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The Utilization of the Project Portfolio Selection Methods in Prioritization of the Public Procurement Assignments

Case Study

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ABSTRACT:

This Master's thesis focuses on the prioritization of the public procurement assignments in the case organization. The case organization is a municipality, the City of Jyväskylä. The study problem in question occurs in the procurement service unit of the case organization when the work order for the procurement assignments is planned. The procurement assignments are assigned to the procurement service unit by other units in the case organization.

This study aims to answer to the research question: How to prioritize the public procurement assignments? To answer the research question and define the research area explicitly, the following research objectives have been set: 1. To identify the relevant factors influencing on the prioritizing 2. To identify the existing project portfolio selection methods 3. To evaluate the suitability of those in the public procurement context. The literature review introduces municipality as an operative environment, the public procurement in the municipality, and the project portfolio selection process.

This Master's thesis was conducted as a desk study. The data for the analysis was collected from the documents of the case organization, from the reports concerning the previous research of the project portfolio selection methods and from the applications of the methods.

The analysis was made in two parts. In the first part of the analysis, the relevant factors influencing the prioritization of the procurement assignments were identified in the case organization. The factors were categorized. Some were relevant for the prioritization process, other for the timeline of the process or the prioritization criteria. In addition, the requirements for the prioritization methods were identified.

In the second part of the analysis, the selected project portfolio selection methods were assessed against the requirements identified in the first part of the analysis. The delimitation of the number of the project portfolio selection methods was based on the framework introduced in the study's literature review. In the analysis the main decisive differences on these methods were identified to be the scalability of the method and the format of the results. Based on the assessment, three most suitable solutions for procurement assignment prioritization were the Q-Sort, the Analytical Hierarchy Procedure and the Weighted Scoring Model.

The findings of this study are beneficial in the actual development of the public procurement prioritization process in the case organization. The practical recommendations for the process development and the definition of the criteria were given.

KEYWORDS: Municipality, Public procurement, Project portfolio management, Project portfolio selection method, prioritization

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Terminology

Concept	Definition
Public Procurement	Public procurement refers to the process, in which public authorities, such as municipalities, purchase work, goods, or services. Public procurement principles, rules and procedures are set in the EU level and national laws and regulations. Additional operative rules are set at the organizational level in the municipalities.
Public Procurement law	The Finnish Act on Public Procurement and Concession Contracts (1397/2016)
Procurement services unit	A team in the case organization that is responsible of conducting and supporting others in the procurement activities.
Procurement assignment	In this study procurement assignment refers to a public procurement task. In practise, an assignment includes the tendering process. It starts from the preparations of tendering, follows with a tendering procedure, and ends to a contract signing.
Prioritization	The process for deciding the order of the task according to the agreed criteria.
Project	"An individual or collaborative enterprise that is carefully planned to achieve a particular aim" (MOT Oxford Dictionary of English). In this study it is compared to public procurement assignments.
Project Portfolio	A range of projects in the organization. In this study it is compared to a set of the procurement assignments.

Project portfolio selection	Selecting a set of projects in optimal manner. In the selection phase the projects are compared to rank them, to create succession and list the approved projects.
Project selection method	A procedure or a mechanism used for the project portfolio selection process.

1 Introduction

Public organizations such as the municipalities are often criticized for being inefficient and slow in their operations. This is usually the case when the public processes are compared to the private sector actions and the hectic business life. However, there are several peremptory factors slowing down the operations in the municipalities such as the political decision-making and the regulatory systems. At the same time, there is a clear demand to achieve transparency, excellent performance, and reasonable use of public funds (Maceta & Berssaneti, 2019). This highlights the fact that these objectives can be met only if the municipalities as organizations constantly improve and develop their processes to improve efficiency.

The new public management approach has been developed from the 1990s onwards. It targets to utilize the private sector management models to enhance the use of the resources. (Salminen, 2011, pp.76-77) The traditional administrative, investment-intensive, and bureaucratic management model has been developed towards concentrating more on outputs, results, and efficiency. The new public management approach focuses increasingly on costs and cost-effectiveness. This has opened the public organizations for a new management mode influenced by the private sectors processes, tools, and working methods. (Virtanen & Stenvall, 2010, pp. 46-471, Maceta & Bercaneti,2019).

This study investigates the possibility to utilize a project portfolio management tool in the municipality context. It concentrates to the puzzle how to prioritize procurement assignments prioritization. The case organizations (City of Jyväskylä) management problem occurs in the planning phase of the resource allocation. The divergence of the procurement activities and decentralized responsibilities creates a complexity on prioritizing as the shared practices are absent. The aim of this study is to identify the factors impacting the prioritization and the process. The study also investigates possibility to utilize a project portfolio selection method as a solution for practical prioritization.

1.1 Background and motivation of the study

The municipalities procure a wide variety of services, goods, and work. The process is called public procurement as the municipalities use public funds and governance. The public procurement process is strictly regulated. The public procurement law (1397/2016) sets principles, rules, and procedures for tendering and contracting processes. In addition, the law urges to conduct procurement activities in a systematic and planned manner but does not give any practical guidelines for the planning.

This study concentrates on a practical problem in the case organization. The puzzle on the prioritization of the procurement assignments occurs in the procurement process before actual tendering process has started. In this phase of the process the execution of the procurement assignments needs to be planned and resources allocated. The decision to conduct a procurement is based on the annual budgeting process or on other decision made by one of the municipality's decision-making bodies. The list of the upcoming procurement assignments is collected from the different units in the organization. The work order of procurement assignments needs to be defined for the listed assignments based on agreed prioritization principles.

