Knowledge Management Driven by Business Cases in Danish Municipalities

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Abstract. Recent years have shown an increasing demand for e-Government initiatives in the public sector. A major aspect of meeting this demand is the digitalization of public services. Studies have shown that these digitalization projects often face management challenges rather than technical. This article expands on an analysis of business cases in digitalization projects in the public sector. The focus of this article is the challenges local governments face when creating business cases for digitalization projects. We approach this challenge by analyzing the business cases of a digitalization project in three different municipalities in Denmark. The analysis is based on knowledge management theories in order to understand how knowledge sharing and creation is driven by the business cases. The analysis reveals four important insights. Firstly how knowledge is created in the process of making the business cases. Secondly which knowledge sharing strategy is dominant in this process. Thirdly special circumstances under which the business cases are formulated in the municipalities are uncovered. Finally insight was gained into how business cases are defined in the investigated municipalities. We discuss these insights in relation to knowledge management theories and the practice under which the digitalization projects in the municipalities are performed.

Key words: IT-projects, business case, knowledge creation, knowledge sharing, and municipalities.

1 Introduction

During a knowledge management workshop (KMGov 2002) the keynote speaker, Friis, emphasized that most products of governance and public administration are delivered as information and knowledge. If we look at this sentiment in the perspective of recent year's digitalization and IT projects within the public sector it is clear that there is a correlation between managing knowledge and digitalization.

The foundation of this correlation is two basic assumptions; 1) knowledge in the public sector can be managed and 2) digitalization and information technologies can aid in managing knowledge in the public sector. Friis has pointed towards the correlation between these two assumptions as an emerging string of research (KMGov 2002). Field studies have been made in order to improve knowledge management in the public sector. A case study in Austria studies accommodation of citizen requirements in digitalization projects which is challenging, however a conceptual model based on UML class models is presented in order to aid in this challenge (Glassey 2002).

Another part of the existing research covers concepts that are strongly related to knowledge management in the public sector. Lenk (Lenk 2002) stresses that there is a link between knowledge and action/decision making. He points out the need for pilot projects specifically developed for the public sector, which applies knowledge management to improve this relation. An Italian study promotes a prototype of a knowledge management tool for supporting the public administration in usage of IT technology (Albolino 2002).

Quirchmayr & Tagg (Quirchmayr and Tagg 2002) have done a study that addresses the increasing request for inter-administration information systems. In extension to this concept Bruecher (Bruecher 2002) proposes an approach to the development of requirement analysis's for knowledge management systems in e-Government.

Knowledge management in digitalization projects in the public sector is a complex affair with a multitude of stakeholders. The most important stakeholder being the citizen, and it has become important for the politicians to transfer and share knowledge with the citizen in order to legitimize their decisions (Stodolsky 2002; Märker 2002). Recent years have proven that the internet is a capable tool for knowledge sharing and furthermore it can be used to improve citizen participation in government (Milakovich 2002, Märker 2002). However even though technological improvements such as the internet create the possibility to increase knowledge management internally and externally in the public sector it also creates the problem of launching and running successful digitalization projects.

Digitalization in the public sector in Denmark is a growing field of interest and examples of this can be found both at state level (Finansministeriet 2010) and local government level (Disimit 2009). However one of the biggest worries concerning digitalization projects is staying within budget and upholding deadlines. Organisational maturity in relation to digitalization projects has been pointed out as a key factor in avoiding these issues (Bonnerup et al. 2001; Loft 2009). One way to measure maturity is introduced by Luftman where five levels of maturity is proposed (Luftman 2000). These

levels reflect the process structure of digitalization projects and consequently the knowledge management and the use of documentation such as business cases.

A report by Dalby & Nielsen (Dalby and Nielsen 2010) covered a thorough analysis of the joint business case model (Modernisering.dk(a) 2009) for digitalization in the Danish public sector. This report identified a lack of research literature on the subject of business cases for digitalization projects. Dalby & Nielsen found four suggestions for improvements of the joint business case model that cover the focus of the business case, clearer purposes, precise user documentation and scalability.

In this article we study digitalization projects in the Danish municipalities. The amount of projects that seek to digitalize public processes is increasing and therefore, there has also been an increased internal demand for the formulation of business cases, that describe these projects (Kræmmergaard et al. 2009). However it has proven difficult to locate prescriptive literature on how the municipalities should approach the problem of creating business cases that describe digitalization projects (Dalby and Nielsen 2010). Several Danish municipalities have joined a research project (Disimit 2009), where one of the goals is to reach a better understanding of how to create and use business cases for digitalization projects in the municipalities. This article studies how business cases drive knowledge management and creation in three Danish municipalities.

The contribution of this article is to answer the following research questions.

- How is knowledge created in the usage of business cases in digitalization projects in the case municipalities?
- How is knowledge shared in the usage of business cases in the digitalization projects in the investigated municipalities?
- How is the usage of business cases affected by the organization being a Danish municipality?
- How are the business case documents defined in the investigated municipalities?

We also consider the answers to these questions a contribution to the research effort of the research project (Disimit 2009) in achieving a better understanding how business cases are currently utilized in the municipalities.

Section 2 will cover existing research in the area of digitalization of the public sector. Section 3 covers knowledge management theory used in this article. Section 4 is a description of our research design. Section 5 is the analysis of the three practical studies performed. Section 6 is a discussion of the findings from the analysis and finally section 7 covers the conclusion and further research.

2 Digitalization and Business Cases

Digitalization of public services has increased in recent years (Eyob 2004). With the internet becoming an increasingly integrated part of society, we have in the last decade seen an increasing amount of public services becoming available online (Eyob 2004).The Danish government has initiated a portal site with information and guide lines for public and project leaders and others who work with digitalization in the public sector (Finansministeriet 2009).

Another initiative that was started is a collaborative project between the public sector and researchers, with the goal of improving the It-management skills in Danish municipalities in order to increase the digitalization degree (Disimit 2009). It is clear that these kinds of initiatives are needed in order to increase the poor success rate of digitalization projects in the public sector (Goldfinch 2007; Bonnerup 2001; Loft 2009) and in addition municipalities are mostly in the early stages in their transition to e-Governments (Moon 2002).

However studies point towards similarities between the success factors in the public and private sector (Ward 2004; Loukis and Tsouma 2002) so digitalization experiences from the private sector could possibly be applied. It is clear that the main success factors are related to management rather than the technical side of digitalization (Swain et al. 1995).

