

1. *What is knowledge management?*

The first sub-question is answered when a knowledge management model is found that supports the exploration into the potential contribution of Web 2.0 to knowledge management within municipalities. The findings of the first sub-question are used as basis for sub-question two, which involves empirical research into knowledge management use within municipalities and CJG's.

2. *What knowledge management bottlenecks can be found within municipalities and within CJG's and to what extent can the bottlenecks be validated?*

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The second sub-question is an explorative step to get more insight into the actual use and bottleneck with knowledge management within municipalities and CJG's. To answer this sub-question, interviews are conducted with civil servants working in municipalities and CJG's. Consequently, the findings are validated with an expert panel. The findings of the interviews are used within sub-question three combined with the presented Web 2.0 categories and technologies in chapter 2. Sub-question three presents the analysis of the contribution of Web 2.0 technologies to the found knowledge management bottlenecks within municipalities and CJG's.

3. *Which Web 2.0 technologies can be used to contribute to the bottlenecks found on the use of knowledge management within municipalities and within CJG's and to what extent can the Web 2.0 technologies be validated?*

The potential contribution of several Web 2.0 technologies to the knowledge management bottlenecks is qualitatively analysed. To validate the findings another validation session with experts is held. The goal of the validation session with experts is to check if the case study findings correspond with the experience and expertise of the experts. The findings are adjusted after the validation session and should increase the value of the findings.

The answer to the main research question can be derived from the answers to the sub-questions. The answer of every sub-question is part of the answer to the main research question.

3.4. Research strategy

To answer the research questions, several research methods will be used during the research project. The following research strategy has been designed to explain how the research is executed. Within this strategy a research framework has been designed, which presents all steps of the research with the corresponding research methods. The research framework is divided into three phases, where every phase has another focus. Figure 5 shows the research framework.

3.4.1. Phase 1: introduction to and formulation of research problem

Chapter one and two are part of phase one and have been presented. Therefore, only the research methodology is concisely described here. Chapter one and two are based on desk research. Various sources like academic papers, proceedings of conferences, books and reports are used for the desk research. Besides these scientific sources, weblogs and wikis are used to describe aspects of Web 2.0, which have not yet been published. To find these sources the internet is used, as well as several scientific databases and the library collection. The desk research results in an overview of the main research topics presented in chapter one and two.

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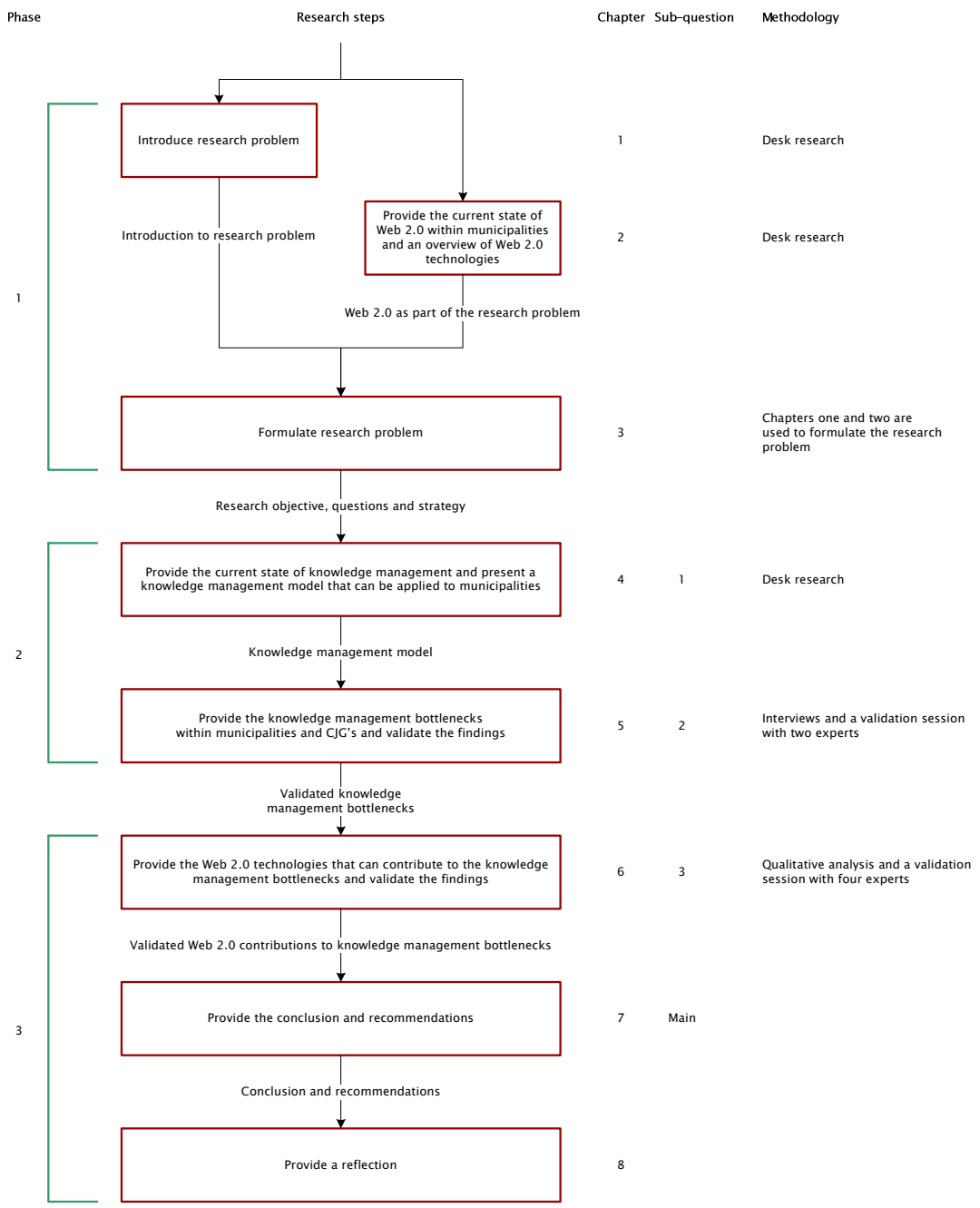

Figure 5: Research framework

3.4.2. Phase 2: knowledge management

Attention in phase 2 is focused on knowledge management. Phase 2 starts with answering sub-question one: *What is knowledge management?* Desk research on knowledge management will be used as research method to answer this sub-question. The main reference types that are used for this desk research are books and academic articles. The answer to sub-question one is presented in chapter four. The goal of this chapter is to explain the concepts knowledge and knowledge management. Furthermore, with explaining these concepts, the chapter works towards a knowledge management model that will be used in the

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context of this research and more specifically to explore knowledge management bottlenecks within municipalities and CJG's.

The knowledge management concepts and the knowledge management model are used to answer sub-question two: *What knowledge management bottlenecks can be found within municipalities and within CJG's and to what extent can the bottlenecks be validated?* To answer this sub-question, knowledge management bottlenecks within municipalities and CJG's are explored. We choose to explore knowledge management bottlenecks, because of the focus of this research project on Web 2.0 technologies. We believe that by exploring the knowledge management bottlenecks a connection can be made with Web 2.0 technologies. As was shown in section 2.5, there are many technologies available, which can contribute to the bottlenecks. With concrete contributions represented by the Web 2.0 technologies, the findings are of practical value. With a more abstract viewpoint on knowledge management and Web 2.0 this is questionable.

The municipality and the CJG are presented as two case studies and are derived from the first two chapters. The exploration of knowledge management bottlenecks shows what can be improved to knowledge management within municipalities and CJG's. The municipality and the CJG are chosen as case studies as they present two extremes on a range of agency types to execute public policy. Within municipalities public policy is executed within a bureaucratic structure, while in a CJG public policy is executed with and by external stakeholders with a governing role for the municipality. These extremes have been chosen, because the contrast between the traditional municipality and the modernisation of municipalities can be presented with these case studies. We expect that with these extremes, the case studies will present contrasting findings, which should deepen our understanding of the contribution of Web 2.0 technologies to knowledge management.

The first case study presents the current situation of knowledge management within CJG's. Within a CJG, several organisations from the youth care sector collaborate to execute public policy. The municipality has a governing role in a CJG, which means they involve the needed organisations and bring them together. The coordinator or manager of a CJG represents the municipality in a CJG. The task of the coordinators and managers is to stimulate collaboration between the involved organisations and professionals. Furthermore, the municipality watches over the overall processes within the CJG. The CJG has been chosen as case as knowledge management becomes more important as more organisations and professionals are involved. Furthermore, an opportunity exists for Web 2.0 technologies to stimulate collaboration between professionals within the CJG and to support knowledge management. Lastly, Alares has many experts and much expertise within CJG's and can support this research with their knowledge. Due to these reasons the CJG has been chosen as case.

The second case study presents the current situation of knowledge management for municipalities themselves. The organisational structure of municipalities is a bureaucracy. Within a bureaucracy processes and activities are standardised. To further improve efficiency power is divided formally by hierarchic relationships (Mintzberg, 2003). Within bureaucracies employees specialise on a certain task. This effects how knowledge is handled

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within bureaucracies or in this case within municipalities. Due to specialisation civil servants become experts on their own field. Knowledge sharing and management becomes important as others can benefit from their knowledge. Another reason why municipalities have been chosen as case study is again the expertise of Alares within municipalities.

To find the knowledge management bottlenecks within CJG's and municipalities, interviews are conducted. The respondents for the CJG case are civil servants working for the municipality as coordinator, manager or in another executive position within the CJG. As coordinator or manager of a CJG there is contact with all involved stakeholders, like the municipality, the partner organisations and the professionals working for the CJG. The link with all stakeholders in the network and the governing role of the municipality make this group interesting for the exploration. The interviews of the second case will be held with civil servants working for municipalities. Respondents have preferably worked with knowledge management within the municipality or have a vision how future work practices should look like on an organisational level. Therefore the selection of civil servants will be based on function and experience. Within municipalities knowledge management is mainly positioned within the IT or Communications department, so respondents with an executive position in one of these departments will be approached.

The knowledge management model that is found in chapter four will be used to structure the interviews and the analyses of interviews. The respondents will be asked questions about knowledge development, knowledge transfer and knowledge sharing. The goal of both case studies is to find bottlenecks that hinder knowledge management. The results of the case studies are further analysed in latter chapters and therefore need to be validated. The goal of the validation is to check the results with the experience of experts from the field and advance with more accurate findings. The findings of the case studies are validated in two steps with two experts. First, the findings were validated in an oral session with two Alares consultants, who have expertise on both the case studies. The second step was the validation of the changes after the oral validation session by email. The findings after the validation are presented in chapter five.

3.4.3. Phase 3: Contribution of Web 2.0 technologies to knowledge management

Phase three focuses on the analysis of the contribution of Web 2.0 technologies to knowledge management. Phase 3 answers sub-question three: *Which Web 2.0 technologies can be used to contribute to the bottlenecks found on the use of knowledge management within municipalities and within CJG's and to what extent can the Web 2.0 technologies be validated?* To answer this sub-question the Web 2.0 technologies and categories presented in chapter two are connected to the findings of sub-question two. Chapter six presents all analysed bottlenecks with one or two contributing Web 2.0 categories and technologies.

The second part of sub-question three requires another validation session. The goal of the validation session is to increase the credibility of the results. This time four experts have been invited to criticise and complement the results. The experts have expertise of or worked in one or both of the organisations presented in the case studies. Furthermore, affinity with knowledge management and Web 2.0 is required. At Alares various employees

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satisfy these requirements and have therefore been invited for the validation session. In a session of one and a half hour all bottlenecks including the context and the contributions of Web 2.0 categories and technologies to the bottlenecks are presented to the experts. After the presentation of each bottleneck and Web 2.0 contribution the experts discussed and commented on the results. The discussion is presented at the end of chapter six and answers the second part of sub-question three.

Figure 6 shows a visualisation of our working method described in phase 2 and 3. At the top the knowledge management model and the Web 2.0 categorisation model are presented. These models deliver the input for the knowledge management bottlenecks and the contribution of Web 2.0 technologies to knowledge management. The right figure at the top visualises the validation session with experts, which sharpens our findings. The visualised working method is presented for informative purposes, but can also be used by scholars as starting point to replicate this research.

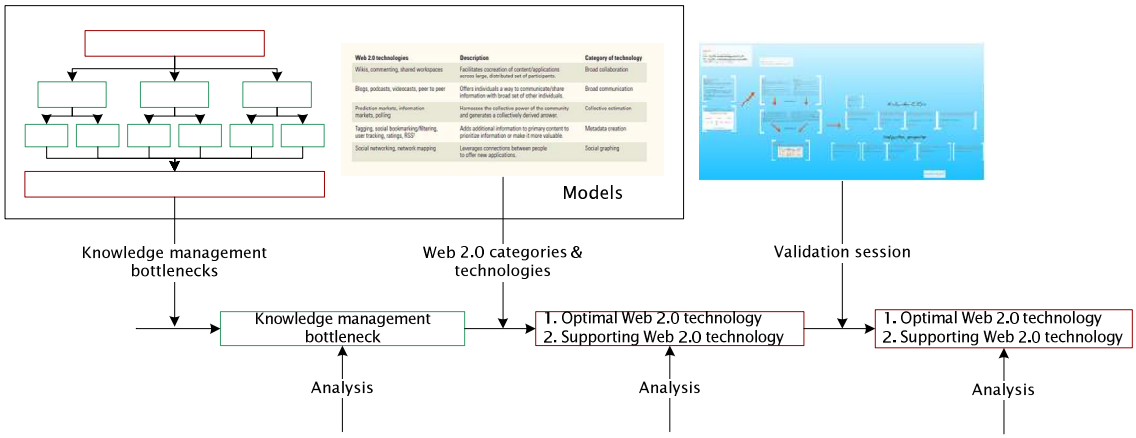

Figure 6: Visualisation of working method

Chapter seven presents the conclusion and recommendations, based on all answers to the sub-questions. This chapter uses all the answers of the sub-questions to answer the main research question: *What can Web 2.0 technologies contribute to knowledge management within municipalities and within CJG's?* This question is answered by the presentation of the used knowledge management model and the Web 2.0 model. Next, the bottlenecks and the subsequent analysis is presented. The conclusion ends with an overview of the contribution of Web 2.0 technologies to knowledge management bottlenecks within municipalities.

The second part of chapter seven presents the recommendations. Based on the conclusion, recommendations are presented on the use of Web 2.0 technologies within municipalities. In addition, recommendations for further research are presented. Certain topics have been delineated to keep this research practicable. Some of these delineations are however interesting for further research. In addition, some of these delineations have limited the research findings. The research limitations are therefore also presented in chapter seven. Lastly, we present our own viewpoint on this research project and the findings in the reflection in chapter eighth.

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3.5. Scope and delineations

This research design has delineated the initial subject on three points. The reason to delineate this research project is in order to execute a more in depth explorative research project as the subject is extensive. The first delineation of this research is to focus on municipalities and CJG's in the Netherlands. A clear knowledge gap exists on the use of knowledge management within municipalities. This explorative research should extend the knowledge on this subject. Furthermore, we choose the CJG to represent the second case study. The network structure of the CJG contrasts with the traditional bureaucratic structure of municipalities and thus we expect that the results of the case studies will differ, which presents interesting insights into knowledge management use within these organisations.

The second delineation is to focus on Web 2.0 technologies instead of Web 2.0 as concept. The contribution of Web 2.0 to knowledge management becomes tangible when Web 2.0 technologies are researcheded. With Web 2.0 as concept the contribution to knowledge management is less tangible. Furthermore, Web 2.0 technologies are easier to define, while functionalities of Web 2.0 are still discussed by scholars. We expect to encounter cultural and organisational issues when exploring the knowledge management bottlenecks within municipalities and CJG's. However, while important for the description of the knowledge management bottlenecks, these cultural and organisational issues will not be discussed in detail when the contribution of Web 2.0 technologies is analysed. We will reflect on this choice in chapter eight, which presents the reflection.

The third delineation of this research is to focus on the internal use of knowledge management and Web 2.0 technologies. Web 2.0 technologies can be used internally and externally, but with different focus. The different focus of internal and external use of Web 2.0 technologies forces us to choose. The external use of Web 2.0 technologies has been described extensively in e-participation literature, while a knowledge gap exists on the internal use of Web 2.0 technologies within municipalities. Furthermore, knowledge management has not much external value within municipalities. Lastly, we presented knowledge management as a back-office domain that can be supported by Web 2.0. Based on these statements we focus on the internal use of knowledge management and Web 2.0 technologies.

3.6. Conclusion

This chapter presented the problem area of this research. Based on the problem area the following research objective is proposed:
Provide recommendations to municipalities that present how and which Web 2.0 technologies can contribute to knowledge management given two organisational structures.

To fulfil the above research objective, the following main research question is proposed:
What can Web 2.0 technologies contribute to knowledge management within municipalities and within CJG's?

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The main research question is divided into the following three sub-questions.

1. *What is knowledge management?*
2. *What knowledge management bottlenecks can be found within municipalities and within CJG's and to what extent can the bottlenecks be validated?*
3. *Which Web 2.0 technologies can be used to contribute to the bottlenecks found on the use of knowledge management within municipalities and within CJG's and to what extent can the Web 2.0 technologies be validated?*

The answers to the three sub-questions lead to the final answer on the main research question. Various research methodologies are proposed to answer these sub-questions. The first sub-question is answered by desk research. To answer the second sub-question two case studies are explored on knowledge management bottlenecks. The results from the case studies follow from interviews conducted with civil servants working for municipalities and CJG's. The last sub-question presents the analysis of the contribution of Web 2.0 technologies to knowledge management within municipalities. The presented bottlenecks and Web 2.0 contribution of sub-question two and three are validated with experts.

Lastly, the delineations of this research were presented. This research focuses on Dutch municipalities, the internal use of knowledge management and Web 2.0 within municipalities and on Web 2.0 technologies. The research strategy and scope have been presented in this chapter and will be used in the rest of the research. The next chapter starts with answering the first sub-question by discussing knowledge management and presents a knowledge management model.

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4. Knowledge Management

> *In an economy where the only certainty is uncertainty,*
> *the one sure source of lasting competitive advantage is knowledge.*
> **Ikujiro Nonaka (1991)**

4.1. Knowledge

What is knowledge? Many have tried to answer this question, which results in many different definitions and viewpoints on knowledge. Drucker (1988) defines information as data with relevance and a purpose. The process to transform data into information requires knowledge. Knowledge can also be seen as a product of human reflection and experience; as a resource that is located in an individual or a collective, or embedded in a routine or process (De Long & Fahey, 2000). In addition, Jashapara (2004, pp. 14-17) defines information as 'systematically organised data' or data with meaning, relevance and purpose. He considers knowledge to be 'actionable information', which allows us to make better decisions and provide an effective input to dialogue and creativity in organisations. However, Jashapara (2004) finds the above notion of knowledge too simplistic. According to him the concept knowledge is much more complex.

This complexity can be seen in the different viewpoints on knowledge in the academic world. Two contrasting views are dominant in the knowledge management literature. The first view focuses on explicit knowledge and how this type of knowledge can be codified and embedded in formal rules, technologies and processes. The second stream focuses on tacit knowledge, or knowledge that resides in persons. For generic purposes it is desired to have a definition of knowledge, which incorporates explicit and tacit knowledge. Davenport and Prusak (2000, p. 5) have defined knowledge with both explicit and tacit knowledge in mind: "Knowledge is a fluid mix of framed experiences, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of knowers. In organisations, it often becomes embedded not only in documents or repositories but also in organisational routines, processes, practices, and norms". This definition pays attention to tacit (e.g. experience and values) and explicit knowledge (e.g. documents and repositories). Furthermore this definition stresses the importance of embedding knowledge in organisational routines, processes, practices and norms. The next section discusses the different views on knowledge.

4.1.1. Tacit versus explicit knowledge

Knowledge is a complex concept, which cannot be fully understand without a discussion of the two dimensions commonly found within organisations. Polanyi (1966) was the first to discuss two dimensions of knowledge, namely tacit knowledge and explicit knowledge. Nonaka (1994) was the first to discuss these categories of knowledge in his discussion of knowledge creation and how the knowledge creation process can be managed. "Tacit

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knowledge is deeply rooted in action, commitment and involvement in a specific context, while explicit or codified knowledge refers to knowledge that is transferrable in formal, systematic language" (Nonaka, 1994, p. 16). The concept of tacit knowledge is more subjective than explicit knowledge and needs to be personally experienced (Jakubik, 2007, p. 10). The tacit dimension entails knowledge that is embodied in the human mind and cannot easily be separated and transferred. These subjective and personal elements make it difficult to formalise and to communicate tacit knowledge. Or as Polanyi (1966) described tacit knowledge: "We can know more than we can tell". Tacit knowledge is also described as 'knowing-how' or the ability of a person to act, to perform different tasks, ability to organise and exploit existing knowledge (ability of acting, doing) (Jakubik, 2007).

Explicit knowledge can be communicated with words, in writing or other sorts of readable content and can be formalised. Consequently, explicit knowledge is found in organisations' rules and procedures and can be seen as 'knowing what' knowledge. As explicit knowledge can be found in rules, procedures and documents, it is easier to communicate and to transfer. To transfer and share explicit knowledge, archives and IT can be used. Explicit knowledge can be transferred by language too, but words however cannot transfer knowledge completely, as previous experiences or other forms of tacit knowledge are needed to understand and interpret the explicit knowledge. Table 1 shows the features of tacit and explicit knowledge.

Table 1: Features of tacit and explicit knowledge (Jasimuddin, 2005)

Features	*Tacit knowledge (i.e. skills and experience)*	*Explicit knowledge (i.e. documents and procedures)*
Content	Non-codified	Codified
Articulation	Difficult	Easy
Location	Human brain	Computers, artefacts
Communication	Difficult	Easy
Media	Face-to-face, storytelling	IT and other archives
Storage	Difficult	Easy

These features of tacit and explicit knowledge show the differences of both types of knowledge. Because of the differences in characteristics, tacit and explicit knowledge need to be managed differently. So before starting with the use of knowledge management, it is important to determine what type of knowledge should be managed and act accordingly. The presented features can help with determining the type of knowledge. Within this research, these features are used indirectly and mainly present an overview to the reader.

4.2. Knowledge management

Knowledge management is hard to define. Many scholars have tried however and just as many different definitions can be found. The variety in definitions can be explained by what has been discussed before. The features of explicit and tacit knowledge showed that these two types of knowledge cannot be or hardly be managed in the same way. The result is two

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types of definitions with both another focus. Different perspectives on knowledge require different knowledge management approaches. Knowledge can be tacit or explicit, refer to an object or cognitive state of mind, reside in a human's mind or in documents and formal procedures (Alavi & Leidner, 2001). Thus, organisations need different approaches to manage the diversity of their knowledge.

As this research does not focus on one type of knowledge or a knowledge management approach in particular, a broad definition of knowledge management is needed. Gottschalk (2005) proposed a broad definition of knowledge management as: "a method to identify and leverage the collective knowledge in an organisation in order to make the organisation operate more efficiently and become more innovative." This definition presents a good start, however as this research focuses on municipalities, a public sector focused knowledge management definition is required. So a definition is needed that focuses on the public sector and that takes into account various knowledge management approaches. McNabb (2007) is one of the few that wrote a book about knowledge management in the public sector and his more focused definition of knowledge management is: "knowledge management is a dynamic, evolving set of interacting existing and new technologies, practices and procedures that employ technology and social interaction in the delivery of public services." Technology and social interaction can be seen as approaches to manage respectively explicit knowledge and tacit knowledge. Furthermore, this definition relates both approaches to public service delivery. As this definition of knowledge management denominates both approaches and public service delivery, this definition is used as standard for this research.

4.3. Knowledge management model

The knowledge management literature is extensive and contains a lot of models. However, knowledge management in the public sector is less popular and has not seen the attention of knowledge management in private organisations. McNabb's (2007) book is one of the exceptions. He dedicated his attention to knowledge management in the public sector and came to the knowledge management model for public organisations shown in Figure 7. The model shows the social and IT processes and mechanisms that are needed to come to individual and organisational learning. The model stresses the importance of knowledge development mechanisms, knowledge transfer by internet-based message systems and Intranets and knowledge sharing mechanisms. Although not specifically treated as such, knowledge transfer mechanism can be seen as the transfer of explicit knowledge using IT, while the knowledge sharing mechanisms require social interaction and as such focuses more on the transfer of tacit knowledge. The next sections discuss the blocks in more detail.

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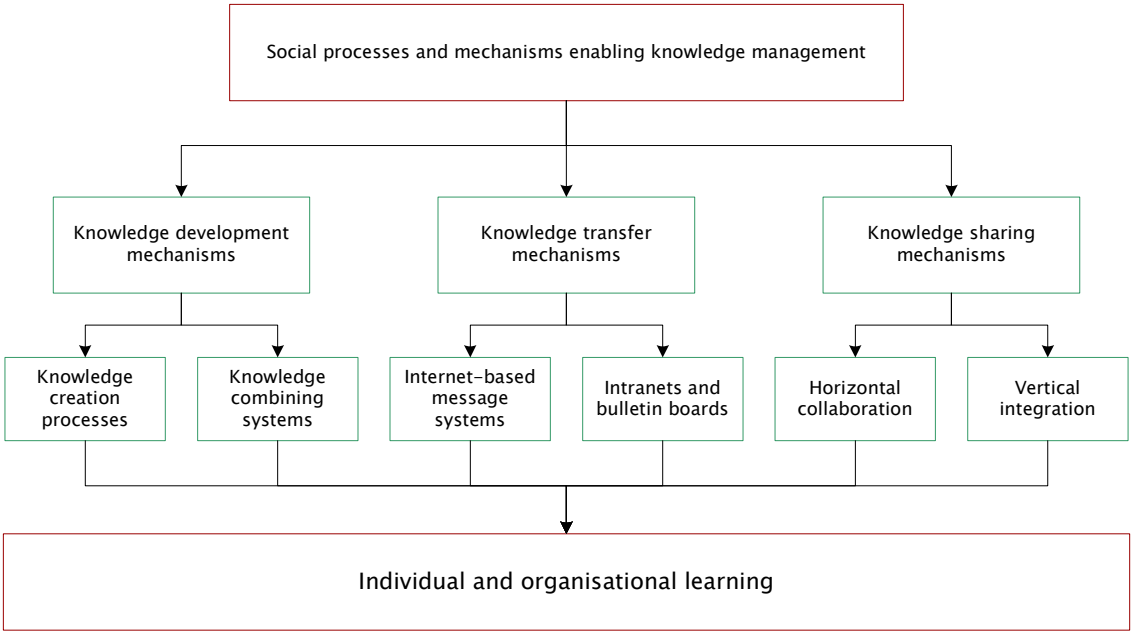

Figure 7: Knowledge management mechanisms in public organisations (McNabb, 2007)

4.3.1. Knowledge developments mechanisms

The first social mechanism that enables knowledge management is knowledge development. Developing knowledge is the starting point of knowledge management. Knowledge development can be divided into knowledge creation processes and knowledge combining systems. The next two sections present both knowledge development mechanisms.

Knowledge creation processes and knowledge combining systems

Knowledge creation is an important process within knowledge management. Before knowledge management can even be used, knowledge has to be acquired. Knowledge can be acquired in various ways. By searching, reading, watching, analysing and organising information sources and by talking to experts, knowledge is acquired. Knowledge is also acquired by organising the knowledge found in this process. So knowledge creating activities take place within and between people. Knowledge is obtained from individuals or groups by having person-to-person contact like conversations or from organisational routines by using structured media like books and documents (Davenport & Prusak, 2000). A leading model on knowledge creation processes is the knowledge creation model Nonaka & Takeuchi (1997), which is discussed in the next section.

One of the steps of the knowledge creation model can be compared to the second step of knowledge development. Knowledge combining systems combine the acquired and created explicit knowledge to new explicit knowledge. In general, IT is meant when we talk about systems to combine knowledge, however systems can also be something different. For instance, a human can be a knowledge combining system in some situations. In general however, explicit knowledge is acquired and combined. Next, this combined knowledge is processed into presentation or meetings. The last step is using this processed knowledge in documents and plans, in other words make it explicit again, so it can be used as input

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for newly created knowledge. The next section discusses the knowledge creation model (Nonaka & Takeuchi, 1997) and consequently elaborates on combing knowledge.

Knowledge creation model

Nonaka & Takeuchi (1997) state that social interaction is crucial for the conversion of knowledge. They present four types of knowledge conversion in their SECI model, which is an abbreviation of Socialisation, Externalisation, Combination and Internalisation. The SECI model identifies four knowledge conversion approaches; from tacit to tacit knowledge, from tacit to explicit knowledge, from explicit to explicit knowledge and from explicit to tacit knowledge. These four knowledge conversion approaches are called socialisation, externalisation, combination and internalisation. Figure 8 shows the four knowledge conversion approaches.

