Turun yliopisto
University of Turku

DIGITAL TRANSFORMATION OF MUNICIPAL SERVICES IN FINLAND

Master´s Thesis
in Information Systems Science
IMMIT

Author:
Tomi Ahveninen

Supervisors:
D.Sc. Eija Koskivaara
Prof. Dr. Patrick Rousseau
Prof. Dr. Anne Rutkowski

31.5.2016
Helsinki

Turun yliopiston laatujärjestelmän mukaisesti tämän julkaisun alkuperäisyys on tarkastettu Turnitin OriginalityCheck -järjestelmällä.

The originality of this thesis has been checked in accordance with the University of Turku quality assurance system using the Turnitin OriginalityCheck service.

Table of contents

1 INTRODUCTION 5

1.1 Research Background 5
1.2 Research Motivation 6
1.3 Research Questions and Scope 7
1.3.1 Research Purpose and Questions 7
1.3.2 Scope and Limitations 7
1.4 Methodology 8
1.5 Thesis Overview 10

2 FINNISH MUNICIPALITIES - SERVICE PROVISIONING 12

2.1 Duties of Municipalities in Finland 12
2.2 Municipal Service Provisioning 13
2.3 Key Issues 14
2.4 Public Service Procurement Thresholds 16
2.5 Synthesis for the Interviews 18

3 DIGITAL SERVICE OPPORTUNITIES 20

3.1 E-Government – Four Levels of Evolvement 20
3.2 Customer Relationship Management (CRM) 23
3.3 Service Request- and Field Service Management 26
3.4 Business Intelligence 27
3.5 Digital Healthcare 29
3.6 Cloud Computing 31
3.7 Synthesis for the Interviews 32

4 ANALYSIS: DIGITAL TRANSFORMATION OF MUNICIPALITIES AND CRM AS A SERVICE PLATFORM 34

4.1 The Interviews 34
4.2 Interview Results 35
4.2.1 Service Provider (Mepco Oy) 35
4.2.2 City of Porvoo 41
4.2.3 Helsinki Mobile Health Care 47
4.3 Reflection: Interview Results and Digital Opportunities 51

5 SUMMARY AND CONCLUSION 61

5.1 Summary 61
5.2 Conclusion 63

REFERENCES 66

APPENDICES 70

Appendix 1: Interview Structure 70
Service Provider (Mepco Oy) 70
City of Porvoo Administration 70
Helsinki Mobile Health Care 71

List of figures

Figure 1 Research structure 9

Figure 2 Interdepartmental silos 15

Figure 3 Public procurement thresholds 17

Figure 4 Finnish EU tenders electronic daily examples 18

Figure 5 Dimension and stages of e-government development 21

Figure 6 Multi-layered model of CRM strategy implementation 25

Figure 7 Service productivity - customer satisfaction frontier 27

Figure 8 Customer relationship management and business intelligence 28

Figure 9 Pros and cons for public, private and hybrid cloud 32

List of tables

Table 1 Interviewee coding 35

Table 2 Summary - Service provider (Mepco Oy) 36

Table 3 Summary - The city of Porvoo 42

Table 4 Summary - Helsinki mobile health care 47

Table 5 Summary - Reflections 52

Table 6 Summary – Motivators, benefits, challenges 64

1 INTRODUCTION

The introduction chapter explains the research and the structure of the document. The chapter starts with an overview into the background of the research, followed by the research purpose, questions and scope. After that, the methodology of the research is explained and the last part describes the structure of the document.

1.1 Research Background

The world of the 21st century is shifting into being increasingly digital. Powered by advances in computing, data storage- and transfer capabilities, the pace is not likely to slow down. Many transactions are moving online: people do not have to leave their houses to make purchases or reservations to services and an immense mass of information is available real time to anyone with internet access. Furthermore, the people do not even have to be at their houses anymore to access this, the movement into mobile has been quick and comprehensive.

Private companies have embraced this change fast; in many industries it is a necessity for the continuity of the business. Competitive advantage is sought for example by improved and individualized customer service, listening to customers, following the competition, online self-service models, data integration of different business units, collecting information on the business and its performance and constantly analyzing and measuring success. In a fast changing environment, it is not about the survival of the strongest, but the most responsive to change. Interaction with one's customers is required to be able to react to change before it is too late (Nguyen & Mutum, 2012).

In the Finnish public sector the change has been slower, but not inexistent. The pressure to change has not been as intense as in the private sector, nevertheless, the people are starting to expect more from public organizations as well (Schellong, 2005). If the local roof repair company can be commissioned through an online self-service, why should a ticket to the technical department of a municipality be made through email or telephone? The change has brought up e-government initiatives in Finland like "the national service architecture (Kansallinen Palveluarkkitehtuuri, KAPA)", a national level interface for integration of public and private actors providing services for residents. KAPA aims in connecting the different authorities and their data bringing public services to a single portal for the users: Suomi.fi (The Ministry of Finance, 2016). KAPA has similarities to the successful national architecture implementation called "X-Road" in Estonia.

1.2 Research Motivation

Finnish municipalities, which are in the center of this research must be adaptive to the new technologies to keep up their attractiveness as a place to live in. The modern customer, and customer is what the citizens should be perceived as, often does a lot of research due to the easy availability of information before making a decision. A municipality with modern digital services throughout the departments and a strategy of embracing modern technology in providing better services will attract more taxpayers than a pen-and-paper-competitor. The key is not only in the technology, but the organizational attitude; the municipality should exist for the citizens and not vice versa. Furthermore a step away from risk avoidance is required. The municipalities that are the first to embrace modern systems and practices will have a chance to get the most out of the potential competitive advantage as well, being ahead of most of the competition. Moon & Norris (2005) point out a municipality's managerial culture as the key to change; orientation for innovation is essential.

Another important matter to note is that main part of the data stored and utilized by municipalities concerns their customers: the citizens. This is one of the reasons for this research to look into customer relationship management (CRM) -type of solutions as a key in the change as a platform for stakeholder management and digital services. Currently the customer data is often held by different silos in many municipalities and there is no single view of the customer: only bits and pieces in the different departments. Throughout their life cycle, many citizens are customers to almost all of these departments. A comprehensive customer view could empower the different departments to provide more individual service and one-stop shopping for the citizens (Layne & Lee, 2001). Furthermore, it could help to detect possible social issues and act on them on time. Not to forget providing a convenient possibility for the citizens to participate in the governance of their home municipality through online feedback collection and service request management. It could further empower citizens and reduce the stress on the municipality by providing a view on the state of their service requests and reports; leaving out the overlapping requests on the same issue and transparently describing the process.

A modern digital CRM platform could also be a key in reducing the amount of manual input needed from the employees working in the municipality, thus saving more time for them to provide the actual core service and not spend their time and expertise in overlapping documentation. The key would be to implement a highly integrated system, which is connected to the daily programs used by the employees; collecting as much information as possible through the first input. For example in healthcare and especially mobile healthcare, a solution that has necessary information to provide good and individualized service for the customer and enables the users to have more time for the core service, would be a great benefit.

This type of major change is highly encompassing, having effects in most of the municipal organization and the current technologies used. Interfaces would also be required, it is not sensible to implement every small specialized function into one system. Nevertheless, the meaningful data should be available from one location (Schellong, 2005). The transformation would also require a major organizational change; many functions that have been done as such for years would change and some would even have to be discarded. The support of the municipal users and the citizens is vital. No matter how good a system is, if no one wants to use it, the benefits can be lost.

This research tries to pinpoint the motivations for municipalities to embark on this transformation into digital services through a single stakeholder management platform, find the achievable benefits of the new system and model of operation, detect the perceptions on different digital service opportunities and lastly to identify major challenges brought up by the implementation of the system and organizational change.

1.3 Research Questions and Scope

1.3.1 Research Purpose and Questions

The purpose of this research is to gain an understanding on the reasons for digital transformation for municipalities, better understand the achievable benefits for different stakeholders and clarify the main challenges related to this transformation. This research tries to specifically examine a model, in which majority of the stakeholder management is done on a single, highly modular platform aiming for true data integration, one view of the customer and one-stop-shopping for the residents. The main questions of this research are:

- What are the motivators for municipalities for modern digital service transformation?
- What are the main benefits of the transformation?
- What are the main challenges for the transformation?

1.3.2 Scope and Limitations

This research is focused on Finnish municipalities and their digital services. The main perspectives considered in this research are ICT-service provider, municipal administration and municipal employees. Representatives from these groups were interviewed for

this research. Furthermore, an important stakeholders considered in the research are municipal residents, who are essential when considering municipal services. The residents enable the existence of a municipality. The research is most focused on the topics that have a distinguishable effect on the customer orientation of a municipality and the level of customer satisfaction.

Higher level governmental systems will not be described in this research further than as mentions when necessary and interesting considering the municipal service provisioning. Vertical integration will be considered, but the specifics around governmental systems will not be covered in the research.

The research was made as a thesis project for Mepco Oy, a Finnish IT company providing solutions for both private- and public organizations for customer relationship management (CRM), financial and management accounting, enterprise resource planning (ERP), human resource management (HRM), and payroll. Mepco is part of Accountor Software Division, which employs around 400 professionals. It has an annual turnover of approximately 70 million euros (Mepco Oy, 2016).

It is important to note in the scope, that even though the research was done as a project for a service provider, the research does not solely take the service provider perspective. The research attempts to form a holistic view on the topic by combining the views of the service provider, municipal administration and municipal employees.

1.4 Methodology

This research was initiated with a proposal reviewed with the University of Turku and Mepco Oy. This proposal worked as a starting point for the research, but the focus and specifics were detailed further iteratively during the research. Going further into the research with studying the existing literature, a semi-structured interview topic design was formed. With this design, multiple people from groups considered important through the literature were interviewed. These results were described as their own entities, first in the research and then reflected upon the literature study. Combining the literature study and the interview results and reflections, final conclusions were formed. An illustration of the research structure can be found in Figure 1 Research structure.

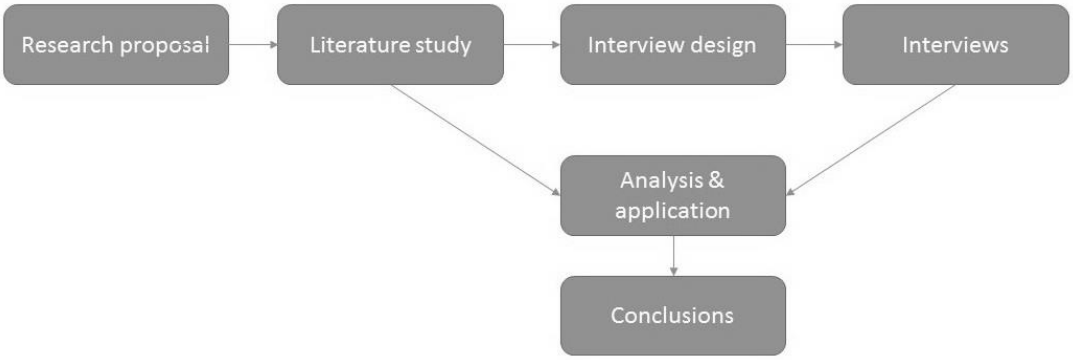

Figure 1 Research structure

The research is qualitative and exploratory in nature, as it attempts to gain understanding and explore the phenomenon without producing quantifiable results or utilizing statistical research. It attempts to generate knowledge on the topic, but not through generalizable conclusions (Golafshani, 2003). The topic is still researched to such a small extent in the Finnish context that it is difficult to form a reliable pattern based on a priori knowledge for a quantitative research. Furthermore, the field of the research is complex and has multiple interrelated elements and the questions of this research contain a qualitative aspect of "why" and "how" (Eriksson & Kovalainen, 2008). The research also examines existing literature in finding concepts perceived as possibly relevant for the topic. Consequently, the research tries to achieve a holistic view and explore which of these topics seem prevalent in the field of municipal digitalization by interviewing experts affiliated with the municipal systems and management.

The research is conducted following the naturalistic paradigm: it examines the environment of the phenomenon as changing and uncertain. All of the elements in the environment are interdependent and affecting the entirety, so in order to understand the phenomenon, multiple elements need to be examined together (Golafshani, 2003). This research is centered on the ontological view that reality is not objective, but subjective, thus possibly different for everyone, and dependent on time and context (Eriksson & Kovalainen, 2008). The research attempts to embrace this thought and view reality for different people from different contexts.

The primary data of this research was collected through interviews, both in person and through online meetings. The interviews were semi-structured: they had an outline in topics, but the discussion was encouraged further from the topics and the wording was not identical for all participants and the interviews had a conversational aspect to them (Eriksson & Kovalainen, 2008). The analysis of the interview data aims to form a holistic picture of the interview data of the different groups. The interviews were built according to a combination of naturalist and subjectivist approaches, trying to discover facts on the

topics, but also interested in the different experiences and emotions of how do the different participants feel about the topics (Eriksson & Kovalainen, 2008). The key concepts of this research were also explained to each interviewee before the start of the interview.

The interviewees were chosen from three different groups: a service provider (Mepco Oy), a municipality (the city of Porvoo) and a municipal employee user group (Helsinki mobile health care). The interviewees from the service provider (Mepco Oy) were chosen on the criteria of having a major impact in Mepco's public sector strategy and/or being related to the Porvoo digitalization project, which is being done in collaboration between Mepco, Microsoft and KuntaPro and has a CRM system running as the core. Consequently, from the municipal administration group in the city of Porvoo, the key personnel related to the digitalization CRM project were chosen as well. From mobile health care, the choosing criteria was finding interviewees who do field work with customers and have experience in using the current systems.

The prevalence of the customer-supplier model in which municipalities buy services from outside providers is one of the reasons this research is considering both, the service provider's view and the view of the municipality. It is integral to gain perspectives from both parties related to providing the services to achieve a full understanding. Furthermore, Komulainen (2010) outlines the importance of handling organizational changes related to these relationships and outsourcing, thus it is also important to involve the users affected by this change. In addition, the involvement of the system's end users are seen as an important part of successful implementation (Finnegan & Currie, 2010). Accordingly, user interviews were also involved in the research.

Starting from the research problem and questions, a corresponding literature study was conducted. Based on both, the key findings of the literature study and professional feedback from the experts at Mepco Oy, a semi-structured interview guide was formed. A comprehensive picture of the entirety of the question was sought, thus taking multiple viewpoints: the service provider (Mepco Oy), the municipal administration (the city of Porvoo) and the municipal users (Helsinki mobile health care). The results of these interviews are presented and reflected on the literature study in chapter 4 Analysis: digital Transformation of Municipalities and CRM as a Service Platform.

1.5 Thesis Overview

The thesis begins with an introduction to the research topic and the questions of the research are discussed. In the first chapter of the literature study the background information on Finnish municipalities is presented, including municipal duties, the municipal laws important for the research, municipal service provisioning, some of the current key issues

related to the service provisioning and public procurement thresholds. Next chapter describes some of the main digital service opportunities that municipalities could utilize. The fourth chapter contains the analysis part of the research, in which the interview results are summarized and reflected upon the literature study. Content wise the research is ended in the chapter following the analysis: conclusion. Following the conclusion chapter are the references used in the research and the appendices.

2 FINNISH MUNICIPALITIES - SERVICE PROVISIONING

This chapter describes the business field of Finnish municipalities. First, municipal duties and the existing service models are explored. Next, some of the important issues related to the current operation of information systems and services are presented. The chapter is concluded with buying thresholds related to public service purchases.

2.1 Duties of Municipalities in Finland

On a high level, the municipal services in Finland can be divided into three main categories: social- and health services, education- and culture services and other services, which include municipal design and maintenance for example. The current order of expenses per category from highest to lowest goes according to the previous list and the costs of social- and health services account to approximately two thirds of all expenses of municipalities (StatFinland, 2014). The category of other services includes responsibilities like environment, waste management, infrastructure and public transportation. In addition, municipalities are responsible for the public housing in their area (Harjunen, Saarimaa, & Tukiainen, 2010).

The municipal law requires the municipalities to have a strategy (Municipal law 37§, 2015). The following points are required to be considered in the strategy (Municipal law 37§, 2015):

- The advancement of well-being of residents
- The organization and realization of municipal services
- The service requirements defined in the laws regarding municipal duties
- Ownership policies
- Employment policies
- The possibilities for residents to be effectively involved
- The development of the vitality of the area

Furthermore, the strategy has to be based on the current situation and future projections of the municipality and it has to define how its success is followed and evaluated (Municipal law 37§, 2015). When the strategy has been defined and accepted by the municipal council, the municipality should be governed according to the strategy (Municipal law 38§, 2015).

An important separate municipal duty is the realization of democracy. It is stated in the Finnish municipal law that the residents have a right to participate in the development of their municipality. Furthermore, a municipality is responsible for creating diverse and effective opportunities for the residents to be involved in the municipal affairs. Among other things, this includes getting feedback from the residents before major decisions and

designing and developing services together with the users of these services (Municipal law 22§, 2015).