One concern for the Danish municipalities is the creation and usage of business cases around IT and digitalization projects (Kræmmergaard et al. 2009). The municipalities often create their own business case tools to address the concern or in some cases apply large frameworks that include a business case tool such as PRINCE2 (OGC 2009). However the self created tools or larger frameworks often leave contents to be desired from those who apply them, which is the reason that business cases have been pointed out as an area of concern in the municipalities (Kræmmergaard et al. 2009) in relation to the collaborative research project (Disimit 2009). An inspiration for the municipalities' self created business case tools is the joint business case model for the public sector (Modernisering.dk(a) 2009). This model was analysed using deconstruction (Beath and Orlikowski 1994) by Dalby & Nielsen (Dalby and Nielsen 2010), in order to increase the understanding of the creation and usage of business cases in the public sector. The report of Dalby & Nielsen pointed out the sparse nature of the literature on business cases for digitalization. Only few prescriptive texts exist such as Reifer (Reifer 2002) which further prompts the municipalities initiatives to create their own business case tools rather than rely on existing literature.

3 Knowledge Management

In our previous work with the municipalities in the DISIMIT project (Disimit 2009) and our analysis of the joint public business case model (Dalby and Nielsen 2010), we gained an insight into business cases and the process around them. In the initiation phase of a digitalization project the business cases can fundamentally be seen as a process focused on collecting information and gaining knowledge of the project and its feasibility. Business cases are sometimes also used as a follow-up and evaluation tool during the project, and can function as a knowledge repertoire throughout the project.

There are several ways to look at knowledge management. The most important aspects are covered in a review article by Alavi & Leidner (Alavi and Leidner 2001). One of the most dominant views on knowledge and knowledge creation presented here is Nonakas work on knowledge conversions (Nonaka 1994). Hansen et al. builds upon Nonakas work in their article about knowledge sharing strategies (Hansen et al. 1999). These two articles form the knowledge management background for the data collection and analysis.

3.1 Knowledge Creation through Conversion

Nonaka (Nonaka 1994) introduces four different kinds of knowledge conversions between tacit and explicit knowledge that allows creation of new knowledge presented in figure 1.

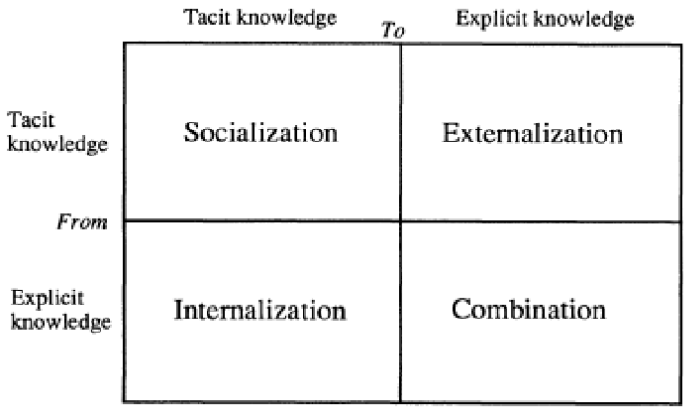

Figure 1: Knowledge conversions

From tacit knowledge to tacit knowledge
The embodiment of this knowledge conversion and knowledge creation is the master/apprentice relationship. Without the need of language the tacit knowledge of necessary skills can be gained by the apprentice through the company of his master. The key to acquiring tacit knowledge is to have some form of shared experience that allows sharing of thinking processes. This process is labelled *socialization.*

From explicit knowledge to explicit knowledge
Internet forums, workshops or conferences could be examples of this knowledge conversion and creation. The explicit knowledge communicated through formal syntactic language shared in these venues is shared, reconfigured and merges into new explicit knowledge. This process is referred to as *combination*.

From tacit knowledge to explicit knowledge
This knowledge conversion and creation is the process of expressing the tacit knowledge you posses into the explicit knowledge that can be formalized through a formal syntactic language. The prime example of this is the teacher/student relationship where the teacher expresses his experiences and tacit knowledge to the student by explicating into verbal or written language. This process is called *externalization*.

From explicit knowledge to tacit knowledge
This is the counterpart to externalization where the student processes the externalized explicit knowledge and converts into new tacit knowledge within himself. Nonaka named this process *internalization*.

Nonakas (Nonaka 1994) central theme is that organizational knowledge is created through a continuous dialogue between tacit and explicit knowledge through these conversions. The knowledge is possessed by individuals, but if all four modes of knowledge creation is organizationally managed to form a continual cycle, knowledge will then spread between individuals, teams and organizations.

3.2 Knowledge Sharing Strategy

The classification of explicit and tacit knowledge is applied and expanded on in the knowledge sharing strategy dichotomy of codification and personalization (Hansen et al. 1999). Codification relies on the notion that knowledge is something that can be formulated into a formal language and stored for retrieval and later use. This corresponds to the explicit knowledge classification. Whereas personalization relies on the notion that knowledge is something that is shared among individuals socializing. This of course corresponds to the tacit knowledge classification. Hansen et al. qualifies this even further by stating that the nature of the knowledge is bound to a notion of maturity. Through the presentation of empirical studies they argue that the personalization strategy is paramount when the organization produces highly customized products. Over time these products might mature and thus no longer require unique solutions. This in turn would change the knowledge sharing into a codification strategy.

The main theme of Hansen et al. is that a codification strategy is preferable when dealing with standard products or when working with a mature area. Reversely a personalization strategy is preferable when dealing with customized products in an innovate environment. Figure 2 shows an

overview of Hansen et al's division of codification and personalization strategies highlighting the differences between each strategy.