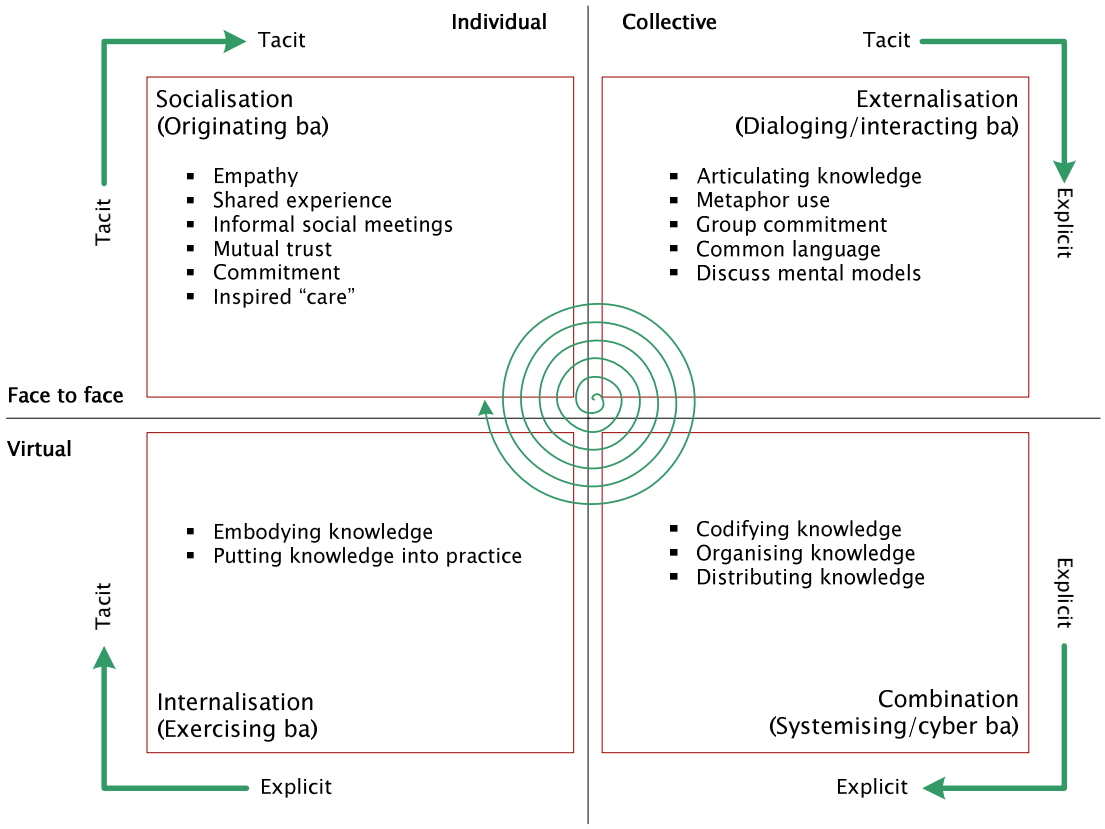

Figure 8: Knowledge creation model (Nonaka & Konno, 2001; Nonaka & Takeuchi, 1997)

These four conversion approaches have their own requirements with regard to knowledge management. When experiences are transferred between people, the socialisation process has been initiated. Socialisation transfers tacit knowledge between people by sharing the experience and results in the acquisition of skills and mental models (Nonaka & Takeuchi, 1997). In general, tacit knowledge, and specifically its context, is not easily transferred by language as skills or mental models are difficult to express with words. Consequently, the transfer of tacit knowledge by socialisation is mainly done by training on the job or coaching programs. With such programs tacit knowledge can be transferred in the specific con-

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text, which makes it easier to understand. The second approach, externalisation, covers the conversion from tacit knowledge to explicit knowledge. Nonaka & Takeuchi (1997) state that this process has a key position in the conversion of knowledge. Externalisation converts tacit knowledge into explicit knowledge by means of written text, visuals metaphors, analogies, concepts, hypotheses and models. These means should transfer the content, as well as the context in which it has been acquired, to be useful. The conversion from explicit knowledge into explicit knowledge is called combination. Knowledge creation in the combination approach starts with the exchange of knowledge between people by means of multiple sources, like documents, meetings or conversations. Restructuring this knowledge by sorting, adding and organising, combines multiple knowledge sources into new explicit knowledge. Nonaka & Takeuchi (1997) emphasise that this approach can be executed more easily with the use of computerised communication networks and databases. The last approach in the SECI model is the conversion of explicit knowledge into tacit knowledge by internalisation. The acquisition of explicit knowledge by a knowledge worker complements his current tacit knowledge and becomes tacit knowledge when used during daily practices. By using it in daily practices, the explicit knowledge becomes internalised. Basically internalisation is the process that can be described as learning by doing. By learning by doing explicit knowledge is internalised in tacit knowledge, which can then induce a new spiral of knowledge creation (Nonaka & Takeuchi, 1997).

The SECI model has later been extended with the concept of 'ba', where ba can be seen as a shared space for emerging relationships. These shared spaces can be physical, virtual, mental or any combination of them. The concept of ba extends the SECI model as it offers platforms in the knowledge spiral process (Nonaka & Konno, 2001). The presented knowledge conversion model in Figure 8, also visualises the concept of ba. There are four types of ba that support the four knowledge conversion processes. Originating ba supports socialisation and is the primary ba in the knowledge creation process. The conversion and transfer of tacit knowledge is supported by face-to-face experiences and therefore, originating ba provides a platform where individual share feelings, emotions, experiences and mental models and where barriers between individuals are overcome (Nonaka & Konno, 2001). Organisational issues that are related to this ba are knowledge vision and culture. Interacting ba provides a platform to support externalisation, with as most important feature to support dialogue between individuals. Dialogue helps to convert tacit knowledge into explicit knowledge or the mental models and skills of an individual into common terms and concepts (Nonaka & Konno, 2001). The use of metaphors can be a means to support the conversion process. Cyber ba supports combination and provides a virtual space to restructure multiple explicit knowledge sources into new explicit knowledge. To enhance this conversion process, cyber ba provides platforms as online networks, groupware, documentation and databases (Nonaka & Konno, 2001). Exercising ba is the last process and supports internalisation of the process to convert explicit knowledge in tacit knowledge. Exercising ba is the world where focused training with colleagues and mentors and active participation in joint exercises results in tacit knowledge. The knowledge generated in each ba is shared and becomes the knowledge base of the organisation. As organisations go through the cycle from tacit to explicit knowledge and back to tacit knowledge, their

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knowledge base increases and they become learning organisations. More on learning organisations at the end of this section.

The knowledge creation model with the extension of the concept of ba, can support organisations with their knowledge conversion processes. The model as presented above will not be used entirely in the next sections, however definitions used in this model will be used in the case studies to explain certain bottlenecks. More specifically, the four conversion processes socialisation, externalisation, combination and internalisation are used to describe certain bottlenecks within CJG's and municipalities.

4.3.2. Knowledge transfer mechanisms

The next step of our knowledge management model is the transfer of knowledge. The first step showed how knowledge can be created and combined. This newly created and combined knowledge needs to be transferred, so everyone in the organisation can benefit from it. In this context, transfer knowledge mechanisms are IT-based systems. Therefore, knowledge transfer differs from knowledge sharing in that the first is clearly based on IT and the second focuses more on social interaction. This difference is important as these terms are both used in this research and have their own meaning and consequences for knowledge management. Knowledge transfer is divided by McNabb (2007) into internet-based message systems and Intranet and bulletin boards. However, McNabb does not elaborate on these two knowledge transfer mechanisms in the description of the model. Therefore, the discussion in the next section are our interpretations of these knowledge transfer mechanisms.

Internet-based message systems

Internet-based message systems have not been discussed by McNabb (2007). This knowledge transfer mechanism however, relates to the earlier discussion in section 2.2 on systems that are currently used to transfer and manage knowledge. Examples of internet-based message systems to transfer knowledge are e-mail and instant messaging (McAfee, 2006). Although both systems have different characteristics, both provide the functionality to transfer knowledge.

Besides e-mail and instant messaging, many other internet-based message systems can be thought of to transfer knowledge. Especially Web 2.0 technologies are capable of transferring knowledge. Web 2.0 technologies like a wiki, a weblog or even microblogging have the ability to transfer knowledge between users. With the knowledge transfer ability and the focus of this research in mind, Web 2.0 technologies have been given a place within this knowledge transfer mechanisms. In this manner the respondents of the case studies can be asked explicitly about the use of Web 2.0 technologies within their organisation. A generic description of several Web 2.0 technologies can be found in chapter six. The next section discusses the second part of the knowledge transfer mechanisms, namely Intranet and bulletin boards.

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Intranet and bulletin boards

The second part of knowledge transfer mechanisms has again not been discussed elaborately by Mcnabb (2007). The functionality of a bulletin board is often integrated on an Intranet and is therefore discussed first. On a bulletin board messages can be posted by users of the bulletin board. Other users can read these messages and can respond to it (Rice, 1987). Posting messages can take place in the real and in the virtual world. The focus in this research is on the virtual bulletin board. Nowadays, bulletin boards are also called message boards or forums. Furthermore, bulletin boards are often integrated in other technologies, like social networking and wiki technology or as stated on an Intranet.

An Intranet is a privately maintained computer network which can be accessed by authorised persons. Authorised persons mainly consist of employees of an organisation or its associates. Intranets use Internet Protocol technologies (IP) and are protected against unauthorised use and provide various functionalities, besides the earlier mentioned bulletin board. Depending on the used Intranet technology, an Intranet provides functionalities like email, data storage and a search option. The Intranet enables interaction between users and the storage of and access to information and knowledge. In other words, an Intranet enables the transfer of knowledge. The next section discusses knowledge sharing mechanisms. The difference with knowledge transfer is the focus on social interaction instead of on IT.

4.3.3. Knowledge sharing mechanisms

To prevent that knowledge has to be created and acquired more than once in an organisation, it is important to share knowledge. Although this newly acquired knowledge becomes more valuable when shared with co-workers, it is often hard to do so. Knowledge comes in various ways and may be acquired in different contexts then the one in which it is shared. To successfully share knowledge, knowledge acquired from one context must be compatible with or fit to the new context. Different contexts can also generate new knowledge as people have to rethink the things they take for granted. Rethinking knowledge from another viewpoint can show new directions and generates new knowledge (Nonaka, 1991). People however are capable of adapting knowledge to other contexts, which facilitates knowledge sharing (Argote & Ingram, 2000). The context in which the knowledge is acquired is important when the knowledge is shared. Sharing the context in which the knowledge has been acquired makes the knowledge even more valuable and easier to understand (Jakubik, 2007). In addition, the form in which the knowledge is presented should be easily understood by others, so they can use the knowledge in their own particular context (Dixon, 2000). However, the receiving individual or team should have enough related knowledge to let the new knowledge become valuable. Successfully creating and sharing knowledge within an organisation is important as it provides a basis for competitive advantage (Argote & Ingram, 2000). Although competitive advantage not applies to municipalities, operational excellence and higher efficiency does.

Common experience and trust enhances sharing within organisations, because sharing becomes easier as common contexts exist. Experience refers to what has happened to us in

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the past and what we have done. Knowledge acquired by executing organisational tasks and the resulting experience has been defined as common knowledge by Dixon (2000) or organisational knowledge by McNabb (2007). Besides the common experience and trust other factors influence the success of the knowledge sharing process. Jasimuddin (2007) found empirically that status of actors, personal ties and proximity are factors that influence successful knowledge sharing. People with a higher status in an organisation cannot be contacted with all knowledge sharing mediums, while this threshold does not seem to exist when sharing knowledge with people on a similar level of status. Personal ties, and specifically strong personal ties between people, enhance sharing of knowledge. Proximity influences knowledge sharing as it is easier to share knowledge with someone in close proximity than with someone at a far distance. Besides the above three factors Jasimuddin (2007) found that urgency, nature of query and trust might also have a significant influence on knowledge transfer.

Horizontal collaboration

The above discussion shows social interaction between co-workers is needed to share knowledge. The discussed factors influence the social interaction between co-workers and therefore also the knowledge sharing process. By interacting socially not only the knowledge, but also the dynamic, context dependant and personal information that is connected to the knowledge, can be shared. Jansen (2007) states that knowledge is embedded in persons and that its is hard to detach this context dependant knowledge with traditional technologies. To enhance the power of knowledge, Jansen (2007) proposes to create virtual and physical spaces where people can talk, ask questions, tell stories and inspire each other. In a social process knowledge can be shared with the corresponding dynamic context and directed at people.

Besides social interaction between co-workers, McNabb (2007) adds that collaboration in the model should be seen as: “the efforts of two or more entities or agencies to accomplish more than the sum of their individual efforts.” In this way the definition of horizontal collaboration is much wider and incorporates social interaction and knowledge sharing between multiple organisations. This additional statement can be related to the increasing use of networks to provide public policy, in which horizontal collaboration is a condition for success. A clear difference in levels of collaboration can be found between the bureaucratic municipality and a network. Horizontal collaboration within the municipality is mainly between co-workers while in networks municipalities collaborate with employees of other organisations. Both levels of collaboration are facilitated by the model.

Vertical integration

For this knowledge sharing mechanisms, social interaction is again important. Integration of knowledge has been defined by McNabb (2007) as the integration of tacit knowledge of two or more individuals to create new agency-level knowledge. This definition does not focus on the vertical aspect reflected in the knowledge management model. In this research the vertical aspect has been interpreted in various ways as McNabb (2007) does not provide

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a more detailed description. Within a municipality vertical integration of knowledge has been interpreted as the sharing of tacit knowledge by civil servants on operational levels with civil servants on higher levels. In addition, knowledge can also be shared from strategic levels to operational levels within this definition.

Within CJG's vertical integration has been interpreted differently due to the differences in organisational structures. Vertical integration has been interpreted in three ways within CJG's. The first interpretation is the vertical integration of knowledge from the coordinator or manager from the CJG to the municipality. The second interpretation is the vertical integration of knowledge from a professional sharing knowledge acquired in the CJG to their respective organisation. The last interpretation is the vertical integration of knowledge from a professional sharing knowledge acquired in its organisation to the CJG. These three processes can also be reversed. The next section discusses individual and organisational learning, which are the result of the above discussed mechanisms.

4.3.4. Individual and organisational learning

Knowledge workers and the knowledge economy have changed the structure of traditional organisations. Knowledge has become an asset of incredible value and acquiring, sharing and managing knowledge has become a priority. To stay competitive in today's world, organisations should focus constantly on creating new knowledge and use it directly to improve or create new products, processes, services and technologies (Nonaka, 1991). The knowledge development, knowledge transfer and knowledge sharing mechanisms are essential steps to drive permanent innovation and to become a learning organisation (Nonaka & Takeuchi, 1997). So knowledge development, knowledge transfer and knowledge sharing enable organisational learning however, certain processes should be supported.

Crossan, Lane & White (1999) have defined organisational learning as the principal means of achieving strategic renewal of an organisation. To come to this strategic renewal, four processes are needed, which can be found in individual, group and organisational learning. Crossan, Lane & White (1999) have presented the 4I framework and defined four processes that are needed for organisational learning. They defined the processes as intuiting and interpreting within the individual learning process, integrating as the group learning process and institutionalising as the organisational learning process and is presented in Table 2.

The levels and processes in Table 2 do not show that individual and organisational learning are dynamic processes. Crossan, Lane & White (1999, p. 532) state that learning occurs across time and levels and creates tension between assimilating new learning (feed forward) and exploiting what has already been learned (feedback). Through feed forward loops information, knowledge or even ideas are shared from the individual level to the group and organisational level. Simultaneously, the feedback loops make sure that what has been learned feeds back to individual and group levels. Figure 9 visualises the feed forward and feedback loops.

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Table 2: Organisational learning framework (Crossan, et al., 1999)

Level	*Process*	*Input/Outcomes*
Individual	Intuiting	Experiences Images Metaphors
	Interpreting	Language Cognitive map Conversation/dialogue
Group	Integrating	Shared understandings Mutual adjustments Interactive systems
Organisation	Institutionalising	Routines Diagnostic systems Rules and procedures

Ultimately, organisational learning is the product of the individual and team learning processes. Organisational learning is the sharing and codification of individual's or team's acquired knowledge. Codification of knowledge in routines, diagnostic systems, rules and procedures is the end, but also the beginning of the framework as feedback and feed forward loops exist. Organisational routines help to understand the interplay between an organisation's structure, its processes and its actions and consequently support organisational learning (Jashapara, 2004).

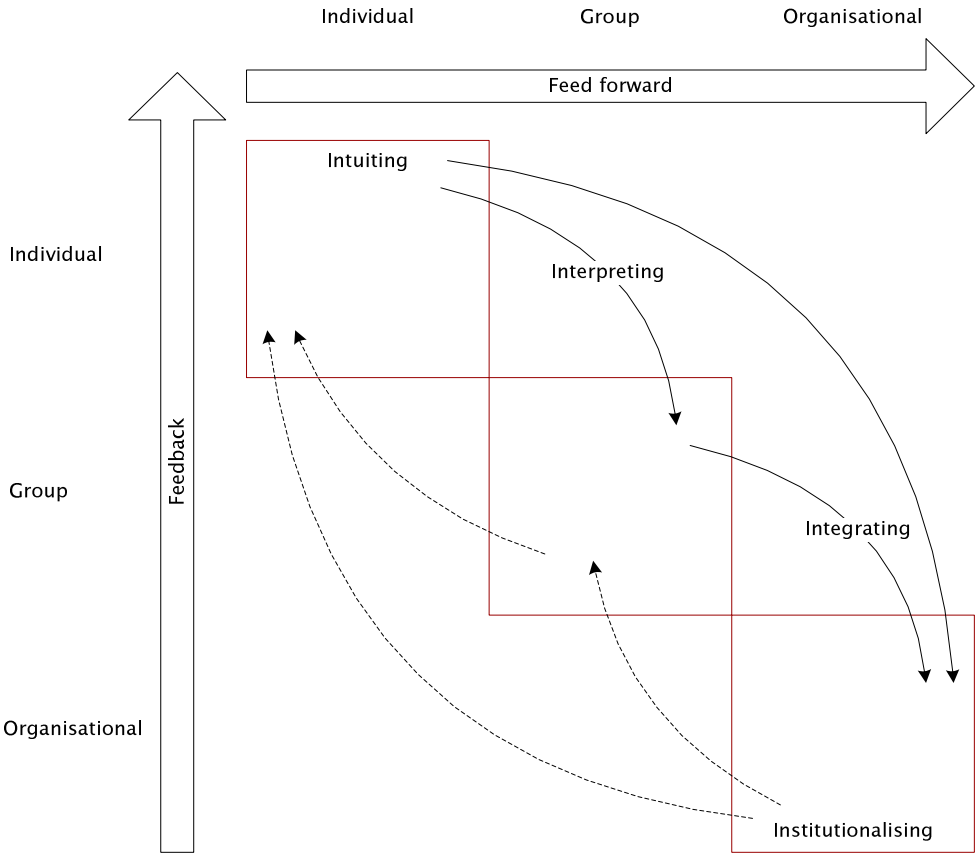

Figure 9: Organisational learning as dynamic process (Crossan, et al., 1999)

Although individual and organisational learning are the final goals of knowledge management within the used knowledge management model, these goals will not be discussed further in this research. Based on the existing knowledge gap and the existing situation at municipalities we expect that knowledge management is still in its infancy within municipalities and CJG's and that individual and organisational learning based on knowledge management mechanisms has not advanced this far yet. Exploring knowledge development, knowledge transfer and knowledge sharing within municipalities will present various bottlenecks that provide ample opportunities to analyse. The next section presents an overview of relevant knowledge management cases and literature.

4.4. Municipal knowledge management in practice

The previous sections emphasised that a knowledge gap exists on the use of knowledge management within municipalities. This section starts with a discussion of relevant case studies. These case studies present research of other scholars and only present an overview what is currently known. Consequently, knowledge management issues within public organisations are discussed.

4.4.1. Current state of knowledge management within public organisations

Although some scholars have written on the reasons to use and the issues of knowledge management in public organisations, a knowledge gap exists on the actual use of knowledge management in practice (Edge, 2005; Syed-Ikhsan & Rowland, 2004). With the focus on municipalities in this research it is even harder to show the actual state of knowledge management. This section discusses the results of several case studies of public organisations that are relevant for this research. The goal is to present a relevant overview of case studies that have researched the use of knowledge management within public organisations.

The first Dutch relevant case study that has been studied is a research executed by three researchers of the Centre for Government Studies situated in the Netherlands. De Jong, et al., (2007) interviewed nine civil servants individually and held two group interviews with in total seventeen participants. All participants are high positioned civil servants in various Dutch public organisations, ranging from local to central government. The case study's conclusions confirm some of the reasons to and issues with using knowledge management within municipalities. The research shows that a vision on knowledge and knowledge management lacks within public organisations and that initiatives are mainly executed ad-hoc. Consequently, a lot of initiatives are in place, which have no connection and are focused on a specific problem or target group. Furthermore the case study shows social trends like the mobility of employees and the retirement of the older generation civil servants are found as reasons to use knowledge management (de Jong, et al., 2007). De Jong, et al., (2007, p. 12) also mention the changing role of the government. Process knowledge becomes more important, while traditionally knowledge concerning professional content was essential. Accordingly the role of the government changes in facilitator or coordinator of public policy processes.

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The research of de Jong, et al. (2007) is mainly focused on central government and shows that knowledge management within public organisations is still in its infancy without a clear knowledge management vision and strategy. Projects are initiated ad-hoc without an underlying structure or connection with other projects. Interesting within this research is the changing role of the government. Governments are increasingly involved in networks to facilitate public policy processes. In these networks other parties are the experts with the required knowledge, while governments increasingly act upon process knowledge.

The second Dutch relevant case study discusses how legal information is managed within municipalities with the focus on IT policy. Combrink-Kuiters, et al., (1999) found that mutual trust among colleagues is essential for sharing knowledge. In addition, they showed that programs to socialise tacit knowledge, like job rotation programs, were not in place and if there were such programs, employees had to apply for it themselves. Furthermore, municipalities generate knowledge internally, but also pull knowledge into the organisation from external experts, conferences and workshops (Combrink-Kuiters, et al., 1999). However, the most important aspect of knowledge management is document management. By using shared disks everyone has access to the same documents as long as they are authorised to access the disk. A distinction was found between municipalities of different sizes. It was found that large municipalities had more structures in place to support knowledge management than the smaller municipalities.

Technology itself is not strong enough to stimulate knowledge creation and sharing and the implementation of knowledge management. Training is an important means to facilitate culture change and to better utilise technology. A Dutch case study of the Automationcenter of the Social Security shows that knowledge management improves results in the organisation and that technology alone is not enough to tackle the issues. Most energy and attention should be focused on the facilitation of the knowledge sharing process (Klunder & Kuiper, 1999). This process can be supported by group work or group meetings, where colleagues can talk to each other.

The above case studies show that the results are roughly similar. All cases show that it is important to overcome cultural issues and that technology alone does not improve knowledge management. Besides the use of technology, knowledge management should be supported by processes or procedures that stimulate interaction between co-workers. Although Web 2.0 is also a technology, social interaction and knowledge sharing are facilitated by these technologies. We expect that within this research project cultural issues within organisations will also play an important role, which are more difficult to circumvent by Web 2.0 technologies. We however focus on the technologies as has been described in section 3.5. The goal of the above case studies is to prepare the reader on the analysis of the knowledge management bottlenecks. The next section gives an overview of literature that elaborates on knowledge management issues within public organisations.

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4.5. Knowledge management 2.0

Traditional knowledge management systems control and validate content centrally and content is accessible on a need to know base (Ribiere & Tuggle, 2010). Web 2.0 technologies are based on a need to share paradigm and this new generation of technologies is easier to use than traditional knowledge management systems and simultaneously support collaboration and knowledge exchange. The adoption rate of Web 2.0 technologies is high as they are easy to use and intuitive and enable users to publish and distribute content immediately (Schneckenberg, 2009).

In addition, the open character of many of these technologies makes combination of technologies into one integrated solution possible. The diversity in technologies creates opportunities to organisations to provide employees a set of technologies that can be used to manage and share their knowledge and knowledge work, instead of several stand alone technologies. Providing an integrated solution of several technologies should make it easier to use within the daily routine. For instance, a virtual shared workspace can be used as base to integrate blogs, wikis and microblogging functionality. RSS can be used to provide feeds to users when new updates or comments are placed on topics of interest.

Another difference with traditional knowledge management systems is the ability of Web 2.0 technologies to share tacit knowledge. While traditional knowledge management systems mainly transfer explicit knowledge, Web 2.0 technologies have the ability to transfer tacit knowledge by facilitating social interaction and communication. Although the transfer of tacit knowledge is still hard, much of the contextual information can be transferred easier with Web 2.0 technologies. For instance, a combination of a blog with videocasts can transfer the contextual information on the blogs, while skills are presented in the video.

4.6. Conclusion

We identified two types of knowledge with different characteristics, namely tacit and explicit knowledge. These two types of knowledge require different management approaches, which was shown with the knowledge conversion model (Nonaka & Takeuchi, 1997). However, knowledge conversion only presents a part of knowledge management. We explored knowledge management and consequently proposed a knowledge management model to be used throughout this research, which is focused on public organisations. The knowledge management model (McNabb, 2007) will be used to structure the interviews that are conducted for the case studies, presented in the next chapter. With the execution of case studies we want to contribute to the existing knowledge gap on knowledge management use within municipalities.

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5. Case studies

> *You cannot begin to manage knowledge*
> *until you know what knowledge is.*
> **Ashok Jashapara (2004)**

5.1. Introduction

This chapter explores how knowledge management is used in two different case studies. The first case study discusses the knowledge management use in CJG's with a governing role for the municipality. The second case discusses the use of knowledge management within municipalities. This research is an explorative study as not much is known on the use of knowledge management within municipalities or CJG's. As the knowledge management literature does not provide clear focus points for research on this topic, the research will be structured by a knowledge management model, which was presented in chapter four. The knowledge management model of McNabb (2007) presents a mix between IT and mechanisms that support social processes to improve knowledge management. This mix and the specific focus on public organisations have been the main reasons to choose this model for the exploration of knowledge management within the case studies.

As this research is explorative, the main goal is to find bottlenecks with the use of knowledge management in the both cases. To get insight into the bottlenecks several interviews have been conducted with civil servants working for the municipality and with civil servants working in a CJG. The interviews have been semi-structured and only contain open questions to give respondents the opportunity to openly speak about the issues and problems with knowledge management within their organisation. More details on the approach of both cases can be found in sections 5.3.1 and 5.4.1.

5.2. Data handling and presentation

The semi-structured interviews contain only open questions. Respondents were asked to answer the questions as elaborate and complete as possible. Consequently, the data from the interviews is qualitative. The interviews have been recorded and have been summarised in transcripts. The data resulting from the interviews is structured by the model of McNabb (2007). The data will be analysed, aggregated and described in a qualitative manner.

The presented data within the description of the case studies are the results of the exploration after a validation session. The validation session of both case studies is described in section 5.6 and enhanced the findings. As the validated findings are presented in this section, section 5.6 discusses in more detail what has been changed to enhance the findings. The findings of the case studies lead to the formulation of knowledge management bottlenecks. The knowledge management bottlenecks are presented as shown below.

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1. Knowledge management bottleneck 1
2. Knowledge management bottleneck 2

5.3. Case study 1: the CJG – a network organisation

The research design in section three presented the CJG already as case study and introduced the reasons why the CJG has been chosen as case study. Within a CJG, various organisations from the youth care sector collaborate to execute public policy together. The next section discusses how the CJG became the first case study.

5.3.1. Case selection

For the execution of public policy municipalities increasingly need to collaborate with external stakeholders in network organisations. In these networks the municipality has a governing role, which means they bring the organisations together, stimulate collaboration between organisations and professionals and control the overall processes. This governing role in a network organisation represents the modern municipality; a municipality that is equal to other stakeholders. This shift in role challenges municipalities to focus on other skills and knowledge. Knowledge concerning professional content becomes less important as the involved organisations have the expertise. Instead process knowledge becomes more important within networks. Furthermore, managing knowledge also becomes more important. The municipality is not the expert in the network, but is responsible for the processes and execution of the public policy. The municipality needs to manage the knowledge that is needed to stay well-informed. The proactive attitude to knowledge makes a network interesting as case study as it differs from the traditional view of municipalities on knowledge.

After deciding that a network would be interesting to research opposed to the traditional bureaucratic structure of municipalities, a more specific case study was chosen. The characteristics of a CJG corresponds to the above description of a network organisation. Furthermore, many have been started the last two years. As all municipalities have to have a CJG by 2011, many municipalities have already initiated a CJG. Consequently, CJG's can be selected that provide the most useful data. For this case study, only CJG's have been visited that were longer than one year operational. This choice has been made to avoid discussions with respondents about problems with setting up a CJG. We expected that after a full operational year, CJG's are more mature and discussions can be more focused on the topics of interest. Furthermore, a opportunity exists for Web 2.0 technologies to stimulate collaboration between professionals within the CJG and to support knowledge management. Lastly, Alares has many experts and much expertise within CJG's and can support this research with their knowledge. Due to these reasons the CJG has been chosen as case study. Other networks were evaluated, but the above reasons were decisive.