Municipalities also have an obligation of public communication: they have to inform the stakeholders, for example residents and societies, on their operation. This includes transparent communication on matters like development of municipal services, economy, decision making and the decisions that have been already made and their effects. Municipalities are required to communicate these in an easily obtainable way online, with some exceptions: classified information should not be disclosed and personal information should be reported in a way that it complies with privacy regulations (Municipal law 29§, 2015).

Considering the municipal law, it is also important to note that the municipalities are not required to provide the services alone. Municipalities can deliver the services in a joint operation (Municipal law 49§, 2015). For example, multiple small municipalities could join forces to be able to deliver services of a modern rescue and emergency department. Furthermore, municipalities can work together in creating ICT-services. The municipalities can also form a consortium, that is treated as a single legal entity able to make commitments and agreements (Municipal law 55§, 2015).

2.2 Municipal Service Provisioning

Being able to comply with all the duties described in the previous structure, a municipality needs an organization and an infrastructure to base all these services on. Next the current service provisioning of municipalities will be introduced.

Municipalities are in a major role in the Finnish economy and service provisioning: the expenses of the municipalities are roughly 18 percent of the Finnish GDP and around 20 percent of the employed Finnish workforce can be accounted to municipalities (Harjunen et al., 2010). Currently there still are a lot of municipalities in Finland compared to the number of residents, and the government has encouraged municipalities to join together into larger units through economic incentives and regulations (Harjunen et al., 2010). It is important to notice the difference between municipal mergers, in which multiple municipalities are merged into one, and municipal consortiums, in which the municipalities have a shared unit for service provisioning, but the individual municipalities remain (Harjunen et al., 2010).

The popularity of customer-supplier model, in which the customer and supplier are different organizations engaged in an agreement has been increasing since the 1980 (Komulainen, 2010). Nevertheless, outsourcing in the public sector has more political and judicial issues to consider than private sector (the public procurement thresholds are addressed in chapter 2.4).

Another upcoming major change to shake the field of municipal service provisioning is the SoTe (social and healthcare) reform. The reform transfers the social- and healthcare services from the municipalities to 15 SoTe areas in Finland. Also the financing is transforming from municipality based into national based (The Council of State, 2016). The main goals of this change are to increase the well-being of the population through an increased level of equality in health services: the new model gives more choice to the resident on where to get the care from (public or private provider). In addition, one of the key goals of SoTe change is to achieve service integration, which includes (The Council of State, 2016):

- Integration of organizing the services: one high level organizer and funder of the services (the national government).
- Integration of data between the multiple actors, the national service architecture interface aims to empower this.
- Integration of care chains requires a cooperation structure between the different caregivers: even when transferring from one facility to another, the continuity of the service experience must remain. Individual services must also be grouped together into larger entireties.
- Integration of service production, which requires bringing multiple individual services together into larger service catalogues.

SoTe is a major change that will have effect on municipal services provisioning, but it is not yet completely clear what. Currently SoTe is mostly in the level of high level goals and regulations. Nevertheless, no matter how the change will be implemented, municipalities still have multiple other responsibilities like mentioned earlier, many of the functions run by the municipal organization are not related to healthcare or social services.

2.3 Key Issues

The current operational environment of organizations, both private and public, has become more dynamic and rapidly changing. Public organizations are not embracing the development on the same pace as private ones; public organizations are often more conservative and risk-avoiding, thus slower to change (Bannister, 2001).

The public administration should be able to interact with and understand the residents better (Janssen & Wagenaar, 2003). Nevertheless, many of the current information systems run in municipalities are not often supportive for an age of customer orientation and intimacy. Service provisioning has been department-oriented, and many of the department are running their own function specific legacy systems. These systems often have low horizontal integration capabilities to communicate with other departments and there

is no common architecture for the whole municipality. This leads to the different departments working as silos with strict built-in processes in the systems and not having an adequate responsiveness required from a customer oriented organization (Janssen & Wagenaar, 2003). Nevertheless, not all of the silo structuration is accountable to the systems, but also the historical organizational and political reasons (Bannister, 2001). The isolated structure can partly be accounted to the historically independent departments that have built their information systems according to the independence. The fragmentation of the decision making authority has also been an issue: a major transformation requires a high amount of support from different organizational units. This independence also generates friction in integration attempts: the historically independent departments may not be content that the departments are brought together and other actors step on their jurisdiction (Vehviläinen, 2016). Viljakainen (2016) also outlined that someone who has the authority to remove the fences between the departments is needed to drive the change and make the departments cooperate. Furthermore, the size and diversity of municipal services causes difficulties in creating a more shared structure for cooperation (Bannister, 2001). In addition, the communication between these colossal systems and the end customer through a front-end interface is low (Janssen & Wagenaar, 2003). Nevertheless, integration issues are not only related to public actors: it is seen as one of the major issues affecting modern organizations, also private ones (Finnegan & Currie, 2010). A visualization of the information silo structure can be found below in Figure 2 Interdepartmental silos (Bannister, 2001).

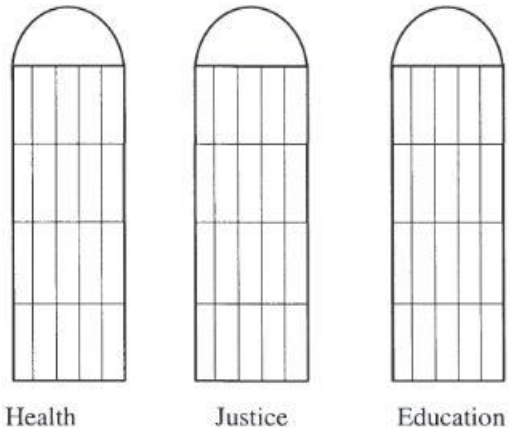

Figure 2 Interdepartmental silos (Bannister, 2001)

The research of Janssen & Wagenaar (2003) was conducted in the Netherlands, but distinct similarities to the Finnish municipal field can be detected, supported by observations made from the media, like the article written by Onninen (2015) which is used later.

Vendor-lock-in is a key issue in municipal sector; there are numerous old solutions, in which the service provider is responsible for almost everything and starting a change project would be expensive and risky. In these situations, even though the purchase price for the system may have been low, the maintenance can be expensive for the municipal customers. Everything has to be bought from the same service provider, and every action costs (Onninen, 2015). Vendor lock-in was seen as one of the public ICT key issues in the research of Janssen & Wagenaar (2003) as well. As an example of service costs, the city of Espoo has outsourced its ICT services to a large service provider, who charges 18 euros for each recovered password of a municipal employee. On a yearly level, this accounts to 200 000 euros (Björksten, 2014).

Heikki Lunnas, the director of information society unit at association of Finnish local and regional authorities (Kuntaliitto) estimates that the everyday ICT services are outsourced in roughly one third of the municipalities. Onninen (2015) accounts the current situation partly to risk avoidance from the public decision makers: when you buy from a large service provider, you will be held less accountable of failures. Otso Kivekäs, a city representative and IT decision maker in the city of Helsinki summarizes it followingly (translated from Finnish): "No matter what the large companies deliver, it is not your fault because you ordered from a source seen as reliable. If you had ordered from a small company, the fault would be yours." (Onninen, 2015).

The risk avoidance mentioned above can be also seen in the major changes made in the public sector. Usually a major change is preceded by a crisis: often there is not enough motivation to implement major changes in the public sector before it is absolutely necessary said Viljakainen (2016), who used the plummeting oil price and the modernization of the Russian Post as an example. The director-general of the IT unit of the European Commission, Gertrud Ingestad (2016) also stressed that the public sector usually changes through crisis, she used the EU refugee crisis as an example. She pointed out that we should be more interoperable and cooperate even before a crisis, to be more reactive and to better handle the crisis together when it is still more manageable.

2.4 Public Service Procurement Thresholds

The ground principles on which the current law for public purchases in Finland is based on the regulations of the European Community (EC) and the directives of the European Union. The actual laws and regulations considering public procurement are made locally, but they follow the EU directives to ensure equality and avoid discrimination in purchases. The main goal of the EU is to create a functioning internal market and free movement of goods and services with these directives (Oksanen, 2010). These regulations and

thresholds are further explained in Figure 3 Public procurement thresholds (Oksanen, 2010).

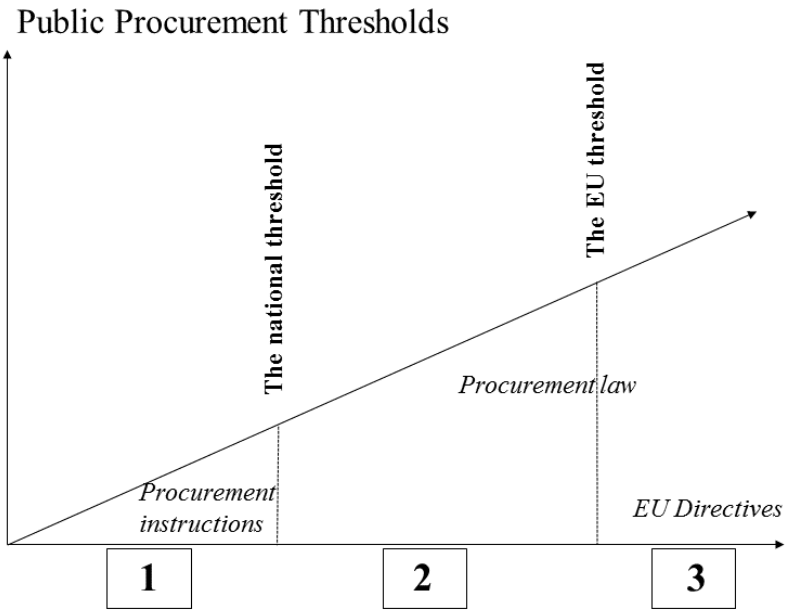

Figure 3 Public procurement thresholds (Oksanen, 2010)

The following descriptions of the procurement levels for municipalities are based on the work of Oksanen (2010):

- *1st level: Below the national threshold (<30000 € for goods and services (HILMA, 2016))* These purchases are not bound by the national procurement law, but still need to utilize the market and follow the principles of good management. From the purchases at this level, there is no possibility to make a complaint to the market court. An appeal can be made to the deciding procurement unit within 14 days of the decision.
- *2nd level: Above the national threshold (between 30000 € and 209000 € for goods and services (HILMA, 2016))* These purchases need to follow the regulations of the national procurement law. These purchases are also required to be tendered, thus they are announced publicly in HILMA-system to ensure an equal competition for the suppliers. At this level of procurement, the suppliers can appeal to the market court considering the decisions.
- *3rd level: Above the EU threshold (> 209000 € for goods and services (HILMA, 2016))* These purchases have to strictly comply the national procurement law and the EU directives. They have to be publicly announced and tendered on an EU level, and the choosing criteria have to be described unambiguously. They

must be entered into the EU TED system (Tenders Electronic Daily). It is possible to appeal to the market court on the results of the procurement decisions at this level.

Examples on some of the descriptions of Finnish tenders active during spring 2016 in the EU tenders electronic daily can be found below in Figure 4 Finnish EU tenders electronic daily examples (TED, 2016).

Description
Finland-Helsinki: IT services: consulting, software development, Internet and support
Finland-Pirkkala: Snow-clearing services
Finland-Hämeenlinna: Telecommunications services
Finland-Kotka: IT services: consulting, software development, Internet and support
Finland-Kuopio: Sewage, refuse, cleaning and environmental services
Finland-Lieto: Health and social work services

Figure 4 Finnish EU tenders electronic daily examples (TED, 2016)

2.5 Synthesis for the Interviews

This chapter has explored the field in which the Finnish municipalities are operating, and that they have multiple duties (The Ministry of Justice, 2015). Furthermore, multiple issues were detected like working in operational silos (Bannister, 2001), low customer responsiveness (Janssen & Wagenaar, 2003)**,** new requirements on effectiveness (The Council of State, 2016) and vendor lock in (Janssen & Wagenaar, 2003) and (Onninen, 2015). The issues point to a direction on what are the motivations for the municipalities to embrace the digital transformation, but it was found interesting to also hear what the people in the actual field of working with these issues think about the motivations. In addition, when it is such an integral part of the research questions as well, it was seen as a key to research this topic thoroughly and holistically. Due to these factors, the interview questions on the motivations were formed.

The research presented in this chapter sees the municipal operation as highly fragmented between the departments (Bannister, 2001) and (Janssen & Wagenaar, 2003). This is why the interview question on who should drive the change was included. When the operation is fragmented, it would be interesting to see who should be the actor lead such an encompassing change. Furthermore, as the municipal field was seen as conservative and risk-avoidant (Bannister, 2001), it was considered possibly difficult to implement the change. Thus came the question on the challenges related to the digital transformation.

Another important consideration in this chapter was the involvement and reactions of the users for the change; organizational changes need to be handled well (Komulainen, 2010). Finnegan & Currie (2010) also saw user involvement as an integral part for the success of information system implementation. These factors lead to creating questions on expected reactions and user resistance minimization for the users.

The SoTe-change presented in this chapter is a major source of discontinuity: it will drastically change the operation of public services, but it is not yet definite how (The Council of State, 2016). This lead to thinking that this kind of upcoming major change could cause changes in ICT-procurement, so the question on how the SoTe-change is seen to affect the potential information system projects was formed to find out more on how the professionals working with these issues feel about the change.

3 DIGITAL SERVICE OPPORTUNITIES

This chapter introduces some of the opportunities enabled by modern technology that could affect municipalities. Key concepts for the research are explained in the chapter, including e-government, customer relationship management, service request- and field service management, business intelligence, digital healthcare and cloud computing.

3.1 E-Government – Four Levels of Evolvement

Electronic government is a concept of increasing the use of modern technology and applications, especially online technologies, in providing public services. The goal is to make it easier, more convenient and more efficient to work with the governmental institutions, thus potentially increasing the satisfaction of the citizens and other stakeholders. While successfully implemented, e-government can also be a way to cut costs, reach a wider base of stakeholders and increase the level of citizen involvement in public affairs. (Layne & Lee, 2001).

The evolvement towards an integrated e-government providing a centralized view for the citizens to conduct their interactions with the governmental actors requires a major effort in management-, technical-, and sociological aspects. Nevertheless, the achievable benefits are immense: the costs can be cut, while improving citizen satisfaction and increasing their involvement. (Layne & Lee, 2001). Furthermore, Schellong (2005) argues that the customer centered online based private sector services also create higher expectations to public services; in order to maintain citizen satisfaction, these issues need to be met.

One of the largest challenges in reaching integration in public IT services is the fragmentation of the different departments and their functions. Even though all of these departments store personal citizen data, they might have a different emphasis: for example information stored by maintenance versus the information stored by healthcare. Layne & Lee (2001) point out that a major success factor for a major change in shared public IT is clear ownership of the system. One department should take the main responsibility for the system, even when multiple departments use it. For example, if a municipality has a strong IT department, it could be the driver and owner of the change. Another viable plan of action could be creating an ad hoc committee from various departments to take responsibility of the change (Layne & Lee, 2001). Top management support is also vital. The processes of all departments need consideration, thus expertise is needed from each of these functions during the development. If the interdepartmental knowledge is low, the process definition is difficult. This could lead to failure in streamlining the processes according to the new strategy (Schellong, 2005).

Layne & Lee (2001) propose a four staged model for reaching e-government: Catalogue, Transaction, Vertical Integration and Horizontal Integration. The stages are reviewed in the model by the required levels of complexity and integration. The model can be found below in Figure 5 Dimension and stages of e-government development (Layne & Lee, 2001).

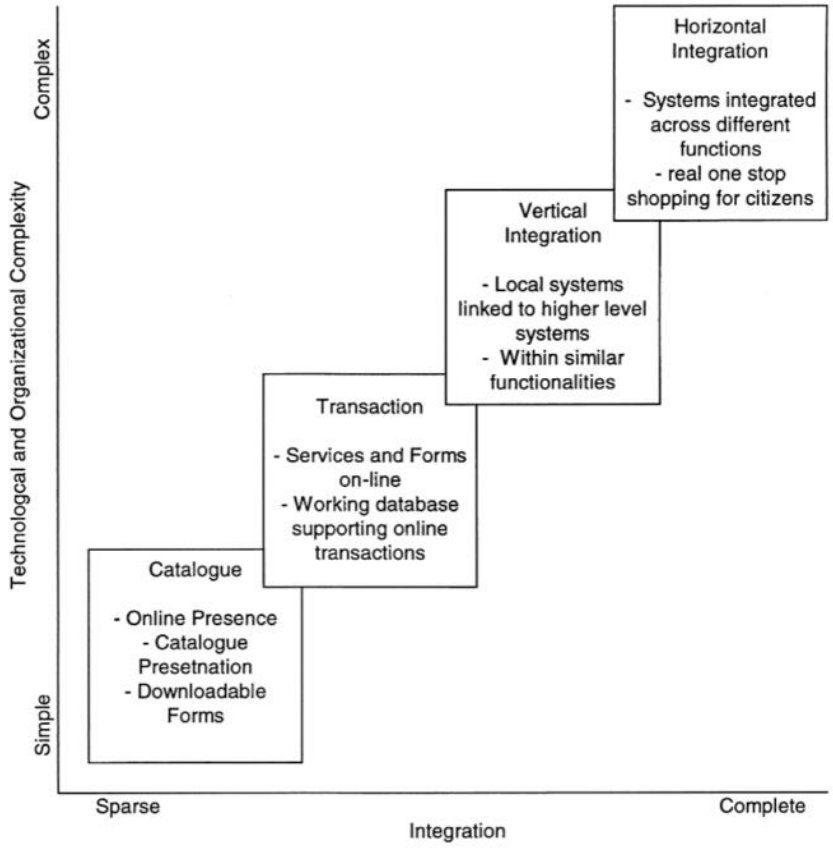

Figure 5 Dimension and stages of e-government development (Layne & Lee, 2001)

In the next part, the stages will be further explained by using the research of Layne & Lee (2001). The research is conducted mostly focusing on state governments in the United States, but the authors state that the model is also applicable to local governmental units globally.