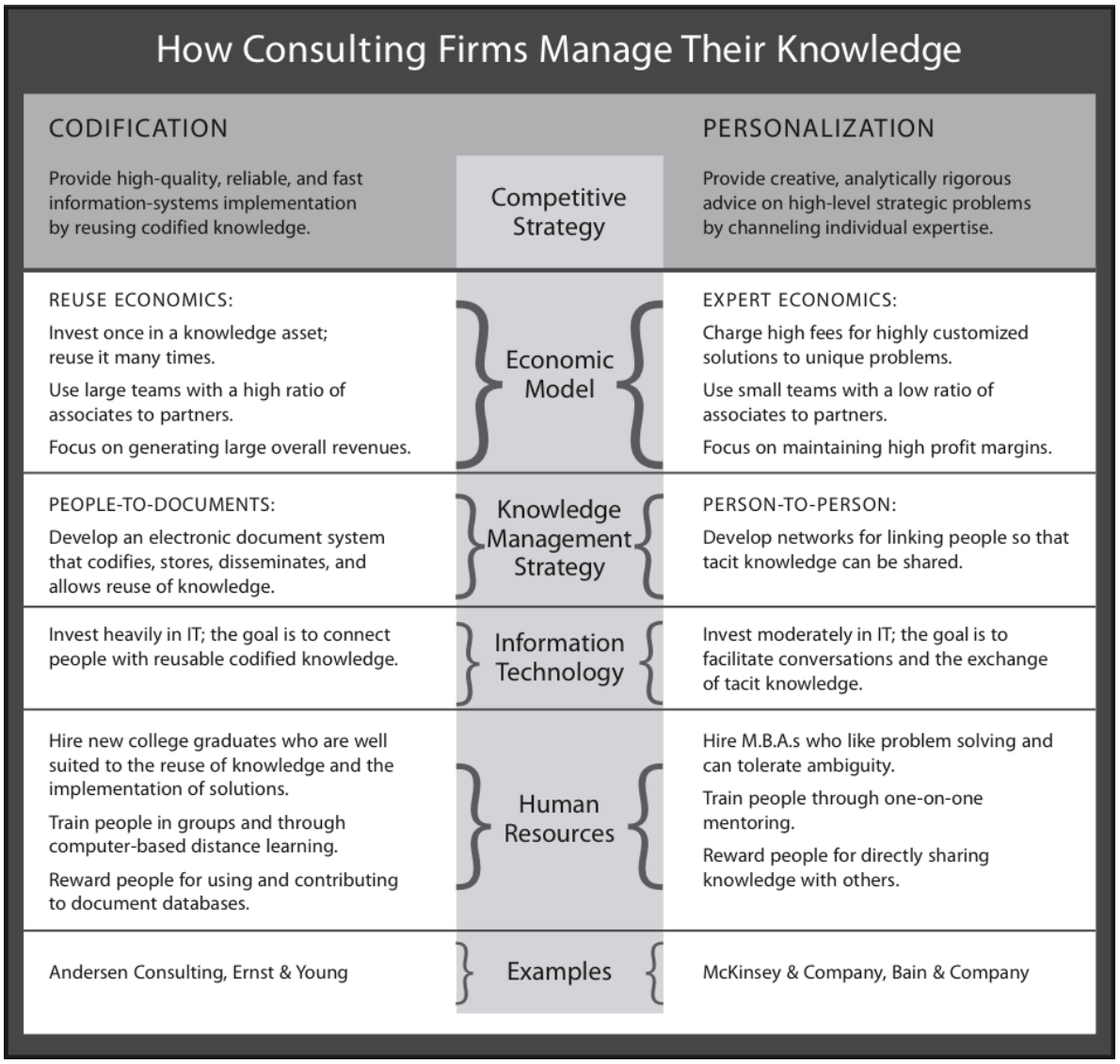

Figure 2: Personalization and codification strategy overview

In this article we will make use of the tacit/explicit classification of knowledge and knowledge creation through conversion as formulated by Nonaka (Nonaka 1994). Furthermore we will make use of the strategy dichotomy of codification and personalization by Hansen et al. (Hansen et al. 1999). These will be used to understand and analyse the knowledge creation and sharing processes driven by business cases in digitalization projects in the investigated Danish municipalities.

4 Research Method

The research presented in this article is part of a larger research study (Disimit 2009). This research project follows the collaborative action research approach (Mathiassen 2002). Mathiassen suggests three different knowledge perspectives that expresses the research goals of a project; Intervention, design and interpretation. In our work we engaged in an interpretation of practise. We collected data, and interpreted this in order to reach a better understanding of the use of business cases in Danish Municipalities. This understanding then supports the research goals to support and intervene with the practice in the collaborative practice research project.

The procedure of our method is to perform interviews on three different projects, in three different municipalities, in order to perform an empirical exploration of the research questions. The approach of using multiple municipalities is chosen to heighten the analytical generalization of the findings in this study, and also to provide further analytical possibilities based upon variations such as size of organisation and type of project. The number of municipalities is also chosen from a representative perspective. Meaning that we choose a range in sizes of municipalities, as well as a rudimentary range in level of digital maturity.

The data collection of the practical studies is primarily performed using semi structured qualitative focus interviews (Kvale 1997). The interview guide in appendix 1 is constructed based on knowledge management theory presented in section 3 , the business case, the communication, and the knowledge sharing in the project. The semi structured nature of the interviews allow us to let the interviewee answer the open questions and volunteer the information they desire. An approach well suited, when the goal of the interview is to explore the life world of the interviewee (Kvale 1997). To cover multiple points of view on the investigated topics, as well as a large coverage of the knowledge flow within the projects, the goal is to interview a representative of each level of the project organisation.

In practice 2-4 interviews were performed in each municipality, with a total of 10 interviews. The interviews were approximately 30 minutes in length. The recording of the interview was transcribed using the software Transcriber (Boudahmane, K. et al. 2010), a software chosen due to authors familiarity, ease of use, and open source status.

The analysis was initiated by performing an encoding of the transcripts using the qualitative data analysis software NVivo (QSR 2010). The concepts used for encoding were constructed using a bottom up approach (Creswell 2009). Following a rough outline of Creswell's steps the transcript of an interview was carefully read, noting down ideas and comments as they came to mind. Then notes were compared, and following a discussion, encoding concepts were constructed. The transcript was then coded with these concepts using the software tool.

This process followed for each of the interview transcripts, starting with a careful reading and noting down comments, using the previous set of encoding concepts as offset. Followed by an evaluation of the concept set, adding or merging concepts, and finally coding the transcript using the software tool (QSR 2010).

We then initiated a top down encoding of the interviews inspired by the knowledge management theory. As the encodings were similar to bottom up, no further significant insight was gained. This could be attributed to the format of our questionnaire, which was constructed with a heavy emphasis on the knowledge management theory presented earlier. Realizing this we took some of the bottom up encodings and collected them in a category inspired by Nonaka's knowledge creation theory (Nonaka 1994), see section 3.1. Next we collected encoding concepts in a category inspired by the knowledge sharing strategy theory of Hansen et al. (Hansen 1999), see section 3.2.

Encoding concepts where grouped into two additional categories based on the preceding work done with the municipalities in the DISIMIT-project on business cases and their use as a tool in the IT-projects of the municipalities.

The four categories serve as a framework of the analysis presented in the next section.

5 Analysis

In the following sections we give an overview of the encoding, and then continue the analysis of the practical studies performed in the three municipalities. For each of the studies we will describe the municipality and the project chosen for study and then present the findings of the four categories constructed. The quotes taken from the interviews are translated and modified slightly to improve readability without changing the meaning.

5.1 Coding Overview

The iterative approach in the bottom up analysis using the Nvivo tool (QSR 2010) resulted in 19 final encoding concepts.

Category	*Concepts grouped*	*Aalborg references*	*Favrskov references*	*Gentofte References*
Knowledge creation	5	24	54	7
Knowledge sharing strategy	5	39	61	21
Issues in the municipalities	6	23	32	15
Business case definition	4	25	30	28

Table 1: Concept categories & references found in each study

Table 1 shows the corresponding findings grouped into the four categories of business case definition, knowledge management, knowledge creation, and knowledge sharing strategy. An overview of the concepts in the four categories can be seen in table 2.