In this study a procurement assignment is considered to start from the preparation of the tendering procedure and ending to the signing of the contract. The simplified procurement timeline is presented in the figure 1.

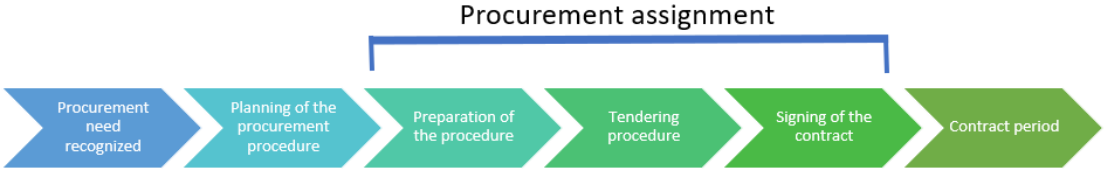

Figure 1. Public procurement timeline.

The case organization of this study is the City of Jyväskylä. There are around 170 procurement assignments conducted annually. The variety of the procurements in the municipality is endless. For example, an assignment can contain a purchase of a tractor for sports department, an innovative identification system for IT department, an electricity contract for the whole organization, or an infrastructure contract for the municipality infrastructure department. In the public organization the procurements vary, due to the variation of the responsibilities and the nature of services. The challenge arises from the different disciplines, objectives, processes, and technologies (Rajegopal et al., 2007, p.5).

From the prioritization point of view, the procurement assignments are difficult to compare. First, the complexity and the amount of work needed for the procurement assignments vary greatly. Some of the procurement assignments are contracts with a wide assortment of the different product categories. Other procurement assignments can contain already familiar and simple entities. On the other hand, procurement assignments can include new purchased entities where the definitions and the requirements need to be made. In the most extreme cases the procurement assignments are part of bigger entirety, for example, an outsourcing of the service contracts.

Secondly, the nature of the procurement assignments varies. The purchases can be related to the daily activities that are mandatory to run in regular basis such as the food supplies and other mandatory supplies for the organization. Other purchases are strategically important or relate to the legal responsibilities and require a principal decision on the political basis. Some of the procurement assignments can be forced to be purchased or become topic of the day by the external conditions such as a change in the current legislation. Also, the value of the purchase varies. The tendering processes are required to conduct within given regulated procedures based on the legal thresholds of the purchase entities. However, the value of the purchased entity does not present the criticality of the assignment.

Thirdly, as the extent and content of assignment varies, also the schedule and time-pressure may vary. Constant flow of urgent procurement needs occurs in the organization. There are also beforehand known renewal needs for the old contracts and already planned procurements. The urgent needs can be related to the changing situations. For example, like in the case of the protective equipment procurement in the beginning of the covid-19 pandemic or a sudden contract termination by any of the contract parties. The time pressure of the contract renewals occurs in the cases where requirement is non-stop availability, for example, in a food service contract. In the optimal conditions, the procurements are planned so that the timing of the tendering process is optimal from the operative point of view and the market point of view.

A strategically important, otherwise critical, or challenging purchases and shared contracts are listed in the case organization. Each of these are considered as individual procurement assignment. The list of assignments should contain all assignments that are in the annual planning cycle. This list is published as a procurement calendar in the municipality's website to inform the prospective tenderers and other interest groups about the upcoming tendering competitions. For the case organization, it presents a list of tasks, but it does not consider the prioritizing the work neither the available working resources.

The responsibility to conduct procurement lies in the unit that needs the purchase of the procurement. In most of the cases, the procurement assignments are conducted in multidisciplinary co-operation. The procurement process requires co-operation with the experts that know the substance of the procurement and experts that know the procedures of the procurement. This ensures a smooth process. The team participants knowhow, previous experience about the public procurement process and about the subject influences on the resource planning. The challenge on the procurement planning and on the resource allocation is seen when the procurement service unit is shared service for all divisions of the organization. The procurement professional's knowhow is needed on almost every listed procurement assignment. This requires time management from the procurement professionals.

This is a case study concentrating on the City of Jyväskylä, referred as the case organization. A municipality is an incredibly diverse environment where each division includes several service departments. Each of these service departments has their own objectives and operative responsibilities.

In the case organization the range of purchased goods, services and works is diverse and the procurement assignments vary in size, criticality, and complexity. In general, in the municipalities the resources are limited and scarce. This is normal situation in every division, but it is especially seen in the administrative and the support functions such as the procurement unit. The wide amount of the procurement assignments should be carried out with scarce resources to deliver them. This causes challenge in the resource allocation as the agreed logic for the prioritizing is lacking. Currently, the planning phase of the procurement assignments does not provide sufficient information for the prioritizing and the resource allocation. The resource allocation is done by an intuitional decision made by an individual decision-making office holder. This is consuming for the decision-makers (office holder) and creates unsatisfaction in the organization as the agreed transparent process for prioritization is missing. The prioritizing and the resource allocation practices need to be developed to ensure efficient working and logical working order. The effective management of the procurement activities will reduce the process costs.

This study aims to identify the factors influencing on the prioritization. In addition, the possible practical solution is investigated through assessment of the project portfolio selection methods. If the common way to evaluate will be agreed and shared model implemented in future, it will be beneficial especially for the procurement services unit. Needless to say, it provides also information throughout the organization for the resource allocation and other evaluation purposes. As this study enlightens only the relevant factors and possible solutions of the prioritization process, the shared acceptable framework for the prioritizing needs still to be developed and implemented in the case organization.