Catalogue stage is the first step for a public actor towards e-government, and means creating an online presence through a website. At this stage the website is mostly for providing information to citizens, a catalogue. The transactions are still done according to the traditional process of phone calls and visiting an office. Nevertheless, when this stage is implemented, the citizens have a new, more convenient source for information and the workload of employees answering the citizen inquiries is reduced. A possible issues of this stage can be allocating workforce to keep the catalogue up to date; there can

be numerous public decisions to upload to the website, and the reliability of the information needs to be maintained.

Transaction stage turns the online communication interactive and two-sided, whereas in the first stage it was static. At this stage the citizens have the possibility to complete tasks online that used to require a visit to the governmental office, for example, filing a tax report online. The transactions are then acknowledged by the governmental actor by receipts for example. Furthermore, the change needs to be both external and internal; the governmental actor also has to update their internal systems to match modern day requirements. For example, this can include systems to handle wages, meetings and supplies. This stage requires a major investment: the existing systems have to be upgraded to support the increasing amount of functionality and data. Even so, the main challenge at this stage is the organizational change. The governmental organization needs to have personnel to handle the online transactions. In addition, the security policies need to be adjusted according to the new systems to ensure privacy and compliance to laws and regulations.

Vertical Integration stage requires a major overhaul of the governmental services and processes as a whole. It means an integration across different levels of government, for example from municipalities to provinces and further to national level. Vertical integration cannot be fully achieved with just implementing new technologies, the different levels of government need to increase the extent of their cooperation. Technically the changes are intensive as well, as interfaces are required between the different level actors. Providing online transactions is no longer enough; the different levels need to have an integrated access to the transactions made in the other levels. An unavoidable challenge when building a spider web of connections is security. Especially legacy systems that are exposed to the internet could become access points for malicious activities. A consideration must be made on the level of public information to be published online versus the privacy of the citizens. Furthermore, the role of the governmental employees starts to shift from being responsible of a single transaction locally into overseeing a multi-level chain of events.

Horizontal Integration stage aims for even further integration. It aims in connecting all the actors on the same level and avoid these actors working as individual silos. For example, that all the different municipalities would be interconnected, and when a transaction is made in one of these units, the other units automatically compare it with their data and have a record of this transaction too. At this stage, there could be just one point of contact for all the citizens to conduct their affairs with the government. A major challenge in this step is the integration of different types of databases containing different types of data collected with different processes. Two functions on the same level that operate on a completely different field, like healthcare and maintenance. Furthermore, as previously mentioned, reaching this stage requires major interdepartmental cooperation

and clear leadership from one department as the change driver and top management support.

3.2 Customer Relationship Management (CRM)

Knowing your customers and tailoring your services to their needs can be a great source of competitive advantage for modern organizations. Municipalities are no different, they are organizations competing on taxpayers. Although, they do have a different emphasis compared to private organizations. Whereas private organizations aim for identifying new potential prospects, for municipalities the focus is more in delivering high quality public services (Schellong, 2005). To know you customers it is important to make sure the information within an organization is explicit and not only silent knowledge gained from interactions, like undocumented meetings or business cards in an employee's wallet. This requires defining appropriate processes for knowledge management within the organization. Furthermore, to establish these processes and make the information available to everyone, a system is needed to support the operation (Khodakarami & Chan, 2014).

CRM systems enable organizations to obtain and keep track of their customer knowledge. Shortly put, they are information systems that enable users to contact customers, gather and keep information on them, visualize this information for a comprehensive analysis and finally provide support for service provisioning. What comes to municipalities, the customer field is complex: there are numerous roles the customers of the municipalities could be divided into. First of all, the residents are tax payers and service recipients, but they can also be service providing partners and supervisors. Thus, it is important for the municipal employee to see the whole profile of a resident (Schellong, 2005). One of the main factors for the level of knowledge generated is the functionality of the system (Khodakarami & Chan, 2014). Furthermore, integrating these systems into multiple functions further improves the generation of customer knowledge. A highly integrated CRM provides more information, for example by collecting information straight from ERP, individual calendars, external customer databases etc. Schellong (2005) perceives integration capabilities as one of the core functions of CRM: transparent business processes are easier to be examined and adjusted.

Competitive advantage is almost impossible to attain today by a strategy of driving the costs as low as possible; it has transitioned into involving and listening to customers. Topics like social listening through the internet and personalization are becoming more and more important. Customers appreciate acknowledging their individual needs, and this process can be supported by a proper CRM system and related activities (Nguyen & Mutum, 2012). Customer knowledge can be divided into three main categories (Khodakarami & Chan, 2014):

- *For customers* is the type of knowledge provided for customers by giving information on the organization's products, services and activities, through marketing messages for example.
- *About customers* is knowledge on customer's backgrounds and needs. This is valuable in improving products and services to correspond with the customer needs and in providing good customer care.
- *From customers* is the knowledge that the customers have on alternatives: the products and services of the competitors. This is also highly valuable to know for an organization to further improve their own offering compared to the offering of the competitors.

Khodakarami & Chan (2014) propose four main processes for customer relationship management "acquiring customers, knowing them well, providing services and anticipating their needs".

Modern adoptions of CRM allow a comprehensive view and combination on the different channels like internet, counter service and telephone. The modern view on CRM is sometimes called "Digital CRM", which emphasizes the use of internet channels and automation (Diemann, Gellner, Kuther, & Legler, 2015). All customer communication, also through social media should be utilized in developing the customer experience. In the digital CRM thinking, it is also stressed that all customer data should be integrated and accessible to all departments (Diemann et al., 2015). For municipalities this combined view is especially important as it enables one stop-shopping for customers by providing the municipalities with a single view on their citizens (Schellong, 2005). Multichannel CRM solutions also enable self-service models for the customers, like internet transactions and service requests.

CRM can be divided into three blocks, which are important to be integrated to gain a complete customer image (Baars & Kemper, 2008):

- Operational layer cover the day-to-day activities like automated messaging and service requests.
- Collaborative layer manages the information on the points of contact with the customer, like telephone and email.
- Analytical layer manages the delivery of customer data to use and makes constant analysis on it.

For encompassing systems, all these parts are required, because a lot of the information on interactions with the customer is gained through emails or other unstructured forms that allow free input, employee reports can be unstructured or not follow a unified pattern and some important documents might have to be imported in the system from third parties. This calls for capabilities to also manage and analyze unstructured content (Baars &

Kemper, 2008). CRM should be leveraged as an integration strategy that provides a common view across departments, thus enabling better understanding on the customer and improved customer service (Finnegan & Currie, 2010).

The transformation of a municipality into being a highly digital organization that provides online services, collects feedback from citizens and has overall a high focus in the customers is naturally not achievable only through implementing CRM or any technology. It is a comprehensive strategy covering the whole organization, made possible by technology (Schellong, 2005). Furthermore, according to Finnegan & Currie (2010), one of the main reasons for CRM projects to fail is a high emphasis on the actual software without a comprehensive understanding of the organizational context of implementation. Integration should not only be viewed as data integration, but as integration of culture, processes, people and technology across different parts of an organization (Finnegan & Currie, 2010). This can be seen as a visualization in Figure 6 Multi-layered model of CRM strategy implementation (Finnegan & Currie, 2010).

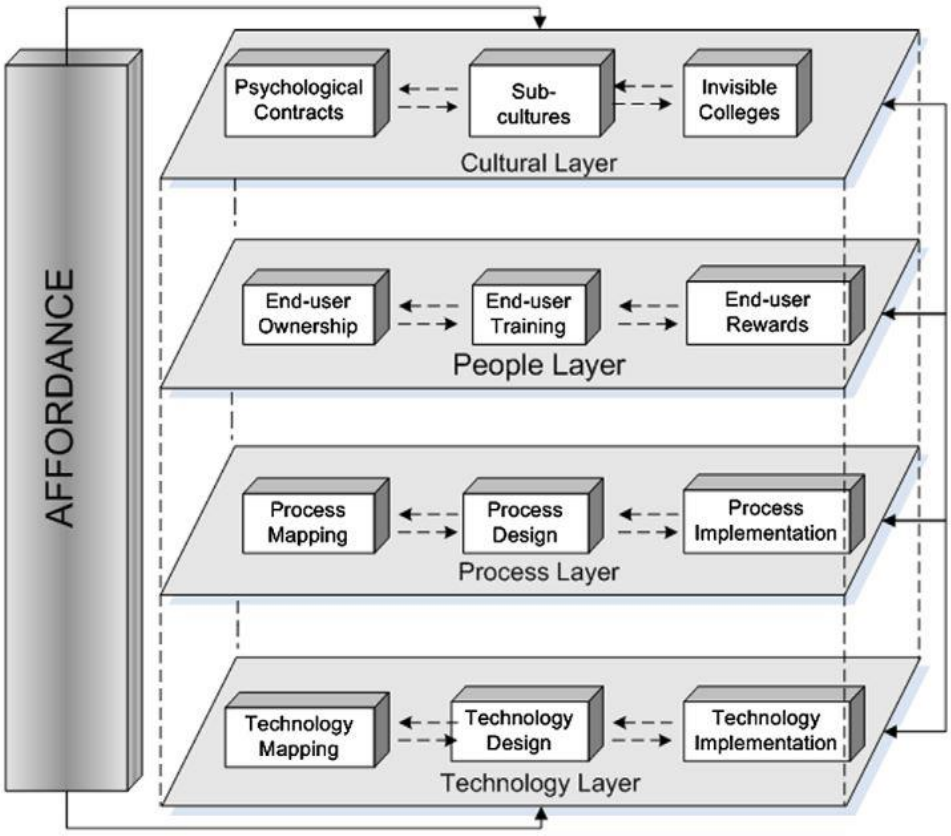

Figure 6 Multi-layered model of CRM strategy implementation (Finnegan & Currie, 2010)

Finnegan & Currie (2010) emphasize that a CRM implementation is built on technology, people, processes and culture. Affordance is a concept introduced by Gibson in 1977.

Affordance is the perception of whether an action is possible in a given setting. It is also important to consider the reference points of different people: what is possible for one might be impossible for someone else given their personal capabilities. Affordance is included in the model, because all the elements in the figure put together can provide a person with different possibilities and restrictions for actions (Finnegan & Currie, 2010). Culturally Finnegan & Currie (2010) suggest that a culture of sharing information and knowledge is important for success, if it is not present at start, a shift is required. People-wise at start not too many people should be incorporated in the project. A better way is to choose a change champion from each department, who should work as a facilitator towards top management and personnel. On the process layer, Finnegan & Currie (2010) suggest that identifying the most important core processes and modifying them to support the new customer-centric model is the most important part. Naturally, also the technical base on which to build needs to be taken into account. It is vital to not only focus on getting multiple software tools, but to build the data structure base in an efficient and reliable way, that the system can be always trusted to provide accurate data throughout the organization. Nevertheless, a CRM strategy requires a lot of balancing between the four layers, and all of them need to be taken into account (Finnegan & Currie, 2010).

3.3 Service Request- and Field Service Management

An important part of a municipality's service provisioning is the handling of service requests. It involves steps like obtaining the requests, allocating them, performing the service and informing the requestor. In this process, a technology platform can also be utilized to improve the level of service and optimize resources (Agnihothri, Sivasubramaniam, & Simmons, 2002). Nevertheless, according to Agnihothri et al. (2002) in service management the same issue needs to be handled as previously discussed: the different departments need to be viewed as an entirety to fully gain the benefits achievable through technology and departments working as separate islands needs to be avoided.

Field service management solutions can eliminate a lot of the manual labor currently involved in handling the service requests. Service requests can be collected through an online portal and automatically allocated to employees with the right capabilities, schedules and tools, while consequently considering the locations of the requests and the employees to make the daily route as efficient as possible. In addition, in an integrated system the warehouse could also be a part of the solution, thus allowing an efficient management of spare parts and hardware (Agnihothri et al., 2002).

Through an integrated system, the service performance could be easily measured and used in business intelligence to further improve the service. Important indicators in field

service are for example the time taken for the whole process from request to completion - "down time". Furthermore, the time taken to respond for a request could be tracked, and the time the employee has to spend on site (Agnihothri et al., 2002). Through multiple platform support, feedback could also be collected directly from customers during the visit (Agnihothri et al., 2002). One of the ways to implement this could be through a form on the technicians tablet for example. Learning is an integral part of service provisioning. The following Figure 7 Service productivity - customer satisfaction frontier (Agnihothri et al., 2002) demonstrates how moving to an integrated technology solution could help finding the balance between service productivity and satisfying the customers, whereas they argue that traditional models are only capable to maximize either-or.

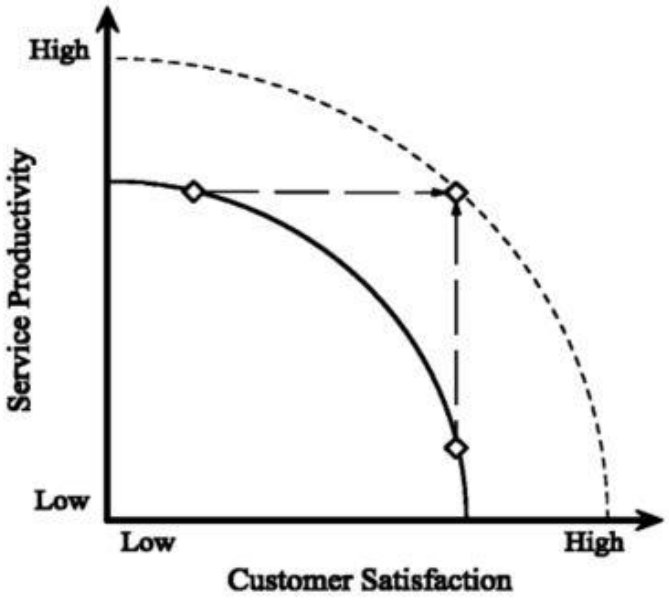

Figure 7 Service productivity - customer satisfaction frontier (Agnihothri et al., 2002)

The dotted line and the rectangle in the center represent the potential of modern service management technologies and the optimal balance. The solid line represents the less flexible traditional models (Agnihothri et al., 2002).

3.4 Business Intelligence

As mentioned in the article by Bannister (2001), continuity and stability are among the key drivers for the decision makers in municipalities. A business intelligence solution could support these key values by providing complex information in an understandable form and supporting in predicting the future trends. Through a business intelligence solution not only could the decisions be better supported by information on the municipality,

but also by information on the larger entireties, like the information on other municipalities (Negash, 2004). According to Negash (2004) the ideal of business intelligence systems is the following: "Business intelligence systems provide actionable information delivered at the right time, at the right location, and in the right form to assist decision makers."

One of the key components in business intelligence is real-time data warehousing. Current data provides the most value in decision making. Furthermore, the data should be constantly checked by the system for anomalies: earlier issue detection gives more time to react. In addition, the system should be able to alert the necessary personnel automatically, for example through email, on the emergence of these anomalies (Negash, 2004). Automatic learning is an important component in the detection of these anomalies; the more the system learns, the less false alarms there are.

Visualization of the data is another essentially important part of business intelligence. Through visualization large amounts of information can be presented in a single screen through a dashboard that can be customized according to the information needs. Having visual information on multiple key performance indicators (KPI) can help detect relationships and gain a quick overview on complex sets of data (Negash, 2004).

Digital CRM can be a key solution in business intelligence as well. An encompassing and integrated system with tightly interconnected operational and analytical layers can be used as a tool in building business intelligence on the customer and environment. An illustration of this can be found in Figure 8 Customer relationship management and business intelligence (Baars & Kemper, 2008).