Knowledge creation	*Knowledge sharing*	*Issues in Municipalities*	*Business case (BC) definition*
Defragmentation of knowledge	Knowledge sharing with externals	Issues on working with BCs in the public sector	BC as a follow-up and evaluation tool
Knowledge acquisition	Knowledge sharing with internals	Knowledge concerning legislation	Definition of the BC
Expansion of knowledge in BC	Knowledge sharing with steering group	Qualification of project idea	Division of the BC
Work on BC creates derived knowledge	Knowledge shairng with other municipalities	Size of the Municipality	Division of knowledge into separate documents
Sparring with subject area experts	Sparring with subject area experts	Usage of the BC	Initiation of the BC
		Use of the BC knowledge	

Table 2: Concept groupings

As can be seen we grouped five concepts under the knowledge creation category. These five concepts were constructed according to our bottom up encoding, see section 4. However the category is based on the knowledge conversions of Nonaka (Nonaka 1994) and the concepts with empiric evidence of his theories. The same idea applies to the knowledge sharing strategy category, however the category is based on the knowledge sharing strategy dichotomy of Hansen et al. (Hansen et al. 1999).

The final two categories; issues in the municipalities and business case definition further describes insights gained through the bottom up encoding. These categories are not analysed directly based on any theory, but they represent significant findings in relation to knowledge management driven by business cases in the investigated municipalities.

5.2 The Municipality of Aalborg

The municipality of Aalborg is the third largest municipality in Denmark. It has over 16.000 full time employees who service the companies and almost 200.000 citizens of the municipality. The municipality is divided into seven administrations. The digitalization project that was chosen as the case of our interviews is called Edag3 and involves every administration to some degree. The interviews that we conducted included representatives from the mayors, technical and environmental, and family and occupation administrations. The Edag3 project is initiated by the Danish government, and is described as the first step on the way to having all communication between citizen and government entities go through digital channels. For Aalborg municipality this means that they have to offer a number of digital services to their citizens before 1st of November 2010. We conducted four semi structured interviews using our interview guide, see appendix 1, interviewing the following people:

- Steering group member from the technical and environmental administration.
- Project manager of Edag3 in the municipality of Aalborg.
- IT manager in the family and occupation administration.
- Steering group foreman and project owner.

Knowledge Creation
When looking at the interviewed participants of the Edag3 project in Aalborg it is clear that this is a large project that is spread widely throughout the organization. The business case itself is mainly utilized on a high organizational level and therefore none of the interviewees were in direct contact with the work procedures that the Edag3 project will attempt to digitalize. However the primary knowledge creation that has been made in order to create the business case has been done by the project manager. He has created knowledge through socialization with several actors in the project and externalized this into the business case.

Interviewer:

Did anyone contribute to the business case and thereby convey knowledge to you?"

Project manager:

> Yes that has happened with all the people I have talked to. As an example the occupation administration and other key actors, but also the national organization of municipalities as they are in charge of this join government project, so there has been a nice amount of sparring there.

As this project is originally initiated by the Danish government, it is apparent that the project manager also serves as the subject area expert and through combination and externalization he has created Aalborgs local Edag3 business case. This was done by an initial internalization of the knowledge in the national Edag3 business case by the project manager. Then followed by a combination of his local knowledge of the municipality of Aalborg and the national business case. Finally the knowledge was externalized into the local Edag3 business case.

The project manager got involved with internalizing knowledge from the national Edag3 project at a very early stage, which had a beneficial side effect. This was a response to a rising concern and confusion in the municipality of Aalborg about what role the municipality would have in the Edag3 project. In the following statement the project manager explains how he and his team already before the summer had taken measures to prepare Aalborg for the Edag3 project, and they were thereby able to quickly dampen the concern and confusion.

Project manager:

> We started work with drawing up a project agreement, business case on this Edag3 project, this was already before the summer break last year, so we said: Dear colleagues take it easy, we got this under control.

So in regards to the Edag3 project in the municipality of Aalborg there has been significant knowledge creation taking place. From the creation of knowledge concerning the national Edag3 project, that in turn led to the creation of an understanding of Aalborg's role in the project. Onwards to a series of meetings and thereby socialization with representatives of each of the participating administrations which caused an iterative development and externalization into the business case until it was approved.

Knowledge Sharing Strategy

During the iterative development of the Edag3 business case in Aalborg, three major tendencies in terms of knowledge sharing strategy stood out; personalization with the steering group, personalization with other municipalities or organizations and codification of business case knowledge internally. Internally implies employees in the municipality that is not part of the projects steering group.

Personalization with the steering group is mostly found in the formal steering group meetings and according to the steering group foreman these take place with approximately once a month. All four interviewees are a part of the steering group and they all have the same impression of the personalization taking place at the meetings in regards to the business case. They all feel that it is a

forum in which it is possible for both the project management and the IT-managers from the administrations to have a chance to put their footprints in the business case and reach a result that everyone can get behind. As an example the steering group member says the following about the steering group meetings:

Steering group member:

> The project manager, as you may know, he is very skilled at this kind of thing, so with him in the center and others giving various input, we take a nice step forwards every time as I see it.

Personalization with other municipalities in this project is mainly directed towards the national organization of municipalities(KL) and the government entity behind the Edag3 national project. The knowledge sharing with KL is described as a sparring possibility because the project manager is a part of a work group in KL where it is possible to discuss the various parts of the Edag3 project.

Project manager:

> I am a part of a work group in KL where we discuss, especially the dokumentboks sub project of Edag3.

However it is seen as a problem that the national business cases where the government has codified their knowledge of the subject area, such as the one made for Edag3, are vague in their wording when it comes to the municipalities. It is not clear to the steering group foreman how they reach all the numbers. He wishes that when the government wants to codify this kind of knowledge into their business case it should be clearer how they reach the numbers that are in the business case.

Codification of business case knowledge internally mainly appears in the administration department level where it is only a certain kind of employee that gains knowledge through reading the business case. This is because there is a division in the employees where some are interested in IT and digitalization projects but the majority either lacks interest or time to study the codified knowledge in the project agreements and business cases. Therefore the knowledge the majority has about digitalization projects such as Edag3 is gained through informal knowledge sharing from the employees with personal or work related interests in Edag3.

IT manager:

> Well, they gain knowledge on an informal basis, because these documents are only interesting to those people that are involved in the project. I do not think that we will see employees voluntarily seeking it out, because they have so many other things to do. However, that is hopefully something we will change.

However if we move up a level to the manager of the Edag3 project in Aalborg we find that he feels that the business case can actually be seen as a communication tool for the project.

Project manager:

> And thereby it also becomes a communication tool for the project manager but also for the project itself, in relation to for instance the board of directors and the administrations.

So in terms of internal knowledge sharing it appears that the Edag3 project management feels they have chosen the right strategy, being a personalization tactic at the top level of the project, who then applies a codification tactic, when sharing with the lower levels of the project. However at the administration department level there is a need for more interest and awareness around this codified knowledge of the digitalization projects in order to make the strategy effective.

Issues in the municipalities

There is a lack of experience in working with digitalization projects which expresses itself as a lack of utilization of the business cases that are created.