The procurement assignments have many similarities with the project world. For the procurement assignment, including the procedure itself, there can be defined beginning and end. The task is given to a group of professionals. This study concentrates on the project portfolio selection methods with later defined delimitations. However, the reader should notice that instead of selecting the procurement assignments or projects (as these methods are originally intended), this study is looking method for the prioritizing. The method information is used for internal communication, planning, and prioritizing.

The topic is currently relevant as there are strategic developments ongoing at the case organization and the national levels. The Report of the Financial Committee of the City of Jyväskylä (2021) has given recommendation to define how the operative activities such as the procurement will be strategically managed. Additionally, the final report includes recommendation that one should evaluate and improve the effectiveness of the public procurement.

At the national level, the new National Public Procurement Strategy has been released in the autumn 2020 (Ministry of Finance, 2020). The strategy highlights the effectiveness of the procurement activities and the importance of the strategic management in the field of the procurement management. This has been recognized also as a development need in the case organization by the Financial Committee of the City of Jyväskylä.

The motivation of this study is based on a practical problem solving. The author is working in the case organization and struggles with this study's research problem in daily basis. Even planning the organization's operative actions is an important part of strategic management, it is often left without or slight attention in the municipalities. The aim of this study is to help the organization to increase the degree of systematic manners in its actions in these specific settings.

1.2 Research gap

There is a clear need for improved and more professional usage of the project portfolio management in the public sector. The best practices from the private organizations should be benchmarked and implemented in the public organizations where appropriate. (Maceta & Bercaneti, 2019)

In the literature of the public procurement, the planning phase of the procurement process seems to be overlooked. This pre-tendering phase is highlighted as a critical part of the process, but the practicalities and the tools have not been widely researched. The best practices for prioritizing are lacking.

The project portfolio management and the selection process are widely researched areas of the art, especially on the business side. However, through the extensive literature search for this study, only few public sectors project portfolio management articles were found. None of them are looking specifically the project portfolio selection methods that is used in public procurement prioritization.

There seem to be a research gap in the public procurement field related to the procurement assignment prioritizing and the project portfolio selection method utilization possibilities. This study focuses on exploring the application possibilities in the context of the public procurement in the municipality.

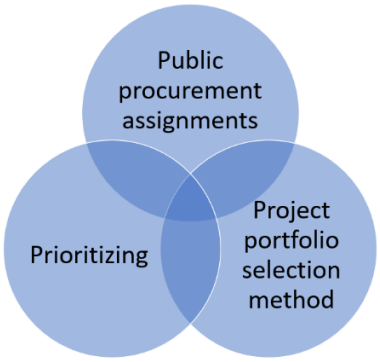

Figure 2: The research gap.

1.3 Research questions and objectives

This study concentrates on the problem of the public procurement assignment prioritization in the municipality. This qualitative case study is conducted as desk study to find a relevant solution for the practical problem in the case organization.

Based on the problem discussions, the research questions are following:

1. How to prioritize the public procurement assignments?

To answer the question and define the research area explicitly, the following research objectives are set:

1. To identify the relevant factors influencing on prioritizing.
2. To identify existing project portfolio selection methods.
3. To evaluate suitability in the public procurement context.

First objective is reached by revealing the factors influencing on the prioritizing. This study investigates the information concerning the municipality, its decision-making, and the literature of the public procurement to find the relevant determinants for the case.

Concerning the second objective, the interest concentrates on the project portfolio management and more precisely on the project selection methods. The previous research concerning the project portfolio selection and the project management is investigated. This study aims to clarify if any of the existing project portfolio selection methods could be utilized for the public procurement prioritization. To meet the third objective the methods will be selected in order to compare and analyse against relevant factors and requirements.

1.4 Delimitation of the study

Certain delimitations take place to clarify the scope of this study. The investigation of the practical solution for the public procurement prioritizing has been delimited to the project portfolio management methods and more precisely on the existing project portfolio selection methods. Furthermore, this study does not evaluate the criteria for prioritization even though the subject is linked to the research question in hand. This study does neither propose any framework for the actual prioritization process.

1.5 Structure of the study

This study contains five main chapters. The beginning introduces the subject of this study through the background and the problem discussion. The description about the research gap is given and the delimitation and the research questions of the study are set. The study continues by providing the literature review. The first part of literature investigates the municipalities through strategic and decision-making lenses with focus on the public procurement in the municipalities. The second part of the literature review concentrates on the project portfolio management. There the project portfolio selection and the selection methods are introduced. Through this literature review, the main factors influencing on the prioritizing are summarized. After the literature review, the methodological background is described. This chapter includes the research design, the data collection and the data analysis. It also includes the introduction of the City of Jyväskylä as a case organization. Also, the validity and the reliability of the study are assessed. The analysis and the findings are presented in the fourth chapter. The closing chapter includes the discussion and the conclusions. Possible implications and the limitations are elaborated in the end, and the suggestions for future research are discussed.

2 Literature review

This chapter will introduce the key concepts relevant for this study. It is divided into three distinct parts. The first part starts with interpreting the municipality as a public organization and its decision-making characteristics. The second part investigates public procurement; first in general, then more specifically considering the procurement assignments and the problem of prioritizing them. The third part familiarizes the project portfolio management, concentrating on the project portfolio selection methods introduced in the literature. The chapter is summarized in the end.