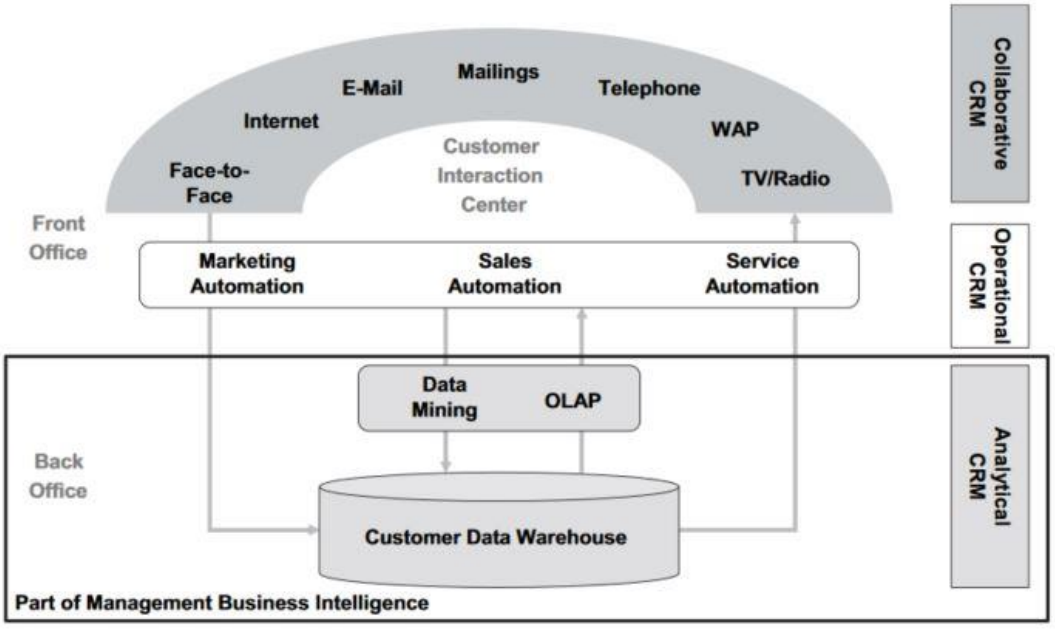

Figure 8 Customer relationship management and business intelligence (Baars & Kemper, 2008)

To explain some concepts in the figure: data mining tools are essential for discovering patterns in immense amounts of structured data through quantitative statistical methods, for example association analysis (finding associations in data, an example of an association could be discovering: if variables A and B are present, then C is likely to be present as well) and clustering (finding clusters of similar data groups) (Baars & Kemper, 2008). OLAP is an abbreviation of Online Analytical Processing. OLAP tools support multiple dimensions to compile information views from, for example facts like customer and services from a specific range like January to April combined with how deep into the level of detail to go like from a city to a district to a specific office. Databases complying with OLAP rules allow complex queries to be completed in relatively short times (Baars & Kemper, 2008).

3.5 Digital Healthcare

Health care is a service that most of the people do not want to use, but everybody has to at some point during their lives. Health care is a major part of the public economy and it has major effect on the quality of life of the population. For the core service which is performed on the patient, they must naturally be physically at the health care unit (Berry & Bendapudi, 2007). Nevertheless, digital services present numerous opportunities both on- and off premise and some of these are described in this chapter.

Integrated patient health records (PHR) are an emergent technology that enables patient to better manage their healthcare, improve the transparency and create a facile communication between the patients and the health care professionals. Furthermore, integrated health records make the health records highly portable (Detmer, Bloomrosen, Raymond, & Tang, 2008). In practice, the health records could be populated for the patient through an online portal, and the data would be real-time through integration with the electronic health record (Detmer et al., 2008). The portal could also enable better communication between the patient and the health care units, for example by sending automatic notifications and alerts, and supporting a channel of direct communication. The PHR portal could also help the patients to view relevant data: dashboards collecting information automatically could be built with the help of health care professionals (Detmer et al., 2008).

An integrated system would also support more efficient use of resources: when the same, actual information would be available for all parties involved in healthcare, manual input would be reduced and the health care professional would have one view of the patient and their history. This would reduce the time required to collect the history of the patient and help in eliminating redundancy of the care. If information on what has been previously done is available, there might be no need to perform these actions multiple

times. Previous customer concerns could also be part of the view. The core benefit of this would be enabling the medical professional to spend more time for the actual care of the patient and have time and information to make a more accurate diagnosis (Detmer et al., 2008). Furthermore, the platform could enable self-service healthcare as well by supporting the use of monitoring devices and remote consultation from health care units. This could be especially beneficial in monitoring long term chronic conditions, like diabetes, by tracking the test results and making them easily available (Detmer et al., 2008).

Medical information easily available for the customers could also increase the public awareness on healthy lifestyle. When health information can be tracked and its changes followed, the lifestyle improvement benefits could became more apparent for the customer, thus promoting a change into healthier life (Detmer et al., 2008).

If so many benefits could be acquired, why is everyone not doing this? One of the main concerns is the lack of a shared architecture and common standards. Medical systems are highly closed and sharing information is difficult. Furthermore, privacy issues are especially important in the medical field. Auditing structures, high security standards and authentication systems would be needed. Consequently, the data would need to be monitored for errors and redundancies: when people's health is in question, errors are intolerable (Detmer et al., 2008).

Currently there are ongoing governmental initiatives to improve data integration and unified processes in Finnish health care, for example "Apotti" and "Omakanta". Apotti is a monolithic change initiative that is not only driving technical changes to support the communication and unification of healthcare systems, but also a procedural change to standardize the healthcare in different units in the metropolitan area of Finland (Apotti Oy Ab, 2016). The slogan of the project is "time for the people", which is quite convergent with the benefits presented earlier in this chapter: reducing the time used for manual information tasks to enable more time with the patients. In addition, the main goals of the project are cutting costs and improving the development of healthcare through business intelligence and measurability (Apotti Oy Ab, 2016). Whereas Apotti is still taking its first steps, Omakanta is already in production. It is a portal to a database for the citizens to access their e-recipe information and medical purchases (The Finnish National Health Archive, 2016). In addition, it enables archiving the patient's health records to one location from different units, and these records are also viewable by the patient. In Omakanta, privacy has also been taken into account by offering the patients a chance to choose whether this information is provided to health care units. The user can also inspect which health care units have received their information and which pharmacies have accessed their personal data (The Finnish National Health Archive, 2016). In addition, healthcare is a field also aimed to be included in the earlier (1.1) mentioned KAPA-project of open interfaces and unification. In a municipal scale, there has been an implementation in the

City of Kouvola, called "Ratamo-center project". Its main principles have been integration, multichannel communication, digital services, and automatic process and resource management (The Ministry of Finance, 2015). The concept was defined with a focus on the customer experience, and not only by using new technology, but also by creating a new model of operation encompassing all social and health services of the city of Kouvola (The Ministry of Finance, 2015).

3.6 Cloud Computing

Cloud computing provides computational power and applications over networks as services, without the constraints of configuration or hardware setup for the customer. High accessibility enabled by fast networks also created a shift towards a multi-platform environment, where systems can be accessed from anywhere with multiple different devices, like smartphones and tablets (Laudon & Laudon, 2006).

The physical infrastructure is usually owned by the service provider in the cloud computing model, and so is the responsibility to manage it, for example the service provider needs to take care of issues related to storage, keeping backups, and having enough computational power to serve all the customers. Consequently, the users cannot affect almost any of these factors and might not even know where the infrastructure that holds their data is physically located (Dillon, Wu, & Chang, 2010). This could be an issue for municipalities, but as a solution hybrid cloud could be implemented, thus allowing to keep the most critical data in-house. In hybrid cloud an organization may have a private cloud for the most critical data, but still use a public cloud for non-critical data and scalability purposes (Jadeja & Modi, 2012). In this model, the different clouds remain as their own entities, but usually there is an information system that enables communication (Dillon et al., 2010). Nevertheless, usually enabling the communication between the different clouds is the most difficult part in implementing hybrid cloud and having the resources to operate an in-house data center needs to be considered as well (Hu et al., 2011). The pros and cons of the different models are listed in Figure 9 Pros and cons for public, private and hybrid cloud (Hu et al., 2011).

		Public Cloud	Private Cloud	Hybrid Cloud
Pros	1.	Simplest to implement and use	Allows for complete control of server software updates patches, etc.	Most cost-efficient through utilization flexibility of public and private clouds
	2.	Minimal upfront costs	Minimal long-term costs	Less susceptible to prolonged service outages
	3.	Utilization efficiency gains through server virtualization	Utilization efficiency gains through server virtualization	Utilization efficiency gains through server virtualization
	4.	Widespread accessibility	–	Suited for handling large spikes in workload
	5.	Requires no space dedicated for data center	–	–
	6.	Suited for handling large spikes in workload	–	–
Cons	1.	Most expensive long-term	Large upfront costs	Difficult to implement due to complex management schemes and assorted cloud center
	2.	Susceptible to prolonged services outages	Susceptible to prolonged services outages	Requires moderate amount of space dedicated for data center
	3.	–	Limited accessibility	–
	4.	–	Requires largest amount of space dedicated for data center	–
	5.	–	Not suited for handling large spikes in workload	–

Figure 9 Pros and cons for public, private and hybrid cloud (Hu et al., 2011)

3.7 Synthesis for the Interviews

Considering chapter three, multiple technologies and opportunities on using them were presented. Naturally when implementing a new technology, it is perceived to support the operation and answer to a need. Thus came the question to also find out how the interviewees see the benefits on the new technological opportunities. Especially considered was CRM as a stakeholder platform, because it was seen as comprehensive and encompassing, having various effects to the whole organization (Schellong, 2005). From the technological perspective also came up the question for the city of Porvoo: on which departments the technologies they are using are utilized and what are their visions on the future considering implementing further technologies to use to more departments.

The next questions to derive from this chapter were considering the economic figures related to these technologies. Almost all of these technologies are expected to cut costs in the long run: e-government (Layne & Lee, 2001), customer relationship management (Schellong, 2005), service request- and field service management (Agnihothri et al., 2002), business intelligence (Negash, 2004), digital healthcare (Detmer et al., 2008), cloud computing (Dillon et al., 2010). So it was seen as an important factor to consider how the people in the middle of the change see the possible cost savings. Consequently, if it were only cost savings and benefits, why would it not be done by everyone? This thought lead to think about the hindrances, from which the question of the highest expenses was formed.

Lastly, the importance of measurability of operation has been stressed since the beginning, for example the continuity emphasized by Bannister (2001) is supported predictability of the future or problems and following what the competition does. Negash (2004) discusses the importance of KPI's and measurements, but one should also know what to measure. Due to this, the question on the main KPI's was created.

4 ANALYSIS: DIGITAL TRANSFORMATION OF MUNICIPALITIES AND CRM AS A SERVICE PLATFORM

This chapter of the research presents the empirical study conducted. First the chapter presents some background on the interviews. Next, the data received from the interviews is analyzed and reflected on the existing literature presented in the earlier parts of the study. The key results are also summarized in tables.

4.1 The Interviews

The empirical data collection part for this research was done through interviews. Further information on the methodology of these interviews can be found in 1.4 Methodology. Nine interviews were conducted in total. However, the interviews included 11 persons all-in-all: the city of Porvoo made it possible to interview three persons involved in the digitization project at once. Each interview lasted approximately 45 minutes, except for the aforementioned larger meeting at the city of Porvoo, which was close to one and a half hours. All but three of the interviews were recorded, and the recordings were utilized in providing the summarizations. Notes were taken from the unrecorded interviews. In addition to telephone (2 interviews), "Skype for business" was used (2 interviews) otherwise, the interviews were conducted face-to-face (5 interviews). The interviews were conducted between February and May in 2016.

The summarization of the results are presented according to the different groups: the service provider (Mepco Oy), the city of Porvoo and the municipal employees (Helsinki mobile health care staff). The results are first summarized in a table, and then further described in the text according to the interview structure. The reflections follow a similar approach, in which each of the different digital service opportunities presented earlier in chapter 3 Digital Service Opportunities are reflected upon individually, combining the insights from the interviews with the earlier research examined in the literature study. To ensure anonymity, the interviewees are not referred to by name, but by the codes presented in the following Table 1 Interviewee coding.

Table 1 Interviewee coding

Referral code	Group	Role	Interview type	Interview date
SPM	*Service provider*	*Management*	*Face to face*	*24.3.2016*
SPS	*Service provider*	*Sales*	*Face to Face*	*29.3.2016*
SPP	*Service provider*	*Project*	*Telephone*	*7.4.2016*
MM1	*the city of Porvoo*	*Management - Administration service center*	*Skype*	*14.4.2016*
MM2	*the city of Porvoo*	*Management - Administration service center*	*Face to face (group interview)*	*18.4.2016*
MM3	*the city of Porvoo*	*Management - Technical*	*Face to face (group interview)*	*18.4.2016*
MM4	*the city of Porvoo*	*Project - Administration service center*	*Face to face (group interview)*	*18.4.2016*
MM5	*the city of Porvoo*	*Management - City level*	*Skype*	*18.5.2016*
MHC1	*Helsinki mobile health care*	*Customer care - Few years of experience*	*Face to face*	*22.3.2016*
MHC2	*Helsinki mobile health care*	*Customer care - Senior employee, experience on an IS project*	*Telephone*	*30.3.2016*
MHC3	*Helsinki mobile health care*	*Customer care - Experience on both hospital- and mobile health care systems*	*Face to face*	*3.4.2016*

4.2 Interview Results

4.2.1 Service Provider (Mepco Oy)

For the service provider interviews at Mepco Oy, the main topics were the motivators for digital transformation for municipalities, benefits and savings brought by this change, challenges and costs, who should drive the change, KPI's for municipalities and an overview of the upcoming SoTe-change for information system development projects. The summarization of these topics for the whole group can be found in Table 2 Summary - Service provider.

Table 2 Summary - Service provider (Mepco Oy)

Digital transformation motivators	The change initiator	Perceived benefits	Challenges & costs	Savings	KPI's
-Requirements from the government *-Same responsibilities, less resources* *-Growing resident expectations* *-More channels for resident participation* *-Transparency in operation* *-Municipal attractiveness* *-Platform to support all the stakeholders, internal and external* *-Shift into mobile services* *-New management, new ways to work* *-Reporting*	*-Top management support is crucial, also the support of the city council* *-Multiple silos can only be brought together by the top management*	*-Increasing customer experience and reducing costs* *-Informed decisions: predicting services required and costs, development based on citizen needs* *-24/7 multichannel service* *-One customer view, integrating silos* *-Easier interaction* *-Efficient and transparent processes* *-Less manual labor* *-Structuring the mass of contacts* *-Automation*	*-The change of operational philosophy* *-Procurement law* *-Defining core roles and services* *-Bringing the silos together* *-Creating new solutions: no current best practices* *-Defining the starting scope* *-Change resistance* *-Integrations*	*-Leaner processes* *-Reduced manual input* *-Office hours saved for the core work* *-Optimizing service requests and reservations* *-Integrating services* *-Detecting overlapping processes* *-Less rehires after retirement*	*-Impact and effectiveness of services* *-Vitality of economic life* *-Completion times* *-Attractiveness*

The motivators for change for municipalities: an issue mentioned by multiple interviewees was the effect of the tightening economy, especially the demands coming from higher level, the government. The same services must be provided with more and more limited resources. Furthermore, the municipalities need to be attractive for residents, so they must provide even better services with these scarce resources (SPM, SPS). Modern municipalities wish to differentiate themselves by leveraging digital services as a competitive advantage. It was also discussed that the residents, who are the customers of a municipality are starting to expect a similar level of service from public organizations as they get from private organizations, part of it being online services accessible from anywhere, at any time from any device (SPS, SPM). It is also important to note that municipalities have multiple stakeholders, like residents, companies and non-governmental organizations. The municipality must be a platform to support them all in the future. The movement into mobile is another key driver for change: the importance of mobile services for the residents is increasing due to their popularity (SPS) and the shift into more mobile work options for public employees (SPM). The tightening regulations are also a motivator for digital change: the reporting needs from a municipality towards higher public institutions

are bound to increase (SPM). The last motivational aspect brought up in the service provider interviews was further including the residents in municipal decision making by providing new channels to give feedback and take part in public discussion (SPS). The stress on the municipal employees can be reduced by digital participation channels, and the complaints can be reduced if the residents have an easy channel to participate. In comparison to a top down approach, in which decisions are made within the top management with low transparency, the new model could increase the resident's acceptance of the decisions.

The meaning of changing leadership in the public sector should be noted as well: the retirement of older management brings younger decision makers and new ways to work into municipalities (SPM, SPS). These new models, remote work for example, require modern technology to support them. Furthermore, the decision makers driving new technologies into municipalities are in an important role considering the development of the whole field: they work as pioneers for these new solutions, and when other municipalities see the effects, even the more risk-avoidant leadership can get interested in these solutions (SPM).

The main benefits: important benefits discovered in the service provider interviews of the digital service transformation were related to increasing the customer experience, providing new channels of interaction, making the operation of a municipality more efficient, and empowering decision making and forecasts with information (SPS, SPM).

The new systems and ways to work could bring more customer oriented thinking into municipalities. Empowering the municipality to view the life cycle of a resident as one customership to consider what is the value generated for the resident by the municipality in the different stages and roles they go through during their customership (SPM, SPS). A requirement for this would be taking down the silo operation model, a transformation which could be empowered by the new system (SPS). A concrete benefit of the digital transformation would naturally be improved digital services. The municipalities could provide multichannel services, with online services usable at any time, from anywhere and with any device (SPS, SPM). These new channels could also take resident participation to a higher level and increase the interactive dialog between residents and municipal employees. When considering interaction between a municipality and the residents, it is important to note that it is not just feedback on issues or service provisioning, but also participation to the future development of the municipality. Further involving the residents in municipal affairs can be a driver for increased communality. When the residents have a clearer channel to have a say in public matters, the feeling of working together towards a better municipality where the residents are listened will increase (SPS).

