

LAPPEENRANTA UNIVERSITY OF TECHNOLOGY

School of Business and Management

Degree in Business Administration

Master's Programme in Supply Management

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**UTILIZATION OF DIGITALIZATION IN PROCUREMENT IN
MAJOR FINNISH MUNICIPALITIES**

Master's Thesis

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ABSTRACT

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This master's thesis researched the contemporary state of the utilization of digitalization in procurement in the major Finnish municipalities. The objective was to review previous findings of municipal/public procurement digitalization literature and research the current state of municipal procurement digitalization through a comprehensive survey questionnaire. Therefore, the method of this research was quantitative. Then, these findings were reflected to the previous knowledge and provide insight how these findings relate to the existing frame of reference of municipal procurement. The state of digitalization in procurement of major Finnish municipalities is relatively adequate and its major drivers are the attempt to streamline the procurement processes, cost savings and enhanced decision-making information for the management. The major challenge for the future is the development of the municipal personnel's capabilities and knowhow with regards to the digitalization of municipal procurement.

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Tässä tutkielmassa tutkittiin ja arvioitiin kuntahankintojen digitalisaation hyödyntämistä Suomen suurimpien kuntien kunnallishankinnoissa. Tämän tutkielman tavoite oli avata aiempien alan tutkimusten tuloksia/löydöksiä, tutkia ja analysoida ilmiötä Suomen kuntasektorilla kattavan kyselytutkimuksen avulla. Tutkielman tutkimusmetodi oli täten määrällinen. Saatuja tutkimustuloksia refleктоitiin aiempiin tutkimustuloksiin ja lopuksi tuotiin ilmi, miten tämä uusi tutkimustieto voidaan suhteuttaa osaksi olemassa olevaa kunnallishankintojen viitekehystä. Digitalisaation tila Suomen suurimpien kuntien hankintatoimessa on verraten hyvä ja sen keskeiset ajurit ovat hankintaprosessien virtaviivaistamisen tarve, kustannussäästöt sekä parempi tiedon johdon päätöksentekoinformaatio. Suurin keskeinen haaste jatkossa liittyy organisaation henkilöstön kykyjen sekä osaamisen kehittämiseen kuntahankintojen digitalisaatiossa.

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“Success in life is the result of good judgment. Good judgment is usually the result of experience. Experience is usually the result of bad judgment.”

- Anthony Robbins

In Vantaa, 23 May, 2018

Iiro Heiskanen

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1 INTRODUCTION

1.1 Background

This master's thesis examines the current topic of digitalization in a rather non-conventional dimension, in Finnish municipal procurement. The motivation to write this thesis and conduct this particular research project stems up from my ambitions to look into areas that I deem could be more fine-tuned and optimized.

In addition, municipal digitalization has been taken into more detailed consideration in Helsinki as the time of writing this city of Helsinki will employ a digitalization manager (CDO) in order to achieve the goal in the city strategy as becoming the “the most functional city in the world”. (City of Helsinki, 2018)

Now, understanding that in the end municipalities are financed by the tax-payers, would be rational to take an aspect in which the public spend could be critically evaluated and developed. Finland has been in a forefront of digital development in the world for past decades. Telecommunications and IT development have been very well represented in the drivers that lead the development of various other conventional sectors, industries and livelihoods.

The background of this study is personally relevant as the transparency of tax-payer funded activities and services are ever-more under more critical public inspection. Digitalization will bring tremendous added value and efficiency (i.e. Saved taxpayer funds). One can argue that the major innovations occur in the private sector before the public sector and that explains the previous findings coming largely from the private sector.

Therefore, it is ever more relevant and timely to have a profound overview on how digitalization is/has been implemented in public procurement. In this case, the municipalities will be major ones which means populations more than 20 000.

The environment of public procurement system is mostly influenced by market forces, internal forces, social economic & other forces, legal forces and political forces. Given that public procurement has been perceived as a major function of government – this area has been relatively neglected in academic research. (Thai, 2001, 10-37)

The transparency dimension in the background is essential driver to conduct this research. For the author, it is essential to find a meaningful and timely research topic that would have an impact in the field of supply management in Finland. Often times, the research is focused on a narrower level such as within one company. Therefore, this topic will tackle an important and timely phenomenon in a sector that affects all members and companies in the society as municipalities are funded through, one could argue rather involuntarily, by taxation.

This thesis has inspirations from the past master studies at Lappeenranta University of Technology. In this research topic amalgamates the general interest to this topic and the general usability of these potential research findings as well as the timeliness of the themes such as public spending, transparency in public sector and digitalization in the public procurement.

1.2 Research problem, objectives and limitations

The main research question is as follows: *“What is the state of utilization of digitalization in the procurement in the major Finnish municipalities?”*

The sub-questions are as follows: *“Are the Finnish municipalities as organizations adjusted to the digitalization in procurement?”*, and *“How will digitalization change municipal procurement in the future?”*

It is important to point out that the research questions were re-examined throughout the research process. The data was collected through an independently designed and conducted survey. The survey was designed and implemented in a way that the research questions put forward would be answered in the most thorough way. The research questions were designed in such a way that the sub-questions are relevant and supportive with the main research

question. The research questions are kept relatively general in order not to restrict the focus and scope of this research.

This research is based on a survey conducted from the major municipal purchasers in Finland and despite how objectively the questions will be put forward, every purchaser will be replying according to the persons capabilities. In addition, the amount of sampling can create problems with generalization: It is important to receive replies from all sizes of municipals for this study so that neither bigger nor middle-sized municipals are over-represented in the results. In addition, another automatic limitation to this study will be that these are major Finnish municipalities, so therefore it cannot be generalized to municipalities in other foreign countries.

To ensure the validity and the reliability of this research the author will purposely send the research survey to as many as 45 municipal purchasers. The validity ought to be extensive as the municipalities range from the population of 20 000 up until 600 000 – receiving appropriate replies from these municipalities, that is. This form of research method will have its benefits and limitations.

Open questions in the questionnaire survey will always have subjective elements and be prone for human errors. This possibility of error will be reduced by ensuring that the survey partakers have proper competency and/or background in public procurement. Surely, this cannot ever be guaranteed as 100%.

Being limited to the major municipalities in Finland, it also puts forward an opportunity for other researchers to make a similar research based on municipalities but in another similar country. One must, though, acknowledge that the countries ought to be comparable to each other to draw similarities or correlations in terms of digitalization in municipal procurement.

1.3 Methodology

This research was conducted by creating a profound survey to be sent to the municipal procurers. Ideally this will attempt to follow a scientific inquiry called hypothetico-deductive method. Hypothetico-deductive reasoning method is very common in business research as

the problems are normally stated numerically. Whenever a phenomenon occurs it puts forward facts and figures, this information is garnered, then analyzed and in the end the results are being reflect with the existing knowledge. This is not, though, applicable in all fields of science. (Uusitalo, 47-48).

The reasoning of this inquiry method is illustrated in the figure 1 below.

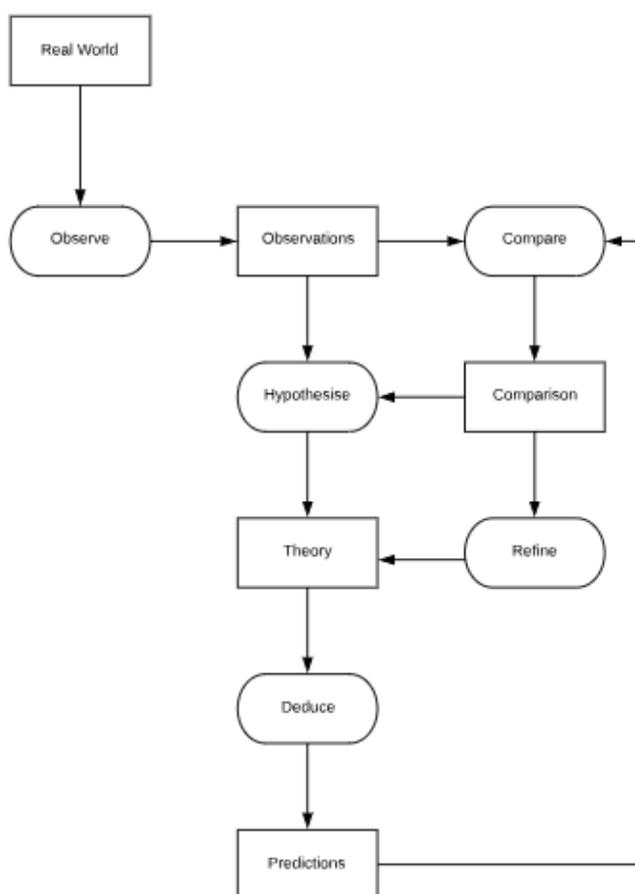


Figure 1: Hypothetico-Deductive method. (Tariq, 2007, 229)

The source of the data will be sourcing managers (or equivalent) in the Finnish municipalities with populations more than 20 000. The data will be collected through a comprehensive survey sent by email. The maximum/optimal number of participants is, therefore, 45 persons. In addition, a prior research and publications concerning public sector e-procurement and digitalization in the municipalities will be inspected and reflected to the results of this thesis survey results. This number of participants partaking this survey ought to be sufficient as possible as they represent all of the major municipalities in Finland.

As public/municipal procurement may cover a wide range of goods and services, purchasing in municipal sector will bring additional challenges in terms of analyzing the survey results. Furthermore, municipalities being different sizes this might, to a certain degree, question the comparability of the results between bigger and smaller municipalities. Municipalities of different sizes will also face different kinds of challenges and needs when it comes to the purchasing and providing services for their citizens. Smaller, more rural towns, will most likely face bigger spend in elderly care related services while big cities instead might face bigger spend for education.

1.4 Key concepts of the study

This master thesis project will be constructed through four key elements: Literature research, literature implications, empirical research and empirical results.

Figure 2 below illustrates the main conceptual framework for this thesis.

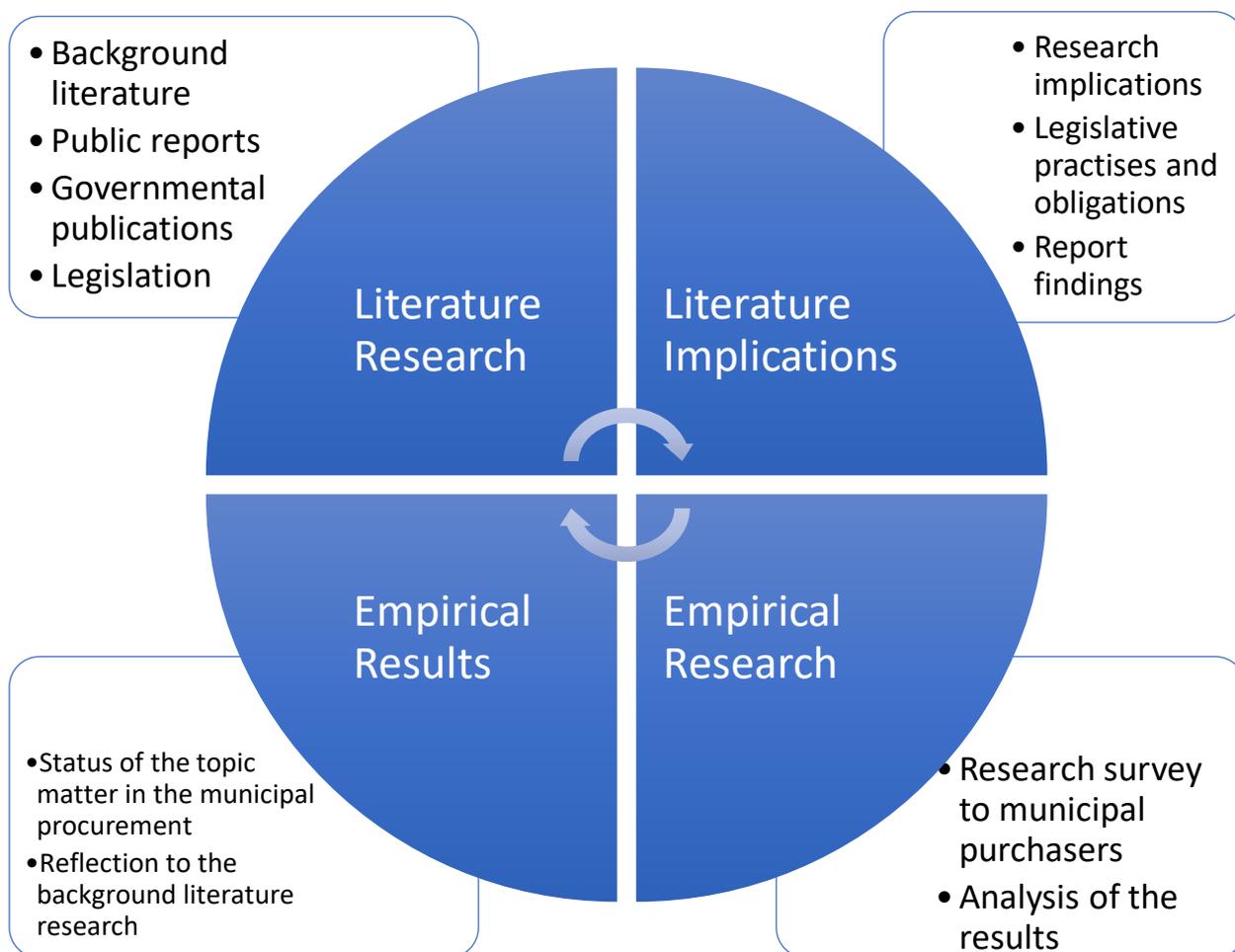


Figure 2: Conceptual framework for this master thesis

From the figure 2 one can conceptualize the research process, its phases and key dimensions. Literature research covers the background literature, public reports, governmental publications as well as legislative documents and practices. This will form a solid backbone for the reader to understand the current status of the digitalization in procurement in terms of research and published reports. It must be noted that the current academic research concerning digitalization in the Finnish public sector is rather limited - so in practice it means that a broader view on public procurement digitalization must be given in order to provide the according overview for literature research. As a practical clarification the Finnish procurement law will be referred as Act on Public Procurement and Concession Contracts throughout this thesis.

Once the literature research has been conducted literature implications will be given: What are the findings from the literature research. Report findings as well as the current status of the legislative documentary will be provided. It is essential to make sure that the reviewed previous literature and research results are relevant for this particular research. If the background research has not been completed accordingly, the final phase of reflection to the past research would be rather challenging.

Empirical research consists of a research survey that will be designed and conducted by the author for the municipal purchasers or to an according person in the municipality. It is essential to ensure enough participants to take part in this survey as if the number of the partakers stay too low, this dramatically affects the generalizability and the reliability of the research findings and would therefore put this research at risk even in terms of finalizing. Then, the analysis of the research results will be conducted. The research method will be quantitative with qualitative elements in it – which is arguably the most applicable as the survey questionnaire will have both multiple choice and open questions.

In the final phase, the empirical results will be explained. This means giving the current status of the utilization of the digitalization in the procurement in the major Finnish municipalities. In the concluding chapter the author will provide a reflection of the results with the previous literature research and other empirical findings in the topic matter. What are not illustrated in the figure 1, are the background of this study, research methods in detail and the final discussion as they are mere supporting elements compared to the core elements from which this research will be conducted.

1.5 Outline of the study

1st Chapter will be the introduction that includes background and motivations for conducting this study, stated research problem, objectives as well as limitations of this research. In addition, the key concepts and outlines of this study will be explained in this chapter.

2nd Chapter will be examining digitalization in procurement in general. The public procurement aspect will be brought as well as it can be reviewed by the previous research and published reports.

3rd Chapter will explore the research method and its key dimensions. The research method of this master thesis will be qualitative. The benefits and downsides of this research method will be also examined.

4th Chapter will describe the case municipalities and their features focusing in public procurement. In addition, data collection and basic frame of reference for the analysis will be explained. The case municipalities will be explained, their features, probable major differences as well as how the procurement might vary between the bigger and smaller municipalities.

5th Chapter will be covering the analysis of the results in a thorough manner. Analysis is one of the most important phases in this research project. The outcomes and concluding remarks would be impossible to come up with without a proper analysis of the data received. Analysis will also consume relatively big part of the time planned for this research project.

6th & 7th Chapters will be concluding the findings and provide a discussion as well as reflection to the background research. The research questions will be answered, and conclusions will be provided. An extra focus must to be given to the answering to the research questions as in the scientific process this phase is essential. In the end, the references and appendices will be listed.

2 MUNICIPAL PROCUREMENT IN FINLAND

Over the past decade or so digitalization has influenced the society around us in a tremendous fashion. Not only in private sector but also public sector has been adopting many ways to make processes more efficient thanks to technology. The development of European Single Market has demanded the member countries' municipalities under ever-more competition due to requirements of economic efficiency. The quantities that will be sourced outside of municipalities in in steep rise simultaneously as the differentiation of buyers and suppliers has also grown. Due to the increase of complexity has also brought the demand for professionalism in public procurement as well as needs for regional co-operation.

2.1 Public procurement

Public procurement encompasses purchasing activities such as goods, services or contractual purchases that the state, municipalities, joint municipalities, state enterprises and other administrative procurement units procure outside of its respective organization. Public procurement must be conducted by following the Act on Public Procurement and Concession Contracts, regulated in order to ensure efficient use of public funding and managed in a transparent and non-discriminative manner in terms of bidders. (Hankintailmoitukset.fi, 2018)

It is essential that the procurement procedure selected is in accordance with the legislation and whether the purchase financially exceeds the European Union or national threshold. If the purchase exceeds the European Union threshold this must be announced European-wide. The European Union -wide purchases must be first announced in the national HILMA -service, after which the purchase will be announced in Tenders Electronic Daily (TED) -database. The purchases that exceed the national threshold must be announced in the HILMA -service only – which has its own instructions and details. (HILMA, 2018)

2.2 Municipal procurement

Municipal procurement has become very critical in Finland as the regional development and joint cooperation with public-private initiatives ought to support the municipal services and creation of enterprises. The cooperation of municipalities and local level enterprises is very essential, and in this area, there is a lot of untapped potential for added value. When it comes to innovation between municipalities and local enterprises the focus is in the development of municipal services strategies that should determine the outlines and rules for its own services production and services that will be purchased externally. (The Association of Finnish Local and Regional Authorities, 2016)

When it comes to municipal procurement European Union is the main regulative body that affects the purchasing activities via certain procurement related regulations, directives and other acts. Figure 3 illustrates the procurement norms enforced by the European Union.

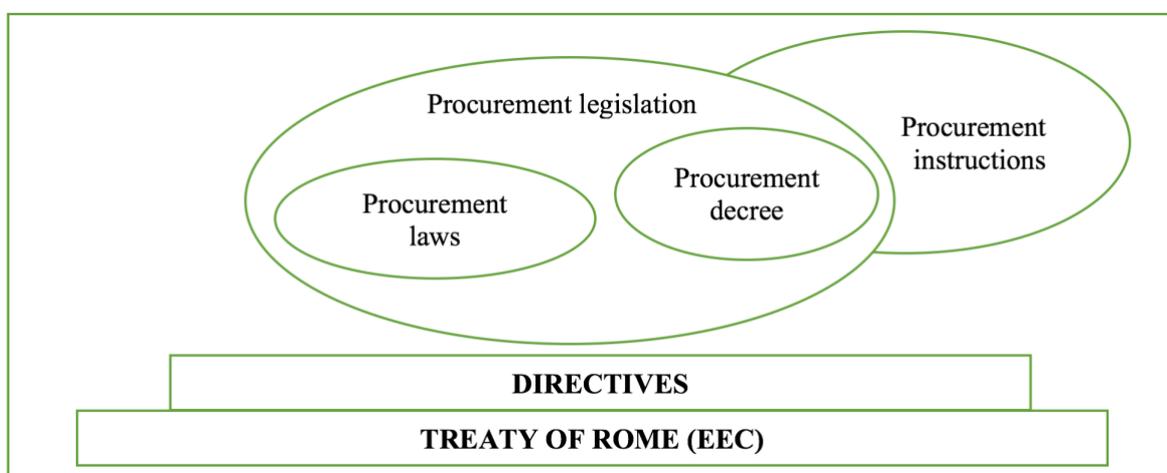


Figure 3: Procurement norms (The Association of Finnish Local and Regional Authorities, 2010, 8)

Ever since European Economic Area was established in 1994, the public procurement was opened for free competition (1505/92). Act on Public Procurement and Concession Contracts is based on the Treaty of Rome as well as the related procurement directives. In 2004 the European Union and the European Council agreed upon the new procurement directives. As the legislative and regulatory framework play a major role defining public and

municipal procurement, the more exact European Union related regulations/directives on public procurement will be covered in the chapter 2.4.

In order to perform profitably the municipal procurement unit must operate in efficient and streamlined-way with other municipal units. (The Association of Finnish Local and Regional Authorities, 2010, 8-10) Procurement activities make up a giant portion of the municipal expenses. Therefore, municipal procurement must be carried out in such a way where bidding and call of tenders are handled in a legal and transparent ways. According to European Union statistics the value of public procurement both in Finland and in the European Union stands at around 15% of the respective GDPs. In Finland, the value of annual public procurement spends in 2008 stood at 27 billion €, from which the municipal procurement covered 14,7 billion €.

Due to increasing services purchases Finnish municipalities ought to focus more on the procurement know-how in the future. In order to manage and make the municipal procurement much more efficient and regulated a joint procurement organization has been established within the The Association of Finnish Local and Regional Authorities, called KL-Kuntahankinnat Oy.