IT manager:

> I do not think that we have been used to thinking in business cases in the Danish municipalities. So this kind of thing with… when you suddenly acquire some knowledge we do not think about, what consequence it will have for the business case.

As the IT manager here explains it is problematic that the municipality is not used to thinking in business cases, because the business cases would be better utilized if the knowledge was better managed, such that the thought of whether a knowledge sharing process could impact the business cases was more common.

In Aalborg there is also a desire to utilize the business case as a follow up tool post project completion. There is an agreement between the interviewees that this is one of the major strengths of the business case. However this strength is not utilized in Aalborg and they would clearly like to get better at managing the knowledge in order to have continued benefits from the experiences they acquire from completed projects.

Business Case Definition

The business case definitions given by the interviewees at the municipality of Aalborg are very similar. They are all under the impression that the business case should include what is a cost/benefit analysis. There is however also opinions that point towards the business case should be able to contain other subjects than just the cost and benefits of a digitalization project.

It is interesting to see that those who have the strongest opinions on the business case and its limitations in its current state are the IT manager and the steering group member from the administrations. The IT manager's concerns are primarily that the business case should be able to handle other kinds of benefits than just economical ones.

IT manager:

> It does not have to be economical; it could just as well be human factors. … Well then there will be many projects, which have human factors or health factors. … It can be hard to measure, but then put it into words instead. A business case can also describe this.

The Steering group member on the other hand mainly supports the cost / benefit way of looking at the business cases. However when looking at the project document which the Edag3 business case is a part of he feels that it is too large which can make it less read and therefore generate less knowledge sharing.

Steering group member:

> I am not a supporter of 22 page documents. Actually we follow some slightly different principals in my department. Because we have, we know the tendency - If you put too many of these size documents on the table no one will read them.

But in general there seem to be a satisfaction with the contents of the current business cases, the actual use and utilization of them is what they need to practice in the municipality.

5.3 The Municipality of Favrskov

The municipality of Favrskov has existed since the municipal merger in 2007. It is a small to medium sized municipality with circa 47.000 inhabitants. The municipality is divided into 4 administrations. The IT department and the Social Services Center (SSC) were the primary participants of the digitalization project in our case study. The IT department is a subdivision of the Job and Economy administration, while the SSC is a part of the Social and Health administration.

The case project is called Projekt online dagpenge, and the declared goal was to process 50% of the incomming requests for sickness benefits electronically within a certain date. The project is a relatively small and simple one. There are no investments in new software for instance, and the main challenges are to change work procedures, as well as promoting the digital solution to the requesters of sickness benefits. The software required to handle the electronic process where already available to the municipality and the customers prior to the initiation of the project.

Similar to the study of Aalborg four semi structured interviews where conducted using the same interview guide, see appendix 1, interviewing the following people:

- Project member and employee at the Center for Social Services.
- Project manager and part of the department of IT.
- Steering group member and manager of the IT department.
- Project owner and manager of Center for Social Services.

Knowledge Creation

The knowledge created during the project, was done in a number of ways. Some knowledge was gained by combination of accessible explicit knowledge, but this proved to be difficult, and therefore the majority of knowledge was gained through the socialization processes of communication and sparring with subject area experts.

Project manager:

> It is really hard to pick things out and defragment them, and put them in [the business case].

Project manager:

> All the time I had to ask for the things from others. I did not have the information beforehand.

Project member:

> That is what it takes yeah, a subject area expert who is participating.

A lot of the socialization was done with the attached project member, who stated that she was an expert on the area, and had good operational knowledge. Several meetings were also held within the project/steering group, where socialization took place and knowledge created were then externalized as updates of the business case.

The process of internalizing knowledge for the business case, derived knowledge of the municipality and further benefits became clear. The derived knowledge showed that the number one customer of the sickness benefit services was the payment office of the municipality itself. This knowledge was added peripherally to the business case as an added benefit. The focus on the work processes in the SSC with this project also prompted other initiatives.

Project manager:

> Her, who sorts the mail simply learned to look at the requests, to see if they were correctly filled out.

This enabled her to directly send back any paper requests, that were wrongly filled out, thus saving the time of rotating the request through the case workers.

Knowledge Sharing Strategy

Knowledge in the project was primarily shared between the project manager and the project member through a personalization strategy. In the steering/project group meetings the strategy was also personalization but with an offset in the codified knowledge of the project documents. Knowledge was further aggregated from project owner to the SSC through a personalization process:

Project owner:

> And then it was more important to me, from being a part of the project group and get the project implemented, and instead talk with the employees about it.

Knowledge was also shared with the customers. Most of the success of the project was dependent on companies using the online services for requests. Hence the primary knowledge sharing with these externals was formed as education on the system and guidance in how to use it, but also why it made sense economically for all parties involved. This knowledge sharing also included the payment office at the municipality. The education activities was performed as personalization between the project member and the target company. Although these activities did not directly involve the business case, the knowledge gained through the process was used to as a sales argument, when pitching the new system to the companies.

Project manager:

> ...But when the project member talked to the companies, then it has been used as a good sales argument.

Post project knowledge from the project and the business case has also been shared with other municipalities in order to promote the success of the project as well as advancing the general digitalization of the Danish municipalities. This knowledge sharing has been done through a codification effort where materials has been sent to the requesting municipalities.

Issues in the municipalities

This project was initialized by the knowledge gained within the organization about changes to the current legislation on the subject of sickness benefits. This knowledge was shared between interested parties at the municipality and a preliminary business case was drafted.

Project manager:

> As a basis we are being told; Get me a business case and show me, that it is a good idea.

A qualification process of the idea was done through the development and expansion of the business case. Knowledge was primarily managed through meetings, but with the foundation of the project documents, where the knowledge deemed relevant to the project was written down. After completion of the project the knowledge contained in the documents has not been used for anything but promotion purposes. However:

Project manager:

> Some of the knowledge gained in the project, we have used in other projects...The thing with readiness of change. That is, how you move employees.

Interviewer:

> So, a direct use of the business case did not occur?'

Project manager:

> No.

We uncovered issues with knowledge management in the project that might expand to Danish municipalities in general. The primary issue is a ``need to know" issue. The general reason for this is a fear of efficiency improvement, since this is a very unpopular theme. The fear is based on the notion that if this digitalization project improves efficiency in my department, then I need to lay off people. This corrupts the whole knowledge management and certain relevant knowledge is not shared through the business case.

Business Case Definition

It is clear that documentation of a project is separated into different documents in the municipality of Favrskov. The interviewees stated that:

Project manager:

> The way we work with it here the business case is part of a larger project plan.

Steering group member:

> I do not have the opinion that a business case contains stake holder analysis, risk assessment plans etc. I believe that belongs somewhere else.

The documentation we received prior to the interviews supports the views stated. The business case is contained within a single document entitled Project Plan, which serves as project documentation. The business case was generally seen as a document that contains the quantifiable, economic and non economic, as well as the unquantifiable benefits, along side the costs of the project.