Automatically allocating, the contacts by the residents is a major improvement as well; then they are not overstressing a single point of contact, like the mayor's office, and the response times can be made shorter. In addition, the manual labor required to handle these

issues and allocating them from a huge mass can be drastically reduced. This could cut costs and increase customer satisfaction (SPS). For the residents, the ability to follow the different stages of these requests would also bring more transparency to the process, as would defining the processes to support the operation of this system (SPS). The overhaul of these processes could also make the municipal operation more efficient. It was also pointed out that it is important to evaluate and reshape the whole process structure and not only try to make the existing processes faster and cheaper (SPM).

Furthermore, it is also important to improve the view on businesses of the area as customers of the municipality and consider the roles a resident might interact with the municipality in: for example entrepreneur, student, patient and so forth. By further being able to integrate and work as a platform for the local private businesses as well, the municipality can increase the customer experience for their residents. Even if a service is provided by someone else, a private company for example, the municipality could coordinate the customers seamlessly and work as a platform for these services as well (SPM).

The improvement on the knowledge management is another key benefit for the municipalities working with scarce resources; they need to know where to allocate these resources, and the structured information can be an enabler for this. When the bottlenecks became evident and the problems are easier to detect and act on, resources can be saved while simultaneously gaining increased customer satisfaction (SPS, SPM). Furthermore, with the information provided by the increased interaction with the residents and better view on the resident base, the municipality could better predict what kind of services are required in the future. Naturally the financial aspect is notable as well, and the availability of information would make forecasting the future expenses easier and more accurate (SPS).

Considering health care the main benefit is similar to the other operational benefits: saving time for the actual core service that generates value for the customer. One of the main enablers would be reducing the amount of manual input required and increasing the availability of information (SPM). Integration is in the center of it as well, for example through open interfaces for different actors to connect to. A functioning platform as a base to build the integration on is crucial (SPS). In healthcare the respondents saw the involvement of all stakeholders essentially important, for example the connections between different care givers, the patient and relatives of the patient (SPS, SPM). In addition, an interesting notion was that the involvement of the community could also be increased through new digital channels (SPM). This could help the elderly for example by activating them through social activities and having volunteers to help in shopping for example. It was also pointed out that it is important to consider the overall well-being of people rather than just the healthiness (SPM).

The main challenges: the challenges for the change were seen as both organizational and operational (SPS, SPM). The investments to begin the transformation are not monetarily huge (still brings an economical challenge as well), but the resources like time and effort from the municipality are significant (SPS). Furthermore, the current procurement law encourages risk avoidance (SPS). The municipalities need to change their whole philosophy of operation, and dismantling the silos may cause some employees to resist the change, while historically they have been strictly responsible for their own territory (SPS, SPM). Furthermore, this transformation includes the municipalities to find and define the new key roles needed and the core services of the municipality: the services around which the other operation should be built (SPM). Just making the current model stricter and stricter only leads to a tighter situation, it cannot be stretched forever. An encompassing change is needed to avoid crisis (SPM). From the project side, the main challenges were seen in the newness of the solutions: the project needs to create models on how to best use the technology from scratch, current best practices are still non-existent (SPP). It is also difficult to define a scope: which services to start with, which to include later? Furthermore, the change should be piloted in smaller, more manageable parts than be done as all-encompassing (SPP). Top management support is seen as a key to the change (SPM, SPS). Top management needs to champion all the departments together (SPM). City council also plays a major part in initiating the change. Technology should be used as an enabler to the transformation, but it was stressed that the actual change involves more work in the organization and in the whole operational philosophy, like processes, organization and responsibilities (SPS, SPM).

The major cost savings: the leaned processes will be an important source for saving money. When the processes became more transparent, it will be more evident where the overlappings are and how to reduce manual input. Transparency also reduces the unnecessary manual contacts and allows the employees to concentrate on their core tasks (SPS, SPM). A quick win was perceived achievable by optimizing time reservations and space reservations through digitizing those (SPS). Furthermore, the self-service model reduces the time spent by municipal employees on the same issues, for example, in the new model an employee will probably not get 14 phone calls considering the same bump in a road, the information will be structured in the system. On a longer term view, the operation could be made more efficient by integrating the silos and defining which services could be provided from "one counter" (SPM). In the task of finding this, feedback from the residents could also be utilized (SPM). When the processes are leaned, savings come from working hours saved for the value creating work for the employees, but also when some of the older personnel retire, rehires might not be needed (SPM).

The most expenses: in an encompassing change a lot of money would be spend on integrations (SPS). There are a lot of old systems, which cannot all be replaced by a stakeholder management platform, but would need to be integrated into it to be able to provide

the shared data. Learning is another expensive part which will need a lot of hours of work from the municipal employees. Learning to use the actual system is a subpart of it, but learning the new ways to work and new processes are a more time consuming part. No matter how good the new system is, after the launch, there will be a period during which the performance is worse than in the old, well-known model (SPS). Lastly, innovation needs to be promoted as a mindset throughout the whole organization, the new model of operation needs to be embraced by everyone. To utilize the benefits of the change, not only needs the technology to change, but also the way of thinking and operating (SPS, SPM).

Measurement and KPIs: indicators considering the effectiveness of the municipal services and vitality of the municipality came up first during the interviews (SPS, SPM). Basic measurements like completion time of the service requests and the time it spends on different actors are also required (SPS). Furthermore, like mentioned before, predictability is key for the municipalities to be able to react in advance, and it is also essential to build KPIs to support this predictability (SPS, SPM). KPIs to follow how close to correct the forecasts were are also important (SPS). The attractiveness of the municipality compared to other municipalities is also an interesting figure to follow, and related to it, the vitality of the economic life within the municipality. In addition, it was suggested that the municipalities should define a key competitive advantage to utilize in their operation, for example modernity, education, healthcare etc. (SPM). Measurements could also be implemented to keep tract of the skills of the municipal employees and training needs (SPS).

The SoTe-change: considering the SoTe change (discussed in chapter 2.2), it was brought up that a platform is required to support cooperation and integration of the different actors (SPS, SPM). The role of the shared service centers owned by municipalities will be increasing in importance in providing unified data, and also the national service architecture will be in a key role (SPS). Considering the governmental funding, the government will also require unified data on the operation in the future as they are paying for it. SoTe was also seen as an opportunity, which shakes the old structures and increases the service level for customers; if the customers have a real possibility for a wider variety of choices, the public healthcare will have to start competing and further develop their services (SPM). In addition, even if some other organization generates the healthcare services, the municipality should still be able to coordinate the operation, which requires a platform that is capable of integrating both public and private actors (SPM). Municipalities need to develop their capability to offer services they are not generating themselves (SPM). All-in-all, SoTe is a major point of discontinuity: municipalities need to consider their role in the future and how to combine the other municipal services with health services. Consequently, it needs to be clearly defined who will be the coordinator in the customer interface (SPM).

4.2.2 City of Porvoo

City of Porvoo was an interesting case to choose for this research, as they are currently implementing new digital services based on a CRM platform. In the first phase it will be implemented in the technical department, allowing residents to make online service requests and structuring them in the back-end. The next phase is to implement the system for internal service requests in the administration service center of Porvoo as well. One stop-shopping is one of the main principles considered in the development, for both external and internal customers (MM2, 3, 5). In the near future, the city of Porvoo is also considering implementing a field service solution to the CRM platform; this was also envisioned to be piloted in the technical department (MM3). A longer term vision is to implement the CRM across the whole organization to have a unified data source for all departments. An important first step is to create an IT-architecture allowing data to be unified, and following this architecture in future projects (MM5). It is also important to note that even though a CRM product is being used, it is used as a more comprehensive platform than just traditional customer relationship management (MM5).

As a city, Porvoo has a high emphasis to be modern: it is even defined in their strategy and vision to be a pioneer in ICT-services and the first utilizer of modern technologies in the municipal field. It was mentioned as one of the motivations to launch the project as well, when the technology evolves to support new ways to work, it has to be implemented into practice (MM1). For the city of Porvoo, the main interview topics were the motivators for the digital transformation project, perceived benefits brought by the transformation, main challenges and costs, cost savings achievable with the system, the main KPI’s to measure the operation, and future visions for the development of the system. A summarization on the discussions on the interview topics can be found in Table 3 Summary - The city of Porvoo.

Table 3 Summary - The city of Porvoo

Digital transformation motivators	Perceived Benefits	Challenges & Costs	Savings	KPIs	Future development visions
-Efficiency and customer experience *-New technology enables new services* *-Streamlining and leaning the processes* *-Structured and visible data, transparency* *-Measurability: decisions based on facts* *-Shorter completion times* *-One-stop shopping* *-New channels of interaction* *-Support to the mobile shift*	*-Efficiency & customer experience* *-Service development based on customer needs* *-Making decisions based on information* *-Less interruptions* *-Structuring the mass of data, transparency* *-Detecting bottlenecks* *-Predictability and forecasts* *-New channels and platforms* *-Easier customer interaction* *-Automation* *-Responsiveness*	*-Change resistance* *-Interdepartmental changes* *-Innovating and building new; no best practices* *-Schedule* *-Defining the scope and new operation* *-Scheduling time from experts for the project* *-Finding a common language* *-Most expensive parts: license costs and human labor*	*-Time saved for core work, reducing the time spent on manual input* *-Efficient processes and automation: allocation of tasks* *-Replacing old information systems* *-Predictability and forecasts* *-Information databases, less service requests* *-Leaner and more responsive organization*	*-Current SLA performance indicators* *-Ticket completion, amount, time spent on different stages* *-Completion time evolvement with the new system* *-Service usage and error reports: information to better allocate resources* *-Comparison to other municipalities*	*-Unified organizational information* *-Coherent IT-architecture, CRM base platform* *-Unified service channel* *-One-stop shopping: physical and digital* *-Field service management solution* *-Reservations, registrations, billing* *-Departments (vision): recreation, social/health, property services, education*

Motivators for the transformation: As was mentioned earlier, one of the key enablers for the transformation was Porvoo's strategy of utilizing technological innovations among the first and aiming to be amid the top municipalities in digital services. This strategy is exercised by the employees and the city leadership in their actions and decisions. On a city level, Porvoo aims in making the operation more efficient, thus allowing better services to be provided with existing resources (MM5). Digitalization also opens opportunities to create completely new service models. It was seen as an important factor not to just implement a new system and run the old processes, but to overhaul the processes with the system (MM5). Major themes in change have been customer experience and supporting the rapidly increasing mobile channels, customers are used to a certain service level in private sector and public sector should be able to respond (MM5).

The change was launched first through a need in the administration service center of Porvoo, which handles the internal service requests. The model of operation was to be modernized, and a system to support the modernization was needed (MM2). In the new model, a key emphasis is in structuring the data, whereas now the service requests and feedback are mostly received through telephone and email. So if a person is not available, a matter might not proceed due to the data being unavailable for more people (MM1, 2,

3). In addition to making the information more transparent and measurable, the disruptions for work are to be minimized. The employees can better concentrate on their core tasks, when the phones are not constantly ringing (MM2). Furthermore, when the service requests are in the system, the measurability of the information is easier. Structuring the data provides information on which the services can be developed and decisions are easier to make based on facts (MM2). It also enables detecting where the resources are actually needed and in which fields the operation should be improved (MM1, 2). Enabling better organizational learning has also been an important motivator (MM1). The potential of this model was also realized on the city level, and the project was expanded. First unit to actually start using the CRM is the technical department, and even a wider coverage is expected in the future (MM5).

The service request handling is to be streamlined and made more efficient and transparent through clear processes of completion and automatic messages to the requester, while consequently a service request would no longer be behind one person. Another motivation for the change is to reduce the time required for the completion of service requests (MM1, 5). New system has also played a major part in streamlining and leaning the processes: the old structures have had to be rethought, and new processes implemented (MM1).

Improving customer experience was also an important motivator (MM5). Considering customer experience, the main values of the new model are providing equal service to everyone, same answers to the same questions and not making solving requests too person-centric. The customer's service experience from start to completion will increase: the process will become more transparent through increased interaction, like starting messages, expert answers, mid-process announcements on the state of the request and lastly a message of completion. It is also important to create new channels to interact with the municipality and provide equal chances for the residents to participate in the development of Porvoo. The CRM platform also enables participating in the social media channel; through social listening tools ongoing online discussion can be followed and participated in. Furthermore, issues detected online can be handled before they even become requests to the municipality (MM5). Nevertheless, the old channels are not to be taken down even when new ones are implemented (MM3, 4).

The benefits: The main benefits of the change on city level are expected to be increased customer experience and knowledge on customer needs (MM5). All the interviewees emphasized the meaning of obtaining real-time information; being able to base the decision making on actual facts and develop the services based on customer needs and demands (MM1, 2, 3, 4, 5). The information is also to be utilized to have a better predictability on future needs (MM1, 5). Completion times for the service requests are also expected to be shorter once the system is established to use. It is easy to track SLAs, both internally and externally, and bottlenecks in the operation can be detected and improved (MM4). Shorter

completion times bring cost savings, and these effects can be followed through the new tools (MM5). Consequently, expected completion times can be established more accurately and verified to the customer once a request is completed (MM4). Furthermore, like previously mentioned that interruptions to work are a major problem; the system reduces them by providing a new self-service channel and structuring the requests in the system instead of them being provided through telephone or email (MM4). Consequently, all requests are to be brought into one place, no matter through which channel they come (MM5). Also the mass of service requests can be better handled, and it is easier to detect the most important service requests and better follow the needs of the requestors (MM3). Overlapping requests on the same issues are also easier to detect and require less time to process from the employees, thus saving more time for the actual core work (MM3, 5). When more emphasis is put on an easily usable knowledge database, the customers can also find the answers through forms like frequently asked questions before even making a request (MM5). Substitutions and introductions to work are also easier to handle when the information is available through the system (MM3).

The department of communications is also involved in the project to bring the new services to the knowledge of the residents. A complete website reform of Porvoo is also timed together with the release of the new services. The website launch attempts to generate knowledge on the new online services and brand the portal through which to conduct affairs with the municipality online (MM5). The services are expected to be put to use by the residents with enthusiasm due to their modernity and freedom: 24/7 connectivity, from anywhere with any device. Usability has been a key driver in the development, if a service is hard to find and/or use, it will not utilized by the public even if the core service would be good (MM1).

The main challenges: Change resistance is always present when making major changes in an organization, no matter how much of an improvement the change is. In Porvoo the first reaction was concerned from the employees, but the worry has been reduced with open communication and interactive conversations. In addition, it is important to involve the experts in developing their own processes (MM5). In some cases, the worry has even changed into enthusiasm (MM4). The main goals have been actively promoted: more time for the core work, unifying and making services more transparent and having a structured documentation (MM4). Nevertheless, even when the employees are enthusiastic, it has been a challenge to find enough time for them to participate in the project. It is difficult to actively give input to an information system project, when the daily duties are still taking a lot of time (MM4). When moving further into interdepartmental changes it might also cause some friction in the traditionally independent units (MM5). Lastly, finding a common language has been a challenge at some points of the project. The CRM model brings concepts which are not all familiar and some of the experts required for the project

are not necessarily information system experts; input is also needed from personnel using the system (MM3).

Being an innovator is not always easy; the interviewees said that one of the main challenges has been working with new products and creating the models of use from scratch (MM4). The products used are so new that there were not a lot of best practices to use as starting points, especially in the municipal sector. In addition to piloting and innovating, the time table was quite strict (MM1). Another challenge for the project has been defining the requirements and processes. At phase one, challenges were brought by rushing into too specific work, like different approval queues, at a too early stage (MM4). The entirety is important to specify first to understand the core around which to build the specifics. In phase two this was better taken into account. Another challenge at phase one was the changing requirements, the scope was to use the system at the administration service center, but when the city leadership saw the potential of the new model of operation and the system, the scope was made wider. Including other stakeholders required some redefinitions for the project (MM4).

The expenses and savings: the most expensive part of the change on the city level is expected to be in license costs. To support the wide use, a large amount of licenses are required (MM5). Another major cost is human labor: a lot of working hours of different experts are required for defining the new, leaned processes to support the new service model. Nevertheless, those process definitions are expected to generate savings in the long run. Lean-thinking has been playing a major part in the change and is seen as emergent in the municipal field as well (MM3, 4). The new processes will save from labor in the future by being more efficient, meaning the time the experts have to use for their core tasks (MM3, 5). The intention is not to cut the personnel, but enable the current workforce to have more time to work on important issues (MM1, 3). In addition, the automation aspect of the new system will generate savings, some of the requests can be automatically allocated to the right people and all requests will be handled more efficiently through centralization (MM4). Some savings are also expected from being able to replace some of the old systems currently operational with the CRM solution's features. Forecasts and accurate predictions are also an important note in the savings, because detecting trends beforehand allows reacting in advance (MM1).