Ever since 1.6.2010 the national threshold for the goods and services procurement in the municipalities are 30 000 €, in the major health care and social services as well as education and workforce related services 100 000 €, and in construction contracts 150 000 €. Act on Public Procurement and Concession Contracts regulates every purchase that exceed the according thresholds.

Municipalities have the freedom to choose which services and to what extent will be provided in-house, jointly purchased with other municipalities, or externally from the private sector. However, a special legislation may regulate municipal procurement in some special occasions. Figure 4 provides the frame of reference for procurement in major Finnish municipalities.

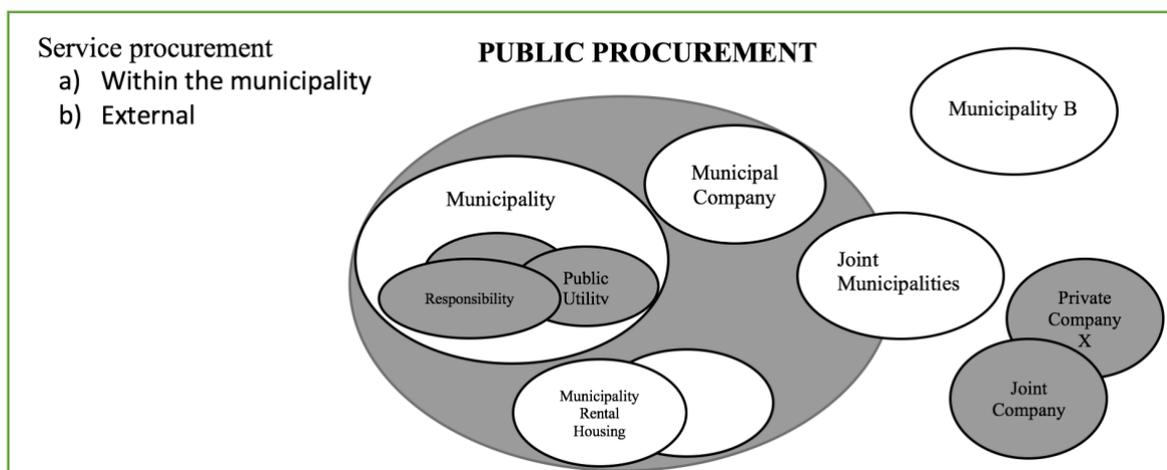


Figure 4: Framework for municipal procurement (The Association of Finnish Local and Regional Authorities, 2010, 13)

In Finland three major services/channels are essential in municipal procurement. These channels are HILMA, Clouadia and HankintaSampo. These platforms are utilized in different public procurement related purposes. In this thesis all these used procurement platforms will not be examined in a great technical depth but rather lay out the general framework in which the Finnish municipal procurement is being managed in the time of writing this. The dimensions of each platform and services will be explained in more detail in the following sub-chapter. Basically, it is up to the municipalities themselves degree to which they will purchase externally each service – as long as the obligations given by state and all according legislation are being met.

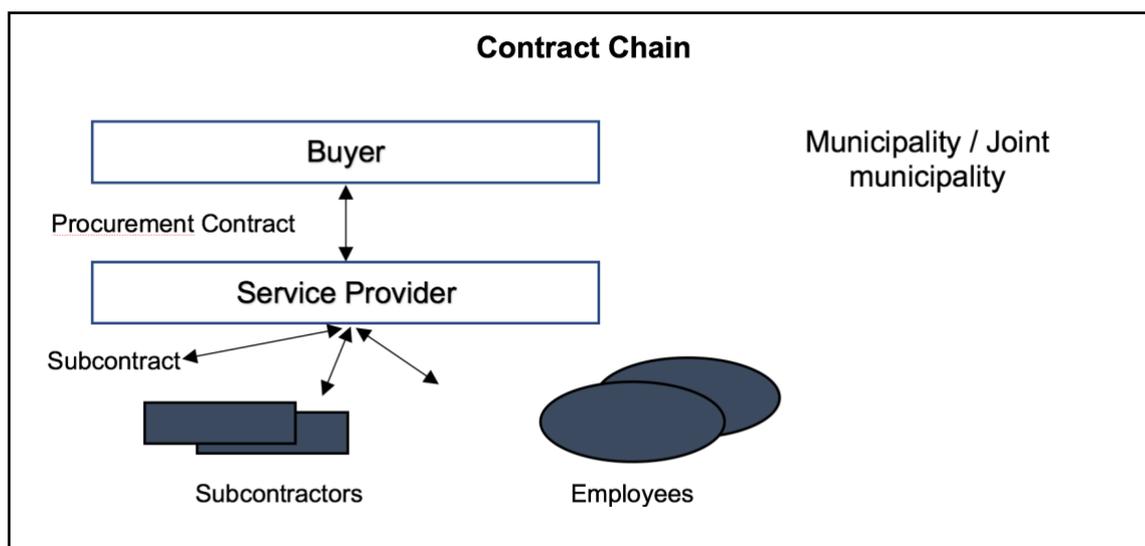


Figure 5: Contract chain (The Association of Finnish Local and Regional Authorities, 2010, 55)

In order to call bids and manage contracts efficiently one must understand and manage properly the chain of contracts. When the municipalities or joint municipalities procure a good or service, the contractual relationship between them and the suppliers is called *procurement contract*. In construction this same contract is a construction contract. The contractual chain is illustrated in the figure 5.

2.3 State regulation and municipal procurement

HILMA is a free, electronic channel where public procurement units will announce their public purchases. This channel is run by the Finnish Ministry of Economic Affairs and Employment. In return, the companies may acquire timely information concerning the ongoing public procurement procedures as well as the foreknowledge regarding the upcoming public procurements.

Cloudia is privately run company providing certified solutions for public procurement in the realm of suppliers, contracts as well as sourcing itself. Cloudia provides a widely used electronic bidding system for public procurement. Through this service municipality can manage a bidding process electronically all the way from the bidding to the procurement contract.

HankintaSampo is another privately run electronic platform for public procurement much like Cludia. At HankintaSampo one can examine the tendering processes that are active. The main difference between HankintaSampo and Cludia is that HankintaSampo is used mainly in the smaller municipal procurement.

The framework in the competitive tendering and procurement:

- **Choices Based on Municipal Policies**
 - Municipal procurement and competitive strategies
 - Municipal services production types
 - Development of the municipal service organizations
- **Realities of the Competition Law**
 - Obligations by the Act on Public Procurement and Concession Contracts
 - the purchases must be bided
- **Contract Law Obligations**
 - Municipality is tied up to contracts just as private companies
 - The obligations by the head of the municipality are not exempted from the obligations of the contract law.

Municipal procurement can be carried out in such a way that the when planning the procured good service - or equivalent – the content of the purchase must be determined so that the local businesses have the opportunity to join the bidding as equal entrant.

Municipal procurement unit must determine which purchases are executed decentralized and which centralized. Typically, different certain types of purchases have been procured centralized at a joint communal/regional level, such as office goods, foodstuffs, fuel purchases, etc. On a national level joint procurement projects have been carried out in such a way that the state's joint procurement organization Hansel Oy has been given a special status by law (1096/2008) in terms of national level procurement.

Act on Public Procurement and Concession Contracts will not be applied to purchases that fall below the national thresholds. The only exceptions are in cases of procurement remediation. The transparency has been ensured due to publicity as well as market

orientation whenever municipal purchases are being made. Whenever the EU thresholds are being exceeded the purchases must be registered at the designated HILMA channel.

The partakers of the municipal procurement bidding – candidates and suppliers – must be treated equally and without any form of discrimination at all times during the process. The general reliability and trustworthiness of the supplier candidates must be carefully considered as well as the technical details and economical status of the tendering party. The procurement process is conducted as follows (The Association of Finnish Local and Regional Authorities, 2010, 50):

Procurement Definition

- Goods
- Services
- Contractual

Bidding Phase

- Selection of procurement procedure
- Determination of the selection and evaluation criteria
- Procurement announcement at HILMA -service
- Processing of the bidding partakers
- Requests for offers

Comparison and Decision Making

- Opening of the offers
- Decision making and arguments
- Declaration of the decision with indications for appeals

Procurement Contract

- Annual or another seasonal contract
- Occasional contract

Contract Monitoring

- Reclamations, redundancies, dismissals
- Approval of the operations.

Municipal procurement resembles to private enterprise as the outcomes of procurement ought to be as economical as possible. However, quality standards must be met in the municipal sourcing. Quality factors play a major role especially prior to competitive bidding in terms of goods/service's features or the planning of the construction. The buyer has all the rights to expect high quality. Municipality can choose the one supplier that is not the cheapest offer by considering the overall quality thorough economical lifecycle costs instead.

2.4 Regulations by European Union & OECD

Finland has been part of European Union ever since 1995 and part of OECD (Organisation for Economic Cooperation and Development) ever since 1969. European Union directly affects the public and municipal procurement in Finland and its other member states. However, OECD does not have direct legislative authorities but rather recommendations for public procurement. These key dimensions of external environment affecting the procurement in major Finnish municipalities will be more examined and explained in this chapter.

2.4.1. European Union

When evaluating the bids, the authorities may utilize different criteria - for instance they may make a decision upon cheapest price or by grounding the decision upon other criteria. In the latter instance every bidder must be informed the weights of each decision criteria. These being for instance:

- Price
- Technical details
- Environmental factors.

The purchases that exceed the EU thresholds must comply with the according regulations and announce the procurement announcement or announcement concerning design bidding. In addition, the final outcome of the chosen bid must be announced publicly. Ever since 2010 the EU thresholds in municipal procurement have been set as follows:

- Goods and services procurement 193 000 €
- Construction contracts 4 845 000 €

And as for the procurement law special cases for EU thresholds:

- Goods and services procurement 387 000 €
- Construction contracts 4 845 000 €.

The authorities may start evaluating the bids only after the deadline for bid delivery has passed. If a bidder has left an offer he has a right to be informed soon if he has won, the bidding competition. If the offer has not been selected the bidder has a right to receive a detailed report regarding why the offer had been rejected. Technical specifications will determine the service, purchase or contract and its details. This specification will also include factors concerning environment, planning, quality control or safety issues. In construction contracts also inspections, testings' as well as technical construction specifications are determined. (European Union, 2018a)

The thresholds above which European legislation for public procurement applies change from time to time and they are now different for central and sub-central authorities. Normally, this threshold regulation changes in every two years. The most recent EU thresholds for public contracts from 1.1.2018 to 31.12.2019 are illustrated in the table 1.

Table 1: European Union thresholds for public contracts 2018-2019 (European Union, 2018b, 11-15)

	Works	Supplies	Services		
			Social and specific services	Subsidized services	All other services
Central government authorities	5 548 000 €	144 000 €	750 000 €	221 000 €	144 000 €
Sub-central contracting authorities	5 548 000€	221 000 €	750 000 €	221 000 €	

In order to make it easier for small and medium sized enterprises to participate in public procurement procedures the contracting authorities are encouraged to divide contracts into according lots. In addition, the contracting authorities cannot set turnover requirements for economic operators at more than two times the contract value – except being the cases that which have a specific justification for this. (European Union, 2018b, 11-15)

2.4.2. OECD

Despite OECD not being a legislative body over sovereign countries is provides certain recommendations for public procurement operations for its member states – which Finland has been since 1969. OECD advocates for the efficient and effective public procurement of goods, services as well as works that are core purposes of government – including infrastructure investment and the delivery of essential services to citizens. OECD (2015, 5-12)

OECD states 13 distinctive recommendation statements regarding public procurement practices. These principles to be followed are as follows:

1. “AGREES that, for the purpose of the present Recommendation, the following definitions are used: E-procurement refers to the integration of digital technologies in

- the replacement or redesign of paper-based procedures throughout the procurement process.”
2. “RECOMMENDS that Adherents ensure an adequate degree of transparency of the public procurement system in all stages of the procurement cycle.”
 3. “RECOMMENDS that Adherents preserve the integrity of the public procurement system through general standards and procurement-specific safeguards.”
 4. “RECOMMENDS that Adherents facilitate access to procurement opportunities for potential competitors of all sizes.”
 5. “RECOMMENDS that Adherents recognize that any use of the public procurement system to pursue secondary policy objectives should be balanced against the primary procurement objective.”
 6. “RECOMMENDS that Adherents foster transparent and effective stakeholder participation.”
 7. “RECOMMENDS that Adherents develop processes to drive efficiency throughout the public procurement cycle in satisfying the needs of the government and its citizens.”
 8. “RECOMMENDS that Adherents improve the public procurement system by harnessing the use of digital technologies to support appropriate e-procurement innovation throughout the procurement cycle.”
 9. “RECOMMENDS that Adherents develop a procurement workforce with the capacity to continually deliver value for money efficiently and effectively.”
 10. “RECOMMENDS that Adherents drive performance improvements through evaluation of the effectiveness of the public procurement system from individual procurements to the system as a whole, at all levels of government where feasible and appropriate.”
 11. “RECOMMENDS that Adherents integrate risk management strategies for mapping, detection and mitigation throughout the public procurement cycle.”
 12. “RECOMMENDS that Adherents apply oversight and control mechanisms to support accountability throughout the public procurement cycle, including appropriate complaint and sanctions processes.”
 13. “RECOMMENDS that Adherents support integration of public procurement into overall public finance management, budgeting and services delivery processes.” OECD (2015, 6-13)

Integrity in public procurement is essential as it refers to the use of resources, assets, funds and authority aligned with the public interest and aligned with broader principles of good governance. OECD (2015, 6) states that “Public procurement refers to the process of identifying what is needed; determining who the best person or organization is to supply this need; and ensuring what is needed is delivered to the right place, at the right time, for the best price and that all this is done in a fair and open manner”

Transparency in public procurement plays a major role as the promotion of fair and equitable treatment for potential suppliers by providing an appropriate and timely degree of transparency at all phases of the public procurement cycle are corner stones of a professional supply management operations. These OECD guidelines are very well aligned with the municipal procurement policies provided by the Act on Public Procurement and Concession Contracts.

3 DIGITALIZATION IN PROCUREMENT

3.1 Progress in the digitalization of procurement

Digitalization in procurement has been researched in various countries in form of e-procurement. In addition, a lot of research has been conducted in the field of construction of all areas. Lots of literature have been published with positive experiences with e-procurement initiatives. These studies with positive notions on public procurement digitalization are being shared from a lot of different kinds of countries all around the world from contract writing systems (Lloyd, 2012, 304-317) to more general utilization of e-procurement systems worldwide. (Lee, 2010; Hassan et al. 2014)

3.1.1 Recent development

In the private sector according to Rajkumar (2001, 2-9), organizations of all sizes may utilize the benefits of e-procurement solutions. These forms of utilization are in the realm of supplier selection, purchase order processing and in catalog search. It is relatively normal that organizations use consulting services in order to help out to start a pilot implementation on 5-10% of their MRO (maintenance, repair & operating supplies) items within a business unit. Internet-based procurement technologies and solutions indeed are changing the way procurement units purchase MRO goods as well as direct goods. The information/data exchanged automatically between buyers and suppliers through technology will result in tighter buyer-supplier relationships. In addition, fewer errors and higher data quality in the back-end ERP systems will occur as the procurement systems are deemed to be ever more integrated with organizations' back-end & ERP systems. (Rajkumar, 2001, 2-9)

Osmonbekov et al. (2002, 5-23) discuss about the e-business revolution in terms of communication, innovations and channel performance. Technology has a mediating role of channel structure in terms of channel outcomes in the realm of effectiveness and efficiency. The authors argue that as e-business tools will have considerably more significant role in the opportunity of adding value to channel relationships. The beneficiaries of the technological innovations in e-business tools that add value in the channel relationships are not only the organizations themselves but also employees, customers, partners as well as other stakeholders. The current trends in information technology and software suggest that there

are no signs of changing in the trend of development of the technological practices in channel systems. Moreover, cross platform compatibility ought to become an important aspect for an organization's day-to-day operations. The authors also point out that considering the rapid pace of changes in the e-business technologies and tools this challenges the researchers to understand the underlying processes of the operations and to offer robust models that could thoroughly capture the impacts of the technological advancements. (Osmonbekov et al. 2001, 5-23)

Innovations appear to be in a significant position in terms of an effective and successful public procurement. Much like Osmonbekov et al. (2002) discuss also Uyarra et al. (2014, 635-639) looked more in depth into the barriers to innovation through public procurement in the suppliers' perspective. The authors found that the main barriers for innovations through public procurement were a lack of interaction with procuring organization, the rigid specifications, low competence of the procurers, poor risk management as well as poor feedback and low appreciation of unsolicited ideas. These dimensions ought to be kept under an eye when evaluating the performance of public procurement in the Finnish municipalities. These dimensions have a strong link to the public organizations internal capabilities, personnel's' mindset and skillsets that play a major role in conducting and developing effective and successful public procurement.

Vaidya et al. (2004, 401-407) note that even though the benefits of e-procurement implementation are very significant, they will not be gained automatically without a successful implementation. Furthermore, the authors note that "The first step towards this is to identify the organizational learning factors" (Vaidya et al. 2004). These learning factors are significantly related to the risks with regards to the e-procurement implementation initiatives.

Vaidya et al. (2006, 79-92) studied also the critical success factors' likely impact to the success of e-procurement initiatives in the public sector. The authors suggest note that despite the fact that there has been a tremendous amount of studies on how information systems and other management disciplines have studied the implementation issues of the traditional e-procurement solutions – there have been relatively few such research findings

in the public sector. Vaidya et al. (2006) put forward framework on how the implementation and impact process actualize in the organization.

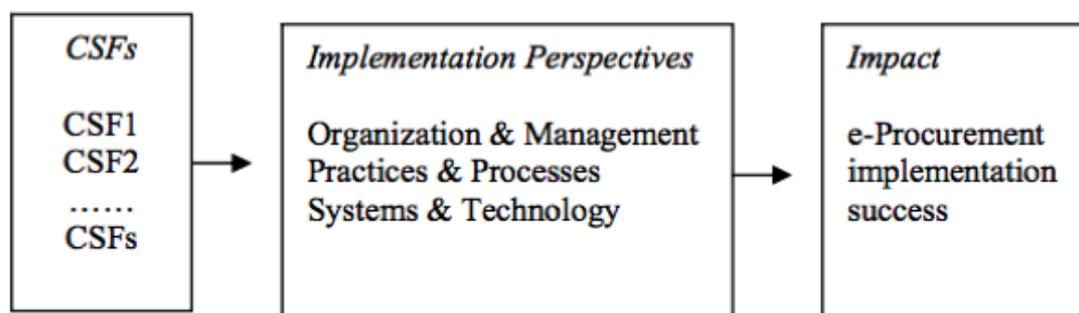


Figure 6: Conceptual framework of e-procurement implementation (Vaidya et al. 2006, 75)

By definition, public procurement is an essential function of government – it must satisfy requirements for goods, works, systems, and services in a timely manner. Public procurement ought to meet the basic principles of good governance: accountability, integrity and transparency. In addition, governments ought to achieve added value for money in procurement. Governmental procurement can be distinctive from conventional private sector in such a way wherein private companies' procurement are determined upon each organization governance policies. In public sector the procurement must operate within a range of regulations. In the public sector buyer attempts to include as many sellers as possible to broaden the competition as well as maximize the opportunities for value for funds. In the private sector, however, buyers may seek to use a small number of suppliers based on trusted relationships in a way that would minimize the operating risks.

For more than a decade there have been initiatives to implement electronic systems in the area of public procurement. In a study conducted by Dooley & Purchase (2006, 31-42) the author argue that certain factors influence e-procurement usage in public procurement. Many things affect the organizations willingness to adopt e-procurement initiatives, however, electronic integration with suppliers was not one of the main influencers. The most influencing factors determining a successful usage of e-procurement in public sector are:

- Major suppliers' willingness & future intention to transact online
- Internal organization support for e-procurement initiatives
- Perceived improvements to purchasing tasks. (Dooley & Sharon, 2006, 31-42)

Furthermore, Alsac (2007, 342-358) also studied the use of e-procurement in public sector in the health services. The author points out that electronic procurement methods are increasingly used in the respective field and that these electronic systems will shorten the time needed to conclude contracts, increases transparency, enhances competition in supplier base as well as reduces the number of transactions. The training of the personnel for the e-procurement initiatives was highlighted. Alsac (2007) also notes that the technical specifications ought to be prepared in such a way that they will not distort competition and unnecessary documents should not be required from the suppliers.

Hackney et al. (2007, 59-66) studied the issues relating to the implementation of electronic reverse auctions (eRA) within local governmental procurement processes in the UK. eRA's are "electronic auctions which are used by companies to electronically procure external goods and services, and thus represent an instrument of business-to-business eCommerce." (Hackney et al. 2007) According to findings turns out that the factors dictating the success of the electronic reverse auctions are:

- Formulation of taxonomy of organizational, human and technical interventions for successful eReverse auctions
- Development of cause-effect models that relate to buyer-supplier relationships from the taxonomy
- Generation of a portfolio of cause-effect animation scenarios using system dynamic modelling
- Delivery and evaluation of a simulation workbench which is populated by a library of simulation models that "demonstrate the impact of different eRA strategies in support of eGovernments" (Hackney et al. 2007)

Hawking et al. (2004, 5-21) studied the adoption of e-procurement initiatives in Australian SME's framework. The findings are also consistent with the previous findings where a fundamental barrier of a successful adoption of e-procurement appear to be the lack of technically skilled personnel within the organization. The maturity of the organization was found to be linked with the degree of adoption of e-procurement initiatives. Prior to adoption of e-procurement initiatives organizations ought to differentiate between supply chain

management and e-procurement, and troubleshoot cross-platform integration problems, and evaluate how e-procurement vendors structure their systems. (Hawking et al. 2004)

In Danish public sector Henriksen & Mahnke (2005, 6-15) studied the implementation of electronic marketplaces and e-procurement. The outcome was that there is a lack of congruency between the models developed for private sector and how they are applicable in the public sector. Regardless the economic rationale of implementation of e-procurement systems due to the decentralized decision-making in Danish public sector – the implementation of centralized e-procurement initiatives is hindered by the structural-political issues of decentralization. These findings are relevant when generalizing private sector solutions with public sector.