Project member:

> A business case, that is a tally of if it pays off. Economically, what are the benefits, what are the disadvantages, does it pay off.

Project owner:

> By a business case I understand a bottom line. I understand a calculation of what we fill in, and what we gain.

A value model was also presented to us, which is utilized when assessing value gained from a project. The model supports the idea of value creation not only for the municipality as an organisation, but also employees, the citizens and companies they service. This model supports the idea of value creation beyond the economical aspects for the municipality.

The interviews also gave a clear picture of the business case as a living document.

project manager:

> In the beginning we only thought. Things can be done more easily in the sickness benefits department. Here is an easier working procedure.

In the initiation phase there are a lot of unknowns. The project started with an idea, which was followed by a rough estimate on the business case. As the project moved along, the details became more fleshed out, and updates were being made to the business case. The business case was also used as a follow-up tool during the project period in order to determine the progress according to the plan.

5.4 The Municipality of Gentofte

The Municipality of Gentofte is a suburb municipality to Copenhagen and it houses approximately 70.000 citizens. In Gentofte we conducted interviews with representatives from project management and the building administration.

The project which was the subject of the interviews is in Gentofte commonly known as DOB which is a Danish abbreviation for online construction case handling. This project is an idea that has been thought up in collaboration with the municipality of Gladsaxe and has the primary goals of reducing the amount of errors in construction applications, and reducing face time with employees in the construction administration. The focus of our interviews was the business case that Gentofte has created for their implementation of DOB. We conducted two semi structured interviews using our interview guide, see appendix 1, interviewing the following people:

- Project owner and co-inventor of the DOB project.
- Project manager and author of the DOB business case.

Knowledge Creation
At Gentofte we got a clear impression that their business case was formulated rather late in the lifespan of the DOB project.

Project manager:

> The Business case is written quite late in the process.

This is an unusual timing for the creation of the business case if we compare to the municipalities of Favrskov and Aalborg because they draft up a business case as one of the first things when initiating a project. In Gentofte however the project has been running for a while and through socialization tacit knowledge has been building up. At a later state the project manager then externalized this knowledge in the creation of the business case. The primary motivation for drawing up the business case is to justify the profitability of the project for the investing parties.

Project manager:

> Therefore I have gotten a lot of input from the people in the construction department in order to understand the subject area. So therefore I have written a proposal for a business case and then I have discussed the result with them and made corrections accordingly.

But from the above statement it is also obvious, that after the project manager has gone through an externalization of the tacit knowledge he gained from the construction department, there has been a further socialization around the resulting business case, which has further improved the explicit knowledge of the business case.

Knowledge Sharing Strategy

The dominant knowledge sharing strategy in Gentofte municipality is personalization. A result of this is also the previously mentioned late stage in the project in which the business case is created. The business case itself has been a part of a personalization process in the steering group where its content has been thoroughly discussed and reviewed.

Interviwer:

> Has there been a form of steering group or project group in charge of the business case that have discussed it during its development?

Project manager:

> Yes the steering group that has been in charge of the project have discussed it[the business case].

However when looking at the project manager's work with formulating the business case his goal is to share its knowledge with project employees and project owner. According to the project owner he has also been present at several of these steering group meetings in order to put his foot prints on the business case. However it is clear that the business case is not being used as an external source of knowledge sharing. When presenting or selling the idea of DOB, the project owner has used it internally. However externally he has spread the knowledge through a personalization process, but with his own tacit knowledge about DOB, not with the knowledge codified in the business case. This can be caused by both the late stage at which the business case has been formulated but also the fact that the project owner's view of the business case as an internal document used for validating and approving the local project.

Project owner:

> It is our own internal business case, presenting our own implementation of DOB, so it is obvious I have used the business case internally to spread the good word, rather than the bad right? Cause we would like to have money for our project. But I have not used the business case to spread knowledge outside the house.

So as for the knowledge sharing strategy in the DOB project it is clear that personalization plays a major role, and the codified knowledge of the business case is primarily seen as a measure to get approval for funds for the project by the directors of the municipality.

An interesting side note is that in Gentofte they apply a knowledge sharing activity, as a part of their strategy, that takes place in a network of project managers. Here they discuss relevant issues of their

work at regular meetings. The project manager expresses that they have discussed the DOB business case at these meetings and thereby the project gained a better business case through personalization.

Project manager:

> Now we have a network, for project managers. And actually we have had this business case as a point of discussion, and it gave some really good input even though none of the participants are working with the subject of the business case.

Issues in the municipalities

The collected data did not give empirical evidence pointing towards issues in the municipality of Gentofte. Neither in regards to knowledge management or the their work with business cases, or a combination. This can be attributed to a lack of collected data, since we were only able to perform two interviews. However it could also point toward a higher level of digital and organisational maturity in Gentofte, where such measures such as following the PRINCE2 project plan (OGC 2009) has eliminated the most critical issues.

Business Case Definition

As stated in the previous sub sections, the business case definition in the municipality of Gentofte differs from the ones seen in the municipalities of Favrskov and Aalborg. The project owner is partial developer of the DOB concept and has very strong opinions on, when the business case is a well suited tool for a project. He actually states that at specific stages of the project, having to formulate a business case can have a negative impact on the project.

Project owner:

> It depends on how far you are in the project lifespan, if it is something that has to drive the innovation that you create a business case, and you have to be innovative about it, because it is probably a good idea because then we can earn or save a lot of money. Then it is a bad idea, because the business case can in this way hinder the innovative process.

This sort of worry about the innovative process in projects is something we only found in Gentofte and it bares witness to a more mature approach to digitalization projects where the first stage of a project focuses on creativity and innovation. Then once the idea is developed and mature, and maybe even a prototype is launched and running, then the business case enters the project playing field as a tool for spreading knowledge to the local decision makers of the municipality.

Project owner:

> It is once you have to commercialize your idea, the innovative process, then the business case is a good thing to lean against.

6 Discussion

The following discussion is divided into four sections. Each section corresponds to a discussion based on one of the four categories defined in the analysis, see section 5.

6.1 Knowledge Creation

The knowledge creation process driven by the business cases in the investigated municipalities have a clear common denominator, which is the subject area expert. The differences in organizational structure and size of the municipalities does not affect that they in all three cases make use of this expert as a driver for the knowledge captured in the business case. However the kind of employee who takes the responsibility of being the subject area expert differs in the three municipalities. In Favrskov there is an employee, who is a member of the department, where the digitalization project is taking place. We think that this is a good approach as she makes sure that the digital solution gets a thorough introduction and is put to good use by the employees which it is developed for. However common for all the municipalities is that there is project manager responsible for constructing the business case. Therefore the primary knowledge conversion driving the construction of the business case is a socialization between a project manager and a subject area expert. The project in Aalborg stands out since the project manager is also subject area expert and therefore the conversion here is also driven by combination followed by externalization.