KPIs: A definitive decision has not yet been made on the KPI package. Part of the indicators also come from the current SLA’s that are measured (MM5). The ticketing system allows very specific indicators, but it has not yet been decided which ones will be chosen (MM4). The system helps in measuring success by allowing the municipal experts to follow the whole completion process. Completion time is an important indicator, and especially following its evolvement after the system is put to use (MM5). It can be determined which are the bottlenecks that need improving and see if external actors are not performing up to standards. It is also important not to just follow the whole completion

time, but to be able to follow the different stages. The new model also enables the municipality to create better SLAs in the future with more possibilities for measurement (MM1). Following the bigger picture of services through feedback and usage is also important to better allocate resources and find out if a problem is constantly repeated to fix the issues (MM1). Customer satisfaction is also a factor to start measuring through surveys for example (MM5). Doing comparison with other municipalities is also important. Thus, measuring KPI's that are also used in other municipalities is one part to consider (MM4).

The future possibilities for the system: the possibilities for future use were considered to be wide by the interviewees and as an opportunity to go towards a unified service channel and one-stop service shopping. One-stop service is actually not far in the future; the physical service point of contact is already centralized in "Kompassi"-service center, and the digital service reform will attempt to centralize the digital services through the CRM platform. The goal is to be able to provide the services from one location, no matter with which device, where from or when they are accessed (MM5). The next application to be built on the platform, was expected to be field service management. A lot was expected out of the solution in terms of automation, further optimization of the resources and the handling of service requests (MM3, 4). On the actual departments on which the interviewees saw potential were recreational department (MM1), social- and health department, property services and educational department (MM2). Functions that could be optimize with the system are for example reservations (schedules of different spaces or meeting reservations), registrations and billing. The larger goal is achieving a unified way of delivering services (MM1). Furthermore, a unified data structure and a common IT architecture is another major goal: currently the different departments have a lot of data, but it is difficult to be utilized across the organization (MM5). The interviewees saw it important to first pilot the concept on a smaller scale to demonstrate that it works, and inspire other departments to join through a proven concept (MM 4).

The SoTe change: lastly considering Porvoo, the outlooks on the SoTe-change (described in chapter 2.2) were discussed. The interviewees found it still hard to comment, as the actual changes have not been completely decided yet and the schedule is not completely clear. In SoTe, two highly visible themes were still detected: electronic services and management through information (MM5). Even if SoTe changes the service structure, it does not remove the need for this kind of information system project. Furthermore, the national service architecture interface was seen as an important consideration (MM 3, 4, 5). Even if SoTe brings some uncertainty, the municipalities cannot afford to just wait on what the future brings. Modernization has to be made, whether SoTe came or not. Municipalities are competing on attractiveness, and the services have to be continuously improved (MM1).

4.2.3 Helsinki Mobile Health Care

The main topics considered during the mobile health care interviews were the current information process and whether it has challenges, how would the change to a single digital stakeholder management platform be perceived, what would be the challenges of the change and how to increase the user acceptance of a new system. The summarization of these topics can be found in Table 4 Summary - Helsinki mobile health care.

Table 4 Summary - Helsinki mobile health care

Current information process	Current challenges	Perceived Benefits (New model)	Challenges (New model)	Acceptance (New model)
-Health center system as the core *-Interfaces with other health care units* *-Mobile interface for field work* *-Resourcing by three users* *-Most acute information: morning meetings and colleagues* *-Special health care and maintenance through telephone* *-Communication with relatives by telephone and pen/paper* *-Part of the customer data as PC input at the end of the shift*	*-Masses of data, hard to detect the important parts* *-Utilization of data is difficult in the field* *-No comprehensive single view of the customer* *-A lot of the customers information is silent* *-At the beginning: reliability* *-Not enough reserve on the clients (mobiles)* *-Overlapping reporting*	*-Important information from the mass real-time: one customer view* *-Care continuity: picking up from where the last left* *-Transparent care requests to other health care units* *-Attachments, long term monitoring* *-Allocation of requests* *-Flexible resourcing* *-Involving relatives and volunteers* *-Reducing manual input* *-Unification of systems*	*-Different units have different requirements* *-Change resistance from the users* *-Customer care versus privacy* *-Employees feeling monitored*	*-Early, transparent communication* *-What is being done and why?* *-Profiling as innovative, not streamlining the old* *-Personalized user interfaces for different groups* *-Involving the users in development* *-Training how to use the system correctly*

Current information process in the mobile healthcare of Helsinki has been supported by a mobile solution for around four years now. A healthcare information system first used as a health center system is running as the core for the operation, and the mobile solution is built on an interface to it (MHC2). To mention some of the main functions, the system holds the customer data, employee resourcing and information on the customer visits. It also has interfaces with other health care units in Helsinki (MHC2). The measurements, like blood pressure are not input into mobile, but manually at the end of the shift into a PC interface (MHC2). The mobile interface is centered in the current customer visit, with a care plan displaying after triggering an NFC chip at the customer location. The resourcing is done by three full-time web users, who build the visit schedules of the employees (MHC2). Furthermore, one of the employees comes to work one hour earlier than others in the morning to see if someone is absent due to sickness and find a replacement

(MHC1). Also the most acute issues from previous shifts are communicated in a morning meeting at the beginning of a new shift (MHC1).

Special health care and maintenance needs are communicated mainly through telephone and paper. If special health care is needed, it is reported to the team leader or nurse (MHC3). The maintenance of the apartment is mostly the responsibility of the customer and their relatives. In acute cases, the relatives are telephoned and in less acute cases the communication is done on a booklet at the customer location (MHC3).

Current challenges were mostly related to the usability and input of the information. A lot of information is saved, but it is difficult to be utilized during the shift (MHC3). Majority of the information is only viewable on the PC interface, which is not efficient enough to view before every shift: there are not enough computers and it takes too much time (MHC3). The mobile interface is centered on the actions on ongoing customer visit. It is challenging to check data from the previous visits via mobile: for example if there has been an issue with the customer, or if there is anything specific to take into notice with the customer (MHC3). Once the visit is triggered, it is only possible to make new entries and not view the old ones. Furthermore, in the mobile interface, the most important entries can be lost in the mass, there is no prioritization in the interface. For example, if there are 150 entries of a good appetite, the one entry on the customer falling may go unnoticed (MHC1). There is a lot of silent information on the customers that has to be found out from the colleagues, like if someone is always hysterical during the morning visits (MHC3). There is no simple overview on the customer. It would also enable better care of the new customers, if some background information on them was available (MHC3). Important information for the customer service could be missed if not heard from the colleagues in the morning (MHC1).

Another major consideration on the challenges was reliability (MHC2). During the start of the implementation of the mobile interface, there were issues with reliability which caused negative views on the use of the system (MHC2). The disruptions in service caused annoyance, and it was pointed out that reliability is a key in systems considering people's health (MHC1). However, this has been now gotten better through updates, and the communication is now stable (MHC2). When the system is reliable, the clients through which it is used also need to be addressed. There needs to be enough reserve in the clients, like smartphones, to ensure continuous operation of the system (MHC2). In addition, at start the system did not have a user interface built specifically for mobile health care. The one built for health centers did not support the mobile health care requirements, like dynamic change and flexibility. This was quickly addressed to and fixed by building another user interface for mobile health care after the detection of the issue though (MHC2).

Special health care communication is also not very transparent for the mobile workforce, an issue might already be reported and in progress, but not known by the employees

resulting in overlapping reports (MHC3). Furthermore, the cases in which the person has no close relatives are difficult. Challenges can for example be like how to get to the store and do the maintenance etc. This is not a fault in the system, but development could be made to better enable involving volunteers (MHC3). Also, the mobile interface does not support attachments, for example pictures, which could be utilized in the care (MHC3).

The main benefits of changing the system into a new integrated stakeholder platform like the CRM model of Porvoo are perceived in fields like effortless real-time information flow, optimization of resources and time for the core service, which eventually results in better customer service (MHC1, 2). Continuity is another major consideration in the benefits: if it were clear what was done and discussed last time, the issues detected last time would be easier to react on for the next person seeing the customer (MHC1). In addition, transparent requests through the system for example to the health center nurse would make it easier to see what issues have already been reported and ongoing, and what the status is (MHC1). Automatic allocation of requests was also seen as a benefit for efficiency (MHC2), for example, a picture of an anomaly sent straight to the health center nurse, with ticket status that is trackable from the mobile interface (MHC1). Better support to monitoring the issues transparently could also help in adjusting the care and seeing if something is working or needs to be changed (MHC3). Furthermore, flexibility is a key in mobile health care, and the resourcing should also be more flexible, for example if a customer has had a major problem during the last visit, 10 minutes may not be enough for the next one (MHC3).

The challenge of involving the volunteers and relatives was also seen as a topic to look into in designing a new system. It was seen that volunteers could be easier utilized through an automated system. For example if a volunteer inputs that they are usable during a specific time on a specific date, the system could match this with an input of a customer need for the same period, the need could be for example going to the store (MHC3).

The main dream brought up by all the interviewees was providing order in the mass of data; a lot of data is collected, but to have real time information on important facts and a comprehensive, easily usable customer view could provide great improvements on the customer service (MHC 1, 2, 3). Simplification is important, for example if a piece of data is needed in multiple places, it should be automatically transferred by the system and not by hand (MHC3). Unification could also benefit in better utilizing the resources of health care: the work force is mobile between different units, and if the systems would be unified, it would be easier for an employee to do a shift in a different unit without having difficulties of learning the use of another system (MHC3).

Challenges of the change into a new model was also a main topic to consider. For a unified platform, the different requirements of different units was seen as a major challenge. For example as discussed in the challenges of the current system, when there was the same user interface for both health center and mobile health care. It should be a main

point from the start to build multiple user interfaces to best support the needs of each group (MHC2). Change resistance from the users was also seen as a challenge by the interviewees. The current mobile interface was also resisted at start for being difficult. However, it was widely accepted after the transition period for the realized benefits (MHC1). Part of technology resistance can also be derived to the generation of the employees, most of them were born before the digital age and are used to traditional means of working (MHC1). If something works when done the old way, it needs a lot of justification for the users to accept a change.

Privacy and monitoring are also essential issues to be taken into account. When the current mobile system was implemented, many employees felt that it was made to monitor their performance, which reduced the acceptance of the positive features of the system (MHC1). If everything is documented and can be monitored by the second, it is important to convey the message that the focus is to improve the customer service and not to document every second of the employees capabilities (MHC1). In an encompassing integrated system, privacy is also a key issue. The more information a caregiver has can improve the customer experience, but how much of the information should not be viewable? In extreme cases it could be vital to have all information on the patient, so the privacy should be done by automatically auditing the accesses to the data instead of building a closed system with constrained information views (MHC3). Obtaining the necessary information through other employees, like nurses and doctors reduces efficiency by taking the time of multiple people (MHC3).

User acceptance is also a thing to consider when implementing an information system. The system is for the users, and if they do not see the benefits and dislike using it, the realization of the benefits is more difficult. Transparent communication was seen as the key to user acceptance by all the interviewees, visibility and clear messages are needed (MHC2, 3). Early communication also lets the users to get used to the idea of the change (MHC3). What is being done and especially why it is done are messages that need to be clear for everyone to gain user acceptance (MHC2). Communicating that something new and innovative is being built instead of just streamlining the old processes is important as well (MHC3).

Involving the users in the development was seen as important by all the interviewees. For example, the aforementioned user interfaces need to be built according to the needs of the different user groups, which are impossible to know without asking the user group (MHC 2). In addition, by actually involving the users, the acceptance of the system could also increase. The users feel more that the system is theirs when they have participated in making it (MHC2, 3).

Lastly, training also has a wide impact in user acceptance (MHC1, 2, 3). It can also make using the system more efficient, when it is made sure that the users use the system correctly (MHC1). The training should also be comprehensive and designed according to

the usage needs (MHC2). The approach of "here is the system, start using it" should be avoided or difficulties can be guaranteed (MHC3).

4.3 Reflection: Interview Results and Digital Opportunities

The interview material will be reflected on the existing research on digital service opportunities presented in the chapter 3 Digital Service Opportunities next. The topics were the following: e-government, customer relationship management (CRM), service request- and field service management, business intelligence (BI), digital healthcare and cloud computing. These reflection topics were not used as separate topics during the interviews. Their correspondence to the needs and topics brought up in the interviews are discussed in the reflections. The main summarizations of the reflections may be found in the following Table 5 Summary - Reflections.

Table 5 Summary - Reflections

The interview group	E-Government change	CRM as a digital service platform	Service request & field service management	Business intelligence	Digital healthcare	Cloud computing
Service provider (Mepco Oy)	*-Citizen life cycle view -One-stop shopping -Integrating municipal services and providing a platform for companies -Interactive e-communication -Technology is an enabler*	*-Multichannel services -Structured information, like contacts and tickets -Forecasts -Involving the customers -Transparency*	*-Efficiency and structure to the mass -Request allocation -Reducing manual input and overlapping tasks - time for core work -Request tracking*	*-Fact-based resource allocation -Cost forecasting -Resident-base as prediction tool -Comparing to other municipalities -Governmental reporting -Economic vitality*	*-Reducing manual input-time for core work -Information availability -Integration -Open interfaces -All stakeholders, also community*	
The city of Porvoo	*-Technology as an enabler for the new model of operation -New digital processes: not just polishing the old -Unified service channel -One-stop shopping -Shared architecture, unified data*	*-Multichannel services -Structured information in one place -Request allocation -One-stop shopping -Organizational transparency, shared information -Scalable platform to build on -Social media channel*	*-Time for core work, no interruptions -Less downtime, more transparency -SLA management and bottlenecks -Developing and learning -Prioritization -Equal and consistent services -Automation -Detecting overlappings*	*-Informed development and decisions -Fact-based resource allocation -End-to-end process as trackable parts -Cost forecasting -Comparisons on other municipalities*	*-Future potential to use the single stakeholder management platform in social- and healthcare department*	*-Safe, but not suitable for all data -Viable option as long as contracts and SLAs are made properly*
Helsinki mobile health care	*-One customer view -Integration of different health care units -Workforce mobility between units*	*-Real-time and easily usable customer data -Transparency -Interaction -Request management platform*	*-More automation for resourcing -Service requests between health care units -Involving volunteers and relatives*	*-Utilizing the mass of data -Detecting issues on trends -History view of the customer -Data and system unification*	*-Reducing manual input-time for core work -Utilizing information transparently -Attachments and smart tools -Reducing overlapping care*	

Next, the topics will be further discussed while reflecting on the literature presented earlier in the research and the inputs received from the interviews. Each topic will be discussed separately.

E-government change was evident to be a guiding topic on both levels of public administration in Finland, governmental and municipal. In the governmental level there are projects like the national service integration interface KAPA (The Ministry of Finance, 2016) and health care unification projects like the personal integrated health records through "Omakanta" (The Finnish National Health Archive, 2016). These initiatives aim towards higher level of public service integration and are headed towards one-stop-shopping, which is one of the key values of e-government (Layne & Lee, 2001). The integration interface also tries to answer to one of the largest issues identified by Layne & Lee (2001), fragmentation. It could be a daunting and near impossible task to push all governmental services to use the same system, but through an interface application in the middle, similar benefits like one view of the customer and the sharing of real-time information can be achieved. Furthermore, more agility and flexibility can be achieved by using the service interface rather than a massive integrated system. The different functions can still run the best systems for their purposes. Nevertheless, the road to complete horizontal and vertical integration is still long, but the direction is clearly set.

In the insights gained from the interviews, the e-government thinking was also evident. Higher levels of integration and taking down the silos were discussed extensively during the service provider interviews. Integration potential was seen to be encompassing: not only could the public services be integrated together, but also private services and companies could be brought to utilize a common platform. The municipality could utilize this platform in providing a unified customer experience, whether the core service is provided by a public or private actor would become more inconsequential for the customer experience. Vertical integration is seen as an increasingly important topic when the health care reform, SoTe takes place. As the funder, the government will require more input from the actors operating the health care. In the mobile healthcare interviews, the integrations also came up as an important topic: if the information flow between different providers considering the health care of a customers can be made effortless and all can be provided with one customer view, the customer service could be improved with continuity and further individualization. Nevertheless, a balance between privacy and information needed to provide improved services is an important consideration. Integrated systems were also seen as an enabler for more mobility of the workforce between different units according to the real-time needs.

Viewing a citizen as one customership throughout their life cycle with the municipality, and detecting what value the municipality can create for them during the different stages of this cycle was also pointed out, and it is a key thought in e-government thinking. The citizen is shifting from being a series of transactions into being a single customer

entity of public services. This also includes providing digital services that are modern and interactive, not just creating e-forms online. In Porvoo, this was also a key goal: not just creating another channel and way of doing the old processes, but creating new, more efficient and customer friendly end-to-end processes properly utilizing the digital technologies. The future views of Porvoo in terms of e-government was to create a unified service channel to support true one-stop shopping for citizens and shared information between the departments. In addition, when taking steps towards e-government, the organizational change was identified as a major consideration. In Porvoo, the change has been operational and organizational from the start: the new system was acquired to support a modern way of working. The technology is in a supporting role in the change to achieve a successful and encompassing transformation. In addition to the administration of Porvoo, during the service provider interviews it was outlined that the technology should be in a more supporting role, compared to the organizational change and change in operation philosophy.