McLaren et al. (2002, 348-364) studied the collaboration between the parties in supply chain management and the costs of implementing, using, maintaining, integrating as well as processing data within the supply chain collaboration. The authors highlight that given the assumed benefits of supply chain collaboration in the end the organization ought to choose whether to maximize supply chain efficiency and integration, flexibility, or system comprehensiveness.

Regression analysis suggests that in order to establish and utilize e-procurement solutions the state government must prerequisite a strong policy leadership and a managerial willingness to innovate. (Moon, 2005, 59-69) Adoption of e-procurement tools do not guarantee their effective utilization – this will be determined the degree to which the organization has managerial and organizational capabilities, not merely technical.

In the Italian public sector Raffa & Esposito (2006, 51-64) have studied the e-procurement solution dimensions from an internal-organizational aspect: interaction between the organizational and technical dimension that enables to implement a new e-procurement system. Turns out that on the organizational side implementing major interventions is challenging due to a rigid legal framework as well as static or bureaucratic organizational setting. The effective implementation of e-procurement tools and solutions make it necessary to involve end-users. Again, the success will be determined upon how to ensure the organizational capabilities that facilitate the use of new ICT-based e-procurement systems.

Singer et al. (2009, 59-74) conducted a research on Chilean public sector – how much does the state save by implementing an e-procurement system. With regards to the previous literature findings the cost savings were not as substantial. Despite the fact that administrative savings were not very well acknowledged in the findings, the e-procurement system does not solve itself the incompetence and dishonesty dimensions that explains found in public purchasing, argue the authors (Singer et al. 2009)

In the UK, Smart (2005, 264-271) studied the short-term vs long term strategy on e-procurement implementation with regards to cost savings (electricity & water industries). In short term the integrated e-procurement solutions ought to support the target of further cost efficiencies. In long term perspective the potential for success depends more on a change of culture. Therefore, if the current focus on procurement and management has to do with stable cost base, the next step would be to re-examine all elements of supply chain management in a macro level.

3.1.2 More recent status

Tran et al. (2011, 132-139) studied the influences of government, organization and technology on a construction enterprise's e-procurement implementation readiness level in the developing countries. The authors constructed a model in which a dynamic definition was posited in order to define an enterprise's e-procurement implementation readiness. The role of government, organization, and technology in an enterprise's e-procurement innovation process in this frame of reference is illustrated in the figure 6.

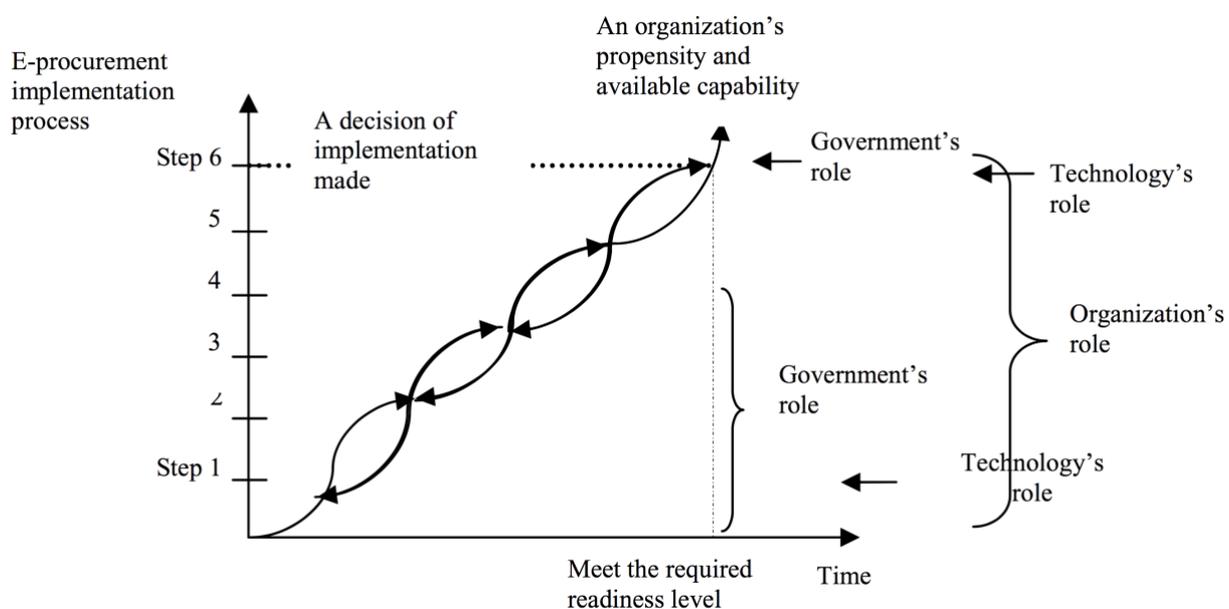


Figure 7: The role of government, organization, and technology in the e-procurement innovation (Tran et al. 2011, 134)

The e-procurement innovation process can be into six distinctive steps. In this model the enterprise's readiness level is influenced by factors which arise from different sources and the most impacting actors at play are government, organization, and technology. According to Tran et al. (2011, 134) the six steps of e-procurement innovation are as follows:

1. Recognizing forces/opportunities for innovation
2. Creating a climate for innovation
3. Developing the necessary entrepreneurial/technological capabilities
4. Providing new construction technologies
5. Experimenting/refining
6. Implementing on projects and in the firm.

The authors note that technology plays an important role in driving e-procurement innovations. Technology ought to make mechanisms of "technology push" and to measure its perceived benefits as well as barriers to the implementation.

In the French public sector instead Beauvallet et al. (2011, 17-25) conducted a research on adoption of e-procurement in the public sector. This is after 2005 when the French government set up new regulations on pushing public and private actors to adopt electronic means for handling the steps of the sourcing process in public organizations and institutions. According to findings the adoption of the e-procurement practices has not been all too swift. Turns out that one year after the legal obligation came into effect on 1st of January 2005 the utilization of e-procurement by the public sector remained fairly limited. The hindering elements were found to be in the areas of technological capabilities in the organization and legislation. Local public authorities suffer from insufficient technical skills as well as resources. Furthermore, the authors found out that it is also insufficient for dealing with specific purchasing processes where responsibility of the public operator is significantly engaged, and where the fear of juridical complication/cancellation hinders the thorough electronic support of underlying process. According to Beauvallet et al. (2001) in order to overcome the challenges of adopting e-procurement in the public sector the organization must adopt common principles for e-procurement platform user interfaces, data related to purchase orders/invoices must be standardized, European level of corporate identification laments must also be standardized, and electronic signatures must be cross-border recognized.

Aminoff (2016) arrived at similar findings as Beauville et al. (2011) where public procurement innovations can be hindered due to legislative restrictions. The main considerations on what challenges supplier innovations towards digitalization evolve around influencing supplier market (early interaction with suppliers essential), procurement of innovation (especially in-house capabilities), and enhancing innovation as part of infrastructure projects (trust, commitment & communication).

Croom & Brandon-Jones (2016, 368-382) looked into e-procurement implementation in the UK public sector. The authors addressed five key dimensions in terms of what impact the e-procurement implementation:

1. Cost efficiency
2. From/nature of supplier transaction
3. E-procurement system implementation

4. Broader IT infrastructure issues
5. Behavioral/relational impact of e-procurement.

Much like prior findings the authors point out that the major driver towards e-procurement adoption appear to be economic benefits – the possibility of lower prices through greater informational economies. However, process costs were more difficult to locate in e-procurement adoption. The concomitant price benefits arose from the economies of volume with more accurate forecast of contract volume requirements to their suppliers. The authors' findings also indicate that for the success of an e-procurement system it is very essential to be able to “punch out” procurement order data into financial control systems. Additionally, organizational commitment as well as support for e-procurement were found key characteristics in order to adopt e-procurement. Moreover, if the implementation was carried out through an inclusive project team the system stakeholders were found to put out less user resistance to e-procurement.

Macmanus (2015, 6-23) note that despite the general perception that in the public sector is the major drag on the improvement of e-procurement development – does private and public share similar types of challenges. Both have been accused of rushing into new technology without considering its broader implications. The author notes that “both have taken the easy routes first: buying and selling commodities on line but delaying purchasing services. Finally, both have called for a re-examination of certain key principles that have guided public procurement over the past several decades”. According to Macmanus (2015) four principles fall under debate: 1) Low bid wins and that's a must, 2) separation between the vendor and user is desirable to avoid claims of favoritism, 3) fixed price and fixed term contracts are best for government, and 4) open access is absolutely a must at all times.

Brandmeier's (2010, 5-23) statistical findings interestingly highlight the high correlation of successful procurement with integration of the procurement unit within the organization and cross-functional interaction within the organization. Being consistent with the previous findings there is a correlation between procurement success and supplier evaluation. (Brandmeier, 2010)

According to Centobelli et al. (2014, 9-13), in order to pursue cost savings and value creation through supply chain management it must be viewed from the entire supplier lifecycle point of view. This encompasses the function of purchasing, logistics, quality as well as administration in order to be more competitive. The simulation results model has allowed to detect the achievable savings with the adoption of a model and collaboration. Indeed, the collaboration between the purchasing organization and its suppliers for process improvement and an integrated approach to engineer design. (Centobelli et al. 2014)

Eskandarian et al. (2016, 74-81) studied the quality in e-procurement success through a comprehensive data analysis. The quality in e-procurement practice and process measure by the timeliness, accuracy as well as configuration of flow of the materials and information. The results were as follows (Eskandarian et al. 2016):

- “Quality in E-procurement practice and process measure by the accuracy, timeliness and configuration of flow of the material and information.”
- “Quality of both organizational culture and E-procurement success have a direct relationship with these mediators’ qualities in organizational culture.”
- “Quality in system and technology, organization and management, process and practice are not mediators in the e-procurement relationship with IT infrastructure
- “The quality in in knowledge management through changing quality in e-procurement implementation factors can change the possibility of success of e-procurement.”

Gardenal (2013, 216-236) point out in their study that the benefits are ever more significant when e-procurement is established as the standard mean to conduct every kind of procedure and users reach mastery of e-procurement solutions. Furthermore, e-procurement can be a stimulus to move from the bureaucratic model of administration to more effective organizational models -such as the “virtual bureaucracy” (Gardenal, 2013)

Transparency plays a major role in public procurement and as one of the drivers in its development. (Vaidya et al. 2006; Alsac, 2007) In Greek public sector, the impact of establishing transparent practices in public procurement activities indicate improved transparency and reduction of the public procurement costs by approximately 1,8% - 3,4% between 2002 – 2013. (Giotopoulos et al. 2015, 461-470)

Much congruent with the previous findings (Vaidya et al. 2006; Alsac, 2007; Giotopoulos et al. 2015), public procurement digitalization has improved transparency also in Russia. Ever since many administrative regions around Russia deployed e-procurement systems this has led to increased transparency (greater participation and more efficient prices) and a rise for cost of corruption. (McHenry & Pryamonosov, 2010, 219-235)

In Malaysian framework the tactical and operational added value due to e-procurement implementation appear to be more prevalent than strategic values. The analysis shows that there is a significant reduction in paperwork and time consumed for queries after the adoption of e-procurement initiative. Furthermore, on top of communication and work process improvements, e-procurement was found to have a positive impact on contract administration as well as effective product/supplier searching. (Hashim et al. 2013, 837-842)

According to McCue & Roman (2012), the last two decades e-procurement implementation has generated only limited changes at the organizational/network levels. E-procurement has been defined merely as a tool that can transform a procurement process without considering the organizational impacts as well as social constructs as limiting dimensions. Furthermore, the authors note that employing ICT is not enough in order to achieve harmonious operations and integration – “adopting technology without understanding the benefits of properly planned integration will result in flawed outcomes”. (McCue & Roman 2012, 223-240)

The findings by Percy et al. (2018, 25-33) show the reduction of administrative costs and purchase prices after implementing the e-procurement processes across multiple industries. Turned out that the use of basic single-process e-procurement applications is actually more prevalent than the use of integrative tools. This is due to the fact that using single-process e-procurement applications require less financial investment and risk. Moreover, as additional challenges were considered to be the training of employees, the incurring costs to implement the e-procurement application, willingness of trading partners to invest in technology as well as security aspects with regards to the electronic transfer of data. (Percy et al. 2018)

In more technical level there is evidence that it is technically possible to arrive at the economically most advantageous tender as an outcome of an automated bidding process. By determining the choice of weights for quality and price can provide very desirable tender

outcomes for the buying organization. To what degree the buying organization emphasizes quality and price will be up to the tenderer. (Stilger et al. 2017, 94-116)

In Slovakia Murray Svidronova & Mikus (2015. 323-333) have arrived at similar conclusions as the research findings earlier in terms of e-procurement initiatives increasing the number of participants and SME's in the competition. In addition, reduction in the monopoly of a potential contractor has occurred. However, the authors also note that despite the e-procurement & e-auction processes will not eliminate all misconducts in the realm of public procurement the transparency they are being viewed as a successful innovation in the management of public services with the use of ICT.

More recently OECD (2017, 113-116) notes that Slovak State officials and the European Commission were requested to consider using Private Platforms in the future. Private platforms continue to provide an alternative solution to national platforms with certain conditions and standards enforced by the state. These conditions and standards for the private platforms are in the areas of cost management, platform functionality, simplicity and speed of the procurement procedure, coverage of the procurement operations, reliability and transparency of the procurement platform. (OECD, 2017)

3.2 Major drivers in digitalization in procurement

Private companies have a tendency to be in the forefront of the development of organizational and operational efficiency. Transformation towards digitalization in procurement has multiple drivers in organizations. The major benefits of moving towards digitalization are the following drivers:

- Increased return on investment
- Cost reductions
- Less maverick buying
- More streamlined processes
- Enhanced control and compliance.

According to ProcureCon Europe Study (Opuscapita, 2017a), 36% of the procurement managers believe that an immediate return on investment is essential to top the decision in favor of digitalization of procurement. Turns out that procurement digitalization investment brings faster returns on investment compared to conventional machinery investments, for instance. These operational and monetary effects of digitalization/automatization of procurement not only lead to a faster investment amortization costs at an early stage but also bring about way more transparency for the entire digitalization process. (Opuscapita, 2017b)

Very recently has also procurement seen many significant steps into digitalization. Among many others these steps include:

- SaaS models
- Predictive analytics
- Cognitive computing
- Artificial intelligence
- Collaboration networks.

Many maturing and emerging solutions can be found in procurement in the private sector. Organizations that uphold a moderate level of existing investment in the procurement digitalization can use targeted investments to bring value from the existing infrastructure. Whereas organizations with substantial level of investment in existing technologies can use maturing forms of procurement technology to significantly improve the performance of the organizations procurement team. (The Wall Street Journal, 2017a)

Despite the rapidly increasing technological development of emerging innovations and technologies many organizations have found themselves not fully benefiting. Supply chains are the centers on the movement of materials, finished goods, capital as well as information through assets operate on. Digitalization in the supply chains has been very rapid the recent years, and moreover this digital journey can be illustrated as “Physical-to-digital”, “Digital-to-digital” and “Digital-to-physical”, see table 2 (The Wall Street Journal, 2017)

Table 2: Digitalization of supply chains (The Wall Street Journal, 2017b)

	Input	Output	Examples
Physical-to-digital	Information occurring in the physical world	Digitalized record of the structure of the process	Sensors, GPS, wearables & 3D scanning
Digital-to-digital	Machine-to-machine communication & advanced algorithms	Advanced analytics of real-time data	AI, predictive analytics & machine learning
Digital-to-physical	Digital form of decisions and actions	Physical outcomes in the supply chain	Autonomous robots, drones, 3D printing & driverless vehicles

In the enterprise sector disruptive technologies have a significant potential to help the procurement unit to increase accuracy as well as the speed of execution, demonstrate its relevance to the organization, and improve outcomes. However, studies show (Deloitte, 2016) that only mere 40% of the procurement professionals have a clear digital strategy in terms of procurement. Simultaneously, it is widely recognized that the organizations must invest in innovative technologies and spend on procurement digitalization at higher rates than before. (The Wall Street Journal, 2017c)

Technological advancements in supply chains make new kinds of value webs and business ecosystems possible better than ever before. The new development of the supply chain performance has led to more nimble and lean operations in way that supply chains have become more adaptive, resilient, agile, flexible and faster in responding to the ever-changing needs of customers. Deloitte (The Wall Street Journal, 2015) has conducted a survey where the use of technical capabilities as well as new technologies have been surveyed.



Figure 8: Use of technical capabilities and new technologies in 2015 (The Wall Street Journal, 2015)

Turns out, designing resilience into supply chains and value webs will play a dominant role and rise in importance in the future as 3D printing technologies – for instance – will enable some supply chains to reduce reliance on types of production arrangements. Main takeaways are that 74% of the survey respondents believe that strategic thinking and problem solving will become more important. In addition, mere 43% of the survey respondents rate their current competency in this as “high”. Moreover, 68% of the respondents believe that collaborating across functions will become more important. In this area only 47% of the respondents rate their competency as “high”. (The Wall Street Journal, 2015)

Moreover, in the realm of procurement itself the practical implications of digitalization are more concrete. The drive in cost management and leadership has led to the adoption of disruptive technologies – especially in procurement in the private sector. Digital supply networks, procurement analytics and disruptive technologies open new possibilities in different areas of procurement. According to The Wall Street Journal (2017b), the respective areas are as follows:

- **Source to contract (S2C)**
 - Demand forecasting through artificial intelligence (AI)
 - Categorize & real time spend management
 - Enhanced cost allocation methods
 - Future innovation sources forecasting
 - Indexed pricing & smart contracts
- **Procure to pay (P2P)**
 - Automatic material demand/consumption/requisition replenishment
 - Validated/trusted decentralized ledgers
 - Triggers for real-time signals of material delivery
 - Automated secure payments
- **Supplier relationship management (SRM)**
 - Real-time risk monitoring through the aggregation and visualization of 3rd party data feeds
 - Supplier visits through augmented reality solutions
 - Supplier audits through crowd sourcing
 - Sustainability monitoring across the entire ecosystems through automatic reporting/visualization solutions.

The shift into digital procurement allows organizations better deliver on their main mission with reduced cost. The improvement in computing power, visualization as well as data analytics enhance the decision making and the speed of execution more than ever before. (Deloitte, 2017d)

Some sources highlight the term of “procurement 4.0” whereby procurement-as-a-platform (PaaP) – according to Medium (2017) – “enables future-proofing of the procurement organization by increasing its value proposition and reinforcing its strategical importance”. Aligned with Deloitte’s findings procurement 4.0 addresses improvements also in areas of category management, SRM and risk management. (Medium, 2017)

Much like Deloitte’s recent findings so too has McKinsey & Company (2017) come to a conclusion in which end-to-end digitalization, advanced analytics as well as automation of procurement would result in more sophisticated applications and processes. They go even further to suggest that the new procurement applications and tools would eventually eradicate the current job titles of “category manager”, or “buyer”. The most emphasized effects of procurement digitalization are in the areas of procure to pay and performance management. This is aligned much like the previous notions on procurement/supply chain digitalization.

Procure to pay (PTP) solutions have been relevant in procurement digitalization ever since the beginning of 2000s as much like in other sectors cost management have a major role in driving technological development. In the future, PTP tools will use the significant amount of order/invoice transaction data in order to enable value generation in the organizations core operational activities. Automated compliance management will be applied to vendors, contracts and buyers. Integrated with ERP systems advanced compliance management tools will act as “an ever-vigilant watchdog” as every procurement transaction from structured and unstructured sources will be accurately scanned. Supplier and procurement performance management will be screened via supplier performance scorecards as well as procurement performance scorecards. These performance scorecards will make it easy to analyze and optimize each respective areas’ performance on a real-time basis. (McKinsey & Company, 2017)

4 RESEARCH METHODOLOGY

This research will be conducted via a questionnaire survey sent to the according responders in the major Finnish municipalities. These respondents will represent a person that is preferably in a managing position of municipal procurement. Consequently, this research will have elements mainly from the quantitative sphere of research and the reader ought to bear this in mind.

The survey covers themes on municipal procurement strategy, sourcing practices, priorities in digitalization and procurement efficiency, the views on the current different procurement platforms as well as institutional challenges regarding municipal procurement. The form of survey questionnaire is an efficient, cost-effective and convenient way to gather data on the subject matter. However, one must realize that like all methods of research so does this have its shortcomings. Despite the fact that survey questionnaire is very efficient one must bear in mind that this type of data collection lacks the nature of including the individual and humane aspects that might affect the questionnaire results. Questionnaires allegedly do not account for behavioristic and feeling related aspects of the respondent.