A secondary driver for the knowledge creation process around the business cases is further socialization. All of the municipalities follow the same pattern where an initial draft of the business is brought up for discussion at project and steering group meetings. A result of these meetings are then updates and modifications to the business case.

So it is clear that the municipalities have limited statistical data to base their business cases on, and therefore we see a general tendency of affiliating a subject area expert to the construction of a good business case. The subject area expert is one of three primary roles that we have seen in the investigated municipalities. The other two are project manager and project owner who in all the studies are different employees. Therefore it is possible to formulate explicit knowledge that defines the important roles in the creation of a successful digitalization business case. This kind of definition would help future digitalization projects as they would be able to look up which roles that has to be filled in order to create a good business case.

Good cooperation between these different roles is required to assist the knowledge creation in the business case in order to improve it, and consequently have a better foundation in the ongoing project. That is, that cooperation between the subject area expert and the project manager should have a level of trust and good communication. Furthermore the communication between the project manager and the steering group (project group) should be free and efficient.

6.2 Knowledge Sharing Strategy

It is clear that the primary strategy for sharing knowledge in the process of constructing business cases in the municipalities is personalization. Hansen et al. (Hansen et al. 1999) describes that in an optimal scenario the distribution of personalization and codification is an 80%/20% split. In practice numbers in the investigated municipalities are closer to 90%/10%. We found substantial evidance of personalization and very little codification. The knowledge is of course codified into the business documents but the analysis indicates that the usage of these in knowledge sharing is lacking. The heavy usage of personalization in the investigated projects is consistant with Hansen et al.'s (Hansen et al. 1999) theory of the need for personalization, rather than codification when dealing with unique projects, which is the case for digitalization projects in the municipalities.

A more codified approach might become more prevalent as the organization and digitalization of the municipalities matures. In the case of Gentofte municipality which has won the EU digitalization award (Modernisering.dk(b) 2009), and through evidence in the data and workshops (Disimit 2009) seemingly had a high level of maturity. We found that the personalization strategy was almost equally dominant, and this might indicate that the digitalization projects are complex to standardize and an increased focus on codification would not be beneficial.

The challenge in the upcoming years will be for the municipalities to increase the focus on the codification strategy such that they will be able benefit more from it. Meanwhile they have to maintain their current focus and usage of personalization. So the goal should be to maintain personalization as the dominant strategy but push towards the 80%/20% split. We think that time and experience will help reach this goal as it will mature the organizations and digitalization projects will become increasingly standardized.

6.3 Issues in the Municipalities

One critical issue stands out in the municipalities work with business cases for digitalization projects. This is the fear of improving efficiency. For most employees in the municipalities this equals budget cuts and thereby layoffs. Therefore the efficiency benefits gained through a digitalization project are often downplayed or even omitted in the business cases. This is a critical issue for the knowledge sharing driven by the business cases, because they can carry knowledge that can be skewed or misleading. We therefore speculate that to utilize the business cases to their full potential this fear of efficiency improvement has to be solved in a manner such that the business cases will reflect reality and not a downplayed version of it. This issue was expressed directly by Favrskov municipality but during the data collection it appeared as an underlying topic in Aalborg and Gentofte, although not mentioned directly. With the current economy of the Danish public sector in general taken into concern we believe that this issue might be present in all Danish municipalities.

So in order to solve the issue of reluctantly to improve efficiency based on fear of budget cuts, the culture and mindset of employees and management has to change in the municipalities. It has to be made clear to the employees undergoing a digitalization process that the gained efficiency will not cause a negative effect on the department. Furthermore the financial mechanisms in the municipalities needs to change to an environment where improving efficiency, in the eyes of the employees, is rewarded rather than punished.

6.4 Business Case Definition

The overall view from the municipalities on business cases corresponds to the definition found in Reifer's book on business cases (Reifer 2002). That the business case is a document that mainly lists benefits and costs of a proposed project. In the municipalities the business case was integrated into a project document that contained relevant information about the projects. The documents were primarily used as a reference in discussions of managerial meetings. As well as a documentation in a budget approval situation.

In Gentofte municipality it was argued that the making of a business case too early in the process could dampen the innovation. The project was initiated rather on a process of gut feelings and minor statistical calculations. In Favrskov the business case was defined as a living document and although construction of the business case document was initiated at an early stage, the document grew as the project moved along. This shows that the role or the nature of the business case changes during the project and the documentation needs change accordingly. In the case of Gentofte what might have been called an initial business case was referred to as statistical calculations. In the case of Favrskov the document was ``growing'' with the project. This is something that one should take into account, if a unified business case documentation model is made.

The analysis also showed that there was a desire to expand the business case or the project documents as a whole in order to more accurately process and document the gains during the project and after completion. However this expansion cannot cause the business case document to grow in size, as the analysis suggests that too large business case documents do not get read. Therefore the expansion has to be through a more precise and concise nature of expression in the formulation of the business case.

It is clear that there is a difference of opinion on what the business case might contain and how it should be used. The difference exist both between the investigated municipalities and between the employees in the individual municipalities. This shows that there is a need for further work towards a joint business case model and a joint understanding of its use and contents. A joint model would enable knowledge sharing between the municipalities of their experiences with the model and open up further possibilities of joint digitalization projects including multiple municipalities. In each individual municipality a joint model would remove any confusion and disagreement between the employees, of what the business case model should contain and how it is to be used.

7 Conclusion

In this article we have investigated the usage of business cases through the perspective of knowledge management in three Danish Municipalities. This investigation was done through a practical study where data was collected through a series of interviews with employees at the investigated municipalities. We present an analysis of the data with findings based on both empirical evidence and current knowledge management theories. In the following we will state the answer to the research questions reiterated below:

How is knowledge created in the usage of business cases in digitalization projects in the case municipalities? We analyse knowledge creation in the municipalities through knowledge creation theories of Nonaka (Nonaka 1994) and found that knowledge is primarily created through subject area experts and their socialization with project managers and to a certain extent socialization in steering and project groups.

How is knowledge shared in the usage of business cases in digitalization projects in the investigated municipalities? The dominant knowledge sharing strategy is personalization and we found that the reason for this is that the digitalization projects are difficult to standardize but also that there is a lack of organizational maturity in the municipalities.

How is the usage of business cases affected by the organization being a Danish municipality? The economical situation for the public sector in Denmark causes a critical issue for the municipalities, as there is a fear of cutbacks and layoffs every time a efficiency benefit is gained through digitalization.

How are the business case documents defined in the investigated municipalities? There is a general attitude towards the business case tool as being a new version of the well known costs benefit analysis, however there is also a motivation for improvement and thereby achieving a tool that describes more than mere costs and benefits.

In theme 1 of the DISIMIT project (Disimit 2009) workshops have been held between researchers and municipalities in order to discuss ways to create more value from the digitalization projects. This paper contributes to the understanding of this area, and the further research that can be made. Further research can be made into a unified business case model for Danish municipalities based on empirical studies such as this article. Furthermore research can be made into the correlation of knowledge management and digitalization in the public sector in order to reach a better understanding of the process and thus increase the maturity of the organisation.