After deciding that CJG's presented a case study, respondents and CJG's were sought that complied with the posed conditions. The first step was exploring, which municipalities already initiated a CJG and how long the CJG has been operational. All locations of CJG's were found in a document without further information of the writer. The locations of CJG's listed

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in this document were however, correct and have been used to search on the internet how long the CJG's were operational. The document listed 76 CJG locations, from which only eighteen sufficed our conditions. From these eighteen, twelve CJG's were selected for the case study. The twelve selected CJG's were longer than one year operational, were within three hours distance with public transport and did not conflict with business of Alares. Subsequently, CJG's were approached by phone. Most coordinators were willing to contribute to the research and agreed with a face-to-face interview. During the first interviews respondents were asked if they knew other respondents who would be willing to contribute to this research. This action resulted eventually in three more interviews with respondents of CJG's, which sufficed the conditions posed. The next section discusses the interviews.

5.3.2. Research approach

To find the knowledge management bottlenecks within CJG's, semi-structured interviews are conducted. The respondents for the CJG case are civil servants working for the municipality as coordinator, manager or in another executive position within the CJG. Coordinator s and managers of a CJG have contact with all involved stakeholders, like the municipality, the partner organisations and the professionals working for the CJG. The link with all stakeholders in the CJG and the governing role make this group interesting for the exploration.

After the introduction, the respondents were asked to discuss how knowledge is shared within the CJG by elaborating on horizontal collaboration and vertical integration. Next the respondents were asked to tell about knowledge development mechanisms. First some questions were asked about knowledge combining systems and knowledge management in general. Questions on knowledge creation were not recorded in the interview protocol, however were integrated during the conversation. The last block of the interview contained questions about knowledge transfer mechanisms, which focus on the IT systems that are used within networks to transfer knowledge, communicate and collaborate. The interview protocol, in Dutch, can be found in Appendix 3. Besides the general semi-structured interview, questions were asked tailored to the specific situation of the organisation of the respondent. These tailored questions were based on website research of the organisation and had as goal to find more specific problems.

5.3.3. Results

The next sections elaborate on the specific problems found in knowledge development, knowledge transfer and knowledge sharing within CJG's. Although various problems have been mentioned, many are alike or slightly different. Therefore the most mentioned problems are discussed here. Moreover some of the mentioned issues have been aggregated to one description of a problem. During the interviews we found out that the structure of the visited CJG's were very different, which affected the outcomes of some of the questions. As this research is an exploration it enriches the outcomes, however it should be noted that the structure of a CJG affects how it is managed and how for example cases are handled. The next section starts with the knowledge development mechanisms.

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Knowledge development mechanisms

Knowledge development mechanisms are divided in knowledge creation processes and knowledge combining systems in the knowledge management model of McNabb (2007). Knowledge creation and combination have been covered by the SECI model of Nonaka & Takeuchi (1997) and will be described in this section accordingly.

Knowledge creation processes

Knowledge creation within CJG's is organised in many ways. Many CJG's have theme meetings around subjects that are interesting for the professionals working in the CJG. Experts from the field or one of the partners themselves can present their view on the theme. The goal of these meetings is to enhance the level of knowledge around certain topics of interest, but also to get to know each other better. In addition, professionals meet on a weekly or monthly basis to discuss case histories. During these case history meetings knowledge on cases is shared and a decision is being made what care is needed and will be provided.

A bottleneck that is found in almost all CJG's is the lack of socialisation between professionals. As described in chapter four, socialisation transfers tacit knowledge between people by sharing the experience and results in the acquisition of skills and mental models (Nonaka & Takeuchi, 1997). Socialisation creates connections between people by having the same references or even a corresponding frame of references. The respondents stated that socialisation within a CJG lacks and therefore a frame of reference or the common feeling of a CJG is missing.

Professionals working within a CJG, especially within the virtual ones, do not know each other well. Professionals still work in their own building with their own colleagues. While the necessity to collaborate is there, social interaction with other CJG professionals lacks as they only see each other once or twice a month during case history meetings. Professionals working for CJG's with a physical location know each other better, but not all partners are located within the CJG. The partners that are not located at the physical location have less contact with the other organisations and professionals. Consequently professionals refer to professionals and products they know, while this does not mean it is the best care for the young person or family. Some of the physical CJG's have overcome this socialisation problem by creating spaces where professionals of the different organisations can meet each other. However, one of the hardest things is to get the interaction between professionals going within the CJG's. The following quote of one of the respondents shows the seriousness of this problem:

> To stimulate interaction lunch schedules are made to prevent that professionals lunch on different times and miss an opportunity to interact.

During the interviews, most respondents had similar approaches to stimulate interaction, which shows how hard it is to facilitate collaboration between professionals and partners. The traditional organisation of the professional field was often mentioned as cause. Each organisation worked and still works autonomously, while in the CJG collaboration is needed between the professionals. The professionals are loyal to the partner organisation and the

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partner organisations can still influence the professionals. Consequently, the CJG lacks a common culture and frame of references. The task of the coordinator is to stimulate social interaction between the professionals and support knowledge creation.

The following bottleneck has been found:

1. Knowledge creation within virtual CJG's is hindered by the lack of socialisation between CJG professionals. Consequently there is no common culture and/or frame of references within CJG's.

Knowledge combination systems

Knowledge combination is the process of sorting, adding and organising multiple knowledge sources together to create new knowledge or new applications of knowledge (McNabb, 2007). In general, knowledge combination can be seen as combining explicit knowledge to new explicit knowledge. This can be done by ICT, but also by other kinds of systems or people. Within CJG's knowledge combination is a point of attention, because case history knowledge is typically located among various partners. Cases can be simple, like a question that can be easily answered or can be complex, for example a family with multiple problems, which requires multiple professionals of three or more organisations to provide care. To treat complex cases, case history knowledge has to be gathered from the partner organisations.

A problem that was mentioned often is that knowledge on cases is fragmented across all partners as all have a file or dossier on the young person or family. Every partner has its own registration or detection system, which creates data that needs interpretation. The second problem is that every system is different and consequently generates data or output that is unique. Ideally all pieces of knowledge, the files and dossiers of the partners, should be combined in one file that represents the CJG case. This CJG file combines all knowledge about the family from the separate files of the partner organisations, making it easier for the coordinator and professionals to discuss the cases in the case history meetings. In some CJG's, coordinators of the CJG have to interpret and compare these different outputs, but as all are different this is hard and takes time. One respondent states:

> An analysis of the situation takes in some cases more than a week, because we do not have a central system, which contains all information of all partners.

Not all CJG's combine knowledge of several partners inefficiently as the above quoted respondent. One coordinator had build his own digital system to combine the files of the partners, which saved him a lot of time. Another coordinator had bought ICT to combine knowledge in one CJG case. Case knowledge on family level is saved in a case file with this system. This is remarkable as neither of the other CJG's did register case histories of families, but instead only of children or young persons. Although some CJG's have some sort of solution to cover the above bottleneck most respondents had no system to combine case histories to one CJG file.

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Even more remarkable is that some CJG's do not form, or as less as possible, a CJG dossier. Knowledge is than combined during case history meetings between professionals and the coordinator. During the meeting a decision is being made on what care is needed and will be provided by the different partners. Without a CJG file, decisions made during these sessions will be recorded in the files of the partners and thus the knowledge is still fragmented across the network.

What can be concluded from the interviews is that in general knowledge combination is not supported by systems. Some CJG's try to combine knowledge without systems, which results in inefficient processes. Almost all respondents indicate that there is a need for a system that covers the above. The system should combine the knowledge of all partner organisations, get on with diverse output and enhance the efficiency of case history meetings. Without a knowledge combining system, processes to provide care remain inefficient and partners remain their own files and processes. This harms the goal of CJG's to collaborate with all partners to provide the best possible care to youth and families.

The following bottlenecks have been found:

2. Knowledge combination is hindered by the fragmentation of knowledge among partner organisation.
3. Knowledge combination is hindered by the diversity in output of registration and signalling systems of partner organisations.
4. Knowledge combination is hindered by the absence of a system where output of registration and signalling systems can be bundled into one CJG dossier.

Knowledge transfer mechanisms

The two blocks that cover knowledge transfer mechanisms, namely internet-based message systems and Intranet and bulletin boards, have been put together, because both are still in its infancy within CJG's. Knowledge transfer mechanisms focus on IT-systems to transfer knowledge. In general this will be explicit knowledge recorded in documents. An general issue in this respect is the large amount of legacy systems of partner organisation within the CJG. More specific issues are discussed in the next section.

Internet-based message systems, Intranet and bulletin boards

Within CJG's professionals communicate mainly face-to-face or by telephone and email. Internet-based message systems like forums or Instant Messaging (IM) are not used yet to communicate and share knowledge with each other in a CJG. The result is a lot of email traffic between the partners and professionals on various topics. The need for a system to communicate and share knowledge more efficiently is present.

A couple of CJG's already started an Intranet located on the (public) website, but did not use it intensively yet. In general, the need for an Intranet is present, but various reasons hinder the application. First, most partners have an Intranet themselves. An additional Intranet, besides the one they use within their own organisation, consumes much of their time. Sec-

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ond, the Intranet has found to be user-unfriendly. Professionals demand systems that are user-friendly and do not consume much of their time. One respondent stated the following:

> Professionals will not use systems, when the use of these systems utilises their scarce time. Time should be allocated and scheduled to work with systems to transfer their knowledge.

Other respondents agreed with the above quote. In addition, most respondents saw the potential of the use of Internet-based message systems or an Intranet to improve knowledge transfer. One respondent mentioned that an Intranet with all information of the partners would already be an improvement in comparison with the current situation. For instance, the current systems fail to provide the information that is needed by the professionals to refer cases to other professionals.

The following bottlenecks have been found:

5. Knowledge transfer is hindered by the absence of internet-based message systems.
6. Knowledge transfer is hindered by the currently used systems as they do not satisfy to the needs of the CJG professionals.

Knowledge sharing mechanisms

The previous sections showed that knowledge sharing mechanisms can also be found when discussing other knowledge management mechanisms. Knowledge sharing cannot be disintegrated from the other mechanisms. For instance to combine and transfer knowledge, knowledge first has to be shared by others. Some of the issues that will be discussed in this section will sound familiar to other bottlenecks, but here they are explained in more detail. The next two sections present the findings and bottlenecks of horizontal collaboration and vertical integration of knowledge in CJG's.

Horizontal collaboration

In a network organisation horizontal collaboration is one of the conditions of success. Professionals need each others skills, knowledge and expertise to deliver the products or services. Collaboration though is hard when organisations are forced to work together, while before they worked autonomous. Professionals working for the CJG are still employees of their respective organisation, so professionals are still tied to their own organisation. One of the respondents for instance was complaining that she had troubles with getting the professionals she needed for her CJG. The respective organisations of the professionals were hindering this process by not letting the professionals go easily. One of the respondents said it strikingly:

> Putting people together does not mean that they collaborate instantly. Within the CJG we see that partners still use their own primary processes to provide care.

This is the situation within CJG's. Collaboration has been recorded in a covenant. Although almost all respondents state that collaboration based on the covenant works well, many

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issues have been stated by the respondents on horizontal collaboration. The amount of issues that were put forward shows however that collaboration within CJG's does not go by effortlessly. The most pressing and most stated issues are discussed in this section.

One issue that has been stated by almost all respondents is the lack of a social map. Partners and professionals are often not acquainted with the activities, products and services of the other CJG partners, which results in referring cases to professionals they know. This contradicts with the mission of the CJG to provide the best possible care by collaboration with all stakeholders. In general the coordinator of the CJG knows which partner provides what services and products and which professionals have expertise on a certain topic. The coordinators that were interviewed have in general worked many years in the (youth) care sector for various organisations and possess the needed network knowledge. One coordinator stated that:

> Coordinators of CJG's fail to do their jobs without regional experience in the youth care sector and knowledge of the regional network.

In physical CJG's it is easier to get acquainted with the expertise and products of other professionals than in virtual CJG's. In virtual CJG's this is harder, because professionals do not have a central place to meet each other and therefore do not see each other often. The challenge is to map the network knowledge of the coordinator so others, like the partners and professionals, can profit from this knowledge. Almost all respondents stated that a social map is needed that reflects the network dynamics.

Another problem that was mentioned by many respondents was the amount of meetings in the youth care sector. As there are already so many meetings, it is hard to have an overview of which are important and what will be discussed during these meetings. Some of the respondents stated that their CJG therefore has chosen not to schedule an additional CJG meeting. We find this remarkable as the partner organisations within the CJG have to collaborate to provide care to cases. Even as important is that professionals construct relationships during these meetings. They get to know each other and can find each other in the future when needed.

As has been described every municipality is forced to have a CJG running by the end of 2011. Some of the partners in the CJG are forced to join, the so-called core partners. Although these partners have the best intentions, one of the respondents stated that she rather works with partners that voluntarily join the CJG as they work much harder to reach the goals of the CJG. Other respondents agree that working with some of the partners is difficult. In addition, some of the respondents mentioned the tension between the commercial and non-commercial organisations. For the commercial organisations in a CJG it is important that enough cases are provided to receive a steady income. For a non-commercial organisation it is not a necessity to provide care for cases as their income is not directly related to the number of cases. However, funding is still an important issue within CJG's. A respondent phrased it as:

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> Collaboration between partners on executive levels is hindered by their own interests. Most organisations try to take possession of as many funds as possible. Without funding they do not change their processes and behaviour.

The above shows that collaboration within a network organisation like the CJG needs constant attention. We conclude that although all CJG partners have signed a covenant, more is needed to establish true collaboration. Consequently knowledge sharing within CJG's is hindered. We find that the level of collaboration within CJG's between professionals and between partners after at least one operational year is poorly. Although the necessity of the CJG is present and known by the partners, the above shows that many partners still work according to their own processes instead of investing in time and resources in a collaborative process within the CJG. It is important CJG's focus their efforts on improving collaboration as collaboration can be seen as a condition for success of CJG's.

The following bottlenecks have been found:

7. Horizontal collaboration is hindered by the lack of network knowledge among the professionals and organisations.
8. Horizontal collaboration is hindered by the amount of meetings from different organisations in the youth healthcare sector with the same purpose.
9. Horizontal collaboration is hindered by the lack of connection between core-partners and partners outside the core.
10. Horizontal collaboration is hindered by the tension between the goals of commercial and non-commercial organisations in the CJG.

Vertical integration

Vertical integration has been interpreted in three ways during the interviews. The first interpretation is the vertical integration of knowledge from the coordinator or manager from the CJG to the municipality. The second interpretation is the vertical integration of knowledge from a professional sharing knowledge acquired in the CJG to their respective organisation. The last interpretation is the vertical integration of knowledge from a professional sharing knowledge acquired in its organisation to the CJG.

Vertical integration between the coordinators and managers of CJG's and the municipality goes well. Most respondents stated that they have regular meetings with officials of the municipality, where they discuss the performance and efforts of the CJG. A positive side effect of the CJG is that based on the kind of questions the CJG handles, societal changes can be signalled early. One of the respondents told that:

> The CJG has the power to signal developments in society in an early stage. When a lot of questions are asked about a certain topic, we discuss this with the alderman of the municipality, who has the ability to prepare further actions.

By sharing the knowledge gathered in the CJG with the alderman, the respondent vertically integrated knowledge obtained in the CJG.

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Professionals in a CJG work for two organisations, the CJG and their respective organisation. Knowledge obtained by a professional can be integrated in two ways between the CJG and the professional's organisation with the professional as intermediary. Professionals take case histories, which is explicit knowledge of the partner organisation, with them to CJG meetings. Furthermore skills and expertise obtained within the partner organisation are used within the CJG. Although knowledge from partners is vertically integrated in the CJG due to knowledge sharing of professionals, many respondents notice that CJG specific skills are missing. According to some of the respondents the skills of the professional are sufficient in their own organisation, but insufficient to provide the specific services of the CJG.

Vertical integration of knowledge from the CJG to the professional's organisations is more difficult. The respondents state that it is hard to reach and integrate the CJG specific knowledge to the organisation of the professional. Consequently, partners' involvement in a CJG is based on their interests and not of the interests of the CJG. In other words, more commitment is required from partner organisations to vertically integrate explicit and tacit knowledge from the CJG. One of the respondents also mentioned this issue and stated that it costs time and effort to build commitment by the partners. This coordinator tried to involve the partners as much as possible on a strategic level, but also on a operational level by for example sending news letters. What can be concluded from the interviews on this topic is that relation building between executives of partners within a CJG is very important to improve collaboration and vertical integration of knowledge between all parties.

The following bottlenecks have been found:

11. Vertical integration of knowledge from strategic levels to operational levels and vice versa is hindered by a lack of commitment from the partners.
12. The lack of priority for vertical integration of knowledge from strategic levels to operational levels hinders the creation of CJG specific skills and knowledge.

5.4. Case study 2: The municipality – a bureaucracy

5.4.1. Case selection and approach

The selection of municipalities is based on the number of citizens. For this research municipalities with a citizen size between 50 and 100 thousand have been chosen to get an overview of knowledge management use within municipalities. The reason for this delineation is that municipalities of this size have between 500 and 1000 employees, which makes knowledge management valuable (Davenport & Prusak, 2000, p. 17). Although knowledge management can be valuable too for smaller municipalities, it can be argued that the need for knowledge management is lower, as the informal contact between the employees is higher. In addition, civil servants within smaller municipalities have to execute more tasks than civil servants in middle-sized or large municipalities, which enhances the possibility of informal contact with employees. The goal of the interviews of this case is finding problems within the blocks of McNabb's model (2007). The risk with interviewing respondents of small municipalities is that there are no problems as knowledge management is hardly needed and used.

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Municipalities with a citizen size above 100 thousand are more likely to use knowledge management than smaller municipalities. Large municipalities process much more information, which increases the need for knowledge management. Large municipalities can be used for this case, however the risk of interviewing respondents of large municipalities is that obtained data differs from data obtained from interviews with respondents from middle-sized municipalities. The expectation is that large municipalities are further with knowledge management than middle-sized and small municipalities. Literature does not confirm this statement however, as literature on this topic lacks. Based on the expectation that large municipalities are further in the process of using knowledge management, its expected that there are less bottlenecks. Therefore, for this case middle-sized municipalities have been chosen as focus for the interviews.

Early 2009, the Netherlands had 41 municipalities that comply with the above delineation. Based on the 41 municipalities, a short list of ten municipalities was created. These ten municipalities were mainly chosen on practical grounds. The shortlist contained ten municipalities in the vicinity of Rotterdam and the Hague. The next step was to approach the municipalities on the shortlist by telephone and come into contact with the civil servants that are responsible for knowledge management. One of the municipalities on the list did not want to contribute to the research. Three other municipalities did not return my phone calls or the responsible persons were on holiday. Eventually of the ten municipalities on the list, six were willing to contribute to this research resulting in eight interviews.

Within the selected municipalities managers have been selected on their function and on their knowledge of knowledge management programs and practices within the municipality. To have a complete overview of knowledge management practices and programs, a various selection of managers has been interviewed. Some managers had more expertise on IT, others more on how to share knowledge with social programs and practices. Therefore, some municipalities required two interviews to cover all questions, while at other municipalities one interview was enough. The reason to explore both the IT and more social programs of knowledge management within municipalities is to present a complete overview of the knowledge management bottlenecks. The findings within this case study could have been biased when respondents could only discuss technological or social issues. The selected managers are mainly divisional heads or senior employees of IT or information and automation departments and of communication departments. The respondents can be found in Appendix 5.

The interviews of this case study are semi-structured too, but are organised in another way. For these interviews a model from the public administration field, namely the public policy cycle framework, has initially been used, but proved to be insufficient to model the results. The policy cycle framework was chosen as it presents public policy processes in a very generic way, which meant all respondents from the municipalities would recognise the structure and could tell where knowledge management is or should be used. All respondents recognised the policy cycle framework, however responses varied greatly. Moreover, the policy cycle framework did not gave the guidance for further research that was needed. Therefore, the model of McNabb has been used after the interviews to structure the data.

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After the introduction the respondent were asked to discuss current and future knowledge management initiatives. The answers to these questions varied and have been used in all blocks of the model. When asked about knowledge management initiatives most of the representatives of the municipalities listed their IT initiatives, because that is the common view on knowledge management. Although the IT initiatives are more concrete, the respondents could list the social initiatives when examples were given. Next the respondents were asked about the use of knowledge management within the public administration field. Although these questions were based on another model, the data could be reanalysed by means of the model of McNabb in order to explain vertical integration problems within municipalities. The last block of questions handles the knowledge transfer mechanisms within the municipality. The interview protocol, in Dutch, can be found in Appendix 4.

5.4.2. Results

The interviews have shown that knowledge management is clearly an issue within municipalities. A lot of conferences and workshops are devoted to knowledge management in public organisations and civil servants are aware of the potential value of knowledge management for their organisation. Some municipalities are further with implementing knowledge management than others, but all see the potential value of knowledge management for their organisation.

During this case study, one of the municipalities presented various outliers. The outliers were explained by the respondent who stated that his organisation is a governing municipality. The governing municipality biased the results of the case study and therefore has been presented separately in Appendix 6. The next section presents the analysis of the bottlenecks.

Knowledge development mechanisms

Knowledge development mechanisms are divided in knowledge creation processes and knowledge combining systems in the knowledge management model of McNabb (2007). Knowledge creation and combination have been covered by the SECI model of Nonaka & Takeuchi (1997) and will be described in this section accordingly.

Knowledge creation processes

To get insight into the effort municipalities put into knowledge management, they were asked which initiatives are in place to create knowledge. The variety in used knowledge management initiatives was great, however only the ones that can be described as improving socialisation and externalisation will be discussed here. Consequently, processes that are described here focus mainly on the creation and transfer of tacit knowledge.

The first program, which was found within several municipalities is coaching. This program is used to teach the next civil servant for a particular function what to do and what to know to execute the job. For example for a particular function, the leaving civil servant coached his successor for almost a year, before leaving the organisation. In this way all tacit knowledge that is needed to successfully execute the job can be transferred by socialisation. In

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addition, other forms of coaching have been mentioned by the respondents in the interviews. These programs focus more on training on the job, which consists of larger groups trained by colleagues. In one of the municipalities, they coach the younger generation civil servants by the older, retiring generation civil servants to close the generation gap and to stimulate the transfer of knowledge. The older generation learns how to handle IT from the IT-savvy younger generation, while the young civil servants can learn a lot about politics and the organisation from the older civil servants.

The second program, which was found by five out of six municipalities, is job rotation. Job rotation programs can be an effective way to transfer tacit knowledge within an organisation. Many of the visited municipalities have a job rotation program in place, although some for specific groups of employees. One respondent mentioned that their program has two functions Firstly to challenge the older generation civil servants who have seen everything in their long career. Secondly to provide an incentive for high potentials to stay in the organisation. Another municipality provides besides the internal job rotation program the possibility to get an internship or a job at another municipality. Job rotation creates new knowledge as civil servants combine their previous acquainted knowledge with the knowledge that is needed to perform their new function. Besides creating new knowledge, this program also improves knowledge sharing between co-workers.

Other initiatives that were mentioned by several respondents were theme meetings with (external) speakers and Communities of Practice (CoP). The meetings are in general not open for the public, so can only be attended by employees of the municipality. These meetings are important, because civil servants come together in an informal meeting and getting to know each other and what they do. Knowledge is shared between the civil servants on these meetings and their knowledge is kept up-to-date by speakers on relevant municipal topics. CoP's are (Wenger, McDermott, & Snyder, 2002, p. 4): "groups of people who share a concern, a set of problems or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis." As the definition shows, CoP's can have various goals and functions, which was confirmed by the interviews. We found CoP's for young professionals, project leaders and for various departmental topics. An overview of all mentioned initiatives can be found in Table 3.

Coaching and training-on-the-job programs are great at sharing tacit knowledge between people and creating new knowledge. This knowledge however is lost when the people that have been coached or trained leave the organisation. The transferred and newly created knowledge has not been saved as it is directly transferred to another person. The same holds for the other initiatives; newly created tacit knowledge has not been made explicit, which means it is lost when civil servants retire or leave the organisation. We found that municipalities fail to externalise this new knowledge, while externalisation is an important step in the knowledge conversion, as newly created explicit knowledge transforms in new explicit knowledge by the combination step as was shown in section 4.3. To gain the full potential of their knowledge management initiatives, municipalities should focus on making the created tacit knowledge explicit.

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Table 3: Initiatives to stimulate knowledge creation[5]

Social initiatives	*Municipalities*					
	X1	*X2*	*X3*	*X4*	*X5*	*X6*
Coaching	X	X	X			
Training on the job	X					
Mentorship		X	X	X		
Internal and external internships			X			
Job rotation		X	X	X	X	X
Meetings with speakers	X		X	X		X
Communities of Practice	X		X	X	X	
Working visits			X			X
Professional training		X				
Staff magazine		X				
Intermunicipal collaboration		X	X			

Another bottleneck we found is that most initiatives are targeted at specific groups or departments within the municipality. Respondents stated that most initiatives are set up with a specific goal, but without a clear underlying knowledge management vision. As specific groups and departments are targeted, the potential creation of new knowledge is hindered. One of the causes of this narrow focus is the lack of strategic attention for knowledge and knowledge management, which results in the absence of facilities to organise knowledge management on a higher organisational level.

The following bottlenecks have been found:

1. Knowledge creation is hindered by the lack of initiatives that transform the newly created tacit knowledge into explicit knowledge or externalisation).
2. Knowledge creation is hindered by the lack of strategic attention for knowledge and knowledge management.

Knowledge combining systems

Three of the visited municipalities use or are setting up IT initiatives that combine different knowledge sources into one system. Two municipalities combine (statistical) information in databases from selected stakeholders, like the police and the GGD, which send information on zip code level to the municipality. This information contains for example the crime rates or illness rates of the citizens on zip code level. The combination of all this information should improve policy making. With this initiative cultural patterns can be found, which improves the knowledge how to govern certain districts or target groups. Policy can be tailored to these districts and target groups with the statistical data in the database.

[5] For readability purposes the municipalities are coded in Table 3. The following municipalities are presented: Spijkenisse (X1), Vlaardingen (X2), Schiedam (X3), Capelle aan den Ijssel (X4), Gouda (X5) and Rijswijk (X6).

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Another municipality wants to use a database with all knowledge of employees of processes to support demand driven questions of citizens instead of supplying information. They started with changing the website from supply to demand driven. The next step is to use the combined explicit and tacit knowledge of civil servants to answer questions of citizens. In workshops and with special campaigns civil servants are taught how to make their knowledge explicit. Besides answering questions of citizens, the combined knowledge of civil servants is going to be used internally too.

While the goals of the databases differ, they all combine knowledge or datasets and generate new knowledge based on existing knowledge. We found that the issue of knowledge combining systems as discussed above is not combining the knowledge itself, but more how to search for the knowledge that is needed. One of the respondents stated that the success of such systems depend on how civil servants search for their knowledge. Civil servants traditionally got their information and knowledge from superiors, while in a knowledge combing system they have to search for it themselves. In other words, civil servants lack the required competencies to search and find the information they need in knowledge combing systems. Another respondent stated that civil servants find it hard to find the right documents for example on the Intranet and he added that they would find it even harder to search for knowledge in such a system. Besides the competencies of civil servants, some of the respondents mentioned that the use of these systems is hindered by their user-unfriendliness.

The following bottleneck has been found:

3. The use of knowledge combining systems is hindered by the lack of required competencies of civil servants to search and find the needed knowledge in these systems.
4. The use of knowledge combining systems is hindered by the user-unfriendliness of these systems.

Knowledge transfer mechanisms

The interviews showed that municipalities have a lot of IT in place to conform to regulation by central government. Although the current systems provide functionalities to transfer knowledge, this IT is mainly used to store (explicit) knowledge. The next two sections discuss in more detail what systems municipalities have in place to transfer knowledge and what bottlenecks have been found.

Internet-based message systems

Within municipalities the use of internet-based message systems is still in its infancy. The results of the interview with the respondent of the municipality of Gouda are presented in Appendix 6 as Gouda is different from the other municipalities on this aspect of knowledge management. Of the remaining five municipalities, three municipalities have already started with Web 2.0. One municipality initiated a wiki for internal use. The goal of the wiki is to generate content on a diverse range of topics by collaboration of users. For now there are no rules that restrict actions of users, but if abuse of the wiki occurs rules will be enforced.

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Another initiative within this category is the virtual workspace. Virtual workspaces are used within municipalities to structure communication during projects with external stakeholders, but are also used for internal use. All information and documents can be placed on the virtual workspace and stakeholders can discuss and collaborate with each other. Microblogging is used within one municipality to shorten the distance between co-workers. The project has proved that it is easier to reach people with certain expertise, than it was before. Table 4 shows what internet-based message systems are used by municipalities.

Table 4: The use of internet-based message systems[6]

Internet-based message systems	*Municipalities*				
	X1	*X2*	*X3*	*X4*	*X6*
Internal wikis	X				
Mashups					X
Blogs					
Microblogging (Twitter/Yammer)					X
Instant messaging (MSN/Skype)		X			
Virtual workspace	X	X			X

The above shows that municipalities just started to use internet-based message systems in their organisations. Therefore bottlenecks with the actual use of these technologies have not been found. The respondents stated that the initiatives within this category are useful, but they also mentioned that the organisational culture hinders organisational wide use. Many of the civil servants are not enthusiastic about using Web 2.0 and sharing their knowledge. In addition, the respondents add that most civil servants are scared of transparency. Civil servants are not used to show their expertise and knowledge on an online platform. One respondent said it strikingly:

> There exists a culture within municipalities to keep silent. A forum or blog should only work when contributions can be posted anonymous or everyone will be reserved towards such an initiative.