2.1 Municipality as a public organization

Municipality is “a district or town that has local government" (MOT Oxford Dictionary of English 2022). In the Finnish Local Government Act (410/2015), the municipality has legal obligations to provide services for its citizens. Over 500 legally binding duties arise from the legislation (Kuntaliitto, 2016). Additionally, the municipalities carry out their independently chosen additional tasks to serve their residents’ well-being (Ministry of Finance, 2021). The governance, the decision-making process and the general strategy work of the municipalities is directly influenced by the different legislative obligations. At the same time, the legislative obligations are guiding the activities and the operations in the municipality. (Kuntaliitto, 2016)

According to the Local Government Act (410/2015), the municipality should have a strategy decision by the council of the municipality. By the Act the strategy needs to include: 1) promotion of the well-being of the residents, 2) practise to organize and produce services 3) the service objectives laid down in the Acts, 4) ownership policy 5) human resource policy 6) the municipality’s residents opportunity to participate and to influence, 7) development of the living environment and the vitality of the area. The municipality board shall lead the municipality according to the strategy. The mayor works under the board acting as the operative leader. Each municipality defines its decision-making body

for the operational matters in its administrative regulations. (Local Government Act (410/2015))

In the municipality, the operations are characterized by the limited resources and conflicting targets of different units. The distribution of the operative work in municipalities is commonly based on a matrix structure that is a combination of the functional and the divisional structures. The work distribution is commonly agreed in the matrix organization. The interfaces are challenging from the power and responsibility point of view, creating pressure on the decision-making process. (Virtanen & Stenvall, 2010, pp.150-151) The interfaces between different units are problematic as some units are centralized and other are decentralized. The communication between the different units is on a daily basis but cultural and structural differences between them occur. (Virtanen & Stenvall, 2014, pp. 120,130)

2.1.1 Public management and the characteristics of the decision-making

Public and private organizations share many similarities. Organizations share the common generic challenges as managing external and internal activities, human factors, and complex environments. This leads to the fact that most of the same management principles and practicalities apply in the organizations in general. (Virtanen & Stenvall, 2010, pp.35) Strategic planning has increased its importance in the public sector and in the municipalities creating the transition in management towards more professionalized practices. (Mantere et al., 2011, pp. 139-140).

However, there are several challenges when implying the strategic management theory into public organizations. The public organizations differ in content from private ones from value producing principles, environmental influences, utilizing resources and capabilities (Johnson & Scholes, 2001, pp.5). The strategy of the public organization is influenced by less market pressure, but there exists need to fulfil regulative and other responsibilities and take care of the public welfare. This is causing different kind of

objectives when compared to private organizations (Johnson & Scholes, 2001, pp.17). The organizational structure and political decision-making interest in the municipality create complexity for strategic management (Virtanen & Stenvall, 2014, pp. 120,130).

In the management of the municipalities, one should consider both political and practical aspects in the decision-making (Mantere et al., 2011, p.149). According to Bozeman's (1988, pp.14-30) study, there are defining differences as the public organizations are generally directed from upper levels and political decision-making, whereas the private sector actions and decisions are based mainly on economic conditions. Furthermore, in the public sector, the influence of political decision-making is visible on responsibilities and work contexts, timeframe, the roles of managers, stakes, and expectations. The time frame is driven by external demand for change from political cycles and decision-making. The role and visibility of managers vary according to their level pressured by the public accountability, and this influences on activities. The stakes in a public organization are related to the health, safety, and security of the public. The expenses and effects are closely followed by the public.

The public organizations are often considered and criticized to be generally slow and ineffective in processes and developments. In the municipality there are characteristic factors influencing the operations such as regulations and political decision-making models. Three characteristics are emphasized in the public management: the units of an organization, the decision-making system, and accountability (Virtanen & Stenvall, 2010, pp.35-39). However, the operations should be developed to work optimally with these conditions. Process management requires ensuring quality, continuous process renewal, and development. (Virtanen & Stenvall, 2010, pp.158) By developing the processes, the organization can increase organizational productivity, economy, and efficiency. The complexity in the process management occurs in the organization where the distribution of work is not following the hierarchy based on the processes. (Virtanen & Stenvall, 2010, pp.148-150) The critical success factors are proper planning and organizing which create logical order for activities and performances. In addition, the internal communication is

the key to the optimal outcome by supporting the identification and recognition of the process. (Virtanen & Stenvall, 2010, pp.152-153)

As the strategic management is characterized by long-term objectives, execution, and ensuring sufficient resources, the public management approaches the challenge by creating visions and strategies to achieve those. There are several factors in the public administration causing challenges for the management when compared to the private sector; 1) managers influencing possibilities are limited 2) the operations in a the public organization are based on openness and monitored by the media and the public audience 3) the legislation and the periodic characteristics of the organization as annual budgeting, elected officials et cetera causes timely problems 4) the influence political decision-making process. (Salminen, 2011, pp.90-91) In the public organizations the unclear and unmeasurable objectives are often causing problems.

2.1.2 Public procurement

The public procurement concerns the procurement of goods, services, or work against compensation by the organizations using public funds. These organizations are for example cities, municipalities, their consortiums, or other public unit described in the public procurement law. (Kuusniemi-Laine, Takala, 2008, pp.1). The public procurement is regulated by the national Procurement Law (1397/2016) that is forced by the procurement directives of the European Union. The Finnish Act on Public Procurement and Concession Contracts (1397/2016), commonly called The Public Procurement Law “seeks to enhance efficiency in the use of public funds, promote high quality, innovative and sustainable procurement, and safeguard equal opportunities for enterprises and other corporations in providing goods, services, and public works contracts in competitive tendering for the public procurement.” In addition, the law encourages to work in economically, well planned manner and take into consideration practical entities. (Kuusniemi-Laine, Takala, 2008, pp.3).