CRM as a digital service platform was chosen by Porvoo for the administration center, and then considered for wider implementation for the realized potential. The literature review suggests that Digital CRM allows comprehensive customer views, can combine multiple service channels, provide access to information for all departments (Diemann et al., 2015) and enable self-service models like internet transactions and service requests (Schellong, 2005). Furthermore, Finnegan & Currie (2010) proposed CRM as an integration strategy, to provide a common view of the customer to understand the customer needs better. Lastly, with the amount of structured data a CRM solution holds, it can be leveraged as a business intelligence solution as well (Baars & Kemper, 2008).

These properties can be seen to match well with many of the interview discussions. Starting with the multichannel services for customers, the city of Porvoo saw it important to provide new online channels of communication and restructuring the processes to utilize modern technology, while still keeping the traditional channels operational. When the contacts from all these channels are integrated in one CRM, the view on a customer, whether they be external or internal, is more comprehensive. A real-time comprehensive customer view was a key topic in the mobile health care interviews as well; when the customers are better known, better service to their needs can be provided. Better knowing the customers and its effect on service development was also brought up in the service provider and the city of Porvoo interviews. When there is structured data on customers and their requests and clear ways to examine this data, it is easier to develop the services according to their needs. Structured and measurable data also better enables the management to predict future trends and make decisions based on information.

Whereas the development and prediction aspects are vital, the city of Porvoo also identified an operational aspect. When the service requests are structured in one place and examinable by all the employees, the service can become more efficient and transparent:

the mass of requests will be easier to manage and tickets will not be so centered on a single person anymore. Transparency was also a topic brought up in the service provider and mobile health care interviews: towards the customers, transparency could be increased by making the processes clear and the requests trackable. In mobile health care transparency was a key topic in customer information, because a lot of it is silent and held by other employees, the service could be improved by making this information structurally available for everyone. Automatic allocation was also a topic brought up by all parties: the service provider and the city of Porvoo brought up that service requests would ideally go automatically to the right person to handle them, and in mobile health care it was considered beneficial if requests could be sent to other health care professionals on site to ensure continuity.

In Porvoo, CRM was also seen as a base platform to build other solutions on, benefiting from the integrated customer data. For example, they had the idea to implement a mobile work solution to support the handling of service requests. The mindset of scalability can also be detected in how a project for a single department got agilely widened in scope to cover more functions. A goal for Porvoo is to create an organization wide easily utilizable information base and a coherent IT-architecture.

Last topic to mention on the CRM part is the interaction with stakeholders. All parties saw a platform to enable better dialog with the customers important. In mobile health care it was suggested that a single platform could empower better involvement of relatives and volunteers for the care of the elderly for example, a thought also discussed with the service provider. Furthermore, the service provider and the city of Porvoo saw that interaction and participation in city affairs could be increased by making it more convenient, and that a step needs to be taken further from creating fillable forms to send: creating actually interactive digital communication. The city of Porvoo also mentioned the meaning of social media: the new digital CRM allows keeping track of and participating in ongoing online discussion.

Service request and field service management could also be an important solution to run on the CRM platform. Like Agnihothri et al. (2002) suggest, collecting the requests digitally and using automatic allocation to the corresponding personnel to complete them can help in reducing manual labor considering their handling and resourcing. Operation can be made even more efficient, if the warehouse and equipment management are also integrated in the system. Another important note is how the organization can be developed through the structured service requests: learning can be better enabled by having the issues structured and collecting digital feedback from the customers (Agnihothri et al., 2002).

While a lot of service request- and field service management is centered on making the operation more streamlined and efficient, it could be a part of the solution when trying

to provide better services with tightening resources and reducing the stress on the employees encumbered by the unstructured mass of contacts and service requests, issues mentioned during the service provider interviews. Considering efficiency, both the service provider and the city of Porvoo saw an opportunity to reduce the end-to-end completion times through digitalization. This could lead to the municipal employees having more time to spend on the core doing of their duties, which was seen important by all the groups of interviewees. In addition, this could reduce the work interruptions by shifting the mass of requests into the online channel instead of telephone for example, as pointed out in the city of Porvoo interviews. The time required currently for manual input and resourcing should be reduced. For example in mobile healthcare, the resourcing was a full-time task for multiple employees.

Providing structure to the requests can also aid in streamlining and providing transparency to the end-to-end service. When the service requests follow a set structure, equal service to everyone, a major consideration for the city of Porvoo, can be attained more easily. Furthermore, transparency could be increased by giving the requestors a possibility to track this process and sending them automatic messages of different stages, this was seen as a major future opportunity by the service provider and the city of Porvoo. Another consideration from the city of Porvoo was that SLAs could be tracked more easily, both internal and external, if structure can be provided to the service process to see where the bottlenecks are. Consequently, structuring the service requests was seen as a development that also leads to easier detection of overlappings, in both service requests (multiple service requests on the same issue) and the duties (multiple persons working on the same issues without knowing it). Furthermore, having transparent data on the service requests is also to be utilized in creating an online knowledge database on common issues, which is hoped to reduce the number of submitted requests. Lastly, the importance of prioritization was mentioned during the Porvoo interviews. If the all the requests are structured and viewable from one location, it is more explicit which are the most urgent ones, compared to the requests being in individual emails and coming by phone.

As was mentioned in the theory, service request- and field service management systems can enhance organizational learning to better levels. The development of services was a prevalent factor in all interviews, and being able to track the entirety of service requests and collecting digital customer feedback can be utilized in better providing services that the customers want. Issues in operation are also easier to detect, if multiple overlapping requests on the same topic constantly come in the system.

In mobile health care, an idea was brought up to involve the relatives and volunteers more. Service request management platform could be a solution to this as well, if the volunteers were given access to an online portal to input their data and availability, and their availability would be matched with the ongoing requests, like a request to help an elderly person with shopping for example. Once matched, the request could come to the

volunteer and be accepted or if not, moved on to the next volunteer. Another service request topic in mobile health care was the communication with the health center: it would be beneficial to have transparent requests viewable by mobile health care, so they could better know what is going on and reported, and what are the statuses of these requests.

Business intelligence could be well supported by the digitized platform and structured data. Baars & Kemper (2008) suggest that a digital CRM platform is an enabler for comprehensive business intelligence, providing information on both the customers and the internal operation of the organization. Having more information can lead to better decisions. Nevertheless, having a lot of data does not empower the decisions, it needs to be put into a meaningful form through visualization, which is an integral part of BI solutions (Negash, 2004). Negash (2004) also points out that BI can be benefited from on a wider scale as well, like comparing own operation to the operation of other organizations. This also came up as an important factor during the city of Porvoo interviews, it is important to know how we are doing, but also to know how we are doing compared to others. Automation could also be leveraged in BI, for example by automatic alerts on anomalies detected in the indicators defined important. Bannister (2001) saw continuity among the top priorities of a municipality, and having information to act on real-time can support this.

Having structured data in a single platform extended with a BI solution could support the needs brought up during the interviews. Utilization of data in service development and resource allocation was brought up by multiple interviewees. When it becomes more apparent where the resources are most needed, better informed decisions can be made and allocation gets more efficient. An example of doing this through information was given in the city of Porvoo interview: the structured service request data could be used to provide information on what services are most used and how they are used, and on the other hand, what services are not. BI could aid in finding out why a service is or is not used. This was seen important for customer satisfaction during the service provider and the city of Porvoo interviews, because the municipality can better provide services according to the needs of the residents and internal customers and base the development decisions on facts. Furthermore, the end-to-end processes can be broken down into smaller parts, which can each be tracked and the stages in which the processes are not effective can be better detected. The end-to-end processes as a whole and in parts were deemed interesting indicators to follow during the city of Porvoo interviews. Consequently, following the evolvement of end-to-end process completion times once the system comes operational was seen as especially interesting, to see the effect the new system has on performance.

Business intelligence can also be leveraged wider than just operational data, in detecting and forecasting future trends. An example given during the service provider interviews was, that the municipality could have a more comprehensive view on their resident

base, which could help in evaluating what kind of services will be on demand in the future. Another important indicator to follow was pointed out to be the vitality of the economic life of a municipality. Both Porvoo and the service provider also saw being able to make comparisons to other municipalities and their trends important. Lastly on the bigger picture and forecasts, the service provider estimated that the reporting needs from municipalities to the government will increase in the future as more government funding goes into healthcare services.

There are also parts of operation in mobile health care that could benefit from a BI solution. It was pointed out during the interviews that there is a massive amount of data, but it is inconvenient to utilize. Providing a simple view of this data in form of a BI dashboard for example could increase the level of customer service, by better enabling the detection of continuous issues and providing a view on the customer's history. During the interviews, it was also pointed out, that if the different health care units were more unified with their systems and data, cooperation could be more efficient and more data to use in providing better customer service could be had.

Digital Healthcare is an immense topic and currently could be more relevant to examine on the governmental level, as the changes like SoTe are aimed to lead towards a more unified healthcare nationwide. Nevertheless, municipalities will still have a major role to play in healthcare at least as a coordinator, so the topic was found important to discuss briefly in this research as well.

Data integration plays a major part in digital health care. In Finland the "My Database"-initiative is a good example: it aims in collecting all the health records for the patient in one view (The Finnish National Health Archive, 2016). Another important initiative integration-wise is the national service architecture interfaces. Open interfaces were perceived among the most important factors in the digital healthcare development during the service provider interviews. Integrating the patient health records improves the transparency when the patients can view all their health information in one location and also makes the communication between the patients and health care units easier. In addition, the integrated health records also enable better communication between health care units (Detmer et al., 2008). Furthermore, having a clear view on the history of the patient could aid in providing better care and reduce care redundancy. This customer view could enable the medical professionals to have more time on the actual core service, health care (Detmer et al., 2008).

Self-service models could also be supported by modern technology, like monitoring devices and remote consultation. This is seen especially beneficial in treating chronic diseases (Detmer et al., 2008). Remote consultation and care were also brought up in the digitalization plan of Denmark: it is aimed to be one of the next steps (Frelle-Petersen, 2016). Remote care could help in customer experience by making it more convenient for

the customers and on the other hand more efficient for the health care providers. Nonetheless, it needs to be well considered which issues can be handled remotely.

The main benefit of modern digital healthcare could be similar to many other technologies covered in this research: more time for the actual core work by reducing the amount of manual input and the time taken to search data from different locations. Both the service provider and mobile health care saw reducing manual input among the key considerations. For example, in healthcare it was found out that sometimes the same information needs to be written multiple times, and for example the measuring devices like blood pressure do not transfer the results automatically to mobile, but they need to be written down and then manually input in the system. By implementing digital healthcare and the included gear, these could be done in a more efficient way. Being able to use attachments, like pictures was also seen as a potential improvement in mobile health care.

Nevertheless, information should not only be easy to input, but the service provider and mobile health care found it also important that it is comprehensively available across medical units, easily viewable and transparent. Some of the information could also be utilized more widely, involvement of the community and relatives was brought up by the interviewees during the service provider and mobile health care interviews. The service provider saw the most potential in a one platform model that could support the involvement of all the stakeholders. Simultaneously, mobile health care also brought up that privacy is essential in health care and needs to be kept in mind, but still being mindful that too high levels of data protection make the care more difficult and can reduce the level of treatment. During the mobile health care interviews it was also discussed that having comprehensive, integrated history view could help in reducing overlapping care. When it is evident what has been done previously, it is easier to find the right treatment.

The city of Porvoo was covered less in this part, because they still had no future action plans considering the CRM platform in terms healthcare and the current digitalization projects were deemed more relevant. The city of Porvoo also had recently digitalized the mobile health care, but through a different model and system. Nevertheless, they saw potential in using a single platform in social- and healthcare department as well.

Cloud computing empowered by increasing network capabilities is perceived to play a major part in creating a shift towards system accessibility anywhere, anytime and with any device (Laudon & Laudon, 2006). Furthermore, it can bring cost savings when the service provider is running the infrastructure (Dillon et al., 2010). A cloud computing service provider has often major economies of scale in providing server capacity compared to an organization that has its core business in another field. If an organization has very sensitive data that needs to stay in-house, which could be the case for some governmental organizations for example, hybrid cloud in which part of the data is on premise, but most of the data is in the service providers cloud, could be implemented (Jadeja & Modi, 2012).

The city of Porvoo is using public cloud in the operation of their new system. It was said during the interviews that cloud can be utilized, but the contracts need to be made well and comprehensively, for example agreeing on the physical location of the data. Furthermore, cloud was seen as a solution safe to utilize as long as laws and regulations are met, but not suitable for all data, for example patient data would be problematic to put into public cloud due to safety reasons.

5 SUMMARY AND CONCLUSION

5.1 Summary

The digitalization of Finnish municipalities is still far from the highest levels of interactive e-government, but the direction is clear. Large national level initiatives are being driven forward and municipalities are facing requirements to make their operation more efficient, while simultaneously the customers are expecting better digital services correspondent to the ones they use in their dealings with private organizations. Digitalization has potential to make the operation of a municipality more efficient, while increasing customer experience through modern, interactive digital services. It could also provide them with structured data and business intelligence to improve the decision making and being able to base it on real-time facts. Nevertheless, being able to collect the benefits requires a lot of effort. The current public procurement models do not encourage for taking risks, and the municipal field is one that values continuity among the main guiding principles. Another risk is a glued-on digitalization: providing a new channel that can be perceived digital for the customer, but still running the old structures and manual processes in the background. Running this can cost even more that just operating the traditional channels. Nonetheless, with courage to leverage the new technologies as enablers for completely new ways to provide services and overhauling the process structure accordingly, benefits and competitive advantage can be attained.

This research aimed in exploring municipal digitalization in Finland through qualitative means. The research was done for Mepco Oy. The approach was not only the service provider's point of view, but holistically examining multiple parties related to the digitalization: service provider, municipal administration and municipal employees. The research was conducted by doing a literature review and empirical research through interviews.

On the highest level, the municipalities in Finland are required to provide social- and health services, education- and culture services and other services, including infrastructure for example. A lot of the operational requirements of a municipality are defined in the law, as is a strategy considering certain points related to the residents, services, development and interaction. Municipalities can also deliver the services, like ICT in joint operations. In economic figures, municipalities are in a major role: municipal expenses are around 18 percent of the Finnish GDP and 20 percent of the employed Finnish workforce is working for municipalities. Outsourcing in the public sector has been increasing since the 1980’s, but has more considerations, like judicial ones, than private sector outsourcing. A major upcoming change to the municipal service provisioning is SoTe, which

transfers execution of social- and healthcare services to 15 SoTe areas instead of individual municipalities. Hindrances and difficulties to the digital transformation of municipalities can be found in the historical model of operation, risk-avoidance, conservativeness and vendor lock-in. The silo model is still prevalent in the municipal field, different departments are not integrated. The departments might even feel that someone is stepping in their jurisdiction in the integration efforts. The vendor lock-in also goes partly hand-in-hand with risk avoidance: the decision maker's personal risk is minimized when buying from a "reliable source", meaning only the largest companies that have been historically worked with.

The key digitalization concepts used in this research were*: e-government, CRM, service request- and field service management, business intelligence and cloud computing.* The digital service transformation can be viewed as different levels of *e-government*: catalogue (static), transaction (interactive), vertical integration and horizontal integration. The model demonstrated that the further a public organization goes in digitalization, the more it requires changes not only in technology, but also operational philosophy, organization and process structures. *CRM* was researched as a platform to build the digitalized services on. This was seen viable because municipalities hold a lot of customer data and a lot of their operation centered on customer interaction. Topics like one-stop shopping, one view of the customer and self-service are issues that could be handled by a modern CRM solution. It was discovered in this research, that a key for municipalities is to pursue a comprehensive digital CRM model as an integrator and structurer for the mass of data in order to create an organization-wide view of the customer (Diemann et al., 2015) and one-stop shopping for the customers (Schellong, 2005). *Service request- and field service management* was also examined, because an important part of municipal operation is handling service requests. Through a digital service request- and field service solution the level of service could be improved and service provisioning could be made more efficient. Furthermore, the service would be easier to develop with service history data and electronic customer feedback. Agnihothri et al. (2002) proposed it as a solution to improve both customer satisfaction and efficiency, and this was supported by the interviews, especially through providing structure and transparency to the customer data. *Business intelligence* can provide predictability to the operation and aid in detecting future trends. When a lot of data is stored, a business intelligence solution can find meaningful information in the mass, and visualization is a key part: providing dashboards with essential data viewable with one look. This is vital for the municipalities as well, as there is a massive amount of data that could be used to improve customer experience, but it is fragmented and not easily composable. CRM was found to be a key solution considering business intelligence as well by providing a structured collection of data. Business intelligence can empower better informed decisions based on facts. *Digital healthcare* requires a lot of integrations, but can aid in providing a comprehensive view on the medical

history of the patient to themselves and medical professionals. In addition to integrated health records, it could enable remote healthcare and consultations and smart monitoring devices. Currently there are multiple digital health care initiatives ongoing in Finland, like Apotti and My Database. Healthcare is also in the scope of the national service architecture interface project. Last topic on the digital concepts was *cloud computing* which is a model in which computational power, storage and applications are provided over networks with a service provider owning the actual infrastructure (public cloud). Cloud computing has been a driver in the shift on applications usable anywhere, at any time and from any device.