The following bottleneck has been found:

5. The implementation and use of internet-based message tools is hindered by the fear for sharing knowledge transparently by civil servants.

Intranet and bulletin boards

All respondents stated that their municipality has an Intranet with integrated bulletin board for several years, which are mainly used to store documents. Although all respondents stated that their Intranet had some sort of functionality to communicate with each other,

[6] For readability purposes the municipalities are coded in Table 4. The following municipalities are presented: Spijkenisse (X1), Vlaardingen (X2), Schiedam (X3), Capelle aan den Ijssel (X4), Rijswijk (X6).

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many told that this functionality is not often used. As has been described in chapter four, social interaction and the use of IT are both needed for knowledge management.

The Intranet provides civil servants a bulletin board to communicate and transfer knowledge. However the bulletin board functionality is hardly used. One respondents stated that social interaction with co-workers on the Intranet is limited to off-topic subjects, which are not related to the day to day job. Although these topics are useful to create relationships, the respondent stated that it is a missed opportunity that no work related topics are opened. Besides cultural issues, the respondents state that their Intranets are mainly unused because their Intranet is user-unfriendly. Compared to all the tools civil servants use at work and at home, the Intranet is old-fashioned and hard to use. Searching a document on the Intranet can take a lot of time if the search query is not concrete enough. Respondents add that finding documents is hard on the Intranet as the search function is not user-friendly. During the interviews many respondents stated that civil servants find it hard to search for knowledge themselves. One respondent phrased it as follows:

> Try to find something as simple as in-house emergency and first-aid service. When this is necessary the responsible persons are hard to find. Imagine to find something like a product or something financial, which is even harder.

We conclude that municipalities use the Intranet often only to store and find documents. Civil servants have become used to get information instead of searching for it. In combination with the user-unfriendly search functionality many of the Intranets remain unused. We see that many factors influence this situation with different angles towards the problem from which the presented bottlenecks are most important.

The following bottlenecks have been found:

6. Knowledge transfer on the Intranet is hindered by the lack of using the bulletin board functionality for relevant discussions.
7. Knowledge transfer on the Intranet is hindered, because the Intranet has become outdated and is user-unfriendly.

Knowledge sharing mechanisms

The previous section showed the bottlenecks with knowledge transfer within municipalities. While knowledge transfer mechanisms are focused on IT, knowledge sharing mechanisms are focused on social interaction. Knowledge sharing mechanisms consist of horizontal collaboration and vertical integration, which are discussed in the next two sections.

Horizontal collaboration

The previous sections have discussed various initiatives within municipalities, where horizontal collaboration is important. Horizontal collaboration can be found in an initiative like Communities of Practice or meetings around a theme, but also for example on the Intranet where civil servants have the possibility to collaborate. Although some of the initiatives are

a success, the interviews showed that in general horizontal collaboration is difficult. A big issue that has been mentioned a few times is that many civil servants use their knowledge strategically. Although initiatives are in place to collaborate and share knowledge, this cultural issue undermines the potential of these initiatives. According to the respondents, especially the older generation civil servants have a hard time to share their knowledge, especially using the newer technologies available. One respondent stated rather harsh that:

> I had high expectations with regard to knowledge management when I accepted this job. Unfortunately, my expectations were not met. Within this municipality civil servants appropriate knowledge and do not share this knowledge with others.

As projects within the municipality increasingly require civil servants to collaborate in project teams and share their knowledge, we see this as a serious bottleneck to knowledge management. Our observation is that this group needs more stimulation to collaborate as they have more problems with changing their way of working. Some of the respondents added that the older generation has more problems with using the tools that are used these days to collaborate, to communicate and to share knowledge. We however find it too easy to conclude that these problems originate because civil servants think along the 'knowledge is power'. For instance, older civil servants find it hard to integrate new tools in their way of working, because they lack the required competencies to work with efficiently with these technologies.

Although there was no question in the original interview form, cultural issues were brought up sooner or later by the respondents and were mainly related to knowledge sharing and horizontal collaboration. One of the respondents stated that employees of his municipality are willing to share the knowledge they have, however civil servants of the municipality do not see the value of knowledge sharing. Civil servants state that they are too busy with their regular tasks and activities and therefore do not have the extra time that is needed for extra activities like knowledge sharing. The interviews showed that most municipalities have no sharing culture. Some respondents mentioned this culture originated as civil servants traditionally got their information and knowledge provided for decades, while nowadays they have to search pro-actively themselves. This requires another way of thinking. What is needed according to some of the respondents is a small group of enthusiasts, which actively try to convince others to share and manage their knowledge.

The following bottlenecks have been found:

8. Horizontal collaboration is hindered by civil servants who use their knowledge strategically.
9. Horizontal collaboration is hindered by the organisational culture of municipalities, which lacks clear incentives to collaborate.

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Vertical integration

Knowledge management can be found in theory through the whole municipality, but initiatives are mainly initiated out of the IT and the Communication department. As knowledge management is seen by many as making information available, the IT department supports these processes with IT initiatives. They are however not responsible for the result of the initiatives and do not have to push others in the organisation to apply knowledge management. In some municipalities the IT department tries to convince other departments of the use of knowledge management. Consequently, the knowledge management focus becomes more technology oriented.

IT focused knowledge management mainly supports the sharing and transfer of explicit knowledge, while tacit knowledge is just as or maybe even more important. While municipalities have social programs in place, initiated by the Communications department, to support the transfer and sharing of tacit knowledge, it can be stated that these programs do not reach the whole organisation at all times. Knowledge management projects are set up ad hoc for specific departments or target groups to solve specific problems. Consequently, knowledge management is mainly used as a problem-solving tool within municipalities and knowledge is not shared vertically in the organisation. The narrow focus of knowledge management initiatives mainly supports the horizontal sharing of knowledge. Knowledge created within initiatives focused on specific departments stays within these departments, while other departments could benefit from this knowledge as well.

Another problem, that is different from the above on an organisational level, is the vertical integration of knowledge between civil servants in executive positions and the public policy makers. A lot of knowledge in public policy processes is situated in the heads of civil servants in executive processes. As they execute the formulated policy they stumble upon problems and think about possible solutions. Day in day out civil servants execute policies providing them with more and more knowledge on the particular subject. Especially this type of knowledge should be shared to support public policy making. Several respondents stated however that this is not the case. One of the respondents stated that some public policies disappeared in a desk cabinet as it was not feasible. The respondents stated that civil servants in executive positions know when a public policy will fail as they have the expertise.

The following bottlenecks have been found:

10. Vertical integration of knowledge is hindered by the narrow focus of knowledge management initiatives on specific groups or departments.
11. Vertical integration is hindered by the absence of strategic attention for knowledge and knowledge management.
12. Vertical integration of knowledge is hindered by the absence of sharing knowledge between operational and strategic organisational levels.

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5.5. Analysis of bottlenecks

The case studies have presented many knowledge management bottlenecks. These knowledge management bottlenecks are used in chapter seven to find Web 2.0 contributions to knowledge management. To enhance the analysis, the knowledge management bottlenecks are combined to more general bottlenecks. The above bottlenecks are defined to more generic bottlenecks for the analysis. We acknowledge that some detail is lossed by combing the found bottlenecks however, finding contributions of Web 2.0 technologies to all knowledge management bottlenecks would mean 25 contributions should be researched.
The combination of bottlenecks has consequences for the definition of the bottlenecks and the structure that has been used during the case studies. The model of McNabb (2007) has been a starting point for this research project and has been used during and after the interviews to structure the interviews and data. With the knowledge management bottlenecks defined, the model has served its purpose. The combination of bottlenecks will not only make the bottlenecks more generic, but also abandons the original division in knowledge management mechanisms. The considerations behind the definition of these generic bottlenecks and which bottlenecks are combined can be found in Appendix 7. The generic knowledge management bottlenecks within CJG's and municipalities are presented below.

The generic knowledge management bottlenecks within CJG's have been defined as follows:

- Knowledge management within CJG's is hindered by the lack of socialisation and network knowledge among CJG partners of virtual CJG's.
- Knowledge management within CJG's is hindered by the fragmentation of knowledge among CJG partners.
- Knowledge management within CJG's is hindered by the absence of a system to combine the diverse output of registration and signalling systems of CJG partner organisations.
- Knowledge management within CJG's is hindered by the difficulties with vertically integrating operational knowledge to strategic levels and vertically integrating strategic knowledge to operational levels.

The generic knowledge management bottlenecks within municipalities have been defined as follows:

- Knowledge management within municipalities is hindered by the lack of required competencies of civil servants to search and find knowledge in currently used systems.
- Knowledge management within municipalities is hindered by the strategic use of knowledge by civil servants on operational and strategic levels.
- Knowledge management within municipalities is hindered by the lack of incentives for using knowledge management.
- Knowledge management within municipalities is hindered by the absence of strategic attention for knowledge and knowledge management.
- Knowledge management within municipalities is hindered by the lack of initiatives that transform the newly created tacit knowledge into explicit knowledge.

These generic bottlenecks have been validated in a session with two experts. The next section discusses what has been discussed with the experts and what has been changed.

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5.6. Validation of findings

The presented findings in the previous sections are the validated findings. The presented bottlenecks and the combination of bottlenecks have both been validated with experts in a validation session. This section discusses how the validation session was structured, how the experts were selected and the results of the validation session.

5.6.1. Outline of validation session

Two experts were approached to participate in a validation session of one hour to validate the bottlenecks. Both experts agreed to participate in the validation session. The validation session was held in the Hague at the office of Alares to sharpen the findings with the experience and expertise of experts. These validated findings are used in the analysis of the contribution of Web 2.0 technologies to knowledge management within municipalities.

The validation session started with a short introduction of the research. Next, the model of McNabb (2007) was presented and explained and how the interviews have lead to the bottlenecks. After the introduction of the research and the research strategy, the purpose of the validation session was presented. The experts were asked to use their own expertise and experience to validate the bottlenecks. More specifically, the experts were asked if the bottlenecks as presented were credible in their opinion. Each bottleneck was presented to the experts with the contextual information. After the presentation of the bottlenecks, the experts were asked to discuss the bottleneck and express their opinion.

After the validation session the bottlenecks have been adjusted and combined. The combined bottlenecks have been emailed to the same experts and they were asked to give their opinion on the combined generic bottlenecks. The experts agreed on the proposed generic bottlenecks, which are presented in the column at the right of Figure 10 and Figure 11. The reasoning behind the combination of the bottlenecks can be found in Appendix 7.

5.6.2. Expert selection

To validate the findings experts are needed with expertise on or experience in municipalities and CJG's. Furthermore the experts should have expertise on knowledge management. Although employees of CJG's and municipalities have experience with their own organisation and maybe even with the other organisation, their knowledge of knowledge management is not sufficient to validate the findings. Therefore, consultants of Alares have been chosen as experts for the validation session. The selected Alares' consultants have broad experience in both municipalities and CJG's. Furthermore, Alares' consultants regularly advise organisations on their knowledge management.

For this validation session, two Alares consultants, Ralph Boeije and Robert Kroon, were approached to attend the validation session and both agreed. Both have expertise on knowledge management and can contribute to the findings. Moreover, both consultants have experience with municipalities and one of the consultants has specific expertise on CJG's. Together they create a balanced situation, which is needed for the validation of the findings. The next section discusses the results of the session.

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5.6.3. Validation of knowledge management bottlenecks

The next two sections only describe the adjustments that have been made to the findings after the validation session with the experts. The bottlenecks that were agreed by the experts without adjustments are not discussed. An overview of adjustments and the combination of bottlenecks can be found for CJG's in Figure 10 and for municipalities in Figure 11. These figures also show numbers before the original definitions of bottlenecks. The next sections refer to these numbers.

Validation of CJG knowledge management bottlenecks

Many of the proposed CJG knowledge management bottlenecks were agreed by the experts or required minor adjustments. The first bottleneck however has been eliminated after the validation session as it is redundant with the second and ninth bottleneck. One expert remarked that this bottleneck matches more with horizontal collaboration. As horizontal collaboration has already a similar bottleneck which describes the lack of network knowledge, we agreed to eliminate the first bottleneck.

The second, third, sixth and thirteenth bottleneck were agreed by the experts after minor adjustments. Distinctions have been made to further specify the bottleneck. The second bottleneck focuses after the validation session on virtual CJG's after remarks of one of the experts. The third bottleneck focuses on the youth healthcare sector after the validation session instead of on the care sector, which was to generic according to one of the experts. The sixth bottleneck focuses on the absence of a system after the validation session instead of on the inefficient combination of output. The thirteenth bottleneck has more focus after the validation session as the original explanation was to generic according to the experts.

The seventh and eight bottleneck were agreed by both experts, however the experts required a reformulation of the bottlenecks. The original description of the bottlenecks were not written in the same style as the other bottlenecks. Both bottlenecks have been rephrased in the same style as the other bottlenecks after the validation session. The fourth, ninth, tenth, eleventh and twelfth were agreed by the experts without adjustments.

Validation of municipal knowledge management bottlenecks

Many of the proposed CJG knowledge management bottlenecks were agreed by the experts or required minor adjustments. The second, third, sixth, eight, ninth, tenth and twelfth bottleneck were agreed by the experts after minor adjustments. Distinctions have been made to further specify the bottleneck. The second bottleneck focuses after the validation session on the lack of strategic attention on knowledge management after remarks of one of the experts. The third bottleneck focuses on the lack of required competencies after the validation session instead of on the difficulties with searching and finding information on the used systems. To the sixth bottleneck a small adjustment has been made. Relevant discussion give this bottleneck more focus. The experts found that the formulation of bottleneck 8 was wrong. Bottleneck 8 has been adjusted after the validation session to the strategic use of knowledge instead of thinking along the 'knowledge is power' line. The

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experts found the ninth bottleneck valuable, however wanted a more specified bottleneck. Therefore, the lack of incentives has been added to this bottleneck. The experts stated that the a technology oriented focus was to narrow defined. Therefore, the tenth bottleneck has been adjusted after the validation session to the absence of strategic attention for knowledge and knowledge management. The twelfth bottleneck has changed of focus after the validation session. The experts stated that the formulation was not clear and should describe the lack of vertical integration of knowledge between operational and strategic levels of the municipality. All statements of the experts have been adjusted in the findings.

The fourth and fifth bottleneck were agreed by both experts, however the experts required a reformulation of the bottlenecks. The original description of the bottlenecks were not written in the same style as the other bottlenecks. Both bottlenecks have been rephrased in the same style as the other bottlenecks after the validation session. The first, seventh and eleventh bottleneck were agreed by the experts without adjustments.

5.7. Conclusion

This chapter presented the case studies. We found several knowledge management bottlenecks within CJG's and municipalities by conducting interviews with coordinators and managers of CJG's and with civil servants of municipalities. We found in both case studies many bottlenecks on the knowledge sharing mechanisms. We believe municipalities do not have a knowledge sharing culture based on the interviews. Furthermore, we found many bottlenecks with collaboration within the CJG's. We think these aspects are related with each other, however we cannot prove this with the empiric results of the case studies. The last chapters discuss this subject in more detail.

The original bottlenecks were found by analysing the case studies, but were too specific for further analysis. Therefore the bottlenecks have been combined to more generic knowledge management bottlenecks. During the combination of the bottlenecks, the choice was made to abandon the knowledge management model. The original and generic knowledge management bottlenecks have been validated in a session with two experts. The validated generic bottlenecks are used in the next chapter to analyse the contribution of Web 2.0 technologies to knowledge management.

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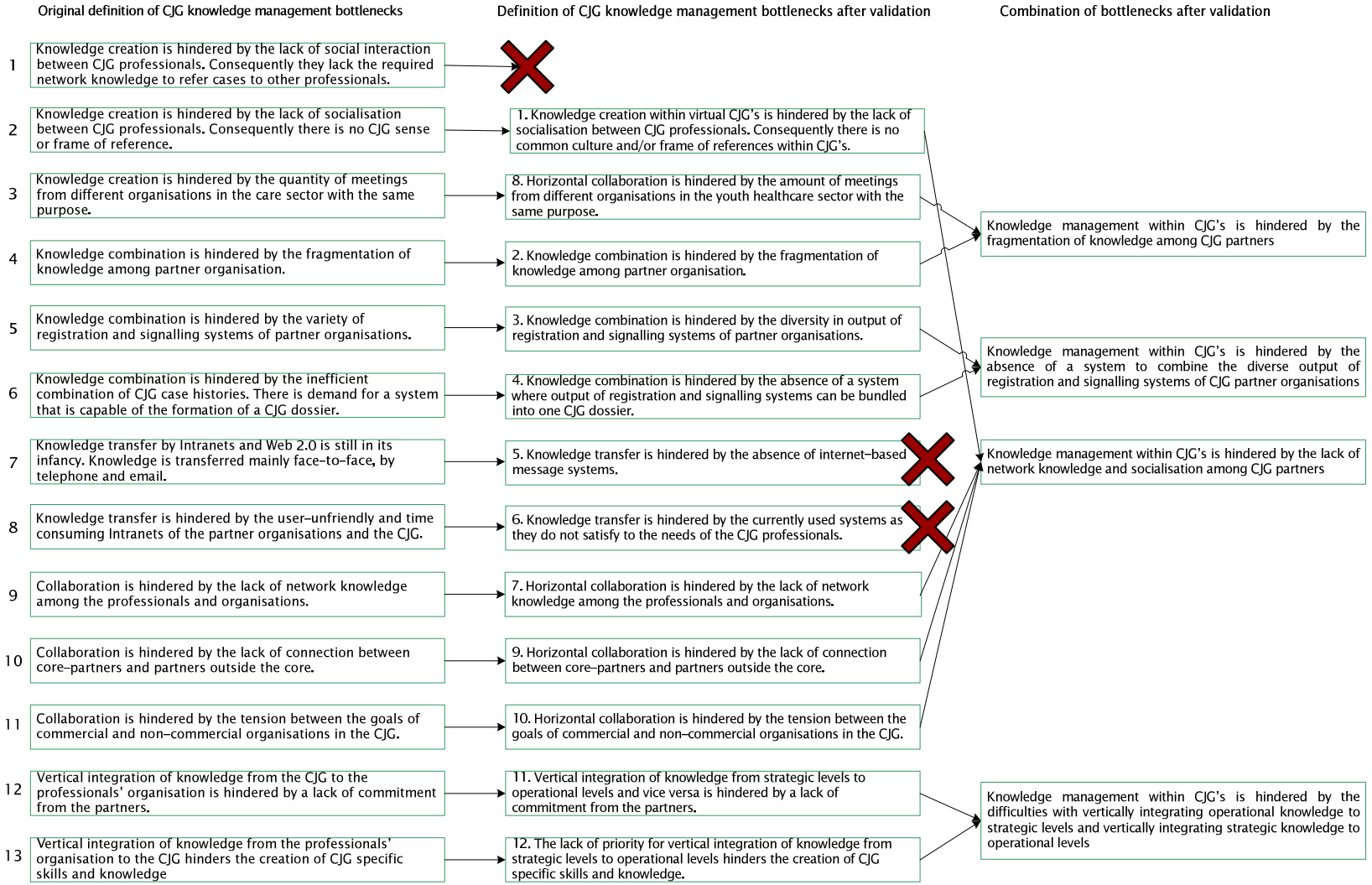

Figure 10: Combination of CJG knowledge management bottlenecks

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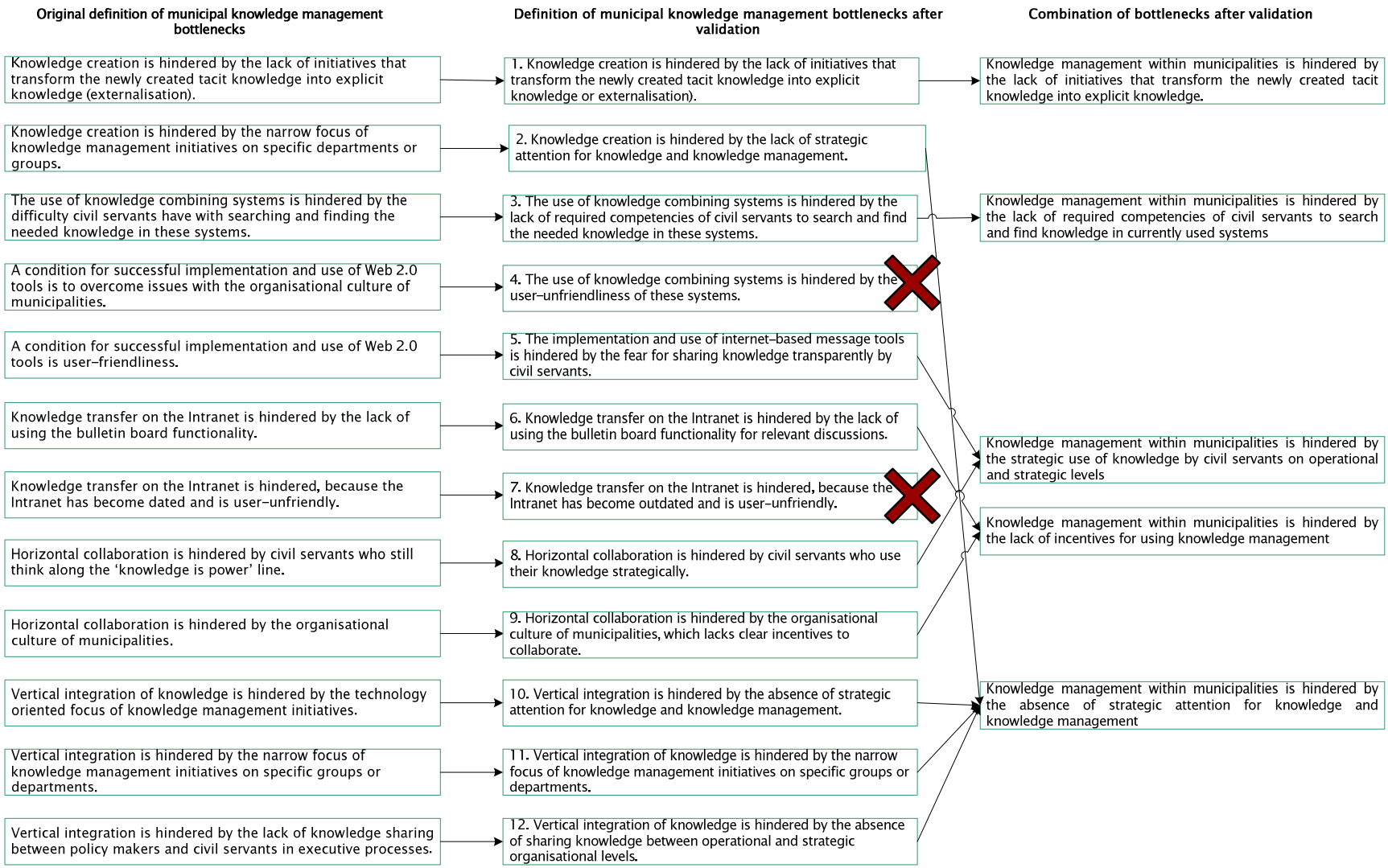

Figure 11: Combination of municipal knowledge management bottlenecks

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6. Web 2.0 contribution to knowledge management

> *The currency of the future is trust.*
> *Social media support building relationships.*
> **Gijsbregt Brouwer (Blom, 2009)**

6.1. From bottleneck to technology

The connection between Web 2.0 and knowledge management and the possible contribution of Web 2.0 technologies to municipalities has been described in chapter 2. Various reports showed that the contribution to knowledge management is diverse and intervenes into various parts of organisations (Bughin, et al., 2008; McAfee, 2006; Osimo, 2008). However, to investigate the contribution of Web 2.0 to the bottlenecks found in chapter five an additional step should be made. This step is discussed in this section and presents a model that categorises various Web 2.0 technologies.

To provide recommendations on the contribution of Web 2.0 to knowledge management bottlenecks, an additional step is proposed. The goal of this additional step is to increase the understanding of the technology selection process. This additional step presents various Web 2.0 technologies in five categories. These categories are used as first step in the analysis of the bottlenecks. Firstly, a category will be chosen that contributes most to the bottleneck. Secondly, a Web 2.0 technology is selected from the chosen category. Lastly, a second category and Web 2.0 technology are chosen that support the already chosen Web 2.0 technology. The two chosen Web 2.0 technologies should enhance each other. The two Web 2.0 technologies and respective categories together present the contribution of Web 2.0 to the bottleneck, where the first chosen Web 2.0 technology presents the biggest contribution to the bottleneck and the second Web 2.0 technology supports the first one. The model that is used was presented in section 2.4. The findings are presented as shown below.

1. Category -> Optimal Web 2.0 technology
2. Category -> Supporting Web 2.0 technology

Before we present the analysis a distinction has to be made. Especially within municipalities, many of the bottlenecks that are found have a long history and are deeply rooted in the organisation. These problems are besides technological aspects influenced by cultural and organisational aspects. Although all aspects are important, this research does not take all them into account as we demarcated this research to Web 2.0 technologies. It is however important to acknowledge that some of the bottlenecks have aspects that cannot be solved entirely by the use of Web 2.0 technologies. The contribution of Web 2.0 technologies to some of the bottlenecks is therefore only minor in comparison to an overall solution. The contribution of Web 2.0 technologies to the bottlenecks will be presented in this respect in the next sections.

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6.2. Web 2.0 contributions to CJG's

6.2.1. The lack of socialisation and network knowledge among CJG partners of virtual CJG's

The lack of network knowledge and socialisation among CJG partners cause various problems in a CJG. CJG partners do not know each other and each others products well, refer repeatedly to the same professionals and do not share their knowledge with each other. The lack of network knowledge among CJG partners has been entitled by almost all respondents as a bottleneck and has by some even been denominated as one of the most crucial bottlenecks they wanted to be solved.

To contribute to the lack of network knowledge among the CJG partners a Web 2.0 technology is sought that visualises the CJG network with all partners, products, services, professionals and other important aspects of a CJG. Furthermore, connections between professionals, products and partners should be easily adjustable. Looking at the Web 2.0 categories, social graphing fits best with the above conditions. Within social graphing network mapping is chosen to visualise the relations within the network. With network mapping informal relations can be made visible, while at the same time presenting an overview to all partner organisations of the other organisations and professionals in the network. With network mapping the coordinator of a CJG has a technology to map all formal and informal relationships with a CJG on operational levels and higher.

However, network mapping only contributes to a part of this bottleneck. The second part of the bottleneck is the lack of socialisation. The lack of socialisation among CJG partners is partially solved by network mapping by visualising the most important components of the network. In this way professionals and partners know where to look or who to ask for certain information or knowledge. To really support socialisation and consequently, knowledge development and knowledge sharing, an additional, supporting Web 2.0 tool is needed. The supporting Web 2.0 tool has also been selected from the social graphing category, namely social networking. Where network mapping shows all components of the network, social networking improves relationships between partners and professionals. With social networking technology, professionals and partners can develop and share their knowledge.

Web 2.0 technologies that contribute to the lack of network knowledge and socialisation within CJG's come both from the social graphing category. With network mapping and social networking, professionals should find each other more easily and should enhance socialisation. The combination of these two technologies enhance each other and provide a greater contribution to the bottleneck.

1. Social graphing -> Network mapping
2. Social graphing -> Social networking

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6.2.2. The fragmentation of knowledge among CJG partners

The fragmentation of knowledge among CJG partners hinders knowledge management. Partner organisations and professionals working for the partners all have specific professional knowledge. Knowledge of case histories, products, services or treatments for instance. This knowledge is important for the coordinators and managers of the CJG, but also for the professionals themselves. However, this knowledge is fragmented on Intranets and possessed by professionals. Furthermore, not all knowledge can be distributed to all involved professionals and partner organisations. Contributions of Web 2.0 technologies should take these conditions into account.

The first Web 2.0 tool that fits the analysis can be found in the broad collaboration category. In essence, the CJG partners and professionals want to collaborate, however they do not have the tools yet. Therefore wiki technology has been chosen from the broad collaboration category to contribute to this knowledge management bottleneck. On the wiki the knowledge of the professionals and organisations can be presented separately and professionals can add to and adjust the content already available. Shared knowledge on the wiki will be mainly tacit knowledge residing in the heads of the professionals and more explicit knowledge, like products, services and treatments. In this way fragmented tacit and explicit knowledge of all partners becomes organisational knowledge and will grow as more professionals participate.

To support the wiki, another Web 2.0 tool from the broad collaboration category is selected. Although the wiki is a great tool to cocreate content, it fails to present and provide documents in a convenient way. Although possible, providing documents is more practical on shared workspaces. Shared workspaces provide various functionalities as described in section 2.5 and have the possibility to store documents and manage the execution of projects with professionals. Furthermore, the wiki can be integrated on the shared workspace to utilise the full potential of both technologies. Constructing organisational knowledge on a wiki is a tough process, but is a great way to share knowledge, to show your expertise and to build relationships. Shared workspaces support the Wiki with the storage of documents, which can be presented on the Wiki with hyperlinks.