Within the time constraints surveys are very efficient mean to collect data. The data collected may not be as wide-ranging as those collected by other strategies. Survey strategy enables to collect vast amounts of quantitative data within a short period of time and the researcher has more autonomy in terms of analysis. By using the survey method possible reasons for particular relationships between variables are possible to make. (Saunders et al. 2009, 144-145)

When examining the survey questionnaire responses reader must acknowledge the possibility that the respondent might not have all the information about each question topic. The truthfulness of the respondent can also be under question as well as the fact that there is no guarantee how much thought a respondent has put in each question. The possibility of open answers has been provided in the questionnaire in specific questions where it is applicable and relevant. Open questions are useful as they compensate the absence of physical, in-person interviews. The respondent may elaborate more in such question where the reply is not unambiguous.

In terms of methodology Hirsjärvi et al. (1997) note that in quantitative research method can be described as hypothetical-deductive, or positivistic research method. In practice, this means that this paradigm the research findings will be deduced from the natural causes and effects. Moreover, this research paradigm constructs of so called realistic ontology in which the reality is composed by objective measurable truths. This – according to the authors (Hirsjärvi et al. 1997) – has formed into a logical positivism in which all information may be collected from direct instinctual observations as well as logical reasoning.

Without robust theoretical foundations the shortcomings of survey questionnaires have to do with the theoretically superficial nature of this research method. The shortcomings are as follow:

- The researcher cannot be assured on how properly the respondent has answered to the questions and how seriously has the respondent taken the research altogether
- There is no guarantee on to degree to which the questions are exhaustive in the minds of the respondents. There can always be a chance of misunderstanding and these can be difficult to control
- One cannot know how informed the respondents have been in the respective areas of the question
- A comprehensive questionnaire takes a lot of time to design and complete. This also requires relatively lot of information and craft to come up with
- In some cases, the lack of respondents may become problematic. (Hirsjärvi et al. 1997, 195)

This questionnaire consists of 31 questions in total from which the majority of the questions are substance questions that have been conducted by utilizing Likert scale. The scale is 6-level, attempting to cover all possible response categories. There are no open fields to fulfil additional information except the last open-ended question where the respondents may add their own comments. The scaling in most questions where it is applicable are as follows:

1. Not very much
2. Not much
3. Neutral

4. A little bit
5. A lot
6. Cannot say.

This scaling method enables the respondents to choose as they feel about the question. In addition, to a certain degree this also enables to make statistical analyses in terms of the responses. The survey questions ought to be designed as consistent and clear as possible.

According to Ghauri & Grønhaug (2010, 119-120) several factors may affect the outcomes of the survey results. These factors are as follows:

- Sponsor
- Appeal
- Stimulus
- Questionnaire format
- Covering letter
- Stamped and self-addresses envelope.

Survey results may result being biased due to multiple of reasons. Surveys may be sponsored by an external body and this may lead to suspicion and therefore deter the respondents from answering the survey questions truthfully. Also, the appeal on how or why the survey is important for the respondent can be a factor to take part in the survey. In addition, psychologically the existence of a stimulus, i.e. A reward for taking part in the survey is a factor in terms of attracting relevant responses. The layout of the survey plays a major role too: The questionnaire format, layout, length and even color schemes may in fact have an effect on the turnout of the responses. In addition, it is essential to provide a proper covering letter for the respondents: “The tone and stance have an enormous impact on the respondent”, argue the authors (Ghauri & Grønhaug, 2010). The authors also point out that the responder needn't incur any expenses while providing the researcher the information. The ease and convenience of submitting the information must be a priority when designing the survey questionnaire. (Ghauri & Grønhaug, 2010).

Indeed, survey questionnaires have their shortcomings. Laaksovirta (1988, 54-55) brings out relevant facts about the problems that may concern the survey method. Laaksovirta points out that the information collected via survey is rather fragmented: only a tiny portion of all information out there will be harnessed and therefore, there is a risk that a bigger picture can be lost. In addition, surveys ought to consist of lot of respondents in order to undermine the validity of the results. In addition, it is crucial that the researcher must put effort into avoid any sampling errors in the data collection. Surveys are appropriate when the research is closer to documentation – or investigation – of the state of a particular issue at hand. (Laaksovirta, 1988, 54-55) The number of respondents in this survey turned out to be mere 17 – this fact will not enable to conduct a thorough and significant statistical analysis. Therefore, the empirical findings must be viewed within the restricted sample size and the generalization of the results may be questioned.

In this research causality will be one method in explaining the occurring phenomenon. According to Uusitalo (2001, 99-104) – by definition – causality is when X makes Y happen. In order to make this statement valid, must one test this hypothesis multiple times to rule out an exception. In reality nothing happens in a vacuum so there is not always a possibility to claim something is purely causal. Empirical causality can be contingent but not indispensable.

Given the possibility different interpretations with regards to the survey questions and their results - one must acknowledge the subjectivity of this research's findings. This survey was conducted carefully so that it should be as exhaustive as possible, and no information ought to be lost in results, analysis or translations.

5 EMPIRICAL FINDINGS

This chapter will examine the findings conducted via survey questionnaire. The survey questionnaire was conducted in Finnish in order to maximize the number of respondents. After the response acquisition the questions have been translated into English as accurately as possible. When reading the empirical findings, one must always acknowledge the possibilities of errors in interpretation due to loss of information in the translation.

5.1 Data overview

The procurement in the Finnish municipal sector varies from one municipality to another. On one hand, most municipalities manage their procurement independently. In some municipalities the municipal procurement has been outsourced to a partner at the private sector. In some municipalities a joint organization (fin. Hankintarengas) has been established to manage the municipal procurement for a number of municipalities in the region. In the end of the analysis one respondents' views on digitalization of Finnish municipal procurement will be examined. There were no significant open answers by the respondents other than one comment that will be analyzed later on. The validity of the respondents' answers will be further examined and discussed in the final part of this thesis.

The respondents' job description or title varies to a degree. The number of different titles turned out to be 10 and most of them are relevant to the area of municipal procurement. The table 3 below illustrates the respondents' title.

Table 3: The survey respondents' occupational titles

N	Title
1	Procurement and Logistics Manager
2	Chief of Procurement
1	Specialist
1	Sourcing Specialist
1	Procurement Assistant
1	Chief of Services
1	Managing Director
5	Sourcing Manager
1	Administrative Manager
1	Finance

Now, at face value the respondents' titles seem appropriate to begin with. 64% of the respondents tell their work experience in the field of municipal procurement is more than 5 years. This is aligned with the titles received from the respondents. The longer the work experience the more valid can one deem the replies be. Longer work experience bring about more insight in the respective field of research and therefore it is arguable that the quality of the replies ought to be high.

In the municipal procurement five specific branches of procurement cover the most sourcing activities. These branches can consider to be:

- ICT procurement
- Materials procurement
- Services procurement
- Social and Health Services procurement (fin. SOTE)
- Contracts procurement.

Information and Communication Technology (ICT) procurement encompasses areas such as telephones, computers, types of audio and video processing and transmission, software, middleware as well as information storing equipment.

Materials procurement encompasses the sourcing of a large number of various items utilized by the municipality. The materials range from simple everyday items to more complex items and devices that are relevant for the municipality to carry out the work. Services procurement encompasses the sourcing of services from the private sector. These services may be for instance waste management or cleaning services.

Social and Health Services procurement in turn encompasses all of services in realm of special treatment and social services what exceed the threshold of 400 000 €. The main principles of social and health services procurement are the quality of the service, continuity, accessibility, affordability, coverage, different special needs of groups, participation, increase of influence as well as innovation opportunity (Hankinnat.fi, 2016).

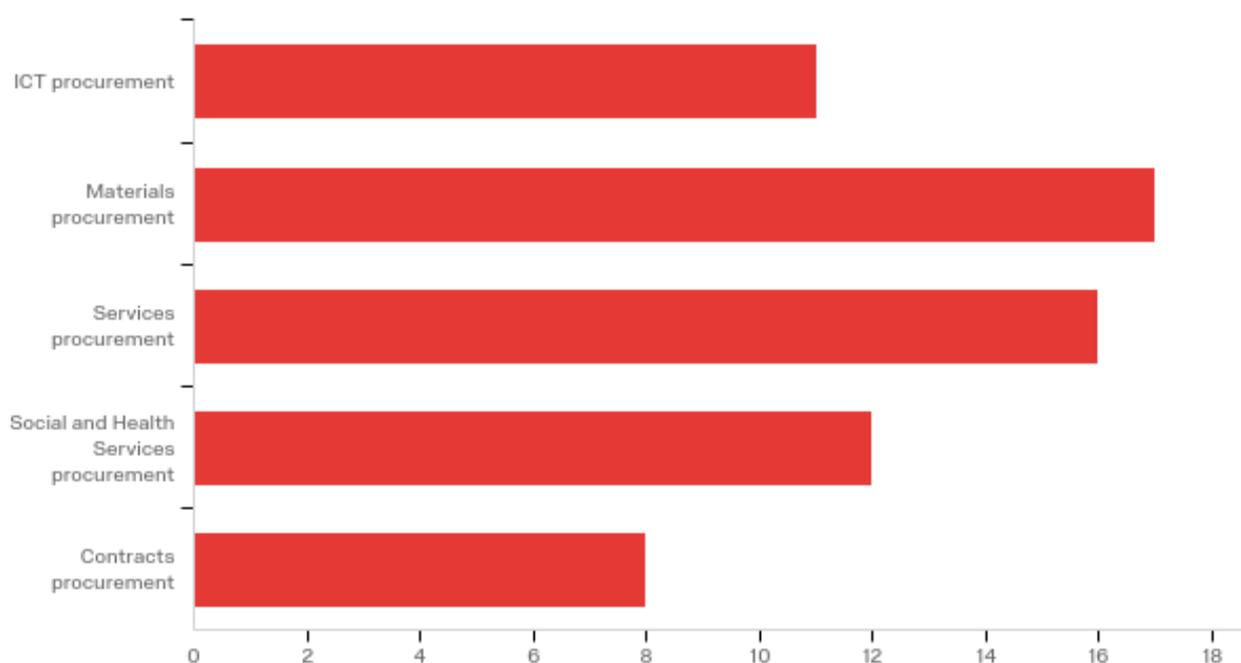


Figure 9: The respondents' branch(es) in municipal procurement

The populations of the municipalities that took part in this survey ranged quite a lot – approximately from 20 000 to 500 000. Around 50% of the partakers were representing small municipalities – population less than 50,000. The municipal populations more than 100 000 can be up to 500 000. Therefore, the average population of the municipality studied can be skewed to be higher than the deemed average. Figure 9 illustrates the size of the municipalities in this research. The unifying fact between the municipalities researched is

the fact that despite their difference of size in terms of population the foundational needs for procurement in each municipality are essentially the same: services, goods, health care, information & communications technology and contracts procurement. Only the quantities and volumes differ to a certain degree. Despite the fact that the respondents' backgrounds are relatively spread out and the expertise therefore concentrated on more certain specific areas – the respondents ought to maintain a sufficient amount of expertise and knowledge to complete the survey that consists of mostly municipal-specific questions regarding timely issues on digitalization of municipal procurement.

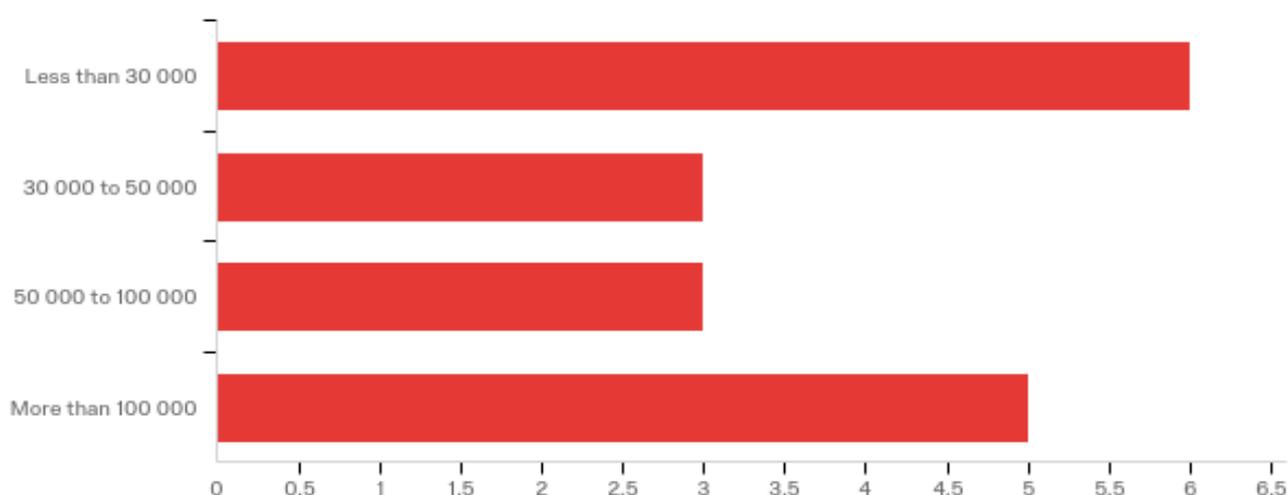


Figure 10: The size of the municipality by population

Degree to which the results of a municipality with population of mere 20 000 can be generalized with a municipality with population of 200 000 – is rather debatable. However, one must acknowledge that most Finnish municipalities are relatively homogenous and the variation between the municipalities is not extreme (considering low population numbers global wise). In fact, having included municipalities of different sizes gives a more thorough outlook on the digitalization of municipal procurement.

5.2 Current state of digitalization in municipal procurement

This chapter explores dimensions regarding the internal framework of procurement digitalization, software and electronic services, and external framework of digitalization. Internal framework of digitalization covers areas around organizational capabilities in

municipalities, digitalization strategy aspects as well as mapping out the most important drivers and challenges that the municipalities deem in the realm of digitalization of municipal procurement. Software and electronic service dimensions provide an outlook on the more specific softwares, their current status as well as their improvement potential for the future. External framework of digitalization offers a view on the institutional and state-level impacts on digitalization of municipal procurement.

5.2.1 Internal framework of digitalization

Major Finnish municipalities studied have attempted to find technological and/or IT solutions to improve municipal procurement – either a little bit or a lot. This speaks well with the findings in the previous literature – the internal organizational outlook towards the digital opportunities have a considerably high relevance with regards to actually adopting new procurement technologies. Most Finnish municipalities appear to keep up with the current trends to develop the sourcing practices. Figure 10 illustrates this issue:

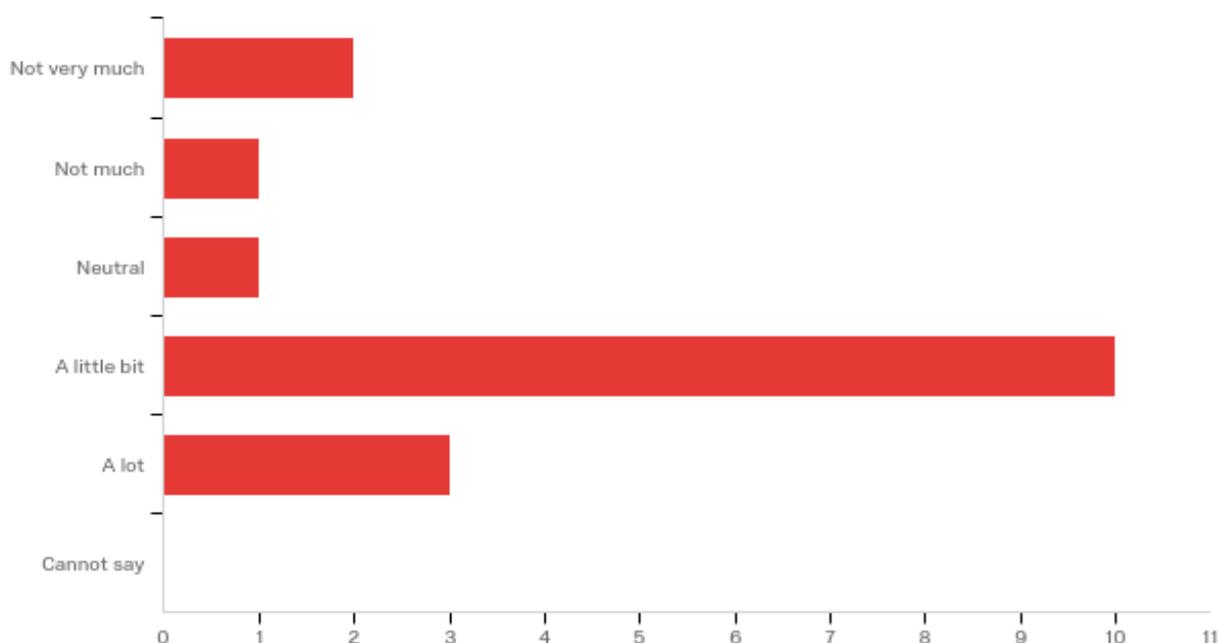


Figure 11: To what degree technological and/or IT solutions have been attempted to find in municipal procurement?

The problem with the digitalization of municipal procurement appear to be the lack of strategic planning. Most municipalities studied do not have a cohesive strategy on how to further develop the digitalization of their sourcing. The lack of strategic planning can be

devastating considering the pace of development in sourcing tools and technologies. Planning ahead ensures that the municipalities keep up with the current trends and can look for economic benefits and cost reductions as the studies have showed. The figure 11 illustrates the lack of strategic planning among the respondents.

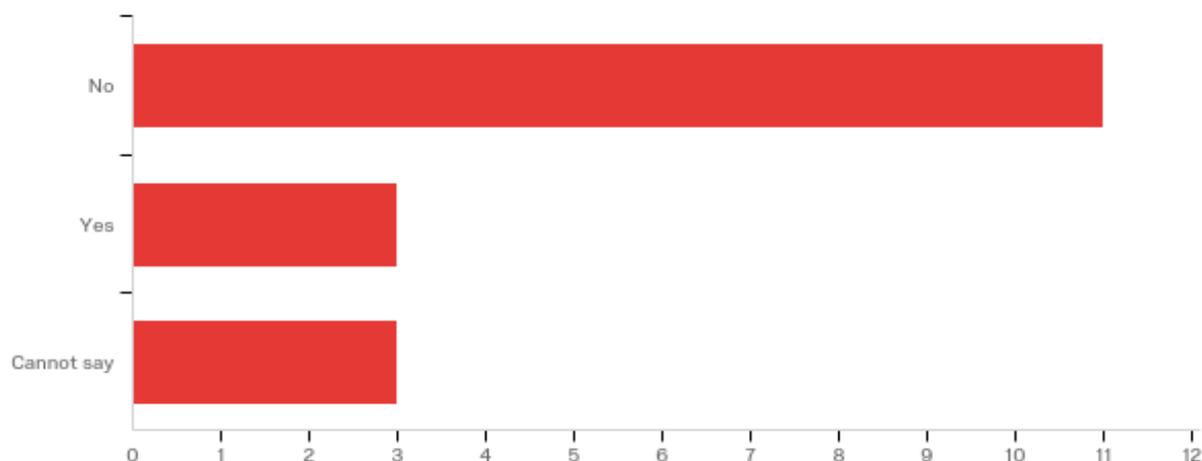


Figure 12: Is there a strategy on digitalization of municipal procurement?

The fact that the municipalities that took part in this survey were rather small in terms of number of population. Small municipalities do not always have the resources, capabilities nor experience in planning strategically the future technological possibilities in order to develop procurement. Therefore, it is undisputed that most municipalities cannot evaluate on to degree to which the digitalization strategy has been followed or not. (See figure 13)

Municipalities clearly do not have a strategic approach towards the digitalization of procurement. It is evident that the approach is more tactical and straight-forward by focusing on the practical implementations in forms of software, services and cost-saving operations. These dimensions are very relevant as they tie together with the underlying mindset that would steer the municipality's operational measures to adopt and implement new procurement technologies. Without a cohesive strategy and organizational mindset is very challenging to execute.

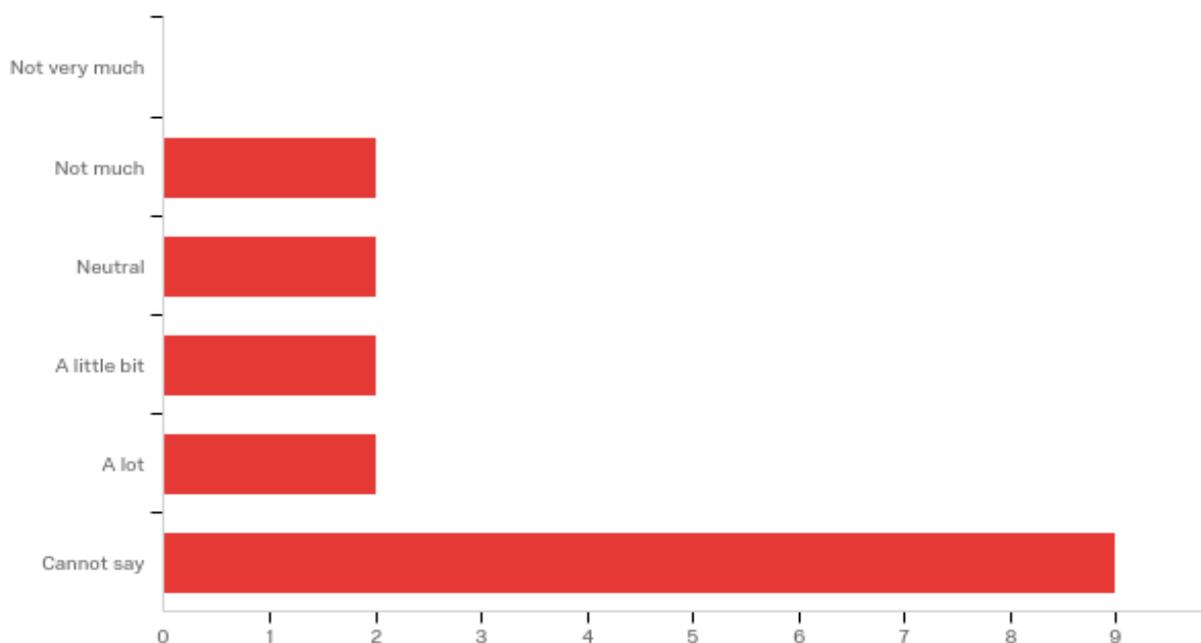


Figure 13: If the municipality has a digitalization strategy – has it been followed?