The new National Public Procurement Strategy of Finland has been released in the autumn 2020 (Ministry of Finance, 2020). The national strategy highlights the effectiveness of the procurement activities and the importance of strategic management that requires intensification in the municipalities. The key objectives are set to economic, social, and ecological sustainability and innovativeness.

According to Iloranta & Pajunen-Muhonen (2008, p. 427) the main difference between the public and private procurement is the regulated tendering process. The root cause behind the law and regulations are the requirements for transparency in the purchasing activities concerning the public funds and equal treatment of the suppliers. Otherwise, the same regularities apply to the public and private purchases as the market conditions, the quality requirements, and the contractual responsibilities of the parties. The strict rules for the tendering process highlight's the need for longer-term planning and preparation in the public procurement. Even though the law and regulations guide the public procurement procedures in a strict manner, failure is likely to happen, without proper planning. Enough time for working with the tendering preparations needs to be ensured to enable the sufficient specification for the purchased entity. (Iloranta, Pajunen-Muhonen, 2008, pp.54)

The public procurement as an upper-level process includes budgeting, planning of the procurement activities accordingly and the actual execution. (Khan, 2018, p.1). The public procurement requires long-term economic planning. This practical manner is realized in the annual budgeting process but at the same time the planning should cover longer time periods as many contracts are for a four-year period or for a non-fix-term. The efficient use of the public funds can be enhanced by creating a procurement plan that would be based on the procurement strategy of the organization. Long-term planning enables the possibility to create bigger procurement entities, recognize the centralized procurement needs and decrease the process costs. The main challenge for managing, developing, and planning the public procurement in the organizations is the operative

fragmentation, lack of co-operation and poor availability of the procurement experts. (Kuusniemi-Laine, Takala, 2008, pp.9-10).

The need for competence development seems to be even bigger in the public procurement sector than in the private companies. In the public procurement is not sufficient to just to understand the legal requirement but also the strategic understanding of the commercial side is needed for successful execution. The public procurement is demanding due to the regulated strict procedures. This causes different kind of demand for the competencies than in the traditional bargaining business. Success in the public procurement requires an understanding of the technical details, the economic factors, and the strategic alignment in addition to the capability to apply law. (Iloranta & Pajunen-Muhonen, 2018, pp.255).

The operations in the public organizations should rely on the strategic outlines. The practical guidelines should be managed in a professional way. Kuusniemi-Laine and Takala (2008, pp. 9-11) underline the planning of the procurement activities as one of the main targets in the public procurement management. Unfortunately, a process such as planning and documentation still often need further development in the public environment.

One important aspect on the planning of the procurement activities is the risk assessment. Municipalities are obligated by the Local Government Act (410/2015) to manage the risks. The risk assessment should also consider financial, strategical, and operative risks and other harms caused by the actions of the public organization in the public procurement context (Pellinen et al., 2019).

2.1.3 Procurement assignments

The main groups of the public purchases are services, goods and work. Each of these procurement types has own characteristics and requirements for the quality and contracting. Those have been separated also in the public procurement law. The thresholds

for the estimated monetary value of the contract are based on the public procurement law and it determines the procedures taking place in each case. The law is applied when the value exceeds the national or EU thresholds. Additionally, many public organizations have their own practicalities set for the procurements under these thresholds. (Julkisten hankintojen neuvontayksikkö, 2020)

In this study, the procurement assignment is considered as a task generated from a purchasing need. The procurement assignment includes a process starting from the preparations of tendering, the tendering procedure and it is ending to signing of the contract. In the case organization the procurement assignment is generated when it is approved and agreed to conduct as a procurement. In principle, the selection phase for the purchases is already done in the budgeting phase during the previous year. However, some of the purchases are part of the operating expenses and not visible in the budget as such.

Each procurement assignments have a responsible unit that is related to the budgeted ownership. Some of the assignments are collectively owned as the expenses are covered by several units needing the contract. For example, the procurement assignment can contain a specific one-time purchase, for example a tractor. Or the procurement assignment may fall upon several divisions of the case organization, for example property maintenance services. Or the procurement assignment can include a contract agreement that is generally beneficial such as the office equipment. The procurement varies also by its length of time from a narrow brief period, to need for long contract agreements. Some procurements include massive new developments. The value of the procurement is calculated according to the whole contract period as defined in the Public Procurement Law (1397/2016). However, the value of the purchase does not automatically define the complexity of the assignment or time needed for completing it.

Occasionally, urgent procurement needs may occur and need to be fulfilled without planning. This kind of case might occur when some device or subject fails to work in the assumed way. (Kuusniemi-Laine, Takala, 2008, pp. 61-62). According to the Public

Procurement Law (1397/2016), the urgent procurement without tendering procedure can be carried out only if the criteria set by the law are met. But in practise, many of the cases can be predicted or the needs are reoccurring over time. So, the rush for the urgent procurement could be avoided with proper planning. However, the urgent procurement assignments do occur and should be taken into account in the resource planning.

2.1.4 Prioritizing the procurement assignments

Prioritization means “the action or process of deciding the relative importance or urgency of a thing or things” (Oxford Dictionary of English, 2022). It requires evaluating the relative merit of a set of objects. (Forman & Gass, 2001).