1. Broad collaboration -> Wiki
2. Broad collaboration -> Shared workspaces

6.2.3. The absence of a system to combine the diverse output of registration and signalling systems of CJG partner organisations

The diversity of output from registration and signalling systems of CJG partners has been mentioned by several respondents as bottleneck. All CJG partners have their own systems, their own interpretation and their own standards. The output from the currently used systems from the partners are diverse and are hard to interpret by outsiders, such as the coordinators of CJG's. Difficulties can be expected with the composition of one CJG specific file for a child or family.

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To solve the above bottleneck, a system is needed that can interpret the different output. The system should be able to combine the different reports or data from the organisations and divide it in parts that the organisations need. This division of knowledge is necessary as not all organisations have access to all information. Consequently, many conditions and restrictions exist on which information can be read by which organisations and professionals. With so many restrictions and conditions a solution should not be sought from the Web 2.0 domain, but instead from the Information Technology or Information Architecture domain. For instance, systems from the Business Intelligence domain collect data from various systems and combine these so output can be compared. Such a system presents a more formal solution to this bottleneck. Web 2.0 technologies create social interaction and collective knowledge, but fails to fulfil the conditions and restrictions as described above.

Web 2.0 can however support coordinators and managers of CJG's when such a system is not in place yet. A wiki can be used for example as a frequently asked questions section. The interpretation of output can be supported by explaining on the wiki how to interpret the output providing the users a tutorial. More cannot be expected from Web 2.0 on this particular bottleneck.

1. A solution cannot be found in the Web 2.0 domain
2. Broad collaboration -> Wiki

6.2.4. The difficulties with vertically integrating operational knowledge to strategic levels and vertically integrating strategic knowledge to operational levels

Within CJG's there is a lack of vertical integration of knowledge from strategic to operational levels and vice versa. CJG specific knowledge of professionals does not reach the executives of partner organisations. Strategic information from the board from partner organisations does not reach the CJG professionals. Respondents stated that because of this lack of vertical integration of knowledge, professionals follow the partners' strategy, instead of a CJG strategy causing a lack of CJG required skills and knowledge. Web 2.0 can contribute to this knowledge management bottleneck.

To improve vertical integration of knowledge among professionals and executives on strategic levels, communication needs improvement. In CJG's professionals and executives have a positive attitude towards knowledge sharing, however they only use email and telephone as media. In essence, this bottleneck is a communication issue. Therefore, the tool that most contributes to this bottleneck is found in the broad communication category. A great tool to communicate strategy or operational activities are weblogs. With weblogs executives and professionals can express their thought and activities. Professionals can blog about what they see in their daily work, what problems they encounter or what can be improved. Executives can blog about the vision they set out for their organisation, their role and strategy in the CJG or other policy related subjects. Weblogs provide the functionality to comment on weblogs, which creates interactivity between professionals and executives.

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Shared workspaces can be used to support bottom-up initiatives of civil servants to think along with executives on vision and strategy. By actively participating in this process by presenting ideas and thoughts, strategy and vision becomes more explicit for professionals. On the shared workspaces, documents that entail the vision and strategy can be placed, so all contributors have the same knowledge. Furthermore, the elaboration of strategy into operational goals and activities can be supported by professionals as they were actively involved in the process of strategy making. Professionals' own experience on an operational level can be used to improve the connection between strategy and operations.

Weblogs have been proposed as optimal technology to contribute to the vertical integration of knowledge bottleneck. With weblogs, executives and professionals can express themselves and executives and professionals will be better informed of each others activities. These expressions can be supported by a collaborative technology. Shared workspaces are proposed to fulfil this supporting functionality. On shared workspaces, professionals and executives can discuss further on strategy and vision. In addition, relevant documents can be placed on the shared workspaces.

1. Broad communication -> Blogs
2. Broad collaboration -> Shared workspaces

6.3. Web 2.0 contributions to municipalities

6.3.1. The lack of required competencies of civil servants to search and find knowledge in currently used systems

Within the elaboration of this bottleneck, explicit knowledge recorded in documents, is meant when knowledge or information are discussed. The interviews showed that civil servants find it hard to search for the information and knowledge they need. Civil servants lack the required competencies to search and find knowledge themselves, which is the result of an organisational culture where superiors for long handed civil servants the information they needed. In addition, the currently used systems are user-unfriendly and outdated, which makes it even harder.

The lack of required competencies can be improved by collaborating with fellow civil servants. The currently used systems do not satisfy the needs of civil servants. Intranets and other systems are outdated and user-unfriendly. It is hard for civil servants to search and find the information they need. A Web 2.0 contribution to this bottleneck is found in the broad collaboration category, namely shared workspaces. On shared workspaces civil servants can share documents, work collaboratively on projects and interact. Documents are easier found as civil servants store the documents in a more logical way themselves.

The supporting Web 2.0 technology should make it even more easy to search and find the documents that are needed. With metadata creation civil servants can add metadata to documents or other produced content to search and find the requested content easier. Tagging is a technology that supports metadata creation and makes the shared workspaces

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more valuable. Documents and content placed on the shared workspaces are tagged with relevant tags, so fellow civil servants can find the content they need easier.

The lack of competencies of civil servants to search and find the explicit knowledge they require hinders knowledge management. We choose a technology approach to contribute to the bottleneck, which makes searching and finding knowledge easier for civil servants. A big disadvantage of the proposed contribution is that knowledge residing in currently used systems is still hard to find. The proposed technologies focus mainly on new knowledge that is placed and tagged on the shared workspaces.

1. Broad collaboration -> Shared workspaces
2. Metadata creation -> Tagging

6.3.2. The strategic use of knowledge by civil servants on operational and strategic levels

The interviews showed that civil servants use their own knowledge strategically. Knowledge that is used strategically can be explicit and tacit knowledge. Consequently, knowledge sharing is uncommon within municipalities as civil servants keep their knowledge with themselves. The cause can be found in the organisational culture. When civil servants always got their knowledge from their superior, they do not have to share this knowledge with others. This last statement cannot be proved with our empiric data, however presents a possible explanation for the strategic use of knowledge.

To counter the strategic use of knowledge within municipalities, knowledge sharing should become more transparent. With Web 2.0 technologies transparency is guaranteed. However, transparency alone is not enough to deliver a contribution to this bottleneck. A contribution should be sought in the broad collaboration category. When civil servants increasingly collaborate, it can be expected that they build relationships and share their knowledge with each other. Therefore shared workspaces have been chosen as optimal contribution to this bottleneck. As described in section 4.4.1, knowledge management and knowledge sharing, becomes easier when a relationship is strong and trust has been build.

Although no tangible incentives to share knowledge are presented, the expectation is that the social interaction between civil servants and the transparency of this process will decrease strategic use of knowledge. To support the processes on the shared workspace, the construction of relationships can be facilitated by Web 2.0 technologies from the social graphing category. To construct and improve relationships between civil servants social networking technology can be used. The focus of the social network is on building relations and trust between civil servants. It is expected that civil servants will decrease the strategic use of knowledge as relationships and trust between civil servants are enhanced.

It was argued that shared workspaces and social networking technology contribute to the strategic use of knowledge by civil servants on operational and strategic levels. The contribution of Web 2.0 technologies focuses on building relationships and trust among civil ser-

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vants to decrease the strategic use of knowledge. The shared workspaces are the first step in this process with social networking as supporting technology.

1. Broad collaboration -> Shared workspaces
2. Social graphing -> Social networking

6.3.3. The lack of incentives for using knowledge management

Within municipalities the use of knowledge management is hindered by a lack of incentives for civil servants. Especially for knowledge sharing no incentives are in place to encourage civil servants. The interviews showed that knowledge management is seen as additional work by civil servants, which does not fit in their daily work schedule. So a contribution to this bottleneck is sought in the creation of incentives to use knowledge management.

A contribution of Web 2.0 to this bottleneck does not involve financial incentives. The contribution of Web 2.0 to this bottleneck is focused on social recognition. With Web 2.0 technologies experts can show their expertise and share their knowledge with others. On the internet, people share their knowledge with others for social recognition often without any financial incentive. A contribution to this bottleneck should therefore be sought in the social graphing category. Within this category, social networking technology contributes most to the analysed bottleneck. Civil servants can share their knowledge and show their expertise on the social network. An example of a social network for civil servants is the Ambtenaar 2.0 platform with more than 3000 members. Some of the active members of this network share their knowledge, show their expertise and are socially recognised. Within a municipality a social network can provide the same benefits only on a smaller scale

Although the social network probably supports this feature, the supporting Web 2.0 technology is ratings. With ratings the expertise of a civil servants can be formalised. With ratings civil servants can rate contributions of other civil servants on the social network. Civil servants with high ratings are read more and have a higher social status.

The analysis of this bottleneck showed that Web 2.0 technologies can only indirectly contribute to the lack of incentives. As there are no incentives in place to use knowledge management, Web 2.0 technologies will hardly be used either without additional incentives. The interviews showed that within municipalities Web 2.0 technologies are mainly used by a small group enthusiastics. Although this small group of civil servants can inspire other civil servants, it can be expected that many will not use Web 2.0 technologies to show their expertise and share their knowledge. Therefore a social network combined with ratings only contributes to social incentives. It is expected that additional incentives are needed to formalise the social incentives.

1. Social Graphing -> Social networking
2. Metadata creation -> Ratings

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6.3.4. The absence of strategic attention for knowledge and knowledge management

Within municipalities there is no lack of knowledge management initiatives. The interviews showed a variety of initiatives to create and share knowledge within municipalities. The main issue is that many of these initiatives are focused on small groups or on specific departments. Consequently, knowledge that has been acquired during the initiatives only reaches a small group of people, while the entire organisation could benefit if involved. We concluded based on the interviews that this narrow focus is caused by the lack of strategic attention for knowledge and knowledge management within municipalities.

The bottleneck as described is mainly an organisational issue. Although Web 2.0 can open traditional organisational structures or operating procedures, the solution for this problem should be sought in other domains. Rethinking strategy and vision needs more than a Web 2.0 technology.

In line with our analysis thus far, Web 2.0 technology can be used to support a solution from another domain. Rethinking strategy and vision is traditionally done by the executives of a municipality. However, Web 2.0 technologies support bottom-up thinking and initiatives. In this way Web 2.0 technologies can support executives in this process of rethinking vision and strategy by giving civil servants on operational levels a medium to express their opinions and thoughts. As this requires collaboration, a Web 2.0 technology is chosen from the broad collaboration category. Within this category a wiki has been chosen to present the opinions and thoughts of civil servants on operational levels. On a wiki civil servants can collaboratively work on how they think about strategy and vision. Collaborating on a wiki empowers civil servants to express their thoughts and share their operational knowledge.

So Web 2.0 technologies cannot deliver a direct contribution to the lack of strategic attention for knowledge and knowledge management. The bottleneck is much wider and can only be supported indirectly by Web 2.0. A wiki has been proposed to perform this function. With a wiki civil servants have a medium to express their thoughts and opinion about vision and strategy. Collaboratively created content on the wiki can support executives on rethinking strategy and vision.

1. A solution cannot be found in the Web 2.0 domain
2. Broad collaboration -> Wiki

6.3.5. The lack of initiatives that transform the newly created tacit knowledge into explicit knowledge.

As discussed in the previous section, a lot of initiatives are in place to create knowledge within municipalities. However, this knowledge is not made explicit. Externalisation of tacit knowledge is important within municipalities, however there is a lack of initiatives to transform tacit knowledge into explicit knowledge. If civil servants leave the organisation or retire, this knowledge is lost. Within municipalities this is a knowledge management bottleneck as knowledge has to be acquired over and over again. Furthermore, new knowledge is not generated as it is not made explicit.

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Transforming tacit knowledge into explicit knowledge can be supported by Web 2.0 technologies. The collective knowledge of civil servants can be formalised with tools so others can benefit from what has already been learned by others. A Web 2.0 technology should be sought in the broad collaboration category. Within the broad collaboration category a wiki is the preferred technology to contribute to this bottleneck. A wiki is a great way to externalise knowledge. To really externalise knowledge, all contextual information in which knowledge has been acquired should be added.

Besides the wiki a more informal technology is used to transform tacit knowledge of civil servants into explicit knowledge. This technology should provide civil servants a means to discuss their knowledge and at the same time transform it in explicit knowledge. Social networking technology has been chosen to support the wiki and cover the informal discussions. A social network provides civil servants a low barrier medium to discuss in an informal setting what they know, what they do and everything else they want to share.

The combination of the more formal wiki and an informal technology should contribute most to this bottleneck. The combination of both technologies enhance each other and deliver a greater contribution. On the wiki civil servants can share their knowledge in a formal way discussing content with other civil servants. On the social network civil servants can discuss and share knowledge in a more informal way.

1. Broad collaboration -> Wiki
2. Social graphing -> Social networking

6.4. Validation session

The goal of this section is to validate the findings of the previous sections. The bottlenecks were already validated in section 5.6 with two experts. This section validates the findings of the above analyses.

6.4.1. Validity in qualitative research

Validation of qualitative research has been a hot issue in the academic world. As qualitative research increased validation criteria and standards are sought. Whittemore, et al,. (2001) state that: “developing validity standards in qualitative research is challenging because of the necessity to incorporate rigor and subjectivity as well as creativity into the scientific process.” Whittemore, et al., (2001) present an overview of several validation techniques and criteria for qualitative research. The validation criteria are divided in primary and secondary criteria. The primary criteria of validity are credibility, authenticity, criticality and integrity. This validation session mainly focuses on the credibility and criticality of the findings. This research also fulfils the integrity criteria of validation as recursive and repetitive steps have been undertaken to validate the findings. All criteria of validity and accompanying questions can be found in Appendix 8.

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Whittemore, et al., (Whittemore, et al., 2001) also present techniques for demonstrating validity. They divide the techniques into four types, namely design consideration, data generating, analytic and presentation. Many techniques have been consciously and unconsciously used during this research, but do not add value to the presented results, so will not be discussed in more detail. Here we only present the technique that is used during the validation session. The technique used during the validation session was expert checking. The next section discusses how the experts have been selected.

6.4.2. Expert selection

To validate the findings experts are needed with expertise on various domains. The experts should have expertise on municipalities or CJG's and on knowledge management and Web 2.0. As the cases have shown, the respondents of municipalities and CJG's can discuss the bottlenecks, but are no experts on Web 2.0 and knowledge management. Therefore, consultants of Alares have been chosen as experts for the validation session. Alares' consultants have broad experience in both municipalities and CJG's. Furthermore, Web 2.0 and knowledge management have been integrated in operational procedures of Alares consultants. Every employee of Alares uses the knowledge environment with integrated wiki and blog functionality and most even express themselves with microblogging. Their own experience with Web 2.0 technologies is useful in this validation session.

Seven Alares consultants were approached to attend at the validation session. The seven consultants were selected and invited based on their specific expertise and consequently their possible contribution to the findings. Unfortunately not all invited consultants were available for the validation session, which resulted in four participants. The four consultants of Alares that were present had all expertise that was needed. Two of the consultants have experience with CJG's. Two other consultant have worked both for more than a year internally in a Dutch municipality. The experts have varying expertise, but together created a balanced situation, which is needed for the validation of the findings.

It should however be mentioned, that the choice to ask consultants for the validations session has consequences for the results of the session and for the findings of the research project. In general, civil servants have another viewpoint on problems than consultants. Consultants try to solve various problems on a daily basis, while civil servants are more observing towards problems. More generic, civil servants are more problem-oriented, while consultants are more solution-oriented. This difference influences the findings after validation. With consultants the session is more focused on the contribution of Web 2.0, while we expect that a session with civil servants would be more focused on the formulated problems. The next session discusses the outline of the session.

6.4.3. Outline of validation session

The validation session was held in the Hague at the office of Alares and took one and a half hour. The validation session started with a short introduction of the research. Knowledge management, Web 2.0 and the case studies were introduced. Furthermore, the research strategy was shortly discussed. The experts are told that the knowledge management bot-

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tlenecks are the results of the case studies, which have been validated in an earlier session with two experts. Next the Web 2.0 categorisation model is presented to the experts. This model is explained in more detail as the presented findings are based on this model.

After this short introduction of the research, the purpose of the validation session was presented. The experts were asked to answer two questions for each presented contribution of Web 2.0 technologies. These questions are derived from the primary validity criteria credibility and criticality. The experts were asked to answer the following questions:

- Do the results of the research reflect the reality reliably?
- Do the presented Web 2.0 technologies contribute to the bottleneck?

The actual validation of the findings started with the presentation of the bottlenecks and the context. Next the contribution of Web 2.0 technologies to the bottleneck was discussed. The contribution of Web 2.0 technologies were presented in the same way as in this report. We explained how the two technologies relate to each other and how the contribution of the Web 2.0 technologies should be interpreted. After the presentation of the bottleneck and the contribution of Web 2.0 technologies the experts were asked to write down their first thoughts. After writing down their first thoughts the experts discuss with each other the presented results. The discussion has been documented and used in the description of the validation of the results. The presentation used during the validation session can be found in Figure 16 in Appendix 8.[7] The validation protocol used during the validation session can be found in Appendix 9. The results after the validation session can be found in the next section.

6.4.4. Validation of CJG findings

After the validation session, the CJG findings only required minor adjustments. In general, the experts agreed with the proposed Web 2.0 technologies. The first knowledge management bottleneck discussed the lack of socialisation and network knowledge among CJG partners of virtual CJG's. The experts agreed with network mapping and social networking as technologies to contribute to this bottleneck. One of the experts discussed blogs as addition to the proposed Web 2.0 technologies to increase communication and social interaction. Blogs add value to the proposed Web 2.0 technologies and are therefore added to the results.

The second knowledge management bottleneck that was discussed was the fragmentation of knowledge among CJG partners. We proposed a wiki as optimal technology supported by shared workspaces during the validation session. The experts agreed with the proposed Web 2.0 technologies, but questioned the order as the focus of shared workspaces is more on the long term, while a wiki focuses more on the short term. The order has been changed so that the shared workspaces with a long term focus are now supported by a wiki with a shorter term focus.

[7] The presentation can be viewed online at http://prezi.com/tr037mjcszes/

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The absence of a system to combine the diverse output of registration and signalling systems of CJG partner organisations was the third bottleneck that was discussed. All participants of the validation session agreed with the proposed contribution of Web 2.0 technologies and acknowledged that this is an issue within CJG's. One of the experts stated that this bottleneck is much broader as organisations not only have different systems, they speak another language, document and measure in different ways and have different understandings of how to provide the best care. Consequently a lot of resistance exists within the organisations to combine or standardise their output and Web 2.0 technology can only support a part of this bottleneck. We agreed that a wiki can be used to support this bottleneck, but with another goal; supporting a shared vision composition process. Therefore, the proposed Web 2.0 technologies are validated only with a different focus.

The difficulties with vertically integrating operational knowledge to strategic levels and vertically integrating strategic knowledge to operational levels was the last discussed knowledge management bottleneck of CJG's. The experts found the combination of blogs and shared workspaces particularly interesting from the executive level down to operational levels. There was some discussion during the session about the order of the two technologies. We adjusted the order of the findings to present a more powerful and logical contribution to the bottleneck.

6.4.5. Validation of municipalities findings

In contrast with the validation of CJG findings, the presentation of the findings within municipalities resulted in more discussion and adjustments. Much of the discussion focused on aspects of knowledge management that are demarcated within this research project. We feel that these aspects cannot be ignored and are therefore discussed in the reflection in chapter 8. During the session we explained the focus of this research project and asked the experts to respond to the proposed technologies with this focus in mind.

The lack of required competencies of civil servants to search and find knowledge in currently used systems was the first knowledge management bottleneck within municipalities that was discussed. We proposed shared workspaces supported by tagging to contribute to this bottleneck. According to the experts the focus of these technologies is to make the use easier, while the lack of required competencies is the real issue. Civil servants should be trained in searching the currently used systems and obtain the required competencies. Web 2.0 technologies can still be used to support civil servants with obtaining the required competencies. A wiki can support the civil servants with their training and courses by providing additional material such as videocasts. Video's or videocasts can contribute to the training as civil servants can view the video's and practise themselves. These remarks are taken into account and have improved the findings.

The second discussed bottlenecks was the strategic use of knowledge by civil servants on operational and strategic levels. We proposed shared workspaces supported by social networking to contribute to this bottleneck. The experts agreed on the shared workspaces as a means to decrease the strategic use of knowledge. However, civil servants who use their knowledge strategically will not use a social network to share knowledge. To counter the

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influence of the organisational culture on the strategic use of knowledge more informal Web 2.0 technologies were discussed. We agreed that shared workspaces can be better supported by the use of microblogging or blogging to bypass the organisational culture and to contribute to this bottleneck. These changes are incorporated in the results.

The lack of incentives for using knowledge management within municipalities was the third bottleneck that was discussed. We proposed social networking supported by ratings to contribute to this bottleneck. Although the experts found that the problem surrounding this bottleneck is much wider, they agreed with the proposed Web 2.0 technologies if a condition was added. The condition states that Web 2.0 technologies can be used to contribute to the bottleneck if a 'if than' solution is used. In other words, if civil servants use the proposed Web 2.0 technologies and pass formulated conditions, than they get rewarded. Summarising, the technologies are not changed, but an additional condition is added after the validation session.

The absence of strategic attention for knowledge and knowledge management in general was the fourth bottleneck to discuss with the experts. All experts agreed that the primary solution should be sought in other domains. The wiki as supporting technology was found too formal by the experts and they proposed more informal technologies, such as blogs and microblogging to contribute to this bottleneck. After discussion, we agreed that a mix of formal and informal technologies presents the best contribution. Therefore blogs are added to the supporting Web 2.0 technologies.

The last knowledge management bottleneck within municipalities was the lack of initiatives that transform the newly created tacit knowledge into explicit knowledge. To stimulate civil servants to transform their tacit knowledge into explicit knowledge technologies with low barriers of entry should be used. The proposed optimal Web 2.0 technology, a wiki, was found to be too formal to contribute to this bottleneck. With blogs and microblogging civil servants can express themselves informally and social interaction between civil servants is stimulated. All experts agreed that social networking contributes to the transformation of explicit knowledge into tacit knowledge with the addition that the social network should have a specific focus. Therefore, the proposed optimal Web 2.0 technology has been adjusted to blogs and microblogging.

6.4.6. Refection on validation

The validation of the results in a session with experts has adjusted the results in minor and major ways. Especially within municipalities it was found that technology alone cannot solve the bottlenecks, but is only a small part of the entire solution. Composing a (shared) vision, enhancing competencies of civil servants and changing the organisational culture of municipalities were some of the examples that came forward during the session. We reflect on these aspects in chapter 8. Within CJG's we found some of these aspects too, however as a common culture within the CJG still lacks it is easier within these sort of organisations to start with Web 2.0 technologies.

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Figure 12 presents an overview from bottlenecks to the contribution of Web 2.0 technologies after validation. A star has been added to the Web 2.0 technology when the focus has adjusted. One of the validated bottlenecks has also been discussed by the experts and has also been marked with a star. Web 2.0 technologies, which have not been adjusted after the validation session have been given a straight arrow with a equality mark. The Web 2.0 technologies that are adjusted after the validation session are presented with an arched arrow and a non equality sign.

6.5. Conclusion

The original findings of the contribution of Web 2.0 technologies to knowledge management within CJG's have been slightly adjusted after the validation session with the experts. Wikis, blogs and shared workspaces contribute most to knowledge management bottlenecks within CJG's. These three technologies enhance each other as integration of a wiki and blogs is possible on shared workspaces. A shared workspace with wiki and blog functionality integrates diverse technologies in one tool, which results in a higher efficiency than three separate technologies. Contribution of Web 2.0 technologies to the lack of socialisation and network knowledge within virtual CJG's was more specific. Network mapping supported by social networking technology was proposed and agreed by the experts. The experts added blogs as an informal technology to enhance socialisation.

As opposed to the minor adjustments in the findings of CJG's, the contribution of Web 2.0 technologies to knowledge management bottlenecks within municipalities has seen many changes after the validation session. The overall conclusion on the findings within municipalities is that the proposed Web 2.0 technologies were in some cases to formal or did not focus on the right angle of the bottleneck. Wiki technology is an example of a more formal Web 2.0 technology, which has been replaced with blogs and microblogging, which are more informal technologies. Furthermore, the experts found the focus of some contributions to technological. Distinctions were made during the validation session based on the expertise and experience of the experts and adjusted the findings. Overall, shared workspaces integrated with blogs, microblogging and/or wikis contribute most to the knowledge management bottlenecks within municipalities. Social networking and videocasts were also proposed, but are specifically focused on one or two of the bottlenecks.

Lastly, we want to reflect on what we think is one of the reasons that there are many collaboration conflicts within the CJG's. We believe that many of the collaboration issues are derived from the tension between traditional hierarchic management approaches and more network oriented management approaches. Municipalities do not have a collaborative culture, while within CJG's collaboration between the stakeholders should be supported by the coordinators and managers. We believe this is the reason that many of the coordinators and managers of CJG's are externally recruited.

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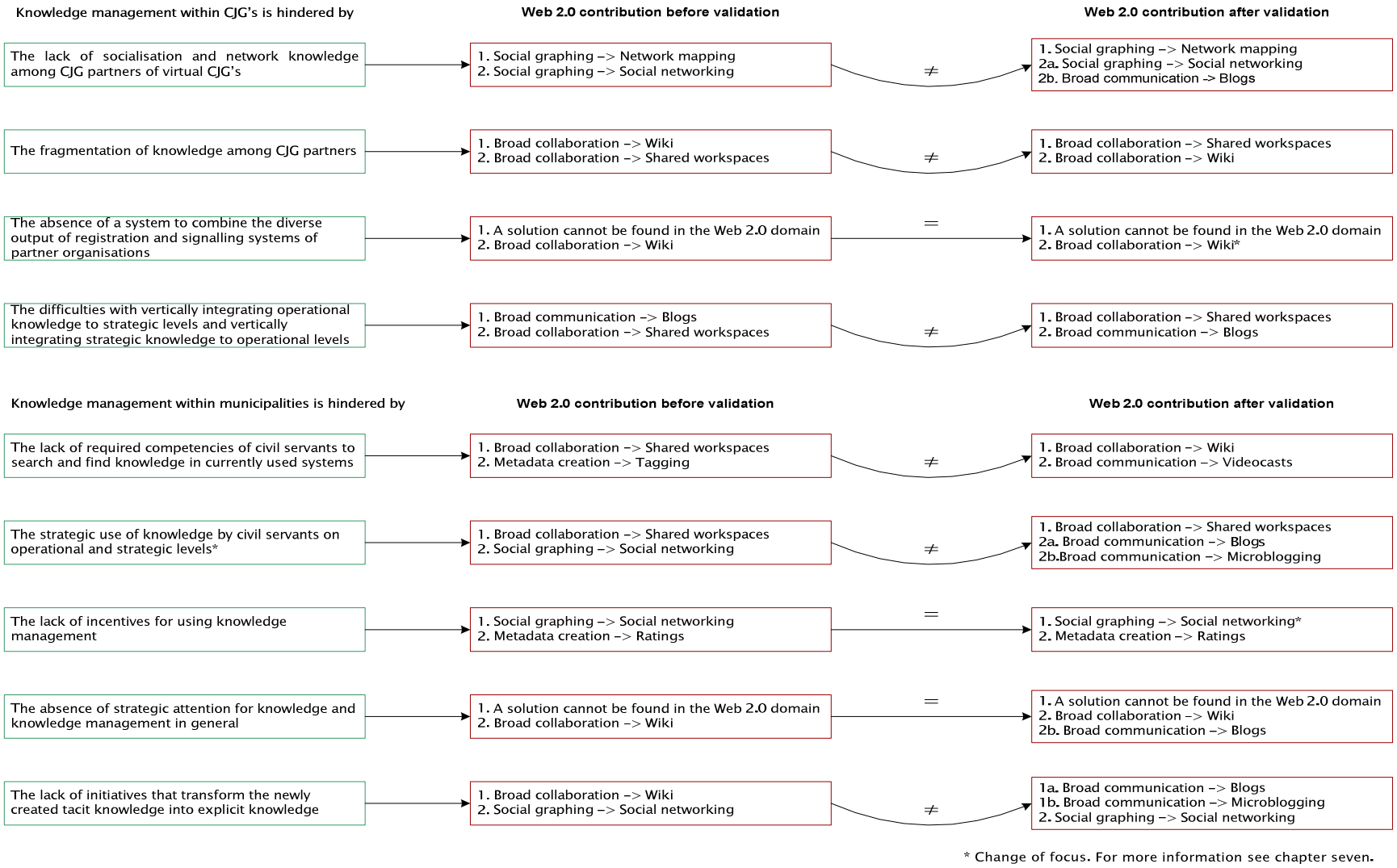

Figure 12: Web 2.0 technologies contribution to knowledge management bottlenecks

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7. Conclusion and recommendations

This research started with the understanding that municipalities are modernising. Societal problems become more complex with many involved and well-informed stakeholders. To solve these complex problems, municipalities increasingly participate in networks to execute public policy in collaboration with external stakeholders. An example of such an network is the Centre for Youth and Family (in Dutch: Centrum voor Jeugd en Gezin or CJG), where municipalities collaborate with external stakeholders to provide advise and care to parents, children and youth about raising children and growing up.