Appendix 1

Interview Guide

1. Introduction of our study and the purpose of the interviews.
2. Can you make a short introduction of yourself, your position and your primary function in the Municipality?
3. Can you describe the purpose and the contents of the case project?
4. Can you explain your role in the project?
5. How is the work process/organisation of the project?
6. What do you understand by the term business case?
7. Do you feel, that it is an advantage or a disadvantage to construct documentations such as a business case during a project?
8. Can you explain the role of the business case in relation to your role in the project?
    a. Can you give examples where you have used the business case?
9. Has the business case provided knowledge (about the project) to you from other participants/stakeholders of the project?
    a. How, can you give examples?
10. Have you provided knowledge (about the project) through the business case to other participants/stakeholders of the project?
    a. How, can you give examples?
11. Do you feel, that there has been knowledge about the project, which should be a part of the business case but was not?
    a. What, can you give examples?
12. Has there in the project been held meetings regarding the contents of the business case between the participants/stakeholders?
    a. If yes, has the business case been updated after these meetings?
13. Has the contents of the business case been discussed informally?
    a. If yes, has this informal knowledge sharing resulted in an update of the business case?
14. Has anyone used the business case post project completion?
15. Do you have further comments regarding the role of business cases in knowledge sharing?

References

Alavi, M., Leidner, D., (2001). Review: Knowledge Management and Knowledge Management Systems: Conceptual Foundations and Research Issues, *MIS Quarterly*, (25:1): 107-136.

Albolino, S.,(2002). A KM Solution for the Empowerment of Local Authorities. *Maria Wimmer*. *KMGov-2002*, Copenhagen: 25-37.

Beath, C., and Orlikowski, W., (1994). The Contradictory Structure of Systems Development Methodologies: Deconstructing the IS-User Relationship in Information Engineering. *Information Systems Research*, (5:4): 350-377.

Bonnerup, E. et al., (2001). Erfaringer fra statslige IT-projekter - hvordan gør man det bedre? *Teknologirådet*.

Boudahmane, K. et al., (2010). Transcriber. http://trans.sourceforge.net.

Bruecher, H., (2002). Requirement Analysis for a Knowledge Management System in eGovernment. *Maria Wimmer*. *KMGov-2002*, Copenhagen: 78-86.

Creswell, J., (2009). Research Design - Qualitative, Quantitative, and Mixed Methods Approaches. SAGE Publications Inc. London.

Dalby, R., & Nielsen, K.M.P., (2010). Dekonstruktion af Statens business case model. *Dat7 project at Aalborg Universitet*.

DISIMIT, (2009). Research project DISIMIT homepage. http://www.disimit.dk/.

Eyob, E., (2004). E-Government: Breaking the Frontiers of Inefficiencies in the Public Sector. *Electronic Government*, (1:1): 107-114.

Finansministeriet, (2009). Modernisering.dk. *http://modernisering.dk*.

Glassey, O., (2002). Building a Virtual One-stop Public Administration: From Users Requirements to a Conceptual Model. *Maria Wimmer*. *KMGov-2002*, Copenhagen: 15-24.

Goldfinch, S., (2007). Pessimism, Computer Failure, and Information Systems Development in the Public Sector. *Public Administration Review*, (67:5): 917-929.

Hansen, M.T. et al., (1999). What's Your Strategy for Managing Knowledge. *Harvard Business Review*, (77:2): 106-116.

KMGov, (2002). Knowledge Management in e-Government. University of Linz and University of Roskilde; Editor: Wimmer, M. A.

Kræmmergaard, P. et al., (2009). It-ledelsesmæssige udfordringer i 12 kommuner - resultat af interviewrunde i foråret 2009. *http://www.disimit.dk/fileadmin/user_ upload/dokumenter /rapporter/it-ledelsesmaessige udfordringer 2009 public.pdf*.

Kvale, S., (1997). Interview - En introduktion til det kvalitative forskningsinterview. *Hans Reitzels forlag*.

Lenk, K., (2002). Relating Knowledge Management in the Public Sector to Decision-Making and Aministrative Action. *Maria Wimmer. KMGov-2002*, Copenhagen: 61-67.

Loft, L. et al., (2009). Statslige IT-nyudviklingsprojekter. *IT-Branchen*.

Loukis, E.N., & Tsouma, N., (2002). Critical issues of information systems management in the Greek Public Sector. *Information Polity*, (7:1): 65-83.

Luftman, J., (2000). Assessing Business-IT alignment Maturity. *Communications of the association for information systems*, (4).

Mathiassen, L., (2002). Collaborative Practice Research. *Information Technology & People*, (15:4): 321-345.

Milakovich, M.E., (2002). From Democracy to E-mocracy: Using the Internet to Increase Citizen Participation in Government. *Maria Wimmer. KMGov-2002*, Copenhagen: 138-154

Modernisering.dk(a), (2009). Business case example. http://modernisering.dk/da/projekter/business case/.

Modernisering.dk(b), (2009). Gentofte EU digitaliseringspris. http://www.modernisering.dk/da/presse_nyheder/nyhedssub/genvej_i_gentofte_vinder_eu_digitaliseringspris/.

Moon, M.J., (2002). The Evolution of E-Government among Municipalities: Rhetoric or Reality? *Public Administration Review*, (62:4): 424-433.

Märker, O. et al., (2002). Integrating Public Knowledge into Decision Making Case Study: Internet Public Hearing in the City of Esslingen. *Maria Wimmer. KMGov-2002*, Copenhagen: 155-169

Nonaka, I., (1994). A Dynamic Theory of Organizational Knowledge Creation. *Organization Science*, (5:1): 14-37

OGC, (2009). PRINCE2 Projectplan. *http://www.ogc.gov.uk/documentation_and_templates_ project_ plan .asp*.

QSR, International, (2010). Nvivo. *http://www.qsrinternational.com/products_nvivo.aspx.*

Quirchmayr, G., and Tagg, R., (2002). An Architectural Concept for Knowledge Integration in Inter-Administration Computing. *Maria Wimmer. KMGov-2002*, Copenhagen: 67-77.

Reifer, Donald J., (2002). Making the Software Business Case – Improvement by the Numbers. *Addison-Wesley*.

Stodolsky, D.S., (2002). Computer-Network Based Democracy: Scientific Communication as a Basis for Governance. *Marina Wimmer. KMGov-2002*, Copenhagen: 127-137.

Swain, J.W. et al., (1995). Issues in Public Management Information Systems. *The American Review of Public Administration*, (25:3): 279-296

Ward, M., and Mitchell, S., (2004). A comparison of the strategic priorities of public and private sector information resource management executives. *Government Information Quarterly*, (21:3): 284-304