The future possibilities of technology in terms of municipal procurement have been acknowledged as seen in the figure 14. Essentially, nearly 90% of the municipalities support the view on relying ever-more on technological solutions in municipal procurement. Figure 14 illustrates the results on how much the municipalities surveyed believe in the technological possibilities to develop the municipal procurement in the future.

Given how much technological improvements and the development of IT infrastructure in private sector so far, we will expect to see more upcoming procurement technologies emerging to also develop the municipal and public sector. Acknowledging the future possibilities is essential and therefore it is a tremendous observation to see that no municipality surveyed responded that there will be no relying on future technological opportunities on municipal procurement solutions. (See figure 14)

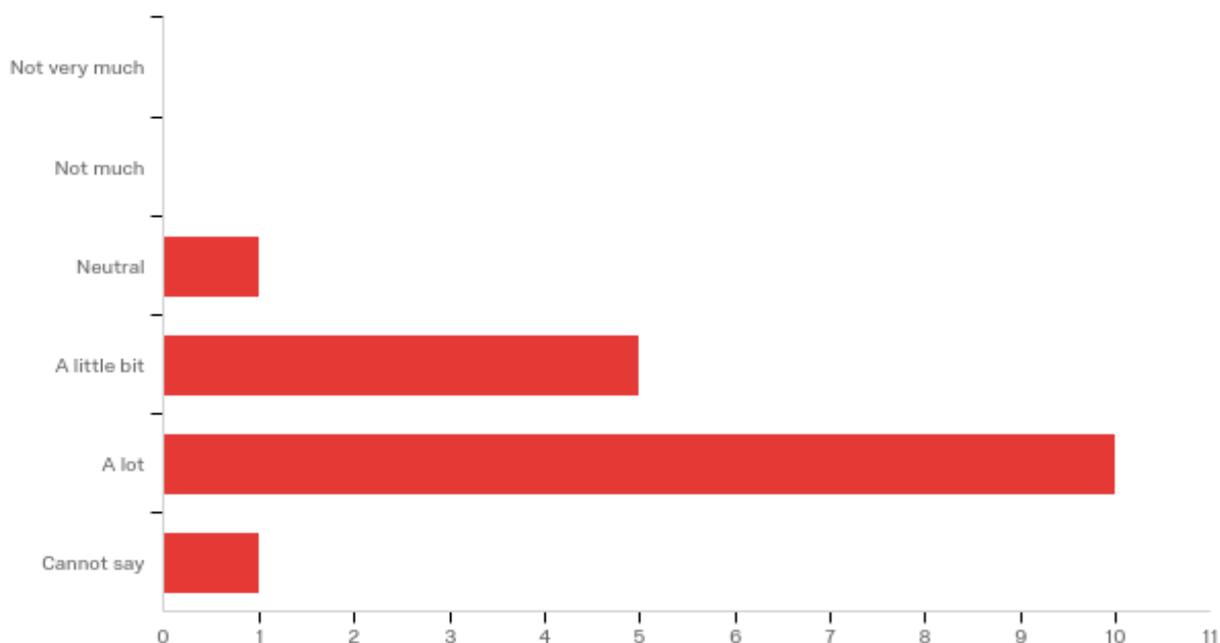


Figure 14: Municipal procurement will rely ever-more on technological solution in the future

This survey also looked into the areas that the municipalities would find the most challenging in terms of management of municipal procurement. The areas of interest were in the realm of supply chain management, supply chain processes, systems and other relevant practices. The prioritization categories were “very important”, “a bit important”, “neutral”, “not important”, “not important at all”, and “cannot say”. The areas surveyed were as follows:

- E-procurement
- Supply chain risk management
- Supply chain knowledge management
- Supply network management
- Innovation management
- Requisition to pay
- Contract management
- Legislation
- Electric systems.

According to major Finnish municipalities (88% of the respondents) the single most important area of municipal procurement that brings challenges is contract management. This is reasonable as contracts can be very detailed and will bind the organizations for certain

terms and agreements with regards to specifics of products, services, rights and liabilities. Less of importance in relation with the previous areas were given to innovation management and e-procurement. These areas were not seen as challenging as most likely because – as discussed in earlier in this analysis – the institutions such as legislation already support e-procurement and innovation in the municipal procurement. The least challenging area was found to be requisition to pay. This refers to an end-to-end process of how a municipality purchases and pays for goods or services sourced. The reason for this being the least challenging in the municipalities can be the fact that it is already in some form implemented properly in the municipality.

Other very important areas of challenges detected were supply network management as well electric systems and supply chain risk management. Mitigation of risks in the supply chain is always relevant as often times the supply chains themselves can evolve into complex processes. Electric systems in turn refer to softwares and technologies that can be utilized as tools to enable the efficiency of municipal procurement. These findings are, too, very consistent with the areas discussed in the previous literature findings.

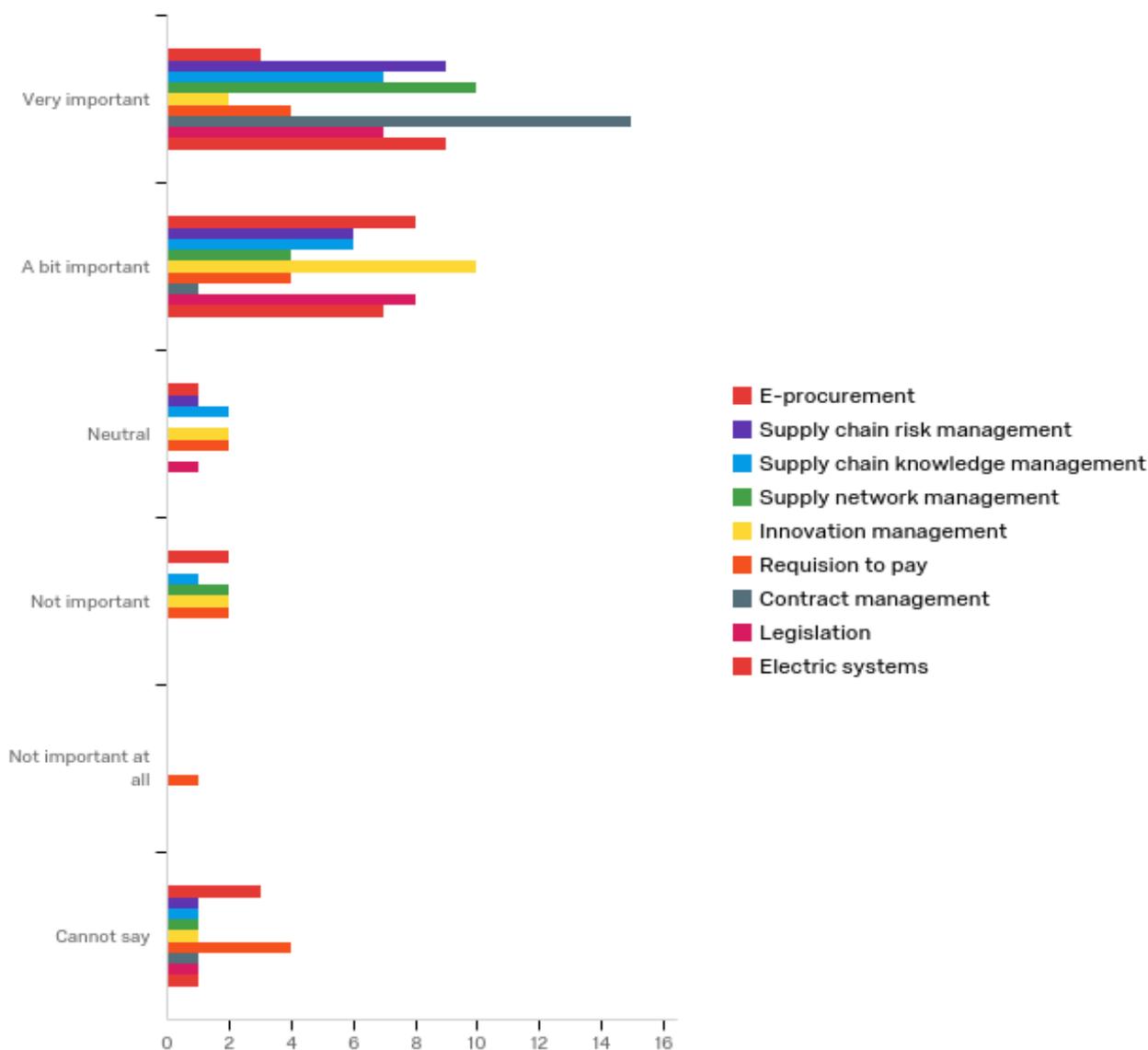


Figure 15: Prioritize the following areas that you find the most challenging in municipal procurement

According to the survey there are several consistencies in terms of the most challenging areas in the digitalization of municipal procurement. The respondents agreed overwhelmingly on certain areas. The most challenging area in the digitalization of municipal procurement deem to be contract management. This is understandable as contracts set the framework for managing municipal procurement.

Supply network management was the second most pressing area that which was found challenging in terms of municipal procurement. By effective municipal supply network management municipalities ensure the resilient and timely delivery of its services for the

citizens. One must note that since municipal procurement does not create goods or services itself – the frame of reference in the supply network is in the realm of supplier relationships and ensuring a seamless stream of procured services.

Supply chain risk management relates to managing and mitigating risks with respects to the supply chain and supply networks. Risks in supply chain management encompasses different areas and varies from industry to another. Some risks are more controllable than others and they normally relate to operations, demand or supply side of the supply chain. The considered risks to manage and/or mitigate relate to environment (extreme weather changes & natural disasters), geopolitics (trade restrictions, corruption, political instabilities, terrorism), technology (technological disruptions) and economic ones (customs, currency fluctuations, price volatility and demand shocks).

Respectively the least amount of perceived challenges was given for requisition to pay. Purchase-To-Pay – or – Requisition-to-pay is “Purchase-To-Pay is an integrated system that fully automates the goods and services purchasing process for a business. The system gets its name because it handles all aspects of the acquisition from the purchase of goods to the payment of the vendor.” (Investopedia, 2018)

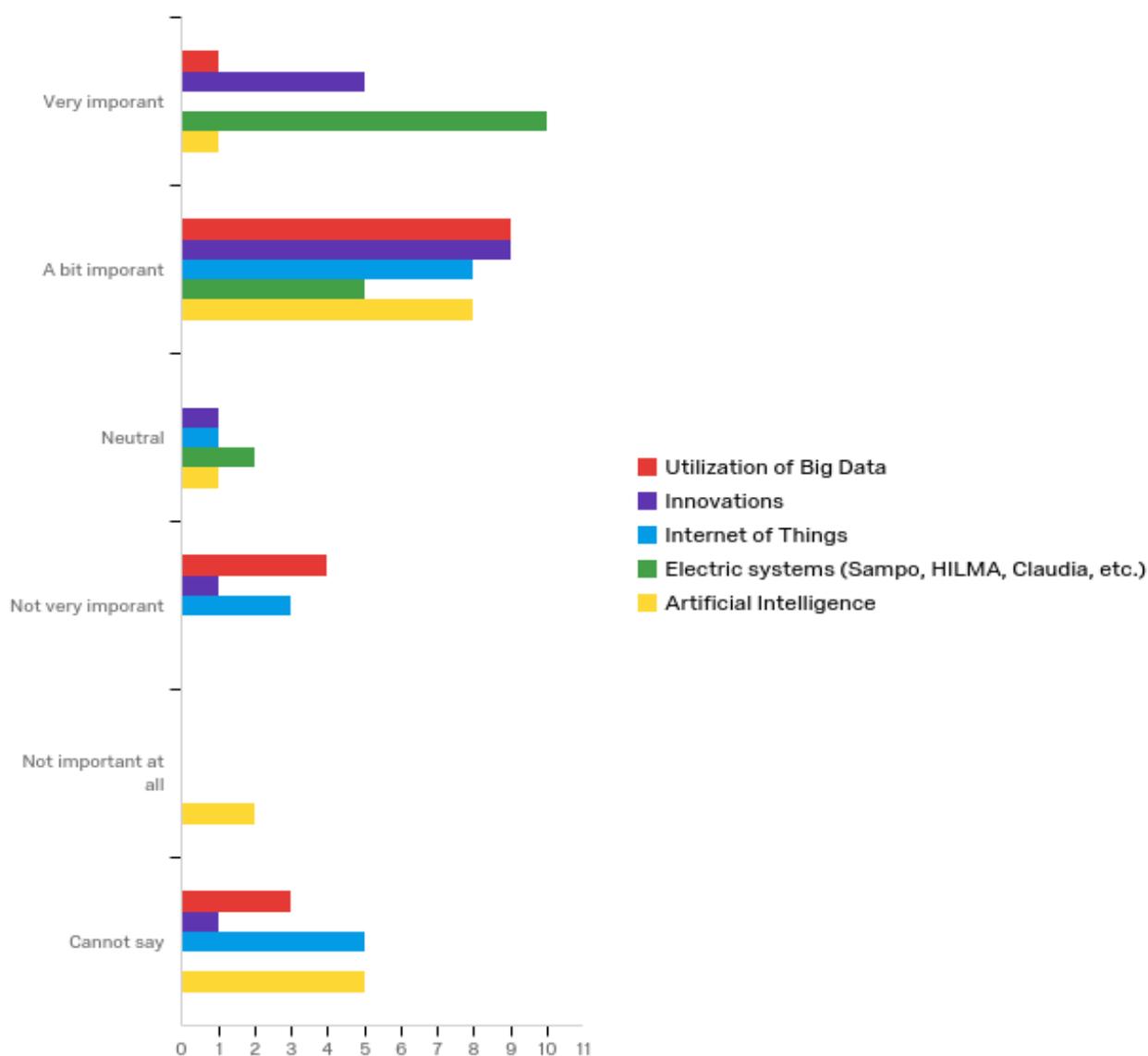


Figure 16: Prioritize the following areas that you find the most important in the future

Importance of certain future dimensions in municipal procurement varies to a degree. This survey mapped out the priorities of some of the timeliest phenomena concerning technological development in supply chain management in the private sector. The following developments being:

- Utilization of Big Data
- Innovations
- Internet of Things
- Electric Systems
- Artificial Intelligence (AI).

Finnish municipalities by and large find electronic systems (including HankintaSampo, HILMA, Cloudia) as well as innovations as the most important technological areas in public procurement. Furthermore, not many previously mentioned aspects were deemed to be not important according to the respondents. Clearly according to these findings most of these technological developments have been acknowledged to be at least somewhat important or relevant.

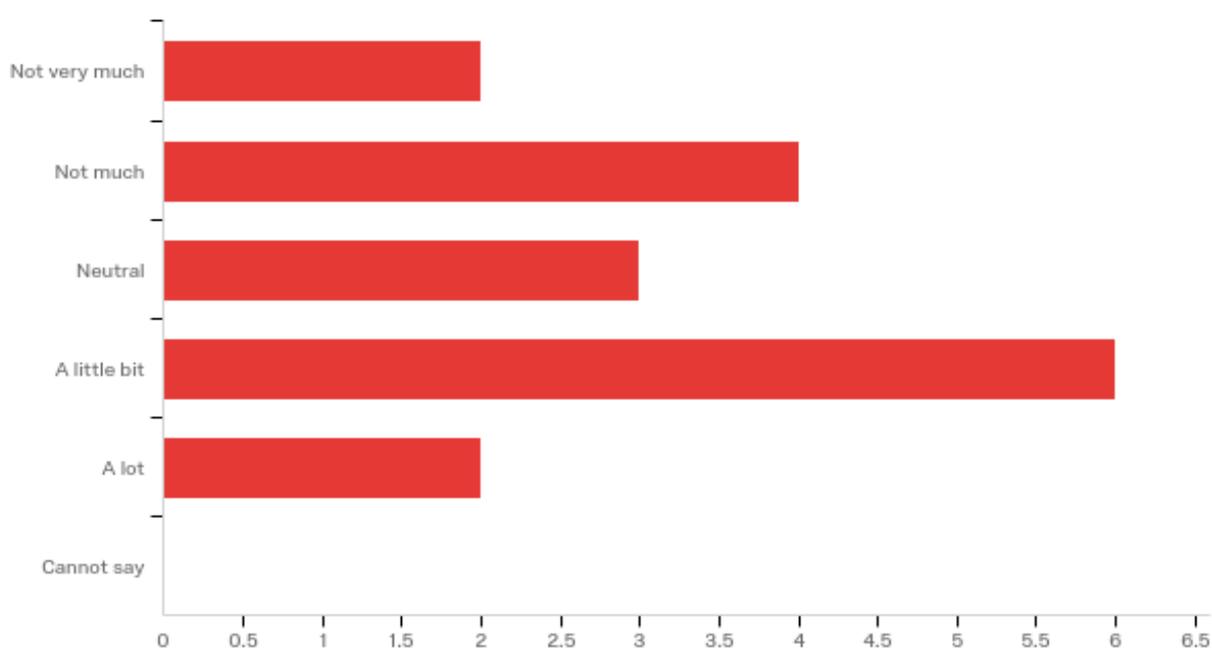


Figure 17: The need of further education on digitalization has been acknowledged

The organizational capabilities to adapt to change is essential – how will the organization face the ever-changing technologies that challenge the current way of doing things? Does the organization have the right resources to equip the current employees with capabilities and knowledge in order to utilize the current technologies in rapidly changing environment?

The organizational excellence in the municipals studied show a degree of variance. An excellent observation is the fact that no municipality responded that there is no idea on the acknowledgment of educational needs in the event of municipal procurement digitalization. The first step in acknowledging the educational needs is to determine whether there is or there is not the need in the first place. Nearly half of the respondents find that the further educational needs on digitalization have been acknowledged. However, 35% of the

respondents found that the further educational needs were not met. This could be explained due to lack of resources in the smaller municipalities – in which the educational needs ought to be managed conjointly with other smaller municipalities with sufficient resources to accomplish this.

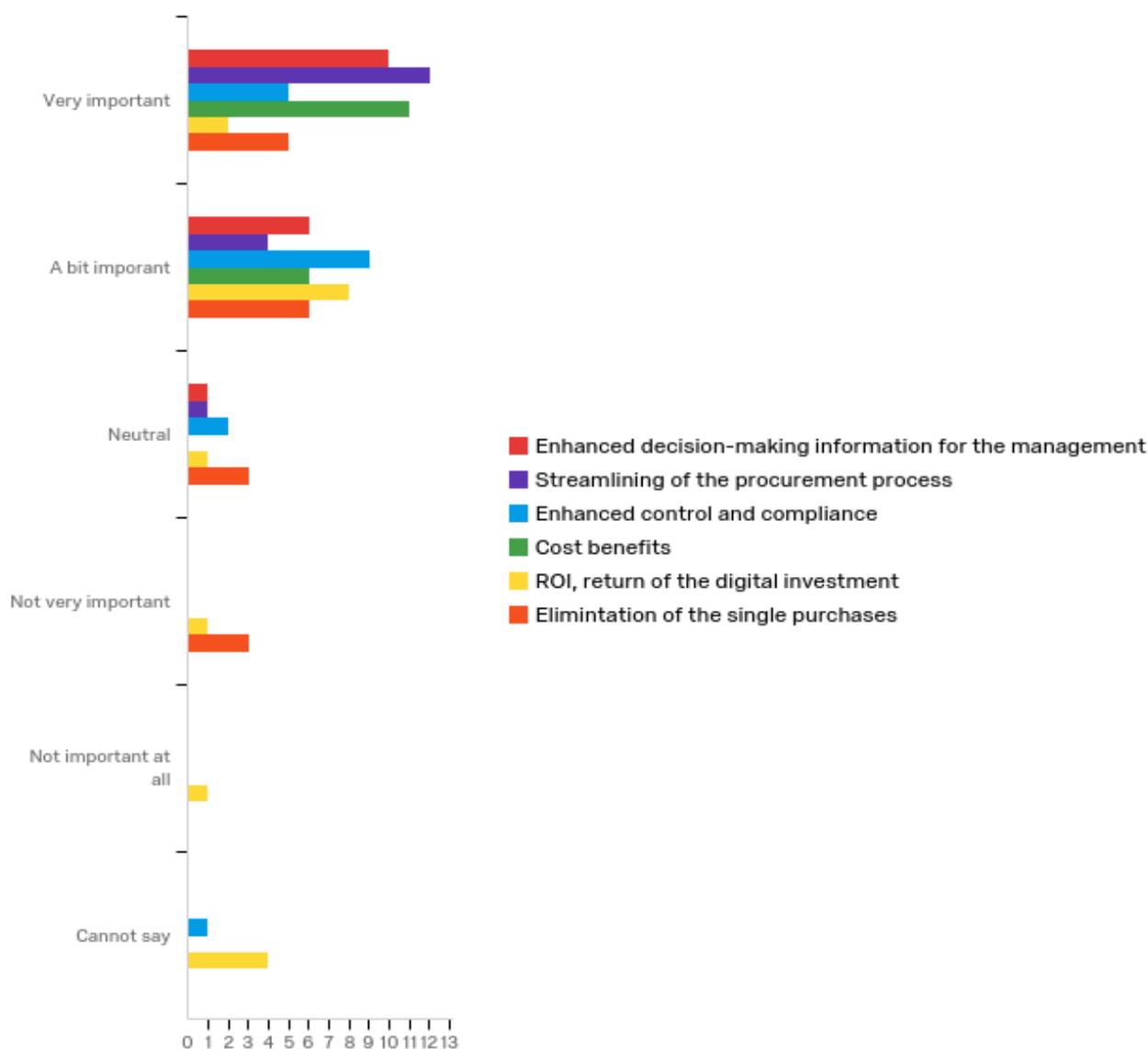


Figure 18: Prioritize the most important digitalization drivers in municipal procurement

This survey also looked into the potential drivers of the digitalization in the Finnish municipal procurement. It is essential to understand what drives the developments that we are observing in the field of municipal procurement. The drivers for the technological development in this framework were related to information, economics, control and

practicalities. The given areas of technological drivers are illustrated more in detail in the figure 18.