The rapid developments in the IT sector provide the possibility to municipalities to execute public policy in more market-style governance structures. These developments have also caused an increasing importance of knowledge. With IT, knowledge became easier to generate, store and share. Consequently knowledge management became more important. With the shift from the traditional bureaucratic way of executing public policy to a more market-style governance structure, we expected that knowledge management differs within these organisational structures. Web 2.0 was proposed as a set of technologies with unique characteristics, which provides an opportunity to contribute to knowledge management and cross-agency collaboration. The research objective was formulated as follows:

Provide recommendations that present the contribution of Web 2.0 technologies to knowledge management within municipalities and within CJG's.

The municipality and the CJG were chosen as case studies as they present two extremes on a range of agency types to execute public policy. These extremes have been chosen, because the contrast between the traditional municipality and the modernisation of municipalities can be presented with these case studies. To accomplish the research objective several steps have been made. These research steps have provided valuable insights into the use of knowledge management and into the contribution of Web 2.0 technologies to knowledge management within municipalities and CJG's. With these insights the research questions can be answered in order to attain the research objective as formulated above. This last chapter answers the research questions and concludes the research in section 7.1. Recommendations are given on how and which Web 2.0 technologies contribute to knowledge management within municipalities and CJG's. Section 7.3 presents the limitations of this research. Recommendations for further research are presented in section 7.4. The last section presents a personal reflection on this research.

7.1. Conclusion

To accomplish the research objective several research methods have been used. Some of these research methods are theory oriented, others have a more practical orientation. This section is divided in a discussion of theory and practice and the combination of both theory and practice. To achieve the research objective the following main research question was formulated:

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What can Web 2.0 technologies contribute to knowledge management within municipalities and within CJG's?

To answer the main research question, three sub-questions were formulated:

1. *What is knowledge management?*
2. *What knowledge management bottlenecks can be found within municipalities and within CJG's and to what extent can the bottlenecks be validated?*
3. *Which Web 2.0 technologies can be used to contribute to the bottlenecks found on the use of knowledge management within municipalities and within CJG's and to what extent can the Web 2.0 technologies be validated?*

The combined answers to the sub-questions results in an answer to the main research questions. The next section starts with answering sub-question one. The next sections answer the sub-questions.

Sub-question 1: What is knowledge management?
Before the first sub-question was answered, the relation between knowledge management and Web 2.0 was investigated. More specifically, literature was researched that presents a link between knowledge management within municipalities and Web 2.0. We found that three back-office domains of municipalities could benefit from the use of Web 2.0 namely, regulation, cross-agency collaboration and knowledge management. With the focus on knowledge management and the modernisation of municipalities in this research project, the knowledge management and cross-agency collaboration domains were of value for this research (OECD, 2005; Osimo, 2008). Although the execution of public policy is a topic of research, regulation falls outside the demarcation of this research as the focus of regulation differs from the focus of this research project. The addition of regulation should require another type of research and additional literature review.

Furthermore, we found that traditional knowledge management systems are applied to explicit knowledge, while Web 2.0 technologies enable the sharing of informal and tacit knowledge. In other words, Web 2.0 technologies have other functionalities compared to the traditionally used technologies, like e-mail and the Intranet. Consequently, Web 2.0 technologies complement knowledge management technologies in the back-office of municipalities. In addition, the execution of public policy increasingly requires cross-agency collaboration. As a networked organisation has been chosen as one of the case studies, the link between Web 2.0 and cross-agency collaboration is also relevant for this research.

Several Web 2.0 technologies were identified that have the ability to contribute to solve knowledge management bottlenecks within municipalities. Chui, et al., (2009) ordered the contributions of Web 2.0 technologies into five categories: broad collaboration, broad communication, collective estimation, metadata creation and social graphing. Each of these five categories houses between two and five Web 2.0 technologies. We interpreted the descriptions of the categories as the generic contribution to knowledge management bottlenecks.

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The literature review discussed the complex nature of knowledge and the different features of tacit and explicit knowledge. Explicit knowledge can be communicated with words or in writing and can be formalised, while tacit knowledge is embodied in the human mind and cannot easily be separated and transferred. To effectively deal with the diversity in knowledge features, organisations need a variety of knowledge management approaches. With knowledge management the collective knowledge of an organisation should be identified and leveraged in order to make the organisation more efficient and innovative (Gottschalk, 2005). With the focus on municipalities in this research project, a definition was found that is aimed at knowledge management within public organisations. McNabb (2007) defines knowledge management as: "a dynamic, evolving set of interacting existing and new technologies, practices and procedures that employ technology and social interaction in the delivery of public services." Besides the focus on public organisations, the last definition also focuses on social interaction and technology, which are both important when managing tacit and explicit knowledge. The knowledge management definition of McNabb has been used as standard in this research.

To structure the next phase of the research a knowledge management model was sought that focuses on the public sector. As McNabb (2007) is one of the few who has written about knowledge management in the public sector, a knowledge management model was found in his work, which presents the knowledge management mechanisms in public organisations. The mechanisms enabling knowledge management are knowledge development, knowledge transfer and knowledge sharing, leading to individual and organisational learning. Each of these three mechanisms is divided into two specific processes or systems. These specific processes and systems have been used to structure the interviews during the exploration phase of this research project that was aimed at finding bottlenecks in knowledge management within municipalities and CJG's. We choose to leave individual and organisational learning outside the demarcation of this research project. We expected that based on the current knowledge management situation within municipalities and the knowledge gap that exists, municipalities have not advanced to the point that several knowledge management mechanisms lead to individual and organisational learning.

Sub-question 2: What knowledge management bottlenecks can be found within the municipality and within the CJG and to what extent can the bottlenecks be validated?
The municipality has traditionally been organised by a bureaucratic structure. We found that municipalities increasingly collaborate in networks with external stakeholders, which presents an interesting case, as a network can be seen as the opposite organisational structure of a bureaucracy on a range of organisational structures. The second step was to select which network should be used to analyse. The CJG has been chosen as case study, because knowledge management becomes more important when more organisations and professionals are involved. Within a CJG, several organisations from the youth care sector collaborate to execute public policy. The municipality has a governing role in a CJG, which means they involve the required organisations, bring them together and stimulate collaboration between the organisations and professionals. Furthermore, we saw an opportunity for Web 2.0 technologies to stimulate collaboration between professionals within the CJG and to support knowledge management.

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The main findings from the analysis have been divided in knowledge management bottlenecks applicable for CJG's and for municipalities. The knowledge management bottlenecks were found after the analysis of the interviews and were combined to more generic knowledge management bottlenecks. On the basis of the interviews we concluded that knowledge management within CJG's was hindered by:

- The lack of network knowledge and socialisation among CJG partners.
- Fragmentation of knowledge among CJG partners.
- The absence of a system to combine the diverse output of registration and signalling systems of CJG partner organisations.
- The difficulties with vertically integrating operational knowledge to strategic levels and vertically integrating strategic knowledge to operational levels.

On the basis of the interviews we concluded that knowledge management within municipalities was hindered by:

- by the lack of required competencies of civil servants to search and find knowledge in currently used systems
- by the strategic use of knowledge by civil servants on operational and strategic levels
- Knowledge management within municipalities is hindered by the lack of incentives for using knowledge management
- by the absence of strategic attention for knowledge and knowledge management
- by the lack of initiatives that transform the newly created tacit knowledge into explicit knowledge.

The presented bottlenecks have been validated in two steps with experts. First, the initial bottlenecks were discussed with two experts in the field of knowledge management. In addition, both experts had relevant work experience within municipalities and CJG's. Next, the bottlenecks have been adjusted and combined to generic bottlenecks and again been discussed by the same two experts. The validated generic bottlenecks have been used in the analysis of the contribution of Web 2.0 technologies, which is presented in the next section.

Sub-question 3: Which Web 2.0 technologies can be used to contribute to the bottlenecks found on the use of knowledge management within municipalities and within CJG's and to what extent can the Web 2.0 technologies be validated?

The analysis started with the selection of a Web 2.0 technology from one of the categories of the Web 2.0 model that proposes the optimal contribution to the bottleneck. In addition, a second category and technology were chosen, which support the (first) optimal tool. The results of the analysis are validated by experts in a validation session. The validation session was attended by four experts with expertise on knowledge management, Web 2.0, municipalities and CJG's. During the session, the bottlenecks were presented with their Web 2.0 contribution and the experts were asked to discuss the results.

We found after validation that several Web 2.0 technologies contribute to knowledge management bottlenecks within CJG's. Wikis, shared workspaces and blogs contribute to multiple bottlenecks within CJG's. The contribution of these technologies to knowledge

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management match with communicative and collaborative practices within CJG's. We found that a wiki presents a formal contribution to the bottlenecks, while blogs contribute to knowledge management in a more informal way. Furthermore, blogs and wiki technology can be integrated into shared workspaces. The combination of these technologies enhance each other's strengths and present an integrated solution of formal and informal technologies supporting collaborative and communicative practices. Furthermore, social mapping supported by social networking technology and blogs were validated as contribution to providing insight into the relationships within the network increasing the network knowledge of professionals and furthermore stimulate socialisation among CJG professionals.

Within municipalities several Web 2.0 technologies contribute to knowledge management. After validation by experts wikis, social networking and microblogging contribute to two different bottlenecks, while blogs were even agreed to contribute to three different bottlenecks. The main contribution of Web 2.0 technologies to knowledge management within municipalities is to stimulate communicative and collaborative practices between civil servants. It was found that within municipalities more informal technologies were needed to contribute to knowledge management. Shared workspaces, ratings and videocast technology are also presented as contributions to knowledge management and are specifically focused on one or two of the bottlenecks. Overall, shared workspaces integrated with blogs, microblogging and/or wikis contribute most to the knowledge management bottlenecks within municipalities.

Main research question: What can Web 2.0 technologies contribute to knowledge management within municipalities and within CJG's?

Based on the theoretic and empiric findings we are convinced that Web 2.0 technologies contribute to knowledge management within municipalities and within CJG's. We were surprised to see that knowledge management within both case studies is of no particular interest. As we have shown, knowledge management becomes increasingly important within municipalities and CJG's, but we found little evidence that shows these organisations acknowledge the importance of knowledge and knowledge management. Although Web 2.0 technologies are only a part of the solution, we believe these technologies are powerful and contribute to the current knowledge management practices. When we look at the definition of knowledge management and the knowledge management model as used within this research, we can conclude that Web 2.0 technologies contribute to several social processes and mechanisms enabling knowledge management, which is visualised in Figure 13.

The dynamic behaviour of Web 2.0 technologies showed several contributions to knowledge management. When we look at the CJG case study, we especially see contributions of Web 2.0 technologies to horizontal collaboration. We find collaboration within CJG's an important point of interest as the existence of the CJG is based on collaboration between the partners. The amount of issues with collaboration between partners and professionals has surprised us. On the other hand, collaboration between formerly autonomous partners and professionals needs time and efforts. Our proposed technologies, shared workspaces, blogs, wikis, social networking and network mapping, can enhance collaboration by strengthening the relationships and trust among partners and professionals.

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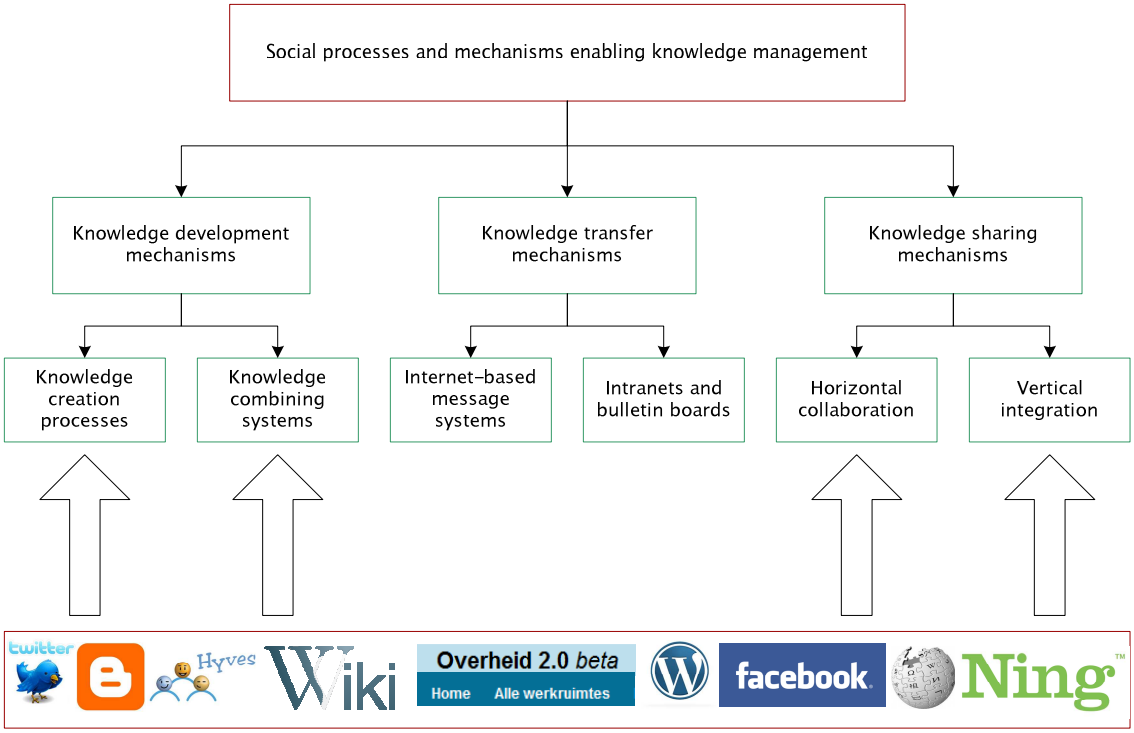

Figure 13: Contribution of Web 2.0 technologies to knowledge management

Within municipalities, the proposed Web 2.0 technologies mainly focus on the categories broad communication and collaboration. Besides social networking and ratings, all proposed technologies (wiki, blogs, microblogging, videocasts and shared workspaces) can be found in these categories. The bureaucratic structure of municipalities does not enhance collaboration between civil servants. Furthermore, we found that within municipalities there is no knowledge sharing culture. Consequently, we proposed Web 2.0 technologies that mainly focus to contribute to collaborative and communicative practices. We believe that our findings contribute to knowledge management within municipalities by giving civil servants tools to collaborate and to communicate. Communication for instance is important for the vertical integration of knowledge between operational and executive levels of municipalities. We acknowledge however that our findings are subject to and are influenced by other aspects. We come back to this point in chapter eight when the reflection is presented.

Furthermore, we believe that the proposed Web 2.0 technologies in both case studies present a balanced set with informal and formal technologies. The informal technologies, like blogs, microblogging and social networking are mainly focused on enhancing social interaction between co-workers on operational levels. More formal technologies, such as a wiki, have been proposed to contribute to more strategic matters. For instance within municipalities we proposed a wiki to enhance strategic attention for knowledge and knowledge management and within CJG's to support the decrease of knowledge fragmentation among CJG partners. Our validated findings show that many informal technologies have been proposed to contribute to bottlenecks on operational levels, while more formal technologies are found to contribute to bottlenecks on strategic levels. We conclude that formal Web 2.0 technologies suit better on strategic levels, while informal technologies fit better with conditions on operational levels.

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Although our research objective does not require a comparison, we want to present a general remark on a difference between both case studies. We expected that knowledge and knowledge management would become more important in networks as collaboration between the municipality and external stakeholders required knowledge exchange. We showed that collaboration within CJG's is indeed important, but that many bottlenecks hinder collaboration. Nonetheless, we believe that the contribution of Web 2.0 technologies is higher in a network than in traditional organisational structures like the bureaucracy. Within municipalities knowledge management bottlenecks are more complex due to factors that need a strategic change or solution. Therefore the contribution of Web 2.0 technologies to knowledge management is only small as it only contributes to a small part of the problem. Within CJG's, the situation is also complex with several stakeholders with their own interests, but without an organisational culture that hinders knowledge management it is more likely implemented Web 2.0 technologies will actually be used by the partners and professionals. The use of Web 2.0 technologies is not without chance within municipalities as Web 2.0 technologies have the power and characteristics to break down traditional business processes and models. We however expect based on the empiric results that the chance is simply smaller than the use of Web 2.0 technologies within CJG's.

7.2. Recommendations on the application of Web 2.0 technologies

This section presents our recommendations how to apply the proposed Web 2.0 technologies within municipalities and CJG's. Within this section our focus is on the context surrounding knowledge management and Web 2.0 technologies. This focus is chosen as we have extensively analysed the Web 2.0 technologies in the previous sections and the implementation and use of the technologies itself is not challenging. Therefore the presented recommendations can be seen as conditions for the use of Web 2.0 technologies and are relevant for both case studies.

Firstly, we recommend to use a combination of Web 2.0 technologies to support knowledge management. The analyses showed that several Web 2.0 technologies contribute to knowledge management, however these technologies are stronger when supported by other technologies. The integration of several technologies into one platform or within one technology has a higher chance of usage. An integrated solution is more efficient for users and combines several functionalities into one tool.

Secondly, we recommend to implement Web 2.0 technologies in phases. First start with the most relevant technologies, which serve several purposes such as blogs, wikis and shared workspaces. Make these technologies available for every employee of the organisation and stimulate participation. The second phase starts when a critical mass has started to use the Web 2.0 technologies. It is hard to determine the exact number of people that define the critical mass, however when on a regular basis discussions are started, knowledge is shared or in any way a contribution is delivered to knowledge management, more Web 2.0 technologies can be added or integrated gradually. With implementation in phases users get used to Web 2.0 technologies and slowly increase their usage and extend their use with more functionalities.

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Thirdly, we recommend to actively stimulate participation. The best case scenario would be to have a group of enthusiastic users, who stimulate their co-workers to use the Web 2.0 technologies. Most civil servants and professionals will not spontaneously going to use Web 2.0 technologies. Participation can be stimulated by rewarding early adopters and by focusing on the advantages of the technologies and the produced benefits. Mention and discuss the benefits actively to potential users in order to stimulate usage and do not censor in any way the content that is placed and produced. Censoring content within Web 2.0 technologies is fatal for usage. Instead start a discussion and present arguments to show another perspective and try to convince people with other opinions of your view.

Fourthly, we recommend that executives within municipalities and the CJG's support the initiatives and facilitate the implementation. Without support from executives, civil servants and professionals on operational levels will not use the Web 2.0 technologies. An even better signal would be when executives actively participate and stimulate others to join discussions, add content or express themselves in any other way.

Fifthly, we recommend to use the proposed Web 2.0 technologies complementary to currently used systems. Although civil servants and professionals are not satisfied with the currently used technologies, such as the Intranet and e-mail, these technologies are still heavily used within organisations. Web 2.0 technologies can be seen as complement as they stimulate social interaction and knowledge sharing.

When these recommendations are applied within organisations, the usage of Web 2.0 technologies has a higher chance of success. Taking the above recommendation into account when implementing Web 2.0 technologies is the first step. As many more aspects influence the usage of Web 2.0 technologies we find it hard to rate the chance of success. The recommendations as provided above increase the likelihood of usage, however are influenced by the organisational culture, the organisation and the competencies of civil servants and professionals. These factors should be in balance with the Web 2.0 technologies in order to come to success. The other factors are discussed in the reflection in chapter eight.

7.3. Research limitations

Although we believe in the presented results, we have to admit that some of the choices we made affected this research project. This section presents the research limitations.

The first limitation of this research regards the model that was used initially during the interviews with respondents of municipalities. The policy cycle framework from the public administration field was chosen as model to structure the interviews and handle the data. We wanted to research in which processes of the policy cycle knowledge management was used or useful. The data on the questions specifically focused on the model varied to a great extent. Moreover, the policy cycle framework did not give guidance for further research. After consultation with the graduation committee, the policy cycle framework was not used anymore in the research. A new model for the use of knowledge management within public organisations was found in the knowledge management literature, which has

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been used to handle the data and to restructure the interviews based on the new mechanisms of the model. We reused the data from the first eight interviews as the semi-structured interviews provided enough depth to provide answers to all blocks of the new model.

The second limitation of this research regards the use of the knowledge management model within public organisations. During the exploration phase, interviews were conducted, which were structured with the knowledge management model suitable for public organisations. Although this model gave guidance, it has also restricted the analysis to the provided mechanisms. Some of these mechanisms however, were hard to identify during the interviews and did not satisfy with knowledge management use in practice. We solved this with the semi-structured interviews, which provided us the possibility to ask questions that did not relate to any of the mechanisms of the knowledge management model. Our experience with this model is that it provides a structure to researchers to define various knowledge management mechanisms. Many of the described mechanisms can be found within organisations and relate to knowledge management. Our recommendation would be to use this model at the start of a research project to visualise knowledge management. When used for empiric research on knowledge management within public organisations we recommend to choose a model which incorporates organisational factors that can show the influence of the organisational culture or competencies of civil servants on knowledge management. These factors are difficult to present with the knowledge management mechanisms in the chosen model.

The last limitation of this research regards the demarcation to Web 2.0 technologies in the research design. While Web 2.0 as concept was introduced along with several functionalities, the choice has been made to focus on technology, whereas it is just an enabler of social processes and interaction. Acceptance of new technologies (for knowledge management) however, also relies on other factors, which are mentioned in the open knowledge environment model used within Alares. Within this model four factors should be in balance and align with other business processes in order to successfully manage knowledge. These four factors are, organisational culture, employees' competencies, organisation and systems. These four factors should all be considered when managing knowledge. So the specific focus on the contribution of Web 2.0 technologies is in some cases only a small part of the solution.

For instance, during the research it was found that especially within municipalities, the organisational culture influences many of the bottlenecks found and is therefore an important aspect when dealing with knowledge management. Although the desk research has discussed the organisational culture within municipalities shortly, it has been treated as a condition for success in this research project and therefore the organisational culture and the influence on knowledge management and Web 2.0 have not been discussed in depth in the theoretic sections. We do recognize however that this issue plays a crucial role in the adoption and use of Web 2.0 technologies. The role of organisational culture in relation to knowledge management and more specifically to the use of Web 2.0 requires further re-

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search. We reflect in chapter eight on the factors organisational culture, employees' competencies, organisation and systems of Alares' knowledge environment.

Despite these limitations, the findings of this research have been validated in several steps with experts and provide interesting insights and results. The results of this research project can be used as a first impression of the contribution of Web 2.0 technologies to knowledge management within municipalities or can be used as starting point for further research. Although the results are valuable, scholars who use this research are advised to take the limitations into account.

7.4. Suggestions for future research

This exploratory research can be used as starting point for future research. We presented in the previous section the research limitations and the demarcations of this research. Based on these limitations and demarcations we present suggestions for future research.

The first suggestion is to explore in more depth how the entire Web 2.0 concept contributes to knowledge management within municipalities. The focus of this research has been on Web 2.0 *technologies*. With a wider research focus it is also possible to explore the changes to business and social processes. Such a research would include other topics, like change management and business engineering. In addition, such a research would also present the opportunity to take the organisational culture into account to, which has been neglected in this research. More specifically, topics like the incentives for civil servants to use Web 2.0 and knowledge management or the strategic use of knowledge by civil servants can than be explored.

The second suggestion is to compare in more depth the differences and similarities of the case studies. The comparison of the case studies falls outside our research boundary, but is interesting to gain more insights into the differences between the traditional bureaucratic structure and the network. This comparison is interesting as public organisations increasingly collaborate with external stakeholders in networks and the dynamics we found in our research will therefore increasingly occur.

The third suggestion is to research in more depth the connection between Web 20 and knowledge management. Within this research, we connected Web 2.0 with knowledge management on several back-office domains. It would be interesting to research this connection on a more abstract or generic level. Research of this topic on a generic level could result in a framework or model that connects knowledge management with Web 2.0.

The last suggestion for future research focuses on the differences found between virtual CJG and CJG's with a physical location. This research introduced the differences and how these differences influence knowledge management, but has not concluded on these differences. A suggestion for future research would be to examine more detailed the differences between both CJG's and how these effect knowledge management and the potential use of Web 2.0 technologies.

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8. Reflection

> By three methods we may learn wisdom: first, by reflection, which is noblest;
> second, by imitation, which is easiest; and
> third, by experience, which is the most bitter.
> **Confucius (551-479 BC)**

8.1. Reflection on research strategy

From the start of this research project the choice was made to focus on Web 2.0 technologies and not on all aspects surrounding the use of Web 2.0 and knowledge management. A knowledge management model and a Web 2.0 model were chosen to analyse the knowledge management bottlenecks and the contribution of Web 2.0 technologies to knowledge management. Working with models within an explorative research in combination with Web 2.0 has presented several challenges. By choosing a model we sought support in this exploratory research project. During the research project the model that was found structured the analysis, but also restricted the solution space and the definition of bottlenecks. Furthermore, Web 2.0 technologies exceeds traditional knowledge management categories as it has a technology component, but also changes social interaction and communication. In hindsight, a less restricting approach would be favourable to research in an explorative way the use of knowledge management within municipalities and CJG's. Anyhow, with our approach knowledge management bottlenecks were also found, but we recommend to use a model in the data gathering phase that restricts analysis less than our model.

We choose to use case studies as research method in this project to explore the use of knowledge management and Web 2.0 technologies within municipalities. Scientific attention for these topics in the public sector still lacks, which makes the use of an empirical research method such as case study research a logical choice. Municipalities and CJG's were chosen as case studies as they present two extremes on a range of agency types to execute public policy. The choice to conduct two case studies that are very different has however consequences for this research project. The case studies are so different that it is hard to compare them entirely. Although many differences and similarities were found between the two case studies, we did not discuss these in detail. We choose to describe the case studies separately to conform to the research objective and only elaborate on the most interesting differences and similarities of the case studies. A complete comparison of the case studies would be interesting, but falls outside the research boundary. This comparison is interesting as public organisations increasingly collaborate with external stakeholders in networks and the dynamics we found in our research will therefore increasingly occur. We however discussed several interesting differences between the case studies, which were not found when only one case study was conducted. In hindsight, the execution of two case studies has broadened the insights into knowledge management and Web 2.0. We presented not only an in-depth analysis of the two case studies, but also presented several differences, which show the friction between traditional bureaucratic ways of working and the networked way of working within CJG's.

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The second choice was how to research the possible contribution of Web 2.0 technologies to knowledge management. We choose to find the knowledge management bottlenecks within municipalities and CJG's and from there we analysed the contribution of Web 2.0 technologies. We realise that this approach is counter-intuitive when opportunities for Web 2.0 technologies are researched to contribute to knowledge management. The rationale behind this choice was that the current knowledge management bottlenecks show what can be improved to the current use of knowledge management. We believe that by exploring the knowledge management bottlenecks a connection can be made with Web 2.0 technologies. In addition, this choice can also be validated by the diversity in characteristics and functionalities of Web 2.0 technologies. Within the wide range of Web 2.0 technologies, a contribution can often be found to a knowledge management bottleneck. With concrete contributions represented by the Web 2.0 technologies, the findings are of practical value. With a more abstract viewpoint on knowledge management and Web 2.0 this would be questionable.

This approach resulted in 25 knowledge management bottlenecks divided over two case studies. We choose to combine the case specific bottlenecks to more generic bottlenecks in order to present an enhanced analysis. This choice has consequences for the analysis. By combining several bottlenecks into one generic bottleneck, the description becomes more abstract and consequently, the generic bottleneck loses some of the details that were found in the original bottlenecks. We solved this by describing in detail the context of every generic bottleneck. We acknowledge however that the analysis of the original 25 bottlenecks could have resulted in other contributions of Web 2.0 technologies. We believe however, that our findings present a realistic set of Web 2.0 technologies that can be used to contribute to knowledge management within municipalities and CJG's.

8.2. Reflection on research findings

The findings based on the choices above were validated in a session with experts. The validation session has sharpened the findings and at the same moment showed the limitations of this research. We discussed earlier how the validation findings are influenced by the choice for consultants instead of civil servants. With hindsight, the experts also saw a lot of problems and obstacles with our presentation of the contribution of Web 2.0 technologies to knowledge management. The experts proposed several adjustments to the proposed Web 2.0 technologies, but also expressed their comments on the one-sided viewpoint of this research project. Although we still support our initial choice to focus on Web 2.0 technologies, this reflection would not be complete if we ignored the other aspects of knowledge management and Web 2.0 that were expressed by the experts. During the validation session many aspects were mentioned that were kept outside the demarcation of this research, but are important in the daily operational practices of the experts. These aspects are integrated in the knowledge environment, which is used within projects executed by Alares and is presented in Figure 14.