In the preparation work of the Public Procurement Law (1397/2016), it was stressed the importance of organizing the procurement activities in a practical and rational way. It can enhance efficiency, savings and create economical solutions. (Kuusniemi-Laine, Takala, 2008, p.2). One critical target of planning is to ensure the sufficient resource allocation. In an optimal case the standardized planning process includes all the relevant planning aspects such as the economical and resource planning that leads to the schedule and individual detailed plan. (Kuusniemi-Laine, Takala, 2008, pp. 55).

By applying the planning and business intelligence principles to the public procurement management can help to achieve efficiency. It can help also to enable other benefits in the contract period thanks to thorough contract determination. The importance of the planning phase is highlighted also through the fact that the public procurement law prescribes to specify the contract terms already in the tendering phase. Careful preparation of the procurement gives possibilities to concentrate on purchasing the effectiveness instead of technicality. (Iloranta & Pajunen-Muhonen, 2018, pp. 378-380)

The relevance of the procurement assignment prioritizing is highlighted in such cases where co-operation of several units is needed, and the contribution of the procurement

service unit is required. The adequate knowhow should be ensured before starting the preparations for the tender procedures. It requires organizing the possible co-operation with the procurement professionals, and in some of the cases, this requires also outsourced resources. (Iloranta & Pajunen-Muhonen, 2018, pp. 412)

2.2 Project portfolio and its management

A project portfolio refers to a range of projects in the organization. The project portfolio is a group of projects conducted under the management of a particular organization and are competing for scarce resources (Morris & Pinto, 2007, p. 4). The project portfolio management is used in different kind industries and applications such as new product development, construction projects, fundamental research, and so on. (Morris & Pinto, 2007, p. 94).

The successful and effective management in the organization can not only concentrate on single projects at time but rather simultaneously on multiple projects as a larger entity. (Morris & Pinto, 2007, p.1) According to the Project Management Body of Knowledge PMBOK (Project Management Institute 2017) “The project portfolio management aims to centralized management of one or more portfolios, which includes identifying, prioritizing, authorizing, managing, and controlling projects, programs, and other related work, to achieve specific strategic business objectives.” Another definition for the project portfolio management is given by Rajegopal et al. (2007, p.11): “Project portfolio management is the management of that collection of projects in which an organization invests to implement its strategy.” So, the portfolio is managed to reach the strategic goals (Maceta & Berssaneti, 2019). In practice, it is a constant process of defining, planning, prioritizing, selecting, and updating the projects (Rajagopalt et al., 2007, p.101).

The strategic importance of each project varies. There are several parameters influencing the project’s strategic importance and the evaluation is not always straightforward.

(Morris & Pinto, 2007, p. 2-3) The projects should be linked to desired and realized strategy. Successful project management requires delivering against the strategic objectives. Okumus (2015) identified in his review the key influencing factors on the implementation of the strategy: strategy formulation, uncertainty of operational environment, organizational structure, culture, operational planning, communication, resource allocation, people, control, and expected outcome. In the context of this study and the project portfolio management, the critical factors to be considered are especially the organizational structure, the operational planning, and the resource allocation. With scarce resources, the municipality with complex structure need to concentrate on output, strategic alignment and goals, and efficient use of resources (Stentoft et al., 2015).

Resource planning is a crucial part of the project portfolio management. Projects in the organization require efforts of diverse inputs. The successful management of portfolio requires optimal mix of the projects utilizing the resources in sound manner. Problems might occur when each project is looked at individually without a realistic full picture of workload and ongoing activities. Lack of management structure may lead to inefficiencies or even failures in the projects when the daily activities conflict with projects and clear managerial management is lacking (Rajegopal et al., 2007, p.4).

The optimal investment of scarce resources and prioritizing the selected projects requires comparable information about all projects (Rajegopal et al., 2007, p.3). As important as prioritizing is connecting the right capabilities to ensure the deliveries. The aim of the project portfolio management is to balance between demand and supply of the resources. (Rajegopal et al., 2007, p.107).

In all projects relates risks. Risk mitigation is critical part of the project portfolio management. There are different kind of risks to be taken into account. Those can be related to the schedule, value, costs, legal, political, environmental, and so on. The risk assessment and the quantification are required for the risk evaluation. (Morris & Pinto, 2007, p. 95-96).

2.2.1 Project portfolio selection

One phase of the portfolio management is the project portfolio selection. In this phase the projects are compared with aim to rank the projects to create succession and ultimate selection. The researchers Archer and Ghasemzadeh are seen as the pioneers of the portfolio selection research (Mohagheghi et al., 2019). They define the project portfolio selection as “periodic activity involved in selecting a portfolio from a set of projects” (Morris & Pinto, 2007, p. 94).

The project portfolio selection is widely researched within the last decades. The majority of the studies concentrate on the R&D projects. (Mohagheghi et al., 2019). The first signs of the project portfolio selection research are from 1950’s but the research of the field has boosted during the last decades (Liesiö et.al. 2021). The wide range of the project portfolio selection methods has been introduced in the related literature, but many remain without proper theoretical background, or they are lacking evidence about the implementation into practise (Flechas Chaparro et al., 2019).

The portfolio selection fundaments should base on overall consensus in the organization and the justification of the selection should be transparent. The different interests and the limited resources can create competition that can be brought down with a constant and reliable process. It can be seen as a committee process where objectivity is the main criteria (Morris & Pinto, 2007, p. 102). The ultimate goal of the process is to balance the important factors and resources (Morris & Pinto, 2007, p. 98).