The empirical part of the research was made through 11 semi-structured interviews done face to face, on Skype and via telephone. Each interview lasted approximately 45 minutes. Three interviews were gained from the service provider Mepco Oy, five from the city of Porvoo and three from Helsinki mobile health care. The results of these interviews were first summarized according to the main topics, and in the next part the interviews were reflected on the digital service opportunities.

5.2 Conclusion

The research aimed in gaining a holistic view in exploring municipal digitalization. One of the key factors to support this was interviewing multiple different groups of municipal stakeholders. When seeking answers to the research questions, both similarities and differences were noted between the views of each group. Even so, based on the research it could be said that the main values of these groups considering digitalization and implementing new municipal information system were quite convergent. Before summarizing the answers to the research questions, a recapitulation on what the questions sought to be answered in this research were:

- What are the motivators for municipalities for modern digital service transformation?
- What are the main benefits of the transformation?
- What are the main challenges for the transformation?

Answers were gained to the research questions by using both the literature and the interviews to find motivators, benefits and challenges for the digital transformation. These are summarized in Table 6 Summary – Motivators, benefits, challenges. The groups that brought up the topic are marked in the brackets after the topics: SP, service provider, MM municipal management, MHC mobile health care.

Table 6 Summary – Motivators, benefits, challenges

Motivators	Benefits	Challenges
-Tightening resources, increasing expectations (SP, MM) *-Structuring information transparently (SP, MM)* *-Shift into mobile (SP, MM)* *-Resident participation, new channels for interaction (SP, MM)* *-Streamlining and leaning the processes (MM)* *-Decisions based on information (MM)* *-Governmental requirements (SP)* *-Competitive advantage (SP)* *-Municipality - a platform to support all stakeholders (SP)* *-New management (SP)* *-Reporting (SP)* *-One-stop shopping (MM)*	*-Efficiency - time for core tasks (SP, MM, MHC)* *-Increased customer experience (SP, MM, MHC)* *-Structuring the mass of data (SP, MM, MHC)* *-Reducing manual input, automation (SP, MM, MHC)* *-Transparency (SP, MM, MHC)* *-Easier interaction with the customers (SP, MM)* *-Developing services according to customer needs (SP, MM)* *-Decisions based on information (SP, MM)* *-24/7 multichannel service (SP, MM)* *-One base platform and one customer view (SP, MM)* *-Forecasts and predictions (SP, MM)* *-Less interruptions for work (MM)* *-Detecting bottlenecks (MM)* *-Detecting overlaps (SP)* *-More responsive organization (MM)*	*-Change resistance (SP, MM, MHC)* *-Innovating, no best practices (SP, MM)* *-Defining the scope and new operation model (SP, MM)* *-Interdepartmental changes (MM)* *-Schedule (MM)* *-Scheduling time from experts for the project (MM)* *-Finding a common language (MM)* *-Employees feeling monitored (MHC)* *-The change in operational philosophy (SP)* *-Defining core municipal services (SP)* *-Bringing the silos together, integrations (SP)* *-Procurement law (SP)* *-Different units have different requirements (MHC)* *-Customer care versus privacy (MHC)*

According to the overall research, it can be said that digitalization of Finnish municipalities is only a matter of time. Changes and challenges go hand in hand, but motivators are quite extensive and require a solution which a digital platform could provide. Major benefits are expected, and all of the technologies mentioned are already in successful use on some level in the private sector. The business case is becoming evident for the public sector as well. Challenges can also be prepared for, through early and transparent communication, training and involving the users for example. Nevertheless, the culture for innovation as mentioned by Moon & Norris (2005), especially in top management is still vital for the change. In Porvoo, this culture was highly evident and even defined in the strategy. Undoubtedly it is one of the key factors for the digital transformation of Porvoo; top management support was seen as an essential part for the change in both the literature and interviews. Another essential success factor discovered in literature and carried out in Porvoo was embracing the organizational change and not just implementing new technology (Finnegan & Currie, 2010). A key value for the project in Porvoo was to enable new and modern ways of executing the operation and leverage technology in doing this and not just use new systems in carrying out the old ways of working.

The research created an overall view on the Finnish municipal service provisioning, digital service opportunities and the views on the digitalization of municipalities through

11 interviewed experts. The research was done holistically considering multiple aspects and does not require a technical or municipal background to be understood. As the sample is small, only three groups, the results are not generalizable, but create overall understanding in the field, also utilizable in designing future research. In previous literature, the topic of municipal digitalization has been researched from different points of views and aspects, but not to a large extent in Finland. An important contribution of this research is providing a current viewpoint on the municipal digitalization especially from a Finnish perspective. Even though municipalities have similarities in their models of operation globally, they are at different stages in development and the ongoing public initiatives driving the change may differ in each country. CRM has also been previously researched for municipal use by for example Alexander Schellong (2005), but this thesis tried to take some distance to the traditional CRM model and go further to view a modern digital CRM as an integration platform to widely support the whole municipal operation, positioning itself somewhere in between a traditional CRM and an enterprise resource planning (ERP) system. Furthermore, it is a current topic as the technology to support such an extensive CRM based service platform is quite recent and was not yet found to be widely researched in the literature review phase. Lastly, this research took an encompassing approach by including multiple stakeholders necessary for such a change and examining the topic from multiple perspectives, whereas a lot of the existing literature takes a more singular approach, for example one of the municipality.

In the future research it would be interesting to examine whether the future implementations of digitalized services have been able to provide the perceived benefits. Even though development is currently ongoing in many public units, there is yet not enough operational data to say whether the digitalization initiatives have been a success or not. Furthermore, it would be interesting to find out to what extent should the municipal operation be integrated together to achieve maximum benefits? Municipalities have multiple fragmented service branches, and it is not certain if full service integration would provide the best results for operational efficiency and customer experience. Another topic of interest could be the SoTe-change, as it is still on an early stage it is difficult to get any definite results yet, but later it would be interesting to find out how does the SoTe change affect digitalization in Finland. Lastly, as municipal joint ventures are integral in providing ICT-services, especially for smaller municipalities with less resources at their disposal, it could be researched whether the municipal joint ventures in providing ICT-services have been successful and what are the key factors for their success. In the near future through initiatives to unify and combine data through open interfaces like KAPA, the meaning of pulling together by cooperating in providing modern ICT-services in the public sector will increase and possibly even become a prerequisite for independent existence for smaller municipalities.

REFERENCES

Agnihothri, S., Sivasubramaniam, N., & Simmons, D. (2002). Leveraging Technology to improve field service. *International Journal of Service Industry Management*, *13*(1), 47–68. http://doi.org/10.1108/09564239810199923

Apotti Oy Ab. (2016). Mikä on Apotti? (What is Apotti?) Retrieved April 10, 2016, from http://www.apotti.fi/apotti-hanke/

Baars, H., & Kemper, H.-G. (2008). Management Support with Structured and Unstructured Data—An Integrated Business Intelligence Framework. *Information Systems Management*, *25*(2), 132–148. http://doi.org/10.1080/10580530801941058

Bannister, F. (2001). Dismantling the silos: Extracting new value from IT investments in public administration. *Information Systems Journal*, *11*(1), 65–84. http://doi.org/10.1046/j.1365-2575.2001.00094.x

Berry, L. L., & Bendapudi, N. (2007). Health Care: A Fertile Field for Service Research. *Journal of Service Research*, *10*(2), 111–122. http://doi.org/10.1177/1094670507306682

Björksten, T. (2014). Lomalla unohtuneista salasanoista tulee jättilasku työnantajalle – jopa 200 000 euroa vuodessa (Huge costs from passwords forgotten during vacations for the employer - even 200 000 euros/year). Retrieved March 28, 2016, from http://yle.fi/uutiset/lomalla_unohtuneista_salasanoista_tulee_jattilasku_tyonantajalle__jopa_200_000_euroa_vuodessa/7362012

Detmer, D., Bloomrosen, M., Raymond, B., & Tang, P. (2008). Integrated personal health records: transformative tools for consumer-centric care. *BMC Medical Informatics and Decision Making*, *8*(1), 45. http://doi.org/10.1186/1472-6947-8-45

Diemann, B., Gellner, M., Kuther, F., & Legler, S. (2015). Digital CRM - From traditional to individual, context-aware, real-time customer interaction. Retrieved from http://www2.deloitte.com/content/dam/Deloitte/de/Documents/technology/DELO_Digital CRM Studie_v21_ks3.pdf

Dillon, T., Wu, C. W. C., & Chang, E. (2010). Cloud Computing: Issues and Challenges. *Advanced Information Networking and Applications (AINA), 2010 24th IEEE International Conference on*, 27–33. http://doi.org/10.1109/AINA.2010.187

Eriksson, P., & Kovalainen, A. (2008). Qualitative Methods in Business Research. London: SAGE Publications Ltd.

Finnegan, D. J., & Currie, W. L. (2010). A multi-layered approach to CRM implementation: An integration perspective. *European Management Journal*, *28*(2), 153–167. http://doi.org/10.1016/j.emj.2009.04.010

Frelle-Petersen, L. (2016). Digitalizing Denmark: Doubts, practices and successes. Helsinki: The Ministry of Finance - Spring Splash event.

Golafshani, N. (2003). Understanding reliability and validity in qualitative research. *The Qualitative Report*, *8*(4), 597–607. http://doi.org/10.3367/UFNr.0180.201012c.1305

Harjunen, O., Saarimaa, T., & Tukiainen, J. (2010). Muistiot 12: Kuntaliitosten syntyyn vaikuttavat tekijät (Factors affecting municipal mergers). Valtion taloudellinen tutkimuskeskus (Institute for Economic Research)). Retrieved from https://www.vatt.fi/file/vatt_publication_pdf/muistiot_12.pdf

HILMA. (2016). Kynnysarvot (Procurement thresholds). Retrieved May 20, 2016 from https://www.hankintailmoitukset.fi/fi/docs/kynnysarvot

Hu, F., Qiu, M., Li, J., Grant, T., Taylor, D., McCaleb, S., Butler, L., Hamner, R. (2011). A review on cloud computing: Design challenges in architecture and security. *Journal of Computing and Information Technology*, *19*(1), 25–55. http://doi.org/10.2498/cit.1001864

Ingestad, G. (2016). Interoperability at the Heart of Digital Europe. Helsinki: The Ministry of Finance - Spring Splash event.

Jadeja, Y., & Modi, K. (2012). Cloud computing - Concepts, architecture and challenges. In *2012 International Conference on Computing, Electronics and Electrical Technologies, ICCEET 2012* (pp. 877–880). http://doi.org/10.1109/ICCEET.2012.6203873

Janssen, M., & Wagenaar, R. (2003). Towards a Flexible ICT-Architecture for Multi-Channel E-Government Service Provisioning. In *Proceedings of the 36th Hawaii International Conference on System Sciences - 2003* (Vol. 00, pp. 1–10). http://doi.org/10.1109/HICSS.2003.1174331

Khodakarami, F., & Chan, Y. E. (2014). Exploring the role of customer relationship management (CRM) systems in customer knowledge creation. *Information & Management*, *51*(1), 27–42. http://doi.org/10.1016/j.im.2013.09.001

Komulainen, M. (2010). *Ulkoistaminen kunnissa (Outsourcing in municipalities)*. Helsinki: Suomen Kuntaliitto (Association of Finnish municipal Authorities).

Laudon, J., & Laudon, K. (2006). *Management Information Systems: Managing the Digital Firm (10th Edition)*. *Database* (Vol. 9th).

Layne, K., & Lee, J. (2001). Developing a fullly functional e-government: a four stage model. *Government Information Quaterly*, *18*, 122–136. Retrieved from G:\PIC_Administracio\papers\Papers Robats LSE\developing a fully functional egov_a four stage model.pdf

Mepco Oy. (2016). Mepco Oy. Retrieved May 14, 2016, from https://www.mepco.fi/yritys/

Moon, M. J., & Norris, D. F. (2005). Does managerial orientation matter? the adoption of reinventing government and e-government at the municipal level. *Information Systems Journal*, *15*(1), 43–60. http://doi.org/10.1111/j.1365-2575.2005.00185.x

Negash, S. (2004). Business intelligence. *Communications of the Association for Information Systems*, *13*, 177–195. http://doi.org/10.1007/978-3-540-48716-6_9

Nguyen, B., & Mutum, D. S. (2012). A review of customer relationship management: successes, advances, pitfalls and futures. *Business Process Management*, *18*(3), 400–419. http://doi.org/10.1108/14637151211232614

Oksanen, A. (2010). *Kuntien yleiset hankintaohjeet (The general procurement standards for municipalities)* (3rd ed.). Helsinki: Suomen Kuntaliitto. Retrieved from http://www.kommunerna.net/fi/Kuntaliitto/yleiskirjeet-lausunnot/yleiskirjeet/2010/12802010/Oksanen_kuntien_yleiset_hankintaohjeet_alkuosa_v_23.8.2010.pdf Hankintaohjeet

Onninen, O. (2015). Tieto voittaa eli suomalaisten julkisten it-hankkeiden surullinen tarina. *Image*. Retrieved February 22, 2016 from http://www.image.fi/image-lehti/tieto-voittaa-eli-suomalaisten-julkisten-it-hankkeiden-surullinen-tarina#comment-form

Schellong, A. (2005). CRM in the public sector: towards a conceptual research framework. *Proceedings of the 2005 National Conference on Digital Government Research*, 326–332. Retrieved from http://dl.acm.org/citation.cfm?id=1065342

StatFinland. (2014). Kuntien ja kuntayhtymien talous ja toiminta (The operation and economy of municipalities and municipal consortiums). Suomen virallinen tilasto (SVT) ISSN=1799-1692. Helsinki. Retrieved February 20, 2016 from http://www.stat.fi/til/ktt/2014/ktt_2014_2015-11-20_tie_001_fi.html

The Council of State. (2016). Sosiaali- ja terveydenhuollon ja aluehallintouudistuksen linjaukset (Social, healthcare and regional governance reform alignments). Helsinki. Retrieved April 3, 2016 from http://valtioneuvosto.fi/documents/10616/2287640/Sosiaali-+ja+terveydenhuollon+ja+aluehallintouudistuksen+linjaukset+5.4.2016/7382c141-45aa-433f-af74-6fc579e76de0

The Finnish National Health Archive. (2016). Omakanta (My database). Retrieved April 10, 2016, from http://www.kanta.fi/omakanta

The Ministry of Finance. (2015). Palvelumuotoilu ja ICT-ratkaisujen konseptointi Ratamo-keskus projektille (Service design and concepting for Ratamo-center project). Valtiovarainministeriö (The Ministry of Finance). Retrieved April 25, 2016 from http://vm.fi/documents/10623/307649/kuntatuottavuus_Kouvola.pdf/d3110f48-4d4a-4944-84b4-0c83e47393ff

The Ministry of Finance. (2016). Kansallinen palveluarkkitehtuuri (National service architecture). Retrieved April 2, 2016, from http://vm.fi/palveluarkkitehtuuri

The Ministry of Justice. (2015). Kuntalaki 410/2015 (Finnish Municipal Law). Retrieved March 13, 2016 from http://www.finlex.fi/fi/laki/alkup/2015/20150410

Vehviläinen, A. (2016). Tuottavuusloikka ja digitalisaatio (Productivity leap and digitalization). Helsinki: The Ministry of Finance - Spring Splash event.

Viljakainen, P. (2016). Viimeaikaiset digitalisoinnin megacaset Venäjällä (Recent Russian megacases of digitalization). Helsinki: The Ministry of Finance - Spring Splash event.

APPENDICES

Appendix 1: Interview Structure

Service Provider (Mepco Oy)

- What are the main factors motivating municipalities to change?
- What are the perceived benefits of integration through a stakeholder management platform for different stakeholders? How about considering healthcare chain/mobile healthcare?
- What are the challenges of attaining these benefits?
- Who should drive the change?
- What would be the largest sources of cost savings?
- What are the most expensive parts of the change?
- KPIs to measure success?
- SoTe effects on the opportunities?

City of Porvoo Administration

- What were the reasons for Porvoo to start a CRM enabled digital transformation project?
- What is the system used for first and in which departments? How about future perspectives for the system?
- What are the expected benefits?
- How to get the residents to find and use the system?
- What have been the largest challenges for the project?
- What are projected to be the major sources for cost savings?
- What will be the most expensive part?
- What KPI's will be used with the system?
- How do you see the SoTe-reform affecting the city of Porvoo considering information systems?

Helsinki Mobile Health Care

- How does the information process currently work throughout a day of mobile health care? How to inform of special care needs?
- What are the main challenges of the current model?
- What do you see as the most significant benefits of a customer data combining mobile work solution used through a thin client running on an integration platform?
- How do you think the mobile health care users would react to this system change?
- What do you think would be the main issues if this change was implemented?
- How to implement the change to achieve minimum user resistance?