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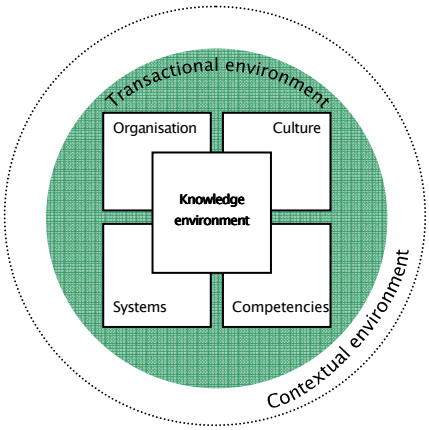

Figure 14: Knowledge environment used by Alares consultants (van Oirschot, 2003)

We focused on technologies (or systems) in this research project, while all aspects of the knowledge environment, as Figure 14 shows, should be in balance (van Oirschot, 2003). Without support or stimulation of the organisation, culture and competencies, knowledge management, but also Web 2.0 technologies will likely fail to be a success. The experts also emphasised this during the second validation session. Especially the organisational culture within municipalities seems to be a problem. Looking at the use of knowledge management within municipalities one can wonder if Web 2.0 will be accepted by civil servants and actually used. To change the culture of an organisation, the three other blocks, systems, organisation and competencies should also change. Paradoxically, Web 2.0 technologies are often used within organisations to enhance the company culture (Bughin, et al., 2008). This situation can be seen as the proverbial chicken and egg story. Without a change of culture and organisational measures it is not likely that civil servants will use Web 2.0, while Web 2.0 could be a catalyst to such change processes.

The results as presented within this research project should be read with the above kept in mind. Another example based on the knowledge environment is the knowledge management bottlenecks which states that civil servants lack the required competencies to work with the currently used systems to manage their knowledge. With the focus on technologies this viewpoint is logical, however with the knowledge environment in mind we should look differently to the findings. It is not the fault of civil servants that they have a hard time working with the provided systems. To have a balanced knowledge environment, municipalities should actively train and educate civil servants to work with the systems.

Organisation is the last aspect that is important within the knowledge environment. The formulation of a knowledge management vision on the executive levels of municipalities can have the organisational impact that is needed to change the culture and at the same time requires new systems and competencies (van Oirschot, 2003). We showed that in both case studies a knowledge management vision lacks. We proposed Web 2.0 technologies to contribute to this bottleneck. A knowledge management vision should however also take the organisational culture and the competencies of employees into account. An ambitious vision could only succeed when the employees possess the required competencies to work with the systems and are willing to execute the activities derived from the vision.

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8.3. Usability of findings

This research project is (one of the) first that combines knowledge management, Web 2.0 and the public sector. Furthermore, there were no empirical research projects that researched the use of knowledge management within municipalities. This research project adds value to the knowledge management field with the explorative analysis of knowledge management use within municipalities. Furthermore, we presented the connection between knowledge management and Web 2.0 for public organisations. The findings of this research can be used as starting point for research in similar research projects.

We believe the findings can be generalised to other areas and public organisations. Although we have not empirically researched this generalisation, we believe the case study findings can be applied to other areas. The characteristics of the first case study, the CJG, can be compared with several other initiatives currently conducted by the government. In the introduction, safety houses were shortly introduced as an example of the increasing collaboration between external stakeholders and municipalities. Although not discussed in detail, safety houses have besides collaboration much in common with CJG's. We expect that many of the problems found in CJG's can also be found within safety houses. Consequently, the analysis of Web 2.0 technologies and the subsequent contribution is relevant for safety houses. Besides safety houses and CJG's, municipalities, provinces and central government increasingly collaborate with external stakeholders on for instance spatial planning or dealing with youth, which cause troubles on the street or in public spaces. Although spatial planning and dealing with youth are very different, they have in common that public organisations collaborate with external stakeholders to solve or mitigate these problems.

Although we have not specifically compared the traditional bureaucratic and the network structure, observant readers can find clues that tension between these structures exist. For instance, many of the knowledge management bottlenecks within CJG's are based on issues with collaboration. As within the traditional bureaucratic structure of municipalities collaboration is not supported, it is hard to govern such a process within the CJG. In our opinion this is one of the reasons why many municipalities have recruited external coordinators and managers. Our case studies can thus be used when tension between traditional hierarchic management approaches and more network oriented management approaches is researched.

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Appendix 1: Scientific article

Knowledge management 2.0 with blogs, wikis, social networking and RSS

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Abstract

Knowledge workers are not satisfied with currently used information technologies like, e-mail and the intranet. These traditional technologies fail to function as proper knowledge management systems as knowledge cannot be easily captured, shared and applied to knowledge work. In this paper we explores the capability of four Web 2.0 technologies to manage knowledge within organisations. Multiple information sources were reviewed to find knowledge management capabilities of Web 2.0 technologies. We show that wikis, blogs, social networks and RSS all contribute to knowledge management in their own way, solving various issues with current knowledge management systems. Furthermore, we discuss several challenges with using Web 2.0 technologies in organisations.

Keywords: knowledge management, knowledge work, Web 2.0 technologies, Web 2.0

Introduction

Knowledge workers are not satisfied with currently used information technologies like, e-mail, intranet and software for document sharing and knowledge management (Davenport, 2005). Davenport (2005) shows that 26% of the respondents stated that e-mail was overused in their organisation, 21% felt overwhelmed by e-mail and 15% of the respondents stated their productivity decreased due to e-mail. Moreover,
another research shows that only 44% of the respondents found it easy to search and find something on the intranet (McAfee, 2006). These traditional technologies fail to function as proper knowledge management systems, as knowledge cannot be easily captured, shared and applied to knowledge work (Davenport, 2005). Furthermore, in-house experts are hard to find with the currently used systems (Nevo, et al., 2009). New technologies have however appeared, which can support knowledge workers in their daily work.
The past decade blogs, wikis, RSS and mashups have enriched the web, which transformed from a static collection of webpages to a collaborative network of applications, tools and people. These applications and tools empower users and become valuable as more people participate. The online opinion of individuals has become valuable for other individuals and for companies. Moreover, these people communicate and share knowledge with each other on a daily basis. These new, innovative internet technologies are often specified in the generic term Web 2.0. Web 2.0 technologies present an opportunity for organisations to improve their knowledge management.

This paper explores the connection between Web 2.0 technologies and knowledge management. We first introduce Web 2.0 and several Web 2.0 technologies that are relevant for this paper. We then present the connection between Web 2.0 and knowledge management and more specific the contribution of Web 2.0 technologies to knowledge management. We conclude with a presentation of challenges with using Web 2.0 technologies.

What is Web 2.0?

The first to mention Web 2.0 was O'Reilly, who talked about these developments on the internet at a conference and called it Web 2.0. Since then the term Web 2.0 is widely used on the internet and by other media. O'Reilly (2006) has since then defined Web 2.0 as: "the business revolution in the computer industry caused by the move to the internet as platform, and an attempt to understand the rules for success on that new platform. Chief among those rules is to build applications that harness network effects to get better the more people use them".

However, Web 2.0 as concept is more than a set of technologies. Technology is just the enabler of the power of Web 2.0. The use of these technologies by an increasing number of people makes Web 2.0 powerful (Li & Bernoff, 2008, p. 11). Hoegg et al. (2006, p. 13) have tried to incorporate both the technological and social aspects in their definition of Web 2.0: "The philosophy of mutually maximising collective intelligence and added value for each participant by formalised and dynamic information sharing and creation." The focus on sharing collective intelligence is important in the last definition as this is one of the most important concepts of Web 2.0 (Wijaya et al., 2009, pp. 9-10). The informal nature of Web 2.0 stimulates knowledge development and sharing among users. While being important on the internet for the general public, this concept can be valuable for organisations too. Knowledge workers demand technologies that manage knowledge more efficiently.

A Web 2.0 definition that is more focused on the organisational use of Web 2.0 is: "Corporate Web 2.0 can be defined as the transformation of the social and technological aspects of the new internet into business, leading to a redesign of existing business processes or even to an evolution of new business models" (Stocker et al., 2007). This last definition describes Web 2.0 as concept and focuses on the transformation of social and technological aspects of Web 2.0 into the organisation. This focus is important as it presents Web 2.0 as more than an additional technology or tool. It presents Web 2.0 as a social technology, which has the potential to transform business processes and could lead to new business models. An example of a new business model can be found on Twitter. Twitter is a microblogging service that is increasingly used as marketing channel, where users can broadcast what they are doing in 140 characters. Some active Twitter users state that their sales have increased after using Twitter. An example of an active user is Petra de Boevere (@slijterijmeisje at Twitter) who owns a liquor store and actively participates on Twitter, giving advice about liquor to people and broadcasts what she is doing. She claims that her presence has increased her sales and that 20% of her total sales can be directly related to Twitter (Blom, 2009).

Although it is important to understand the concept behind Web 2.0, this paper focuses on the contribution of Web 2.0 *technologies* to knowledge management.

The next section discusses several Web 2.0 technologies with potential to contribute to knowledge management.

Web 2.0 technologies

Web 2.0 is a generic term encompassing several Web 2.0 technologies. These Web 2.0 technologies have the potential to knit an organisation together and manage knowledge in formerly impossible ways (McAfee, 2006). In addition to managing knowledge, Web 2.0 technologies enhance social interaction and drive collaborative practices across various levels of the organisation (Boulos & Wheeler, 2007). By interacting socially with other people online and offline, informal and formal knowledge is shared. A good discussion can arise by the coffee-machine, but can also be facilitated by social networking technology or weblogs. Nonaka & Takeuchi (1997) state that social interaction is crucial for the conversion of knowledge. Knowledge as concept is complex and often resides in a human's mind entangled with contextual information in which the knowledge has been created. Knowledge sharing becomes a social process in which the knowledge and the context in which it has been created are both shared.

Web 2.0 technologies support and facilitate social interaction, while simultaneously store the created and shared knowledge. Furthermore, anyone can apply this knowledge and generate new knowledge. While a conversation by the coffee-machine only reaches a few people, Web 2.0 technologies have the ability to reach everyone with a computer and an Internet connection. Even when used within an organisation, Web 2.0 technologies provide the opportunity to every employee to generate and share knowledge and get in contact with colleagues. The value of these tools and applications becomes greater with each additional user, because of the additional intelligence and knowledge each user shares. McKinsey explored for which purposes organisations use Web 2.0. Their research shows that organisations mainly use Web 2.0 technologies to manage knowledge, to foster collaboration and to enhance the company culture (Bughin, et al., 2008, p. 3)). Another more recent survey among 1700 executives around the world from McKinsey (Bughin, et al., 2009) shows that Web 2.0 technologies are used internally by organisations to increase the speed of access to knowledge (68% of the respondents) and to increase the speed of access to internal experts (43% of the respondents). These survey results present some of the contributions of Web 2.0 technologies to knowledge management within organisations. Four of the most used Web 2.0 technologies within organisations are wikis, blogs, social networking and RSS (Bughin, et al., 2009; Matuszak, 2007; Ribiere & Tuggle, 2010). These four technologies are presented in the next sections.

Wiki

A popular technology is a wiki. Wiki is the Hawaiian word for quick or hurry and refers to the way content can be made visible. Every user of a wiki can add or revise articles that has been created. Wiki technology tracks revisions to articles, which can be viewed by all users. Users have to reach consensus on the content of the articles as no editorial oversight or approval exists within the basic functionality. In cooperation with other users articles can be produced about virtually anything and articles and themes can be linked easily. Navigating through linked articles and themes is easy as wiki tech-

nology uses HTML. Ebersbach, et al. (2008) have come to the following definition of a wiki: "A wiki is web-based software that allows all viewers of a page to change the content by editing the page online in a browser. This makes wiki a simple and easy-to-use platform for co-operative work on texts and hypertexts." A well known example of a wiki is Wikipedia, where more than eleven million users have created three million articles and have edited these articles more than 350 million times.

Blogs

Weblogs or blogs are websites where regularly new content is placed around a specific topic or theme. New blog entries can be placed by one or multiple authors and are called often called blog posts. Blog posts are usually displayed in a reverse chronological order, so with the most recent posts on top. Blog posts can contain text, pictures, video's or other content related to the topic (Murugesan, 2007). The goals of weblogs vary, as some blogs are informing and others are more personal. In general the goal of a weblog is to inform the readers of the blog on a certain topic, which may be a specific niche or the writer's personal activities. Most weblogs provide the possibility to comment on the posted content of the writer, which creates interaction between readers and writers. This interaction elaborates the discussion and creates two-way communication. Other features that are generally found on weblogs are permalink (permanent link), post date, category and/or tag and a trackback and pingback function (Murugesan, 2007).

Social networking

Social networks support the use of self-generated user profiles to help facilitate and mediate social interactions. Typically, social network users share details about themselves, search for others with similar interests, exchange messages, and work together (Yehuda, 2008). Examples of social networks are Hyves and Facebook. On these social networks, users can connect with friends and build social relationships, but also express themselves by personalisation of and adding content to their homepage. Examples of social networks with a specific focus are Myspace, LinkedIn, but also Ambtenaar 2.0. On these social networks people come together and link with each other when they share a particular interest. On Myspace this interest is music, on LinkedIn more business related networking takes place, while on Ambtenaar 2.0 civil servants connect and discuss how to use Web 2.0 technologies in public organisations. Nowadays it is relatively easy to start a social network, with for example Ning technology.

RSS

Really Simple Syndication or RSS in short is a technology to get regular updates of topics or websites of interest. These regular updates are called feeds and can be read in a browser or application. When a new update is placed on a website a new feed is sent to the reader. A user sees the feeds of his subscribed sites the next time he opens his RSS reader. The feed is a standardised XML file format, which allows viewing the information in many different ways. With RSS it is easy to keep up-to-date on any topic of interest without having to browse every website each time.

The above technologies only present a small portion of all available Web 2.0 technologies, which are most relevant for this paper and which are most popular among organisations. For a more generic overview of Web 2.0 technologies see Chui, Miller & Roberts (2009). These technologies have their own features and characteristics, which are useful for knowledge management. Based on a literature review, the next section elaborates how Web 2.0 technologies can enhance knowledge management.

Knowledge management 2.0

Traditional knowledge management systems control and validate content centrally and content is accessible on a need to know base (Ribiere & Tuggle, 2010). Web 2.0 technologies are based on a need to share paradigm and this new generation of technologies is easier to use than traditional knowledge management systems and simultaneously support collaboration and knowledge exchange. The adoption rate of Web 2.0 technologies is high as they are easy to use and intuitive and enable users to publish and distribute content immediately (Schneckenberg, 2009). In addition, the open character of many of these technologies makes combination of technologies into one integrated solution possible. The diversity in technologies creates opportunities to organisations to provide employees a set of technologies that can be used to manage and share their knowledge and knowledge work, instead of several stand alone technologies. Providing an integrated solution of several technologies should make it easier to use within the daily routine. For instance, a virtual shared workspace can be used as base to integrate blogs, wikis and microblogging functionality. RSS can be used to provide feeds to users when new updates or comments are placed on topics of interest. This section discusses how the most popular tools previously described enhance knowledge management.

Wiki

When knowledge workers within an organisation work in a team on an evolving issue, like a project or a report, a wiki can support their efforts in a more efficient way by using a shared website to which anybody with access can add knowledge on the subject. This is more efficient because the exchange of email back and forth between members of a team is decreased, which enhances communication efficiency and productivity (Murugesan, 2007). Furthermore, team members can contribute asynchronously to the wiki, which means time and location do not restrict the composition of a team. Team members can see what others have added and adjusted to the content with the revision tracking functionality. In addition, these revisions and the content itself can be discussed with the discussion functionality. The advantage of a discussion on the wiki is that all members can see what has been discussed and how consensus is reached on evolving issues. Once again, when email is used many messages need to be send back and forth to reach consensus and moreover it can happen that not all members are part of the email traffic.

The above example can be used for teams, but also for groups, departments or entire organisations. Web 2.0 technologies are easily scalable, which also applies to wikis. On an organisational level wiki technology provides employees a tool to express, share and find knowledge. Since the majority of organisational

knowledge resides in people's mind, technologies, such as wikis that are simple and easy to use can be made available to employees to harness the power of many to provide a dynamic that lets people volunteer to create a common good (Wagner, 2004). Wagner (2004) adds that he expects faster knowledge management with fewer mistakes than in closed source knowledge management environments, such as the traditional knowledge management systems provide.

Blogs

Just as wiki technology, blogs present an opportunity for organisations to enhance their knowledge management. Blogs can be used internally and externally by organisations to show and share their knowledge with others. Especially the transfer of tacit knowledge with contextual information can benefit from the use of blogs within organisations. Tacit knowledge was traditionally shared with others during face-to-face conversations (Nonaka & Konno, 2001). Face-to-face conversations requires that both persons are at the same place at the same time. Furthermore, if others want to benefit from the knowledge of one person they need to join the conversation. The knowledge cannot be consulted later by others as it is not stored.

With blogs these obstructions to share knowledge are solved. When blogs are used, the physical and geographical location of someone does not obstruct the transfer of knowledge. Furthermore, the knowledge that is transferred in blogposts is stored on a webserver that hosts the weblog, which means knowledge is always available for later use. In addition, Martin-Niemi & Greatbanks (2010) have monitored 33 weblogs for 5 months and concluded that blogs have the potential to develop communities with all of the necessary attributes to provide an environment for tacit-to-tacit as well as individual-to-organisational knowledge conversion. Furthermore, a blog environment can provide an appropriate setting for members of a virtual community to fully participate, and feel part of the community, even when physically separated (Martin-Niemi & Greatbanks, 2010).

Social networking

Social networking is mainly used for expertise location, talent management and community building (Gotta, 2009). Expertise location means who knows what and who knows whom. Employees of an organisation are often not acquainted with projects, professional interests or hobbies of colleagues, while these can be important when a specific expert or expertise is sought. Community building is presented as interacting with peer groups, building relationships with colleagues and as leveraging informal contact (Gotta, 2009). The association between community building and social networking is important to emphasise as community building becomes an essential part of gaining technology adoption among employees. In other words, a strong community on a social network has a positive effect on adoption among employees of an organisation and vice versa. Gotta (2009) distinguishes three types of communities on social networks, namely ad hoc groups, projects teams or communities that are more formal, such as those recognised by management. Due to the open character of a social network, these communities can have different goals and focus.

Social networking contributes to a problem with traditional knowledge management and knowledge management systems as social networks provide a

means to employees of an organisation to show and share their expertise and experience in a natural way to and with others. Nowadays, employees of an organisation do not know who to ask for certain specific knowledge and do not know how other employees are related. Furthermore, colleagues get to know each other better on social networks and build relationships on (in)formal contact. Current systems do not satisfy these needs.

Social networking technology provides an opportunity for organisations to tap into the collective wisdom of its employees in a user-friendly and user-generated environment. With a few clicks experts or colleagues with similar interests and experience can be found. In the same manner knowledge is shared, but not with one or a few others, but with the entire community. Kane, Robinson-Combre & Berge (2010) even state that with social networking technology knowledge is shared exponentially. Due to network effects, many more people can be reached compared to traditional systems.

RSS

RSS is a Web 2.0 technology that changes the way people acquire their knowledge. Gruman (2006) presents an example of a Chief Information Officer who e-mails colleagues or browses the internet when he wants to know something. The Intranet is not used much and colleagues often do not email back. In this way finding the information that one needs depends on colleagues e-mailing back and the ability to find information on the Intranet or internet. RSS is now used within this organisation to push relevant information via subscription to employees, customers and business partners (Gruman, 2006). So the use of RSS has value for the internal organisation to provide the same core information to all employees, but also for the outside world, that gets regular updates of what the company is doing.

With additional software, usage patterns of employees can be analysed regarding their previous use of RSS. Consequently, important feeds can be prioritised and others can pushed back based on the analysed patterns. Furthermore, these patterns are valuable for executives as they give insight into the knowledge demands of employees (LaMonica, 2006). This metadata can be used by executives to supply employees with the information they need. This saves time as employees do not have to search for information anymore as information is automatically broadcasted to them. Off course this does not take everything into account, but the most generic information can be supplied in this way. Furthermore, with RSS technology employees can add feeds that they need for their work and personalise their supply of information.

Challenges to knowledge management 2.0

Blogs, wikis and social networking are presented as technologies with much potential to enhance current knowledge management within organisations. However, dynamics on the internet are different from dynamics within an organisation. The first challenge is participation of employees within an organisation. A rule that is often cited when this limitation comes up is the participation inequality or 90-9-1 rule, which states that in most online communities 90 percent of users never contribute, 9 percent of users contribute little, while only 1 percent of the users account for most action (Nielsen, 2006). Due to the scale of the internet and the amount of users using popular Web 2.0 technologies, the

participation inequality rule is not a big issue. In an organisation however with 1000 or less employees, participation needs to be higher to get useful results. Chui, et al., (2009) state that successful participation needs grassroots activity and subsequently support from the executive levels of the organisation. Moreover, executives should serve as role models for others and evangelise the use of the Web 2.0 technologies.

The second challenge which should be considered before starting with Web 2.0 technologies is that users will not adopt them spontaneously. Time and effort should be invested in the focus and goals of the Web 2.0 technologies. In addition, before implementing several Web 2.0 technologies, executives should understand the connection between the business processes and Web 2.0 technologies (Matuszak, 2007). Furthermore, Chui, et al., (2009) state that it is important to integrate the use of Web 2.0 technologies in the work flow. In other words, Web 2.0 technologies should not saddle employees with additional work, but instead the technologies that are used should be relevant to daily work practices and should provide value to the user.

The last challenge is protecting and securing internal information on Web 2.0 environments (Matuszak, 2007). When Web 2.0 technologies on the internet are used an organisation depends on the security measures of the provider of the technology. More and more Web 2.0 technologies are developed that can be used within the secured network of the organisation. Several organisations supply wiki technology or completely integrated packages with various functionalities for organisational use. The disadvantage is that they are often not free of charge in contrast to the free technologies on the internet, but security can be managed in-house.

Conclusion

This paper introduced wikis, blogs, social networking and RSS as Web 2.0 technologies that contribute to currently used knowledge management systems within organisations. We showed that each of these technologies has its own features and characteristics and consequently can be used for other knowledge management purposes within organisations.

The power of Web 2.0 technologies to contribute to knowledge management lies in the first place in its diversity. We presented only a small selection of a much wider range of technologies, which all have their own characteristics and consequently their own contribution to issues with the current use of (knowledge management) systems.

In the second place several Web 2.0 technologies can be integrated into one solution providing multiple functionalities on one platform. The open character of Web 2.0 provides the opportunity to mix different technologies and create a mash-up with a diverse set of functionalities. For instance wikis, blogs and microblogging can be integrated on a social network or on shared workspaces. With several technologies on one platform, employees can use the provided functionalities more efficiently and consequently manage knowledge easier.

In the last place, the presented Web 2.0 technologies are easily scalable and can therefore be used by teams, departments or organisation-wide. With traditional used systems, such as email, it is more difficult to involve all employees of the entire organisation within a project.

We believe based on the findings within this paper that Web 2.0 technologies have

unique abilities and functionalities to enhance knowledge management within organisations.

Future research can be focused on the connection between Web 2.0 and knowledge management, which is a more generic research focus than our paper. Future research can also focus more specifically on the application of Web 2.0 technologies to enhance knowledge management within organisations. Lastly, future research can focus on the integration of Web 2.0 technologies, which is not been well documented yet. Especially in relation to knowledge management this would be an useful addition to the current academic contributions. This paper can be used as a starting point for these approaches.

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Appendix 2: Web 2.0 model

The model shown in Figure 15 presents the capabilities of Web 2.0 technologies within organisations. First, the user of this model decides for what purpose Web 2.0 technologies are used and who are participating. The next step is to determine, which block fits best with the problem and which category should be chosen. Subsequently, from the category a specific Web 2.0 technology can be chosen to use within the organisation.

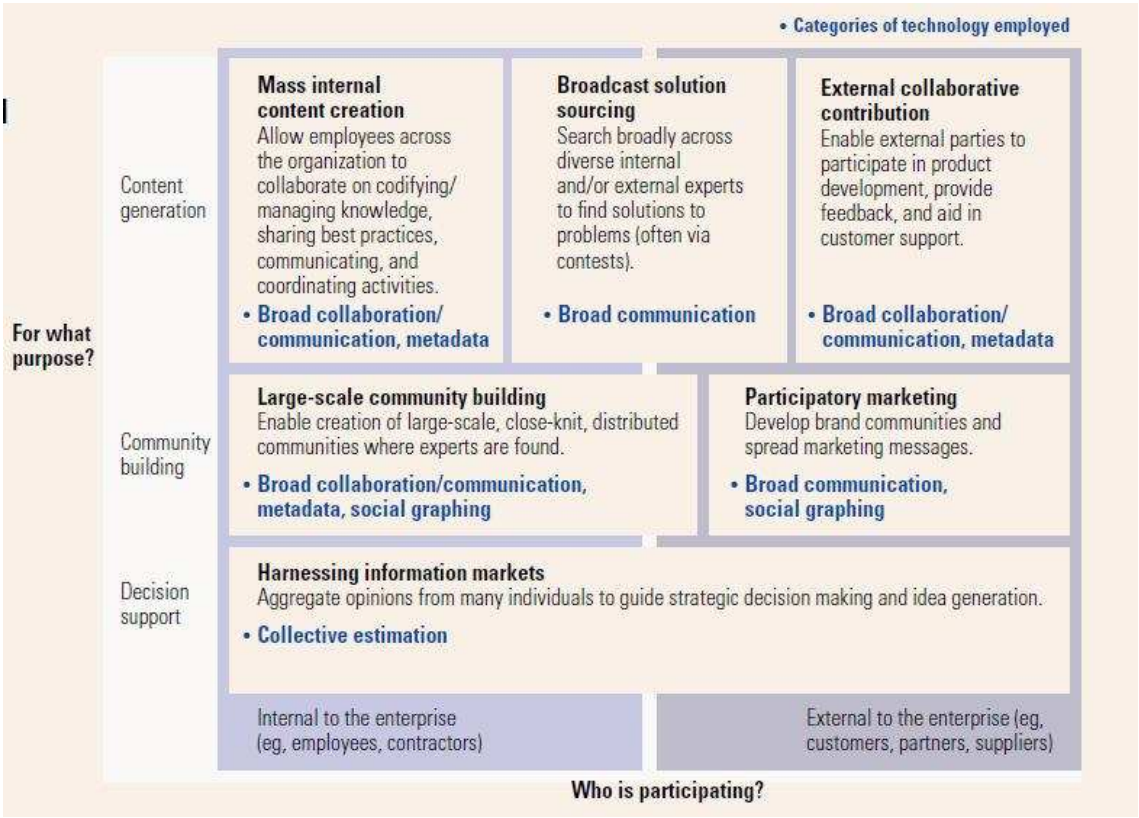


Figure 15: The use of Web 2.0 within organisations (Chui, et al., 2009)

Appendix 3: Interview case study 1

Datum :
Tijdstip :
Locatie :

Aanwezig :
Verslaglegging : Alex Verheij

Achtergrond

A: Wat is uw functie binnen het CJG?
R:

Horizontal collaboration

A: Hoe komt samenwerking tot stand binnen het CJG?
R:

A: Hoe verloopt de samenwerking tussen de verschillende partijen in het CJG?
R:

A: Heeft de gemeente doorzettingsmacht binnen het CJG?
R:

Vertical integration

A: Hoe verloopt de communicatie/samenwerking tussen de coördinatoren binnen het CJG en de gemeente […]?
R:

A: Aan wie legt u verantwoording af over het proces?
R:

A: En hoe?
R:

A: Is er behoefte aan richtlijnen vanuit het Rijk?
R:

Knowledge combining systems

A: Wat voor kennis is belangrijk voor het uitvoeren van uw rol/taak binnen het CJG?
R:

A: Over wat voor kennis zou u nog willen beschikken om uw functie uit te oefenen?
R:

Kennismanagement

A: Bestaat er een visie met betrekking tot kennismanagement binnen het CJG?
R:

A: Bestaat er een strategie met betrekking tot kennismanagement binnen het CJG?
R:

Uitwisseling van kennis

A: Wordt kennis opgeslagen?
R:

A: Wordt kennis actief gedeeld binnen het CJG?
R:

A: Hoe wordt kennis gedeeld?
R:

A: Zijn er systemen, zoals een intranet of een forum, om kennis uit te wisselen?
R:

A: Wordt er gebruik gemaakt van online mogelijkheden om kennis uit te wisselen?
R:

A: Is de cultuur binnen CJG's ernaar om kennis met elkaar te delen?
R:

A: Wat voor knelpunten ervaart u binnen CJG's rondom kennisdeling?
R:

Appendix 4: Interview case study 2

Datum :
Tijdstip :
Locatie :

Aanwezig :
Verslaglegging : Alex Verheij

Introductie

- Introductie van mijzelf en mijn onderzoek met de nadruk op kennismanagement binnen gemeenten en de twee onderkende stromingen uit de literatuur.