According to the municipalities surveyed nearly all of the given areas were viewed either a bit important or very important. This survey could not find too much variance between the importance of the given options. This also speaks from its behalf that the Finnish municipalities can point out that there exist many drivers behind the technical developments of municipal procurement. However, three dimensions stand out the most as “very important”, these being (see figure 18):

- Streamlining of the procurement process
- Cost benefits
- Enhanced decision-making information for the management.

The areas above are, in fact, very reasonable. These observations are aligned with the earlier literature and data provided by the academia as well as private sector supply chain management sources. (Giotopoulos et al. 2015; Pearcy et al. 2018; Opuscapita, 2017b; Deloitte, 2017d; Smart, 2005)

Streamlining of the procurement process is essential as in a multi-step processes there may occur additional, non-value adding steps that could be eliminated in order to garner operational, organizational as well as economical efficiencies. Streamlining of the procurement process can increase transparency and it might include operations such as centralization and administrative rights of purchases, and utilization of technology. Cost benefits are rather self-explanatory. Cost management and monitoring are primary drivers of digitalization in public procurement and this also applies in the private sector. Considering the prospects of the cut-back of public funding this urges municipalities to find more areas of cost savings and economies of scale. Enhanced decision-making information for the management as a driver in municipal procurement digitalization. This can be explained by the ever-increasing need in also public management in which the procurement performances. For the management the importance is not necessarily on how much new data can be gathered but rather how all this data can be processed and formulated in order to come up with meaningful and applicable managerial long-term based decisions.

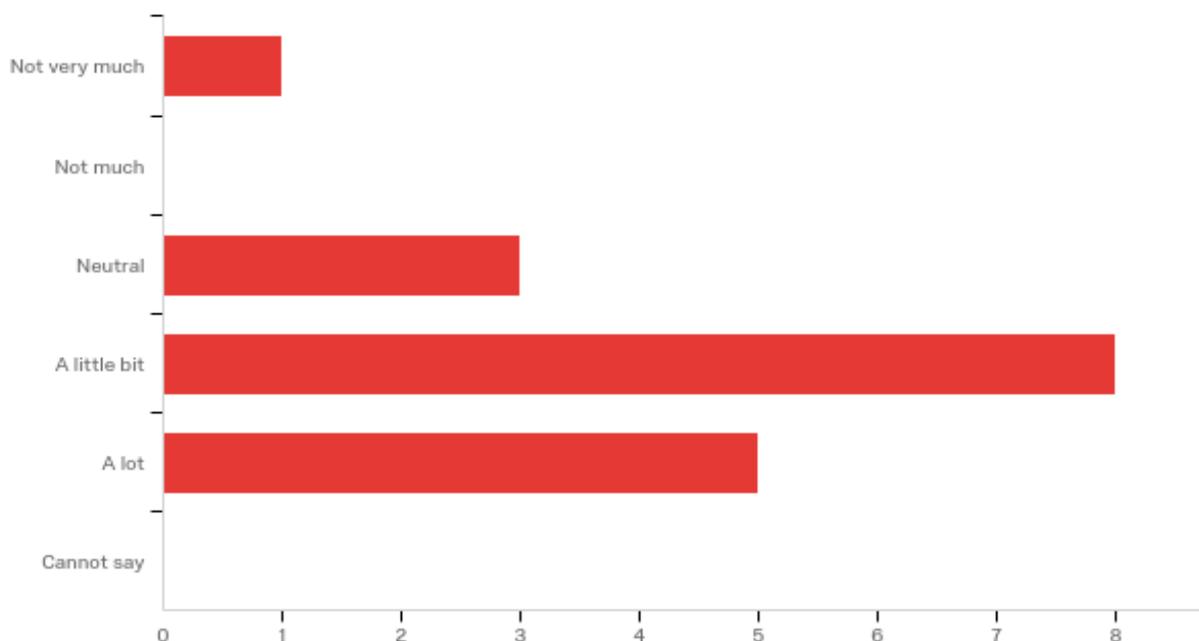


Figure 19: The data security threats have been acknowledged in the development of digitalization of municipal procurement?

When dealing with confidential and strategic information in the municipal and state level the aspects of data security inevitably arise. Despite bidding information being visible to all stakeholders and transparency being important in the municipal decision making – certain confidential information ought to be kept in private. The degree to which municipalities have carried out the safety of the threat management in the digital framework should be examined thoroughly at all times.

According to the survey results 76% of the municipalities found that the data security threats have been acknowledged in the development of digitalization of municipal procurement (figure 19). Considering all the dimensions of municipal procurement digitalization drivers (see figure 18) as well as the most important areas of development of municipal procurement (see figure 16) these will involve a lot of information in digital format to manage. Internet of Things (IOT), Big Data and all the strategic municipality-specific information ought to be secured by taking care of the state of the software, the IT capabilities of the personnel and updating the hardware from time to time. Legislation guarantees from its behalf to meet the basic level of data security in the municipalities and in the public sector in general.

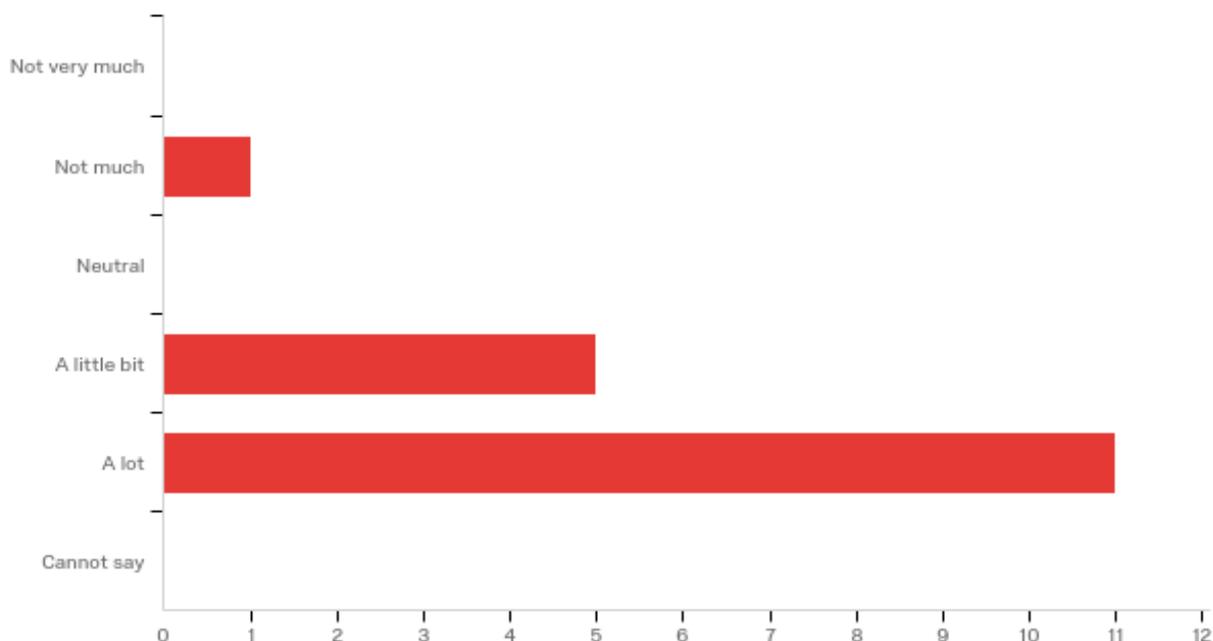


Figure 20: There is will towards digitalization in the municipality

At times parts of the organizations may show opposition towards impending changes. This is by all means understandable as a fundamental change might endanger the current paradigms oneself has grounded upon. At times, these changes may even endanger the profession as digitalization has many times done in various number of industries. There evidently is a will towards digitalization in major Finnish municipalities (see figure 20).

Considering the degree to which digitalization has been developing already in the private sector it makes a lot of sense considering the aspirations towards digitalization in the Finnish major municipalities as well. Understanding how rapidly digitalization challenges the current processes as well as organizational routines and practices – all organizations ought to face the sufficient organizational culture to embrace the future trends.

Digital initiatives and the enthusiasm towards implementing new technologies in municipalities should be driven organically. Organizational culture in the municipalities must be open for trying new technologies and initiatives with curiosity as top-down implementations by the management might cause significant resentment. Consequently, in order to make innovations and new technology adoption in the organization as a routine and culture – most initiatives should spring out organically from the employees.

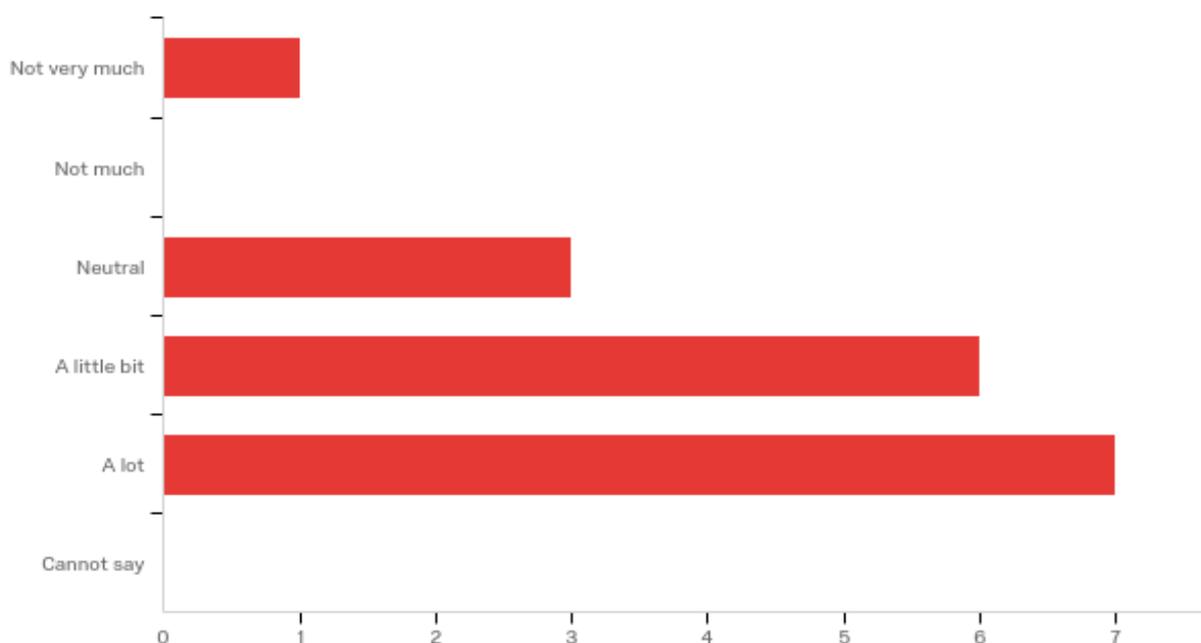


Figure 21: The organization culture supports the digitalization of the municipal procurement

Figure 21 illustrates a delightful information on the fact that the municipalities studied show very significant amount of evidence that their organization culture supports the digitalization in the municipal procurement. Given that Finland is considered to be technologically advanced country with a relatively high degree of digitalization – the organizational culture already has the infrastructure to move forward with the new technologies. Now, there may be differences between larger and smaller municipalities population-wise. These results do not discuss on the level of municipal differences but given the respondents' municipalities populations – the results do not differ much after all.

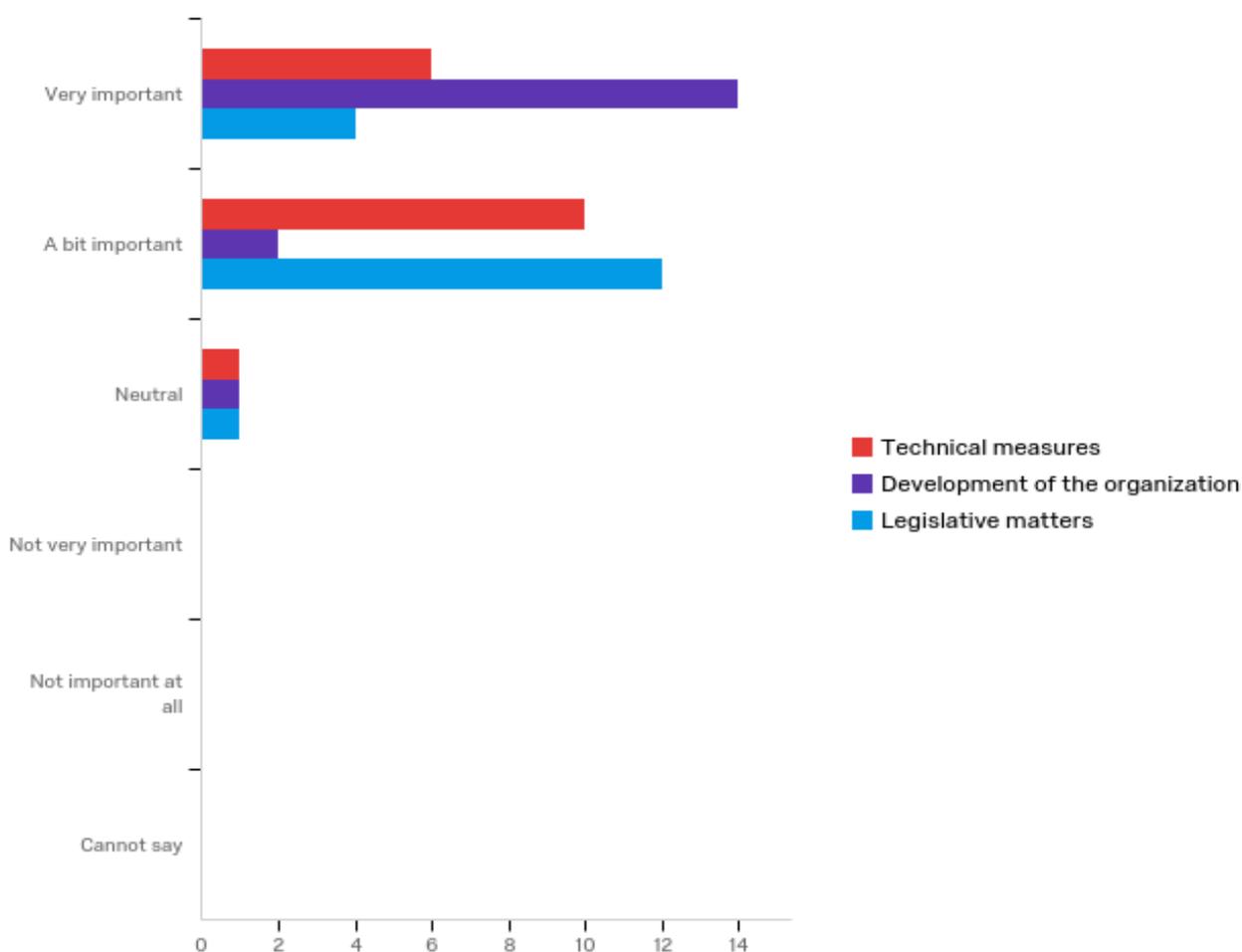


Figure 22: Prioritize the following factors in terms of how essential You find them in developing the municipal procurement

This study also mapped out the municipalities' views on the factors in terms of how essential the respondents viewed different key factors in developing municipal procurement. The factors taken into consideration were technical measures, development of the organization and legislative matters. Technical measures and development of the organization refer more towards the organization's inner capabilities. Whereas legislative matters are external forces affecting the field of municipal procurement.

Figure 22 illustrates the overwhelming results regarding the surveyed municipalities' views on the prioritized factors. By far the most prioritized are (82%) was the inner dimension of development of the organization.

5.2.2 Software & electric service dimensions

The softwares play a key role in the area of municipal procurement digitalization as they provide the platform to garner and analyze an extensive amount of data from supplier networks to internal processes. In the public sector the compatibility of the softwares between each other has been under question for some time and therefore municipalities must consider the multi-functionality of their software in such a way that no information ends up missing or misinterpreted.

The dimensions of the softwares used have been covered in the earlier chapters. Needless to say, there are multiple different softwares being utilized in the municipalities each for different purpose. These softwares and services being HILMA, Cloudia and HankintaSampo. This study shows that by far most of the municipalities surveyed did not have HankintaSampo in active use so therefore it will be left out from the analysis. This questionnaire covered the validness of the respective utilized softwares or services:

- Is the current HILMA and Cloudia services appropriate?
- Could HILMA/Cloudia services be improved?

HILMA is the most important electronic service regarding municipal procurement bidding. According to 76% of the respondents the current HILMA service is appropriate either a little bit or very much. This indicates that most municipalities find that – to a degree – this service meets their need in terms of having a platform for public procurement bidding. Figure 23 illustrates the respondents' views on HILMA.

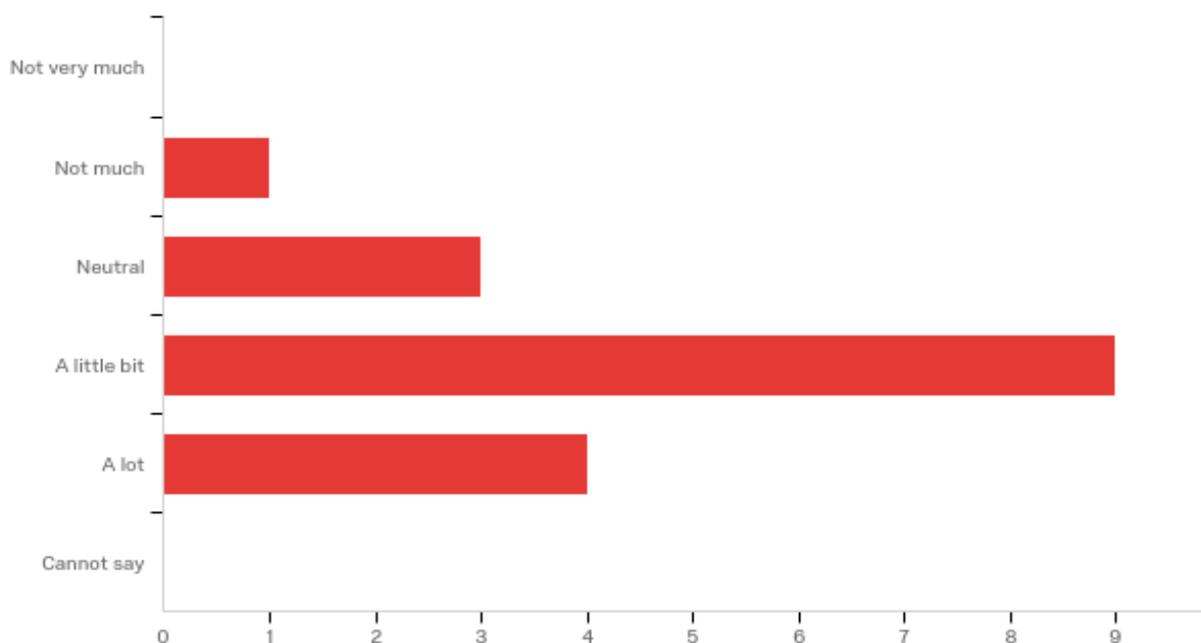


Figure 23: The current HILMA service is appropriate

Despite the relatively high appropriateness of HILMA a clear majority of the respondents found something to improve. Being a thorough and widely used service it is no surprise to end up having certain shortcomings. After all, despite most municipalities having a lot of similarities, many too have their distinctive needs and situations. Therefore, there cannot always be a one-size-fits-all solution in municipal procurement. In this regard this result is by no mean a surprise. Figure 24 reveals the distribution of the results regarding improvement potential of HILMA.