The project portfolio selection is periodic but same time a continuous process (Mohaghegni et al., 2019). The successful project selection requires a consistent process that creates sufficient data for the organization. The data need to be available in an explicit

format. The data providers and users need to be trained and their responsibilities clarified to create accepted process and co-operation. (Morris & Pinto, 2007, p. 103-104).

According to Rajegopal et al. (2007, p.108) the main objectives of the project portfolio management are firstly to select and prioritize the projects with the highest value and secondly to ensure the balance of the projects all together. Each project is required to be evaluated individually against the tactical criteria and the strategic objectives. The value of the project and the selection criteria need to be customized for each organization.

When the project portfolio is created according to the agreed process, it helps to create a realistic view of the project pipeline. The process of selecting projects should aim to assist the organization's strategic orientation and the operational impact. The project evaluation and selection process should be part of the organization's daily activities and part of the strategy process. The optimal processes require time to develop, and even then, the development should be continuous. (Martinsuo et al., 2003, p. 89).

Archer & Ghasemzadeh (1999) presented in their research that the number of stages in the portfolio selection process should include several steps. The steps can utilize varied selection methods to support the manager's decision-making that can be used to facilitate strategy work in the operational planning. (Qehaja et al., 2017).

The project portfolio management is difficult if the criteria for project selection and prioritization are missing or unclear. The projects can be incomparable due the variety. Additional reasons for difficulties can be related to an insufficient project portfolio definition and missing strategic criteria. (Rajegopal et al., 2007, p.99).

The selection method's criteria and importance have to be selected before entering the selection process. A meticulous work on selecting the suitable method ensures the comparable data in future as the changes might cause confusion and opposition in the

organization at the later phase. (Morris & Pinto, 2007, p. 104). Measures and scales are utilized to create comparable information for the selection process. The evaluation of a project varies according to the organization's culture, the leadership model and the project portfolios characteristics. (Martinsuo et al., 2003, p.89). There are several sufficient ways to evaluate the project but the main requirement is that practices are comparable, clear and easily understandable. The requirement for sustainable results is the reliable data (Morris & Pinto, 2007, p.99).

In the case of large number of the projects, it might be relevant to group or divide the projects in different pools (Kodukula 2014, p. 161). One way is to divide the projects into three classes: 1) the must-do projects 2) the new business projects 3) the sustaining projects. Other way is to categorize the projects according to the importance: the mission-critical ones, the highly desirable ones, and the desirable ones. Each class can have its own set of criteria. (Cooper et al., 2001). Rajegopal et al. (2007, p.114) provide different logic for the categorizing according to the time frame and the type: the strategic projects, the administrative and tactical projects, the innovation projects and the future vision projects.

2.2.2 Project portfolio selection methods

In this study the project portfolio selection method is considered as a procedure or mechanism used for the project portfolio selection. In the literature also terms procedure, approach and model are commonly used. This study uses a term selection method in this context.

Archer & Ghasemzadeh (1999) propose in their study that a common process need to be established to enable the accurate comparison of the projects. There are several approaches and methods developed for the project portfolio selection. Most of the existing methods for the portfolio selection have been created for the development projects in the commercial environment, new product development or investment portfolios. In

1960's the selection methods were mainly based on the numerical analysis. Over the years the new methods have been developed for supporting the decision-making in different kind of organizations and project portfolios. (Flechas Chaparro, et al., 2019).

Archer & Ghasemzadeh (1999) acknowledge that there are currently over 100 different techniques existing for the project selection. They also criticize many of them for not being user-friendly, being irrelevant in the comparison to the existing data, ignoring the risk assessment and the relations to other entities. Also, Cooper et al. (1999) highlight the problematic nature of many selection methods being mathematically difficult to utilize as those demand a huge amount of data, some of it not existing or unreliable. Those methods often disregard the risk and uncertainties.

The selection methods can be roughly divided into the numeric and to the nonnumeric ones (Meredith et al., 2006, p.44; Morris & Pinto, 2007, p.99). Those can be used at the same time or separately. The numeric methods are usable if the available information is precise. (Martinsuo et al., 2003, p. 91)

Due the fact that great number of the different techniques and methods are introduced in the academic research, several taxonomies have been introduced to clarify the field. Archer & Ghasemzadeh (1999) propose a three-phase framework to clarify the problematic decision making in the project portfolio selection. They share the portfolio selection in three stages: the strategic consideration, the individual project evaluation and the portfolio selection. Each stage has several election methods proposed. Mohagheghi et al. (2019) simplified the taxonomy by identifying in their literature review just two main groups for the selecting methods: the optimization methods and the scoring methods.

2.2.3 Prioritization criteria

The characteristics of the projects has impact on their selection and prioritization. The project prioritizing is a straightforward process if the evaluation can be based on a single

criterion. Albeit this is often not the case, and the evaluation requires several criteria to get the full picture. (Kodukula, 2014, p. 154). “A criterion is a standard on which a judgement or decision may be based. The prioritization criteria established a tangible relationship between the proposed work and strategies of the organization.” (Rajegopal et al.,2007, p.160).

The criteria should be clear and understood by the organization so that the evaluation of each project is consistent. The poorly defined criteria easily lead to disuse of the method. (Cooper et al., 2001). The prioritization criteria need to be limited in number, not overlapping, clear, measurable, consistent applicable, linked to the strategy and support the focus and domains. (Rajegopal et al., 2007, p.161). The competition between projects will be eliminated by setting a shared criterion.