A: Wat is uw ervaring met kennismanagement?
R:

A: Hoe definieert u kennismanagement?
R:

A: Bestaat er een visie met betrekking tot kennismanagement binnen de gemeente of zijn de genoemde initiatieven veelal losse projecten?
R:

Kenniscreatie en -combinatie

A: Wat voor kennismanagement initiatieven lopen er op dit moment binnen de gemeente […]?
R:

A: Zijn er al kennismanagement initiatieven afgesloten?
R:

A: Wat is het doel van de huidige en afgesloten kennismanagement initiatieven?
R:

A: En wat is het resultaat van de kennismanagement initiatieven? Zijn de doelen behaald?
R:

Toekomstige initiatieven met betrekking tot kennismanagement

A: Zijn er nog kennismanagement initiatieven die de komende jaren uitgevoerd zullen worden?
R:

A: Is er met betrekking tot kennismanagement nog behoefte aan initiatieven? Wat kan beter?
R:

Twee stromingen binnen kennismanagement

A: Als u kijkt naar twee eerder genoemde stromingen binnen kennismanagement, waar ligt de focus dan binnen de gemeente […]?
R:

A: Denkt u dat deze focus in de toekomst zal veranderen?
R:

Inzet van kennismanagement binnen de bestuurscyclus

A: Als u deze theoretische bestuurscyclus bekijkt, in hoeverre komt deze overeen met degene die binnen de gemeente Spijkenisse gebruikt wordt?
R:

A: Als u deze theoretische bestuurscyclus bekijkt, waar wordt volgens u kennismanagement gebruikt?
R:

- Introductie van Web 2.0 en de potentiële waarde voor kennismanagement binnen gemeenten.

Web 2.0

A: Is uw gemeente intern al bezig met Web 2.0?
R:

A: Zo ja, kunt u mij meer vertellen over de doelen en het resultaat van deze initiatieven en eventueel de visie erachter?
R:

A: Denkt u dat Web 2.0 toepassingen de huidige kennismanagement initiatieven zouden kunnen aanvullen? En zo ja, hoe?
R:

Appendix 5: Respondents of case studies

Case study 1

- Arno Hogendoorn, policy advisor GGD Rotterdam Rijnmond
- Sandra van Leeuwen, policy advisor municipality of Eersel
- Ed van Herk, coordinator CJG Ridderkerk
- Henriëtte van Aken, coordinator CJG Almere
- Miranda Valkhof, coordinator front-office CJG Lelystad
- Pim van Hulst, project manager CJG Enschede
- Anne Willems-Goethals, CJG Tilburg
- Ariska Holland, manager CJG Apeldoorn
- Margrethe Bongers, coordinator CJG Rozenburg, Brielle and Hellevoetsluis
- Colet Snoeren, chain director CJG Eindhoven
- Marjan van Parijs, project manager CJG Breda

Case study 2

- Hans Hartzema, head of department Document management, Computerisation & Automation of the municipality of Spijkenisse
- Jan Ambachtsheer, head of department Concern management of the municipality of Vlaardingen
- Paul Turion, head of department Management & Information of the municipality of Vlaardingen
- Raymond Lefel, department manager Computerisation & Automation and Digital Information Services of the municipality of Schiedam
- Jan Wiegmann, co-worker Policy and Management support, Task group IT
- Piera Cherchi, manager of Information services of the municipality of Rijswijk
- Nancy van der Leest, sitemanager Communication of the municipality of Rijswijk

Case study 3

- John Pape, Senior advisor Information services of the municipality of Gouda

Appendix 6: Case study 3: A governing municipality

Case selection and approach

Case studies one and two have been carefully selected based on defined arguments and conditions. The governing municipality however has been found during the interviews of the second case study and has therefore the same selection criteria as case study two. The governing municipality came out as an outlier from the interviews and therefore will be discussed separately in this section. As only one interview has been conducted the findings are not significant, however they provide valuable insight into the structure of a governing municipality, which is a mix of the other two case studies. Only the aspects that differ from the second case study and that present interesting insights will be discussed in this section. The next section discusses briefly what a governing municipality is.

Governing role of municipalities

The introduction showed that municipalities increasingly collaborate with external stakeholders in networks due to the increasing complexity of problems. This collaboration in a network changes the role of the government (Bekkers & Bouwman, 2009). Solving so-called wicked problems, which are unstructured, relentless and cut through multiple policy domains (Weber & Khademian, 2008), requires another role for municipalities. To solve these problems municipalities have to collaborate with external stakeholders in networks to execute the policy. This policy is often formulated by the central government. The role of a municipality in a network that executes policy differs from its role in traditional policy making. As participation to the network is voluntary, municipalities cannot use their hierarchical power, but should use other means to get the stakeholders to collaborate with each other (Koulen, Scheidel, & Wolthuis, 2006). The role of municipalities becomes a more governing one in these networks. Pröpper, Litjens & Weststeijn (2004) define governance as: "a special form of direction, which is aimed at creating a fit between actors, their goals and actions to come to a predefined result."

Although the policy is formulated by the central government, the responsibility for the execution of policy lays with the municipality. So although other stakeholders execute the policy within the collaborative networks[8], the municipality is accountable for the result. This situation, where the central government imposes policy or policy frames, which is executed by external stakeholders, is challenging for municipalities. Research of Pröpper, Litjens & Weststeijn (2004) on the governing role of municipalities shows that municipalities want space to execute policy in the best way according to local practices. The central government therefore increasingly offers frames to municipalities, on policy fields like integration and education, in which municipalities have space to execute the policy as desired with

[8] Networks and collaborative networks are used interchangeably within this report, but have the same meaning.

local stakeholders (Koulen, et al., 2006). Within the policy frames municipalities can execute their tasks according to their own understanding.

The above shows the situation as described in the first case study. A governing municipality (regiegemeente in Dutch) goes one step further than collaborating in networks when central government imposes such structures to them. A governing municipality outsources many of the traditional municipal tasks to external stakeholders. So tasks that can be executed by civil servants are often outsourced to external partners. These external stakeholders can be private, semi-public or public organisations. The municipality, however, has still the responsibility of the proper execution of these tasks and has to manage all these processes with their partners. Managing these processes and partners requires a lot of knowledge and knowledge processing. In addition, the role of civil servants changes fundamentally as it becomes more facilitating and coordinating. De Jong, et al. (2007) state that together with the changing role of public organisations, the importance of other types of knowledge have increased. Municipalities have various tasks to execute in their governing role in networks. It is the task of the municipality to form a network of stakeholders, which collaborate to execute the policy. Furthermore the municipality should have an overview of the situation and is responsible for the results. The last task is the provision of collective policy lines (Pröpper, et al., 2004).

Results

One of the visited municipalities in case study 2 described itself as a governing municipality. To support civil servants of this municipality with their activities, knowledge management is used in a more structural way compared to case study 2. A diverse range of technologies are used to support and stimulate their knowledge workers and activities and they are still investigating new technologies to add. Funding is basically the only reason within this municipality why some of the plans for pilots are rejected. The goal of the visited governing municipality is to come to a better result or execute the process more efficiently with stakeholders than by executing every step themselves. Knowledge management should support them reaching this goal.

In a governing municipality it is essential that civil servants have access to new knowledge anywhere and anytime to manage the process and the outcome. Consequently, it is expected that knowledge management becomes more important in their daily work practices. Knowledge management in this case supports the knowledge worker in the governance or management process. Based on the interviews it is not possible to tell if it is a coincidence or a structural aspect that knowledge management is used for another reason in a governing municipality than in traditional municipalities. Although the projects were mainly pilots, the use of Web 2.0 was higher in Gouda too. The next sections discuss the above in more detail along the blocks of the model of Mcnabb (2007). Some blocks have been aggregated as there was not enough data to discuss the blocks separately.

Knowledge development mechanisms

Knowledge creation and knowledge combination

Knowledge creation and combination initiatives within a governing municipality can be compared to the initiatives of a traditional municipalities. The visited governing municipality has a job rotation program in place for civil servants that want to change jobs. Furthermore, theme meetings with (external) speakers are organised regularly to discuss specific topics of interest. The visited governing municipality had also two Communities of Practice in place. The first Community of Practice has been set up for project leaders where they can exchange knowledge and practices. The second Community of Practice has been set up for civil servants under the age of 35. The goals of these initiatives are to create new knowledge and share this knowledge among civil servants. The respondent stated that they are always in search for new initiatives to enable knowledge creation and sharing among the employees of the municipality. The technology related initiatives are discussed in the next section.

The respondent did not mentioned any knowledge combination initiatives besides databases and the Intranet. What should be mentioned is that this governing municipality was working on a flexible architecture of their IT, so civil servants can work at home or at another location. Although this is not a pure knowledge combination initiative, it makes all knowledge available anywhere and anytime, which is a requirement when civil servants work much outside the municipality at external locations. The respondent has not mentioned any new bottlenecks on knowledge creation and combination compared to the other case studies.

Knowledge transfer mechanisms

Intranets, bulletin boards and Web 2.0

The respondent stated that six years ago he took the initiative to start an Intranet with as primary goal knowledge sharing. Since then the Intranet has become outdated as well as the underlying vision document. Nowadays, the Intranet is mainly used to present and transfer explicit knowledge. The initial goal however, has not been changed. Although other technologies are used, the goal to share knowledge among civil servants is still alive.

The use of Web 2.0 technologies is remarkably high at the visited governing municipality. The main driver behind the use of these technologies is to share knowledge between civil servants. Many pilots were started and they are still investigating new technologies to add to use in their daily practices. One of the first pilots was a wiki for internal use. Every civil servant can use the wiki to add or edit content that has been created. In cooperation with other civil servants content can be produced about virtually anything. The goal of the wiki in the visited governing municipality is to support social interaction between employees. To reach this goal, the wiki has been implemented for the whole organisation and on the wiki certain topics have been specified where the input of employees is needed. Users can also come up with topics themselves, so besides the more formal topics, many informal discus-

sions are running. The wiki is already used for projects and for specific departmental topics. An important difference compared to the second case study is that initiatives are set out for the whole organisation. Consequently, all employees can benefit from the knowledge shared by co-workers.

Besides the internal use, Web 2.0 is also externally used. For example, the respondent stated that they use virtual workspaces internally, but also externally to organise communication and collaboration during projects with external stakeholders. All information and documents can be placed in the virtual workspace and stakeholders can discuss and collaborate with each other. Other technologies that are used within the visited governing municipality are microblogging, Instant Messaging and weblogs. Blogging and microblogging are still pilots, so not much can be said about the success of these initiatives. Instant Messaging was not a success yet as the Open Source application they used was user-unfriendly.

The above findings show that a wide range of technologies are used to share knowledge and to communicate between civil servants and with external stakeholders within the governing municipality. The respondent stated that they are currently looking how to balance efforts between the wiki and the Intranet. Although the Intranet and a wiki have their own characteristics, both have much in common. To prevent issues, the respondent was still thinking about the goals of both technologies and how to facilitate these goals. Both are needed and need attention of civil servants. As long as the visited governing municipality is thinking about how to balance time and effort between the wiki and the Intranet, the two technologies are redundant.

This need for attention for all the technologies that are implemented poses a bottleneck within governing municipalities. Although knowledge management, and more specifically, knowledge transfer systems, are used more intensively in a governing municipality, the time that is needed to maintain all these systems can be a bottleneck. Besides the Intranet and wiki, a virtual workspace is used internally and externally and even a community has been started. On the other hand are these technologies used within the workflow of the civil servants making adoption easier. These four technologies all present the possibility to share knowledge and communicate with each other, which means some of the technologies are redundant. This proves to be right as the community and Intranet are hardly used. So before starting more pilots it is necessary to evaluate what the goals are and which technologies present the best features to fulfil the goals.

The following bottlenecks have been found:

1. The use of several knowledge transfer technologies is hindered by the lack of clearly defined strategic goals and focus.
2. Knowledge transfer with Web 2.0 technologies is hindered by the redundancy in functionality of tools, which requires civil servants to balance their time and effort.

Knowledge sharing mechanisms

Horizontal collaboration and vertical integration

The discussion of several Web 2.0 technologies showed that knowledge transfer and communication are important goals within a governing municipality. These goals are also important when collaborating with co-workers. Without knowledge sharing and communication, horizontal collaboration would be hard to execute within a governing municipality. Within the visited governing municipality, horizontal collaboration is mainly facilitated by the tools that are discussed in the previous section.

Besides internal collaboration, governing municipalities also collaborate with external stakeholders. The mix of internal and external collaboration presents interesting insights. With collaboration as topic, the governing municipality can be seen as a mix of a traditional municipality and a network organisation. When looking at internal collaboration the governing municipality looks like a traditional hierarchical organisation. However, when looking at the external collaboration, the governing municipality looks much more like a flat network organisation.

Although the governing municipality is flatter than the traditional municipality, the organisational culture is still a bottleneck for collaboration. As described Web 2.0 tools are the main facilitator of collaboration within the governing municipality. Within the visited governing municipality many civil servants do not want to share their knowledge and use the tools that are provided to them. The respondent stated however, that there are many enthusiasts that stimulate collaboration and the use of Web 2.0 technologies.

Discussion

The above shows that knowledge management is hindered by some of the earlier identified bottlenecks. However, we also found that within the government municipality more efforts are focused on collaboration and consequently more technologies are used to support and stimulate this collaboration.

Appendix 7: Considerations of combining bottlenecks

Generic knowledge management bottlenecks within CJG's

Thirteen bottlenecks were found during the interviews with CJG respondents. These twelve bottlenecks have been combined in generic knowledge management bottlenecks. These generic bottlenecks are presented in the next sections.

Knowledge management within CJG's is hindered by the lack of network knowledge and socialisation among CJG partners

This generic bottleneck is a combination of CJG knowledge management bottlenecks 1, 7, 9 and 10. Bottleneck 1 and 10 present the lack of socialisation and the lack of network knowledge among CJG professionals. These bottlenecks have been mentioned by many of the respondents during the interviews and form the basis of the generic bottleneck. These bottlenecks are combined as both have a social cause. CJG bottlenecks 7 and 9 were mentioned a few times and were not found within all CJG's. Bottlenecks 7 and 9 have the social cause in common with bottlenecks 1 and 10. Therefore these bottlenecks have been placed within this generic bottleneck, but only as context.

Knowledge management within CJG's is hindered by the fragmentation of knowledge among CJG partners

This generic bottleneck is a combination of CJG knowledge management bottlenecks 2 and 8. Especially, the fragmentation of knowledge among CJG partners was mentioned by many respondents. This bottleneck hindered knowledge management in various ways within CJG's. This bottleneck has therefore been the basis of this generic bottleneck. CJG bottleneck 8 adds value to this generic bottleneck. Some of the respondents stated that a large amount of meetings take place in the youth care sector between the partner organisations is a CJG. The respondents found it hard to decide which meetings to attend and which not. As not all meetings can be attended by all partner organisations, knowledge discussed during these meetings is fragmented among partners. This bottleneck however has been added as context to this generic bottleneck and not in the description.

Knowledge management within CJG's is hindered by the absence of a system to combine the diverse output of registration and signalling systems of CJG partner organisations

This generic bottleneck is a combination of CJG knowledge management bottlenecks 3 and 4. These CJG bottlenecks have in common that they relate to output generated by registration and signalling systems of partner organisations. Both bottlenecks have been mentioned by many respondents and are therefore both described in this generic bottleneck.

Knowledge management within CJG's is hindered by the difficulties with vertically integrating operational knowledge to strategic levels and vertically integrating strategic knowledge to operational levels

This generic bottleneck is a combination of CJG knowledge management bottlenecks 11 and 12. Bottleneck 11 is the actual basis of the generic bottleneck as it discusses the lack of commitment of partners. Bottleneck 12 can be seen as a derivation of bottleneck 11 and presents in more detail the knowledge management issues. The combination of bottleneck 11 and 12 is however defined more generic. The description of bottleneck 12 is therefore added as context to this generic bottleneck.

Redundant bottlenecks

Bottlenecks 5 and 6 have not been used in the combination of bottlenecks. These bottlenecks support the view of this research that Web 2.0 technologies can contribute to knowledge management. Both bottlenecks have in common that knowledge transfer is hindered, but both bottlenecks do not benefit from a specific contribution as any Web 2.0 technology can contribute to these bottlenecks. Therefore these have not been used further in this research.

Generic knowledge management bottlenecks within municipalities

Twelve bottlenecks were found during the interviews with civil servants working for the municipality. These twelve bottlenecks have been combined in generic knowledge management bottlenecks. These generic bottlenecks are presented in the next sections.

Knowledge management within municipalities is hindered by the lack of required competencies of civil servants to search and find knowledge in currently used systems

The proposed generic bottleneck has not been changed after the analysis and represents bottleneck 3. This bottleneck was too specific to combine with other bottlenecks and therefore the original description has been used.

Knowledge management within municipalities is hindered by the strategic use of knowledge by civil servants on operational and strategic levels

This generic bottleneck is a combination of municipal knowledge management bottlenecks 5 and 8. Bottlenecks 5 and 8 have in common that knowledge sharing is hindered. Bottleneck 5 was mentioned by several respondents and is an effect of the organisational culture within municipalities. Bottleneck 8 is more focused on transparency, but also hinders knowledge sharing. These have been combined to the strategic use of knowledge by civil servants. Both levels have been defined, because bottleneck 5 occurs on both operational as strategic levels of municipalities.

Knowledge management within municipalities is hindered by the lack of incentives for using knowledge management

This generic bottleneck is a combination of municipal knowledge management bottlenecks 6 and 9. These two bottlenecks have been combined, because they have both in common that there is a lack of incentives for using knowledge management. The lack of incentives was mentioned by several respondents and described in bottleneck 6. Bottleneck 9 is an effect of bottleneck 6. As there are no incentives to use knowledge management, the Intranet is not used either. Therefore, these bottlenecks have been combined.

Knowledge management within municipalities is hindered by the absence of strategic attention for knowledge and knowledge management

This generic bottleneck is a combination of municipal knowledge management bottlenecks 2, 10, 11 and 12. We choose to take bottlenecks 2 and 11 as start for the combination of these bottlenecks. Many respondents stated that there is a lack of vision and attention for knowledge management from the strategic level of municipalities. As there is no strategic attention for knowledge management, knowledge management on operational levels is hindered too. Bottleneck 10 shows that knowledge management initiatives are focused on specific groups and departments, which means knowledge is shared between certain colleagues instead of with the entire organisation. Bottleneck 12 describes in even more detail that knowledge is hardly shared between operational and strategic levels of a municipality. These bottlenecks have been combined to the above generic bottleneck.

Knowledge management within municipalities is hindered by the lack of initiatives that transform the newly created tacit knowledge into explicit knowledge.

The proposed generic bottleneck has not been changed after the analysis and represents bottleneck 1. This bottleneck was too specific to combine with other bottlenecks and therefore the original description has been used.

Redundant bottlenecks

Bottlenecks 4 and 7 have not been used in the combination of bottlenecks. These bottlenecks support the view of this research that Web 2.0 technologies can contribute to knowledge management. Therefore these have not been used further in this research.

Appendix 8: Validation criteria, techniques and outline

Whittemore, et al., (2001) have listed several common techniques to validate qualitative research. Furthermore, they defined primary and secondary criteria to validate qualitative research together with questions to assess the criteria. Table 5 presents the identified techniques and Table 6 the primary and secondary criteria of validity.

Table 5: Techniques for demonstrating validity (Whittemore, et al., 2001)

Type of Technique	*Technique*
Design consideration	Developing a self-conscious research design
	Sampling decisions (i.e., sampling adequacy)
	Employing triangulation
	Giving voice
	Sharing perquisites of privilege
	Expressing issues of oppressed group
Data generating	Articulating data collection decisions
	Demonstrating prolonged engagement
	Demonstrating persistent observation
	Providing verbatim transcription
	Demonstrating saturation
Analytic	Articulating data analysis decisions
	Member checking
	Expert checking
	Performing quasistatistics
	Testing hypotheses in data analysis
	Using computer programs
	Drawing data reduction tables
	Exploring rival explanations
	Performing a literature review
	Analyzing negative case analysis
	Memoing
	Reflexive journaling
	Writing an interim report
	Bracketing
Presentation	Providing an audit trail
	Providing evidence that support interpretations
	Acknowledging the researcher perspective
	Providing thick descriptions

Table 6: Assessment of primary and secondary criteria of validity (Whittemore, et al., 2001)

Criteria	*Assessment*
Primary criteria	
Credibility	Do the results of the research reflect the experience of participants or the context in a believable way?
Authenticity	Does a representation of the emic perspective exhibit awareness to the subtle differences in the voices of all participants?
Criticality	Does the research process demonstrate evidence of critical appraisal?
Integrity	Does the research reflect recursive and repetitive checks of validity as well as a humble presentation of findings?
Secondary criteria	
Explicitness	Have methodological decisions, interpretations, and investigator biases been addressed?
Vividness	Have thick and faithful descriptions been portrayed with artfulness and clarity?
Creativity	Have imaginative ways of organizing, presenting, and analyzing data been incorporated?
Thoroughness	Do the findings convincingly address the questions posed through completeness and saturation?
Congruence	Are the process and the findings congruent? Do all the themes fit together? Do findings fit into a context outside the study situation?
Sensitivity	Has the investigation been implemented in ways that are sensitive to the nature of human, cultural, and social contexts?

Validation session outline

Based on a selection of criteria of validity, a validation session was held with experts. Figure 16 shows a screenshot of the presentation during the validation session.

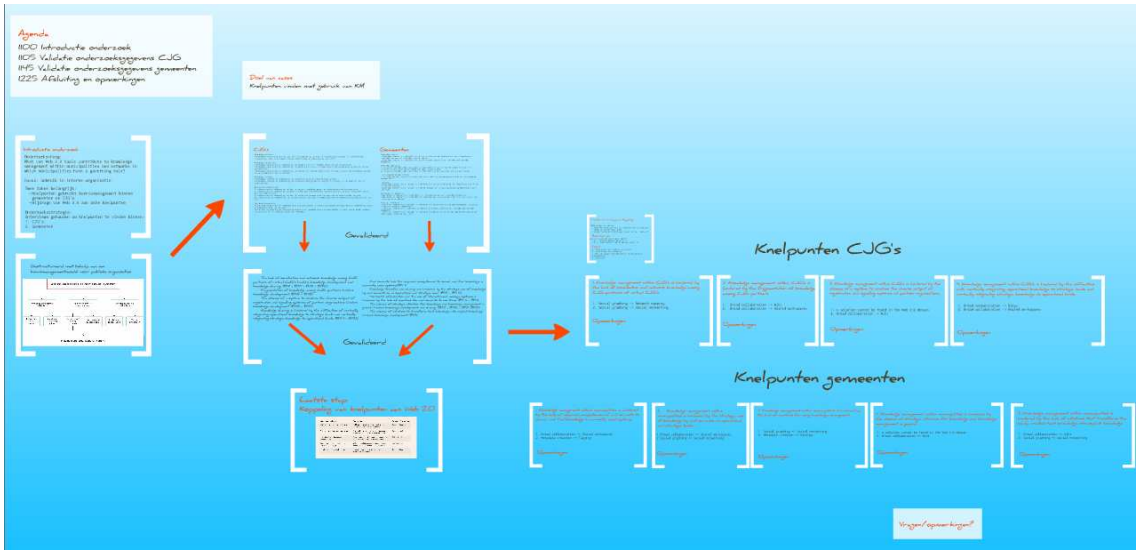


Figure 16: Screenshot of validation session with experts

Appendix 9: Validation protocol

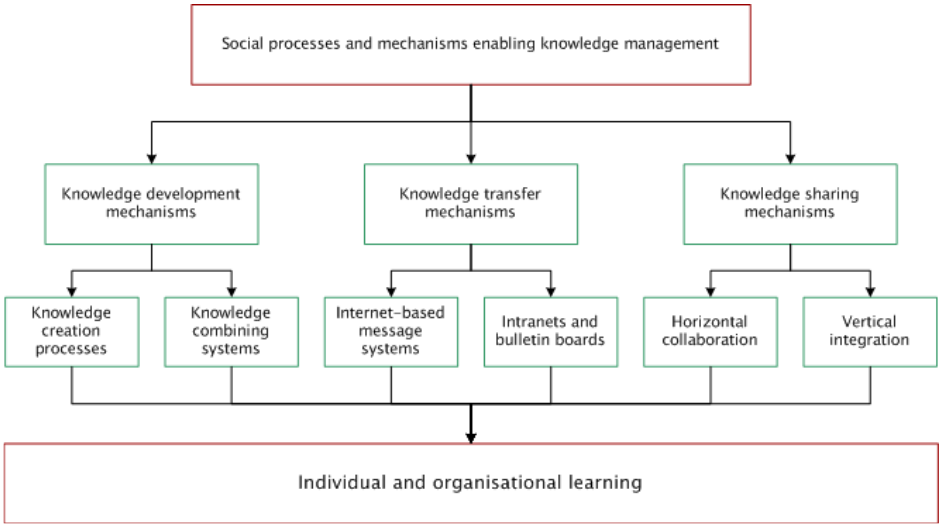
Datum : dinsdag 2 februari 2010
Tijdstip : 11:00 uur
Locatie : Mauritskade 57, Den Haag

Aanwezig : Mila Bouwense, Ralph Boeije, Tijmen Bak, Laurens Waling
Verslaglegging : Alex Verheij

Onderwerp : Validatie onderzoek AV

Onderzoeksmodellen

Kennismanagement model wat gebruikt is om knelpunten te vinden en interviews te structureren.



McNabb (2007)

Model om van knelpunten naar Web 2.0 technologie te komen.

Web 2.0 technologies	Description	Category of technology
Wikis, commenting, shared workspaces	Facilitates cocreation of content/applications across large, distributed set of participants.	Broad collaboration
Blogs, podcasts, videocasts, peer to peer	Offers individuals a way to communicate/share information with broad set of other individuals.	Broad communication
Prediction markets, information markets, polling	Harnesses the collective power of the community and generates a collectively derived answer.	Collective estimation
Tagging, social bookmarking/filtering, user tracking, ratings, RSS[1]	Adds additional information to primary content to prioritize information or make it more valuable.	Metadata creation
Social networking, network mapping	Leverages connections between people to offer new applications.	Social graphing

Chui (2009)

Achtergrond onderzoek

Onderzoeksvraag:

What can Web 2.0 tools contribute to knowledge management within municipalities and networks in which municipalities have a governing role?

Focus: Gebruik in interne organisatie

Twee zaken belangrijk:

Knelpunten gebruikt kennismanagement binnen gemeenten en CJG's

Bijdrage van Web 2.0 aan deze knelpunten

Onderzoeksstrategie:

Interviews gehouden om knelpunten te vinden binnen:

1. CJG's
2. Gemeenten

Validatie van vandaag

Twee vragen van belang:

Geven de resultaten van het onderzoek een betrouwbaar beeld van de werkelijkheid?

Vinden jullie de oplossingen passen bij het knelpunt?

Beoordelen op:

Aansluiting van tool op knelpunt, waarbij:

Tool 1. De meest optimale oplossing is

Tool 2. Ondersteunend is aan de optimale oplossing

Opzet:

1. Presenteren van knelpunt en context
2. Presenteren van oplossing
3. Kort de vragen beantwoorden op papier (mag in steekwoorden)
4. Discussie

Validatie van vandaag

CJG's

- Knowledge management within CJG's is hindered by the lack of socialisation and network knowledge among CJG partners of virtual CJG's.

Tool 1 = Social graphing -> Network mapping
Tool 2 = Social graphing -> Social networking

Opmerkingen:

- Knowledge management within CJG's is hindered by the fragmentation of knowledge among CJG partners.

Tool 1 = Broad collaboration -> Wiki
Tool 2 = Broad collaboration -> Shared workspaces

Opmerkingen:

- Knowledge management within CJG's is hindered by the absence of a system to combine the diverse output of registration and signalling systems of partner organisations.

Tool 1 = A solution cannot be found in the Web 2.0 domain
Tool 2 = Broad collaboration -> Wiki

Opmerkingen:

- Knowledge management within CJG's is hindered by the difficulties with vertically integrating operational knowledge to strategic levels and vertically integrating strategic knowledge to operational levels.

Tool 1 = Broad communication -> Blogs
Tool 2 = Broad collaboration -> Shared workspaces

Opmerkingen:

Gemeenten

- Knowledge management within municipalities is hindered by the lack of required competencies of civil servants to search and find knowledge in currently used systems.

Tool 1 = Broad collaboration -> Shared workspaces
Tool 2 = Metadata creation -> Tagging

Opmerkingen:

- Knowledge management within municipalities is hindered by the strategic use of knowledge by civil servants on operational and strategic levels.

Tool 1 = Broad collaboration -> Shared workspaces
Tool 2 = Social graphing -> Social networking

Opmerkingen:

- Knowledge management within municipalities is hindered by the lack of incentives for using knowledge management.

Tool 1 = Social graphing -> Social networking
Tool 2 = Metadata creation -> Ratings

Opmerkingen:

- Knowledge management within municipalities is hindered by the absence of strategic attention for knowledge and knowledge management in general.

Tool 1 = A solution cannot be found in the Web 2.0 domain
Tool 2 = Broad collaboration -> Wiki

Opmerkingen:

- Knowledge management within municipalities is hindered by the lack of initiatives that transform the newly created tacit knowledge into explicit knowledge.

Tool 1 = Broad collaboration -> Wiki
Tool 2 = Social graphing -> Social networking

Opmerkingen:

Algemene opmerkingen

Mocht u nog algemene vragen of opmerkingen hebben over de validatie of de opzet van het onderzoek kun u die hier plaatsen.