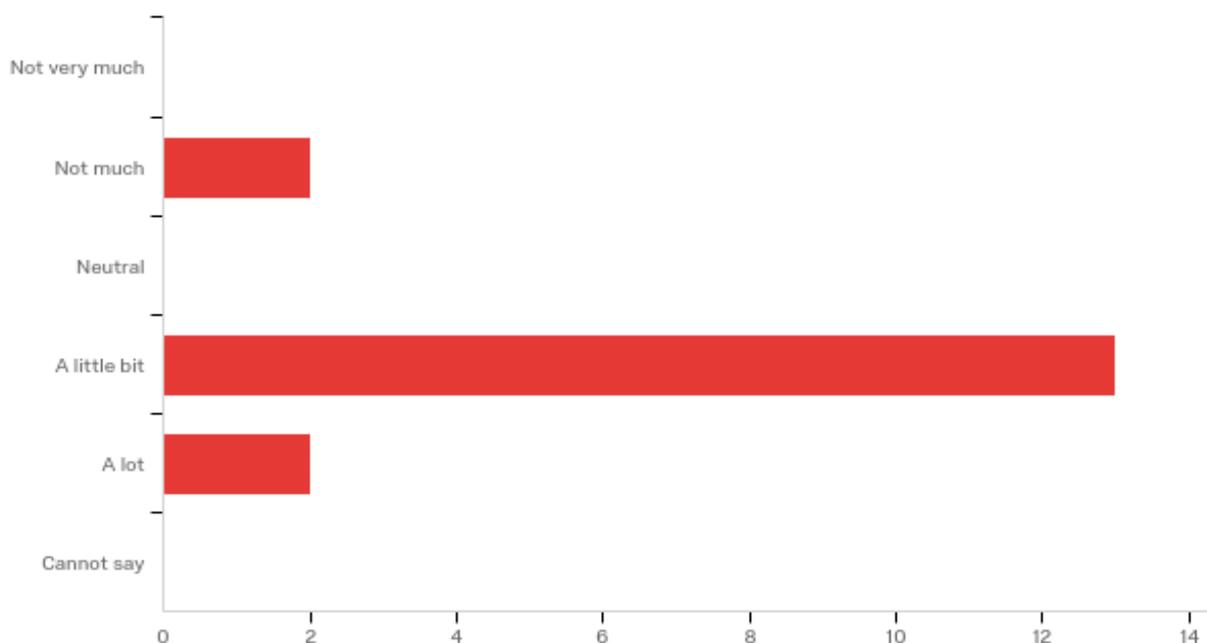


Figure 24: HILMA service can be improved

Cloudia is a 3rd party service for proactive and hands-on supplier management. The details on Cloudia have been explained in the 2nd chapter in more depth. The respondents by and large find the current form of Cloudia service either a bit or very appropriate. This can be interpreted as that the service meets the needs and standards of the municipalities surveyed (see figure 25). In addition, this also indicates that 3rd party services can indeed provide a robust service also for municipalities in terms of supplier management in general.

Different softwares, services and technologies have a different degree of utility for each municipality and organization. Therefore, not necessary all services/technologies surveyed show significant relevance to every municipality. Figure 25 shows differing information compared to figure 23. The respondents view that Cloudia service is relatively more appropriate than HILMA.

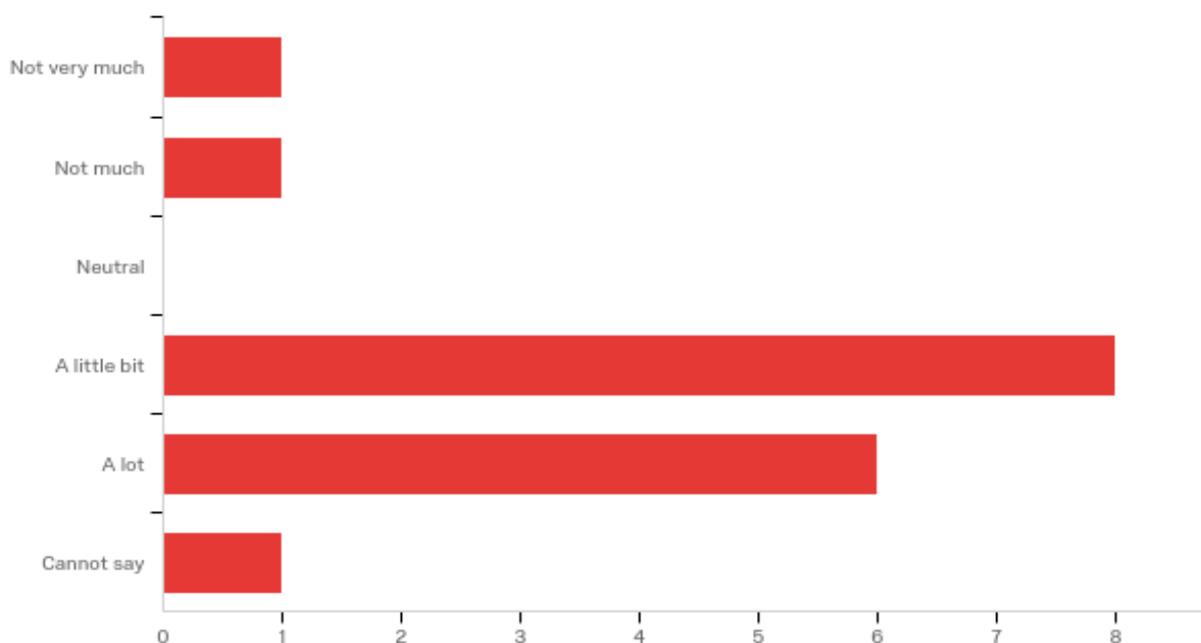


Figure 25: Current Cloudia service is appropriate

82% of the respondents say that the current Cloudia service is either a little bit or very appropriate. This goes to show that this privately-run service also meets the requirements and needs of the respondents' municipalities. As previously noted, the technological development has been undergoing in the private sector procurement over many years now so therefore it's a no surprise as to why the private sector solutions in municipal procurement have shown significant benefits.

Despite Cloudia service being deemed as an appropriate service the respondents see some room for improvement as well. In fact, 88% of the respondents view that Cloudia service could be improved either a little bit or a lot (figure 26). This is aligned with the findings with HILMA previously. The same arguments apply to Cloudia as well as not necessarily any service is exhaustive in terms of meeting all the needs of municipal procurers.

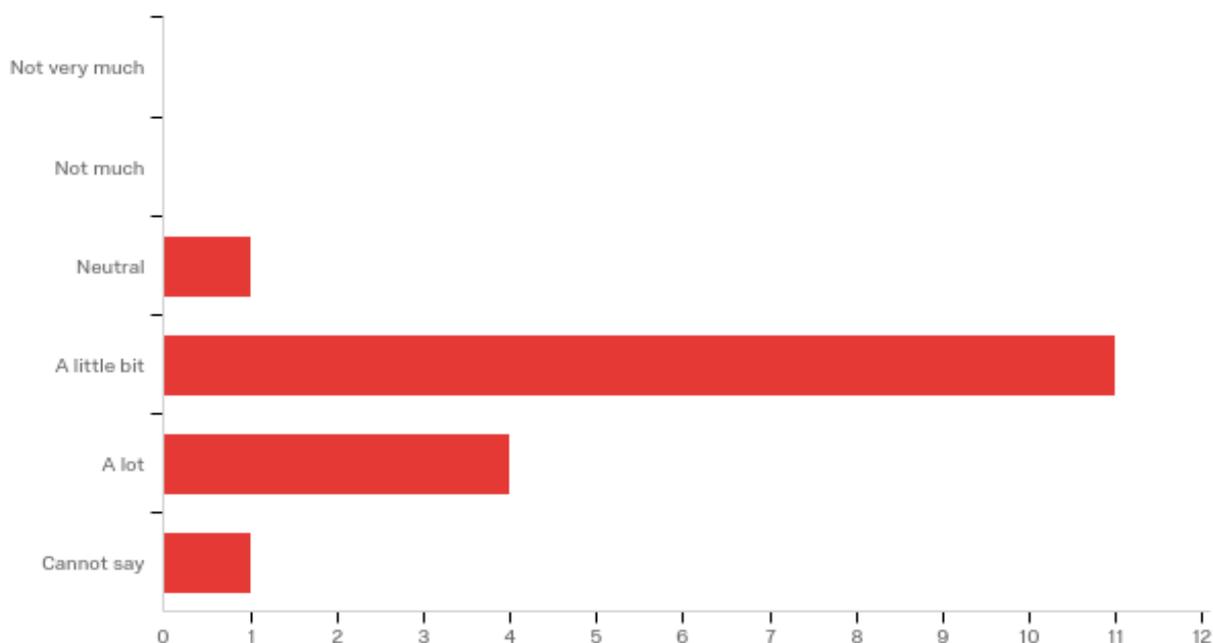


Figure 26: Cloudia service can be improved

HankintaSampo service was not included in the final analysis due to the lack of sufficient replies to analyze. According to 76% of the respondents there was no opinion on the degree of appropriateness of this service with regard to their municipality. Furthermore, the same amount of indifferent responses was given in order to evaluate the improvement potential of this service.

In conclusion, the software and electronic services provided for municipal procurement support appear to be in a relatively good shape. Apart from HankintaSampo, all of the electronic procurement services viewed as to be either in part of very appropriate for the needs of the surveyed Finnish municipalities. In addition, despite the fact that the services were found appropriate in general, there were some areas of improvement to be found in these services.

5.2.3 External framework of digitalization

This sub-chapter examines the external framework of digitalization of municipal procurement. The external framework would consist of the areas of external environment affecting digitalization of municipal procurement. These areas in this study are mainly state legislation and European Union.

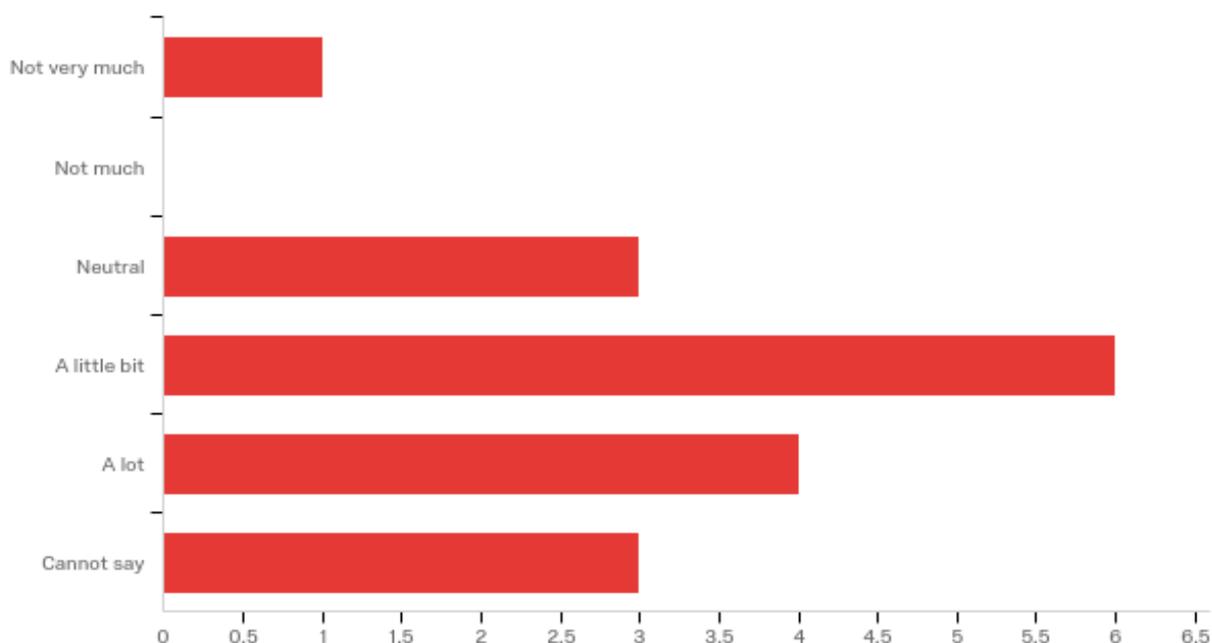


Figure 27: The legislative challenges have been acknowledged in the development of digitalization in municipal procurement

There is some discrepancy to degree to which municipalities have acknowledged the legislative challenges in the development of municipal procurement. Most of the time legislative issues have been acknowledged in the municipality procurement digitalization. However, due to relatively high number of “neutral” and “cannot say” answers we cannot generalize this conclusion (see figure 27). This can be explained by the complexity of laws in contrast to the respective legislative knowledge of the municipal procurement personnel.

The Act on Public Procurement and Concession Contracts sets the basic framework for all municipal procurement related activities. There is a clear consensus based on the survey respondents regarding whether the current procurement law (Act on Public Procurement and Concession Contracts) enables the utilization of procurement technologies in the municipal procurement (see figure 28). It is interesting to find out that 88% of the municipalities found Act on Public Procurement and Concession Contracts being favorable towards digitalization of municipal procurement.

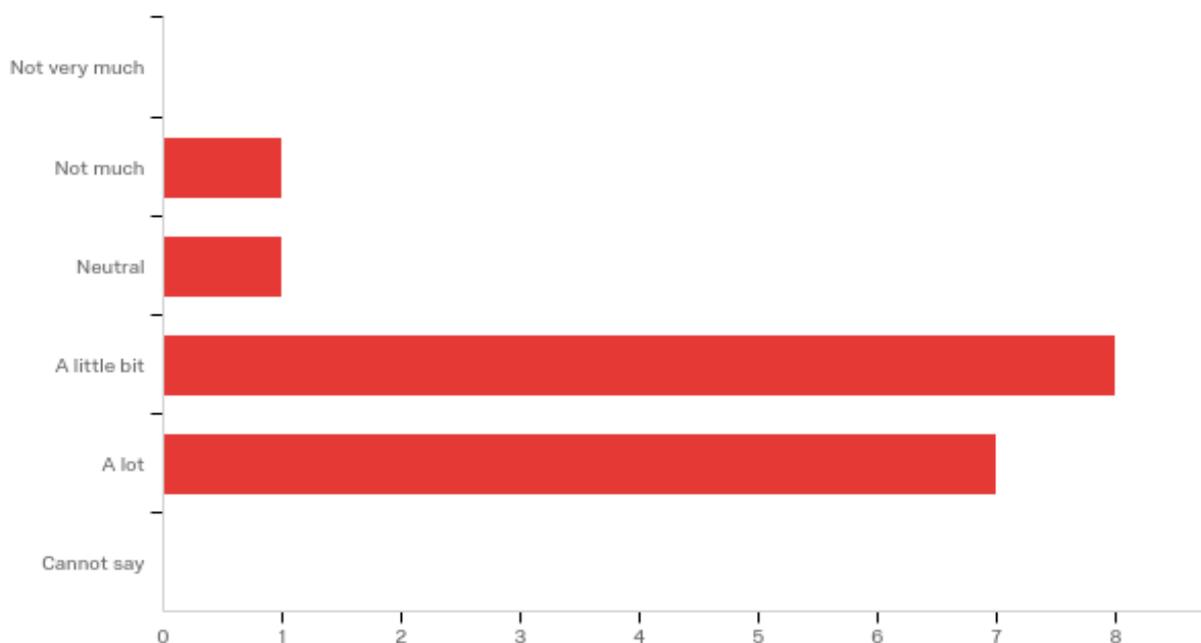


Figure 28: The national procurement law will enable the utilization of procurement technologies in the municipal procurement

Ever since Finland joined the European Union back in 1995 the effects of the union have been quite significant to better or worse. Mostly the respective effects have been in forms of regulations and directives. Interestingly enough, according to 88% of the surveyed municipalities the current Act on Public Procurement and Concession Contracts was viewed to enable the utilization of procurement technologies in municipal procurement either a little bit or a lot. This is an interesting finding as the previous literature (Beauvallet et al. 2011; Aminoff, 2016) legislative and regulative aspect imposed by a state - or some other similar entity – were by and large found as a hindering dimension with regards to technology adoption in procurement. This finding is very important when understanding the playing field of adopting new procurement technologies in the major Finnish municipalities. Given that the Act on Public Procurement and Concession Contracts enables to this large degree of utilization of procurement technologies it reveals that the legislation is up to date and not a burden looking into future of digitalization of municipal procurement.

Act on Public Procurement and Concession Contracts and Finnish state are not the only institutional dimension affecting the digitalization of municipal procurement – European Union has also a big impact in the subject matter and therefore it has been surveyed as well. Figure 29 illustrates the respondents' views concerning if European Union has a significant

role in the digitalization of municipal procurement in the major Finnish municipalities. 59% of the municipalities found that European Union had a bit of a significant role in the digitalization of municipal procurement. This does not go to say whether all the perceived impact from the European Union is in fact positive nor negative. Clearly the municipalities do not portray the European Union not to have an impact in this area.

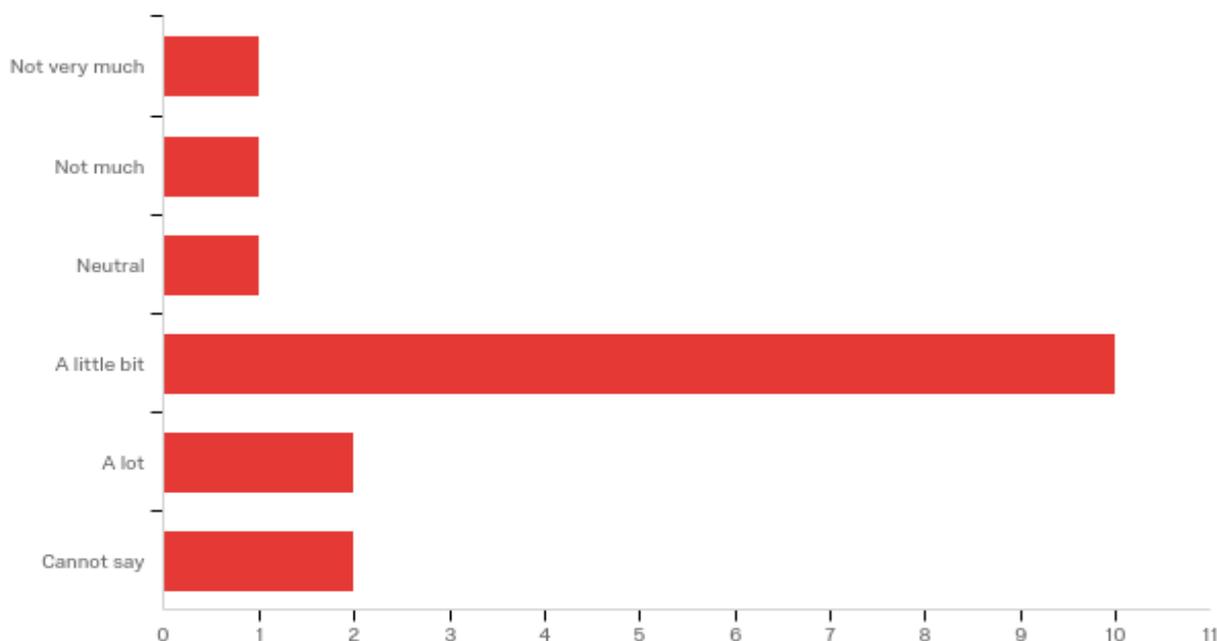


Figure 29: EU has a significant role in the digitalization of municipal procurement

European Union indeed has legislative impact to each of its member states. Therefore, it would be relevant to have a sense the degree to which European Union attempts to steer the digitalization in the major Finnish municipalities. According to the respondents 65% of the surveyed municipalities found European Union to steer the municipal procurement digitalization “a little bit”.

Interestingly, one in four of the respondent municipalities replied that they were indifferent whether European Union attempts to steer the municipal procurement digitalization (see figure 30). This portion could be explained by the smaller municipalities surveyed in terms of population size. Another possibility is that the influence of European Union is not widely known in parts of the country due to lack of relevance or information in general – despite the multinational influence in recent years.

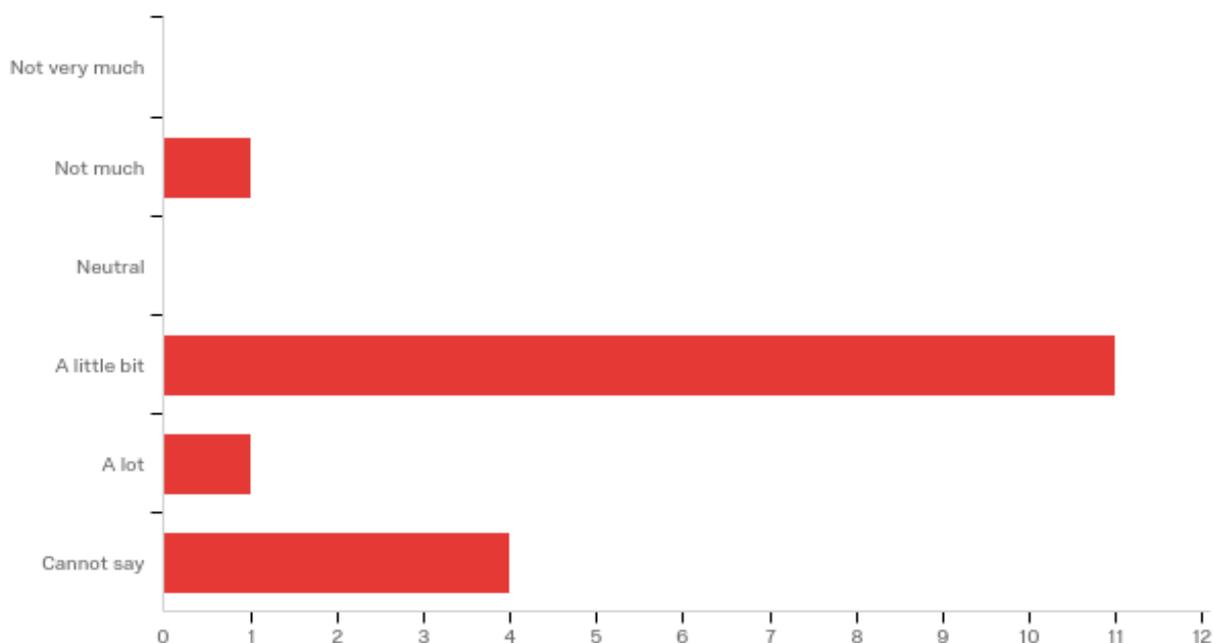


Figure 30: EU attempts to steer the digitalization in municipal procurement

European Union evidently has an impact on Finnish municipal procurement, however, in practice it is not as clearly viewed on what's the practical steering measures compared to the notion of having a significant role in municipal procurement. This survey does not provide clear implications whether the steering measures would be legislative but given the past findings (Beauvallet et al. 2011; Aminoff, 2016) there may be institutional influences in forms of directives and regulations impacting municipal procurement.

Figure 31 illustrates whether European Union is deemed to advance the digitalization of municipal procurement. 53% of the municipalities surveyed found that the Union advances the municipal procurement digitalization "little bit". Furthermore, some municipalities did not have a clear view regarding this area. In total, more than half of the respondents found that European Union advances from its behalf the digitalization of municipal procurement.

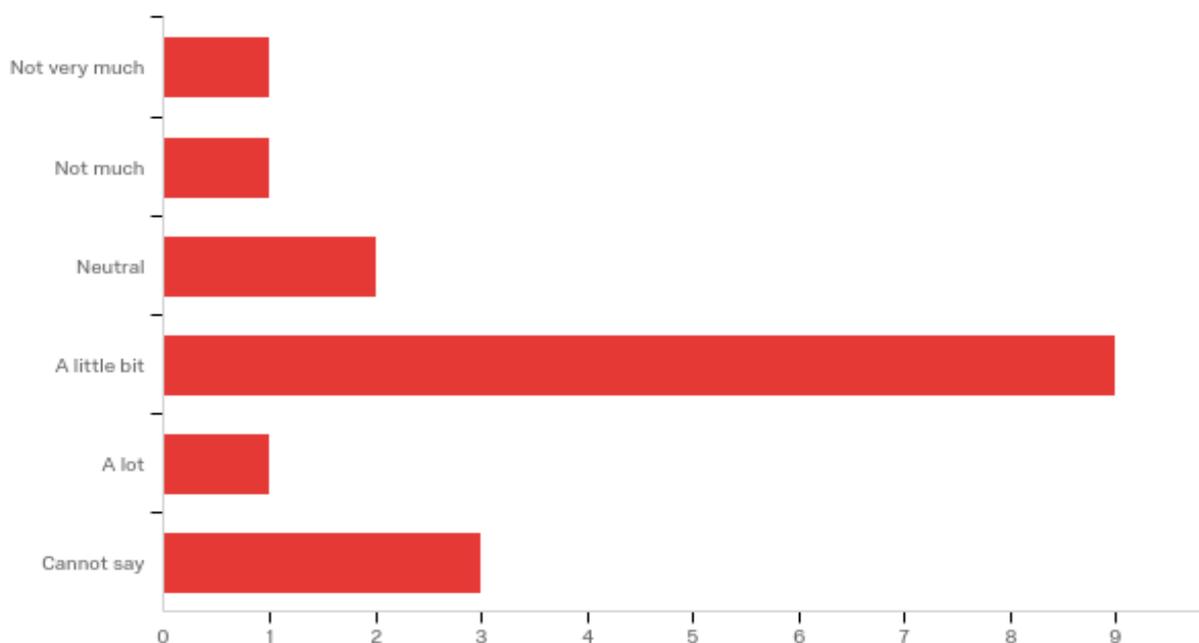


Figure 31: EU advances the digitalization of municipal procurement

To conclude, external institutions as European Union and the local Finnish legislation are deemed to have an impact in the development of digitalization of the major Finnish municipalities. Given the degree of impact by the state legislation in the recent literature (Beauvallet et al. 2011; Aminoff, 2016) the impact of European Union and Finnish legislation in the Finnish municipalities are somewhat aligned. Finnish municipalities are not immune towards the external influences in the subject matter – which was surely expected by this point.

5.3 Additional dimensions of digitalization in municipal procurement

This chapter examines the additional areas revealed by the survey results that cannot be categorized neither internal nor external dimensions in municipal procurement digitalization. Some distinctive topics were also covered to bring added insight on top of the earlier analyses. These topics being degree to which digitalization of municipal procurement advances the transparency and efficient bidding in municipal procurement (figure 32). In addition, another question asked was whether digitalization in municipal procurement advances the equal and non-discriminative treatment of the bidder (see figure 32). These statements are stated in the Act on Public Procurement and Concession Contracts as guiding principles in terms of characteristics of public procurement.

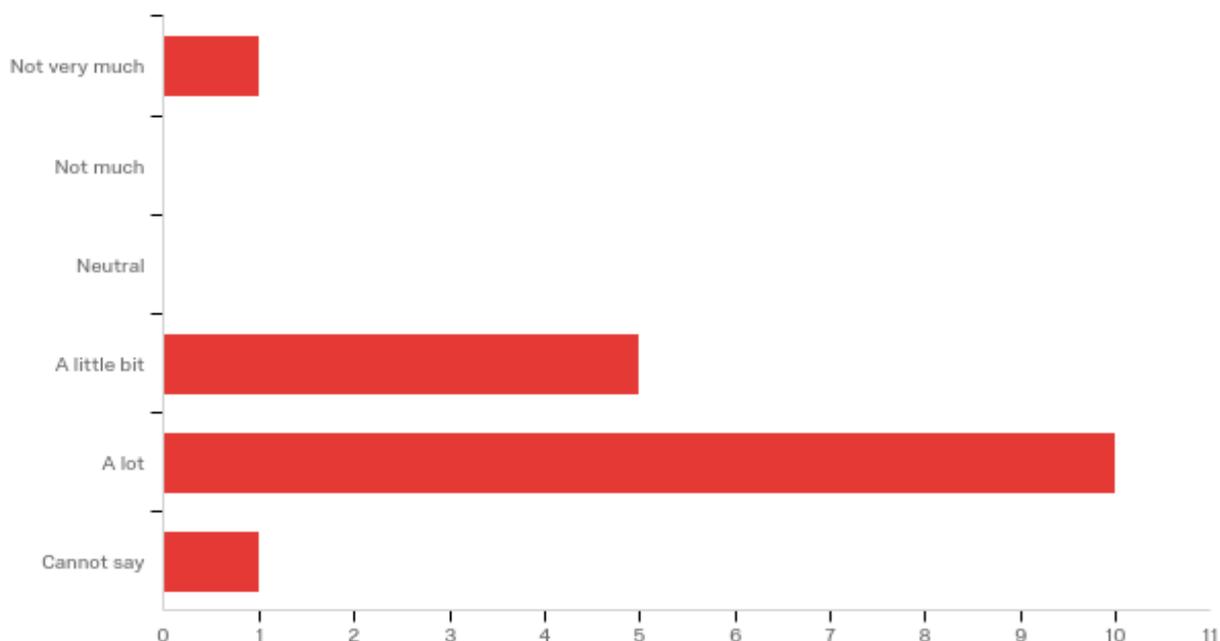


Figure 32: Digitalization of municipal procurement advances the transparency and efficient bidding in municipal procurement

The overwhelming majority of the respondent municipalities find that digitalization of municipal procurement advances the transparency and efficient bidding in their respective municipalities. This finding is also very well aligned with the previous findings in this survey as the benefits of digitalization were by and large acknowledged and the role of emerging technologies were also widely considered.

Furthermore, digitalization in municipal procurement was found to advance the equal and non-discriminative treatment of the bidder. (See figure 33) The landscape appears to be very consistent with the previous findings of this survey as to how the potential of the digitalization of municipal procurement is being viewed in the major Finnish municipalities. Hence, the will and the institutions in terms of supporting this development clearly exists in Finland at the time of conducting this research.

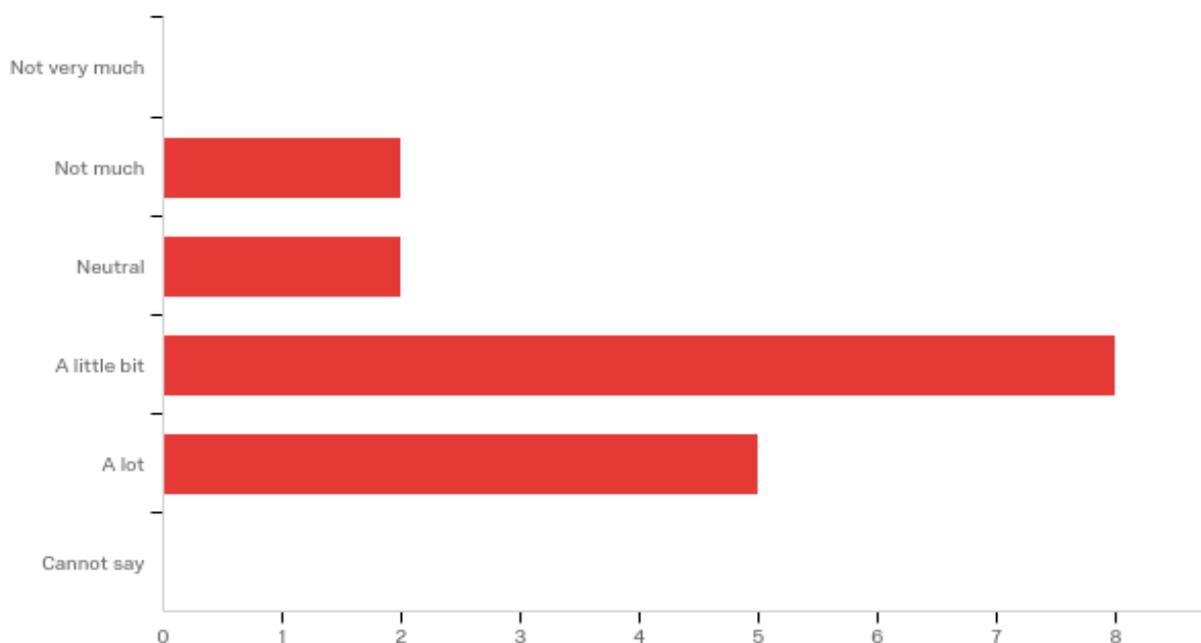


Figure 33: Digitalization in municipal procurement advances the equal and non-discriminative treatment of the bidder

To conclude, much like in the figure 31 the findings are relatively aligned in relation to each other. The development of digitalization in the municipal procurement clearly has an impact on the main publicly stated principles of public procurement. These being the transparency, efficiency and equal and non-discriminative treatment of the bidder in the municipal procurement process.

According to one survey respondent there is too little knowhow in the Finnish municipalities and companies. HILMA and Cludia services were deemed as inconvenient and challenging to use and hence do not further advance municipal digitalization – and vice versa. According to the respondent, these compulsory and inconvenient bidding systems/platforms reduce the incentive to bid in a transparent way. In addition, big data and equivalent phenomena are not even under consideration in the smaller Finnish municipalities. To utilize internet in municipal procurement is still only in its infancy – according to this respondent.

6 DISCUSSION

This master thesis has been conducted to provide an outlook on the utilization of digitalization in the procurement of major Finnish municipalities. In the past literature a large variety of topics in the realm of public and municipal procurement have been studied and the pain points of development of this area have been appointed. Most of the issues concerning developing and improving public procurement have been appointed to be in the area of inner competences: the expertise of the personnel and organizational capabilities, such as knowhow and practicality dimensions.

The limitation of this work is the relatively low absolute number of respondents (response rate 38%) this affects the reliability of the research findings. However, given the nature of questionnaires, design and content of the questions – in order to conduct the research within the time constraints the response rate can vary a lot and this result ought to be accepted as is. If the sample size would have been expanded and/or the response rate been increased the reliability of the results would certainly have, too, increased. This thesis attempted to follow the hypothetico-deductive reasoning method, however, this was not successfully carried out in its definition.

In the municipalities surveyed there have been attempts to find technological or information technology related solutions in municipal procurement. However, most municipality lack efforts on having a strategy on digitalization of municipal procurement let alone following it. Despite the fact that the degree to which digitalization has been already utilized in the surveyed municipalities varied – there is a consensus that municipal procurement will rely ever more on technological solutions in the future. In addition, majority of the municipalities acknowledge that there is a need of further education on digitalization in terms of procurement.

Contract management was clearly pointed out as the most challenging area of municipal procurement. This is understandable as contracts ought to be carefully designed to consider all the legal dimensions regarding the purchase. Also, in an ever more complex environments the aspects of regulations and laws from the national as well as European-level gives the contracts management an extra layer of complexity. Supply network management arises as

a challenging area in municipal procurement which is arguable given the intricate web of suppliers consisting both private and public sources and different practices in each area.

Given the challenges and views on the future of municipal procurement - the municipalities studied found the electronic procurement systems and innovations as the most important aspects for the future procurement. As explained previously, future supply chains as well as legislative pressures put ever more strain on municipal procurement. Therefore, it is logical that Finnish municipalities consider the aspect of innovation as an important area in municipal procurement. Innovations when cultivated in a favorable environment can bring about tremendous opportunities in terms of processes improvement and efficiency as well as cost savings long term.

When it comes to the drivers in municipal procurement the municipalities studied found that cost benefits and streamlining of the procurement processes as the most important areas. Cost benefits were very frequently noted aspect in the municipal procurement development. Much like in other industries and sectors operational and financial efficiency play a major role also in municipal and public procurement. Given that municipalities are funded by and for the taxpayers the accountability of economically sound decisions in the municipal management is a high priority.

As sided to a certain degree earlier the municipalities surveyed clearly found that the development of the organization plays a key role as a factor in municipal procurement improvement. In order to efficiently implement new technologies into municipal procurement the organization must have enough capabilities to pursue with the strategy and put it in work. The municipalities have a significant will towards digitalization and the organizational culture is also found to be supportive for these future digital endeavors by an overwhelming majority.

Data security threats have been well acknowledged in the surveyed municipalities. Data security dimensions arise into ever more important focus since so too municipalities are dealing with ever more information technology and managing a lot of information.

Furthermore, data security dimensions are given ever more importance in the public sphere as personal information are being stored and managed digitally by the state bodies and privately-owned companies more broadly.

HILMA and ClouDia were found to be relatively appropriate so according to these findings there is no imminent need to improve the current softwares and external services when it comes to municipal procurement despite the fact that there were some room for improvement found to be for these services. This study did not go further to study exactly what and where were the areas of improvement. Therefore, more profound look should be taken into examining the more exact areas of municipal procurement in which technological improvement can be found.

Legislation has been thoroughly acknowledging as one of the key aspects in municipal procurement as well as public procurement as general. Despite some respondents could not evaluate this aspect the majority of the municipalities find that the legislative challenges on the development of digitalization have been acknowledged to a large degree. This is an excellent finding as legislation is difficult to affect let alone change. It is a positive notion that the national legislation supports the attempts to utilize digitalization in favor of developing municipal procurement. Judging by an overwhelming majority the current Act on Public Procurement and Concession Contracts clearly supports and enables the utilization of procurement technologies. Legislation has been viewed in past literature as a challenging factor in e-procurement implementation.

The effects of European Union on digitalization of municipal procurement is relatively distinct as well. EU views to attempt to steer the digitalization in municipal procurement. This is presumable as European Union has distinctive mandate over national legislation among its member states. In addition, European Union is deemed to have a significant role in the digitalization of municipal procurement. This study did not editorialize the degree to which the outcomes of European Union's interferences are desirable or not.

The main research question of this research was: *“What is the state of utilization of digitalization in the procurement in the major Finnish municipalities?”* The major Finnish municipalities do find the used platforms useful and appropriate with regards to the digitalized processes. Major Finnish municipalities, though, find that there is room for improvements in HILMA and ClouDia and this gives a challenge for these services' providers to give more inputs in terms of driving future digitalization in the municipal sector.

The sub-questions of this research were “*Are the Finnish municipalities as organizations adjusted to the digitalization in procurement?* “, and “*How will digitalization change municipal procurement in the future?*“ According to this research’s findings major Finnish municipalities are relatively well adjusted to digitalization in municipal procurement. However, congruent with the literature findings the issue of organizational and personnel capabilities arise. According to the findings there are several important areas looming as future potential in the digitalization of major Finnish municipalities.

Given the relative low number of respondents into consideration it is essential to acknowledge the open comment in the end of the analysis with regards to digitalization in the major Finnish municipalities. The results of this questionnaire are not exhaustive as this research method did not leave room to expand in forms of personal or subjective comments (apart from the final open feedback). This affects to the generalizability of the answers and they must be deemed as more macro views from the Finnish municipal procurement professionals.

7 CONCLUSIONS

This thesis has covered a number of predetermined themes in the area of digitalization of procurement in major Finnish municipalities. These findings are exclusive only in the Finnish context and therefore generalizable in this frame of reference.

Municipalities have adopted a number of digital services to enhance their sourcing. In general, these digital services were deemed appropriate, however there was found to be room for improvement as well. Aligned with the previous literature the main concern appears to be the organizational capabilities. These capabilities refer to knowhow and skills of the employees to utilize the services. This need for more capabilities has been acknowledged very well in the surveyed municipalities.

Electronic services and innovations were found to be the most important areas of future improvement. Organizational capabilities are very well linked with the capability of utilize the digital systems as well as to innovate in the municipal procurement. Applicability and convenience of these electronic systems can be linked into future success of digitalized municipal procurement when the personnel have the means and understanding of making the most of the electronic systems.

Cost management was to be found as the most important driving factor in the development of municipal procurement. Mitigation of the cost is understandable incentive as municipal sector is ever more under a strain in terms of funding and transparency of its expenses.

Legislation and external institutional aspects were not to be found as hindering dimension in development of digitalization of procurement in the major Finnish municipalities. On the contrast, European Union and the current Finnish state legislation were deemed as supportive and adjusted for the future digitalization of municipal procurement. In the future it is essential that legislation and other regulations keep on being in favor of digitalization of municipal procurement given its empirical benefits.

Digitalization of procurement (e-procurement, e-auctions, and alike) are upcoming trends in the private sector which is found to be a major driver of changes and future development in supply chain management. As public sector often times follow private sector trends it comes as no surprise that big data and digital services in municipal procurement are only in its infancy. In order to utilize digitalization in much more efficient and according manner the needs and capabilities of the personnel must be well acknowledged.

Reflecting the findings of this study to the previous literature this research gives a unique and first-hand perspective on the topic matter of digitalization in Finnish municipalities. These findings can be viewed as useful background information if further research in this area will be conducted. For further research areas can be suggested a more in-depth analysis of municipal procurement digitalization in Finland through a comprehensive data-based case analysis. In addition, a very timely and relevant topic would be to review the software-dimensions of municipal procurement digitalization in more detail. The fact that this study has been involving only Finnish municipalities it can be only generalized within the Finnish context. Generalizability with - for instance - other Nordic countries' municipalities would prerequisite more information with regards to these foreign municipalities and their procurement procedures and state laws.

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APPENDICES

APPENDIX 1: Initial list of the major Finnish municipalities

Helsinki

Espoo

Tampere

Vantaa

Oulu

Turku

Jyväskylä

Lahti

Pori

Kouvola

Joensuu

Lappeenranta

Hämeenlinna

Vaasa

Seinäjoki

Rovaniemi

Mikkeli

Kotka

Salo

Porvoo

Kokkola

Lohja

Hyvinkää

Järvenpää

Rauma

Kirkkonummi

Tuusula
Kajaani
Savonlinna
Nokia
Kaarina
Ylöjärvi
Kangasala
Vihti
Riihimäki
Raasepori
Imatra
Raahe
Sastamala
Raisio
Hollola
Lempäälä
Tornio
Iisalmi
Siilinjärvi
Kemi
Kurikka
Varkaus
Valkeakoski
Jämsä
Mäntsälä
Hamina
Sipoo

APPENDIX 2: Survey questions

- Q1 - The job description of the respondent in the municipality (in Finnish, i.e. Sourcing manager, buyer, etc.)
- Q2 - Work experience of the respondent in the municipal procurement
- Q3 - Respondents' branch(es) in procurement
- Q4 - The size of the municipality (population)
- Q5 - To what degree technological and/or IT solutions have been attempted to find in municipal procurement?
- Q6 - There is a strategy on digitalization of municipal procurement
- Q7 - If the municipality has a digitalization strategy, has it been followed?
- Q8 - Digitalization has been utilized already in the municipal procurement
- Q9 - Municipal procurement will rely ever-more on technological solutions in the future
- Q10 - Prioritize the following topics that You find the most difficult in municipal procurement
- Q11 - The legislative challenges on the development of digitalization have been acknowledged
- Q12 - Prioritize the following the following themes that You find the most important in the future
- Q13 - The Procurement Law will enable the utilization of procurement technologies in the municipal procurement
- Q14 - The need of further education on digitalization has been acknowledged
- Q15 - Prioritize the most important drivers in municipal procurement
- Q16 - The data security threats have been acknowledged in the development of digitalization of municipal procurement?
- Q17 - There is will towards digitalization in the municipality
- Q18 - The organization culture supports the digitalization of the municipal procurement
- Q19 - Prioritize the following factors in terms of how essential You find them in developing the municipal procurement
- Q20 - The current HILMA service is appropriate
- Q21 - Current Cloudia service is appropriate
- Q22 - HankintaSampo service is appropriate
- Q23 - HILMA service can be improved

Q24 - Clouidia service can be improved

Q25 - HankintaSampo service can be improved

Q26 - EU attempts to steer the digitalization in municipal procurement

Q27 - EU has a significant role in the digitalization of municipal procurement

Q28 - Digitalization of municipal procurement advances the transparency and efficient bidding in municipal procurement

Q29 - EU advances the digitalization of municipal procurement

Q30 - Digitalization in municipal procurement advances the equal and non-discriminative treatment of the bidder