The collection of the prioritization criteria may contain key criteria and sub-criteria. Only one criterion will not provide sufficient variation and decision-making support in the project portfolio evaluation process. The criterion can be simple question with “yes” or “no” answer. But criterion can include also range. The criteria are often related to the project scope, the total investment, the required expertise and resources, the effectiveness, the schedule, and the organization’s strategy (Morris & Pinto, 2007, p. 98). Or they are related to the benefits, the costs, and the risks (Gardiner 2005, p.98). Maceta & Berssaneti (2019) identified in their study seven main criteria categories: 1) external environment/stakeholders, 2) strategy, 3) financial, 4) internal processes, 5) project components, 6) risks, and 7) social and environmental criteria.

The criteria can also have different importance and it can be described with weights. The criteria and their weights should be designed to support the organization's mission, capabilities, and limitations. The consistent and commonly used criteria assure consistency in the evaluation and prioritizing. It will also ease the comparison of the diverse projects.

2.3 Project portfolio selection processes in the public organizations

The benefits of the project portfolio management are generally acknowledged in the public organizations and covered in the literature. However, the project portfolio selection and more precisely the utilization of the project portfolio selection methods in the public procurement context seems not to be covered.

Maceta & Bercanetti (2020) studied in their research the differences between the public and the private sector in the project portfolio management practices. According to the findings, the traditional tools and the processes that private sector uses for project portfolio management were utilized in the public sector. However, the project portfolio selection the tools are not in use. The project selection is often based on the interest of the politics or decision of the administration after the intuitive decision. The research concerning development projects in the Danish municipalities indicated that the project prioritization in many cases is done based on a subjective judgment. Most of the municipalities included in the research were lacking a collective portfolio management and the prioritization process and were suffering from scarce resources. (Stentoft et al., 2014)

Martinsuo and Dietrich (2002) have conducted a case study for the City of Espoo concerning the project management framework. The study reviewed the public sector and the project portfolio management frameworks and techniques. The study aimed to identify the possible modification need for process. It was conducted as a case study concentrating on the IT projects. The main findings were related to the portfolio management capabilities but the study also investigated the project portfolio selection, criteria, and their relative importance. The data was gathered in a workshop where the participants ranked the three most important selection criteria. The relative importance of each criterion was calculated based on points divided by the points of the most important evaluated factor. (Figure 2.) The most important criteria were identified to be link to the strategy, benefit of the project, the resources needed, risks, link to the other projects and impact to the stakeholders.

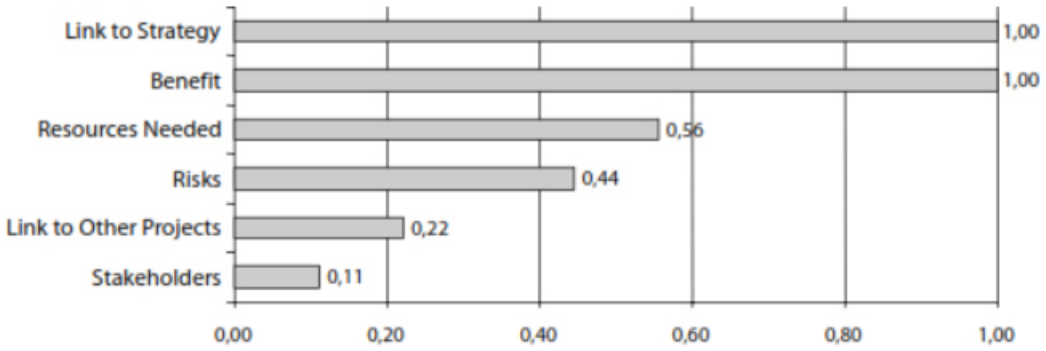

Figure 3: Criteria and weights of IT-project portfolio selection in the City of Espoo (Martinsuo and Dietrich 2002).

2.4 Summary of the literature review

The first part of the literature review outlined the municipality and its decision-making characteristics is influencing the public procurement. Generally, the literature about the procurement and more precisely on the public procurement highly concentrates on the tendering process, covering the suppliers, and outcomes of the sourcing processes rather than the planning phase. Albeit the literature of the public procurement highlights the importance of the planning, it does not consider the puzzle of prioritizing the work in the complex environment. This problem can be recognized to be an organization specific in the terms of the structure of the organization, the variety of the dimensions and shared values.

In the municipality, as a public organization, many factors influence the operations and prioritizing of the activities. There are requirements set by different legislation, responsibilities and obligations based on the chosen strategy. The periodic characteristics are created through the annual budgeting. The public welfare through health, safety and security are the most important drivers when not forgetting the risks involved.

The literature review revels the main factors that influence the public procurement practicalities in the municipality context. As those are generally recognizable, it leaves

unknown the criticality or priority order of those factors. More precisely, it is unclear how to emphasise those in a practical manner in the operations and processes.

The second part of the literature review concentrates on the project portfolio management. The main intrest is on the project portfolio selection as a subprocess. Those practices have been recognized as success factors for the organizations when utilizing the scarce resources. Also, those practices ensure that the activities are in line with the organization's strategy. The project portfolio selection should support the objectives and goals of the organization. At the same time the selection process should consider the available resources and other impact factors. The risk control, optimizing scheduling and resources can be seen as the main targets of the project portfolio selection. As such, those apply to the procurement assignment prioritization.

The project portfolio selection methods are widely researched area with many applications. The taxonomy of the selection methods is trying to conceptualize the field of the selection methods. However, the number of the methods is great and field disordered. Many of the selection methods are intended for a new product development purposes or other commercial needs. As such they are irrelevant for this study. Only few sources indicated that the project portfolio selection methods have been used in the public organizations and none them indicated the use in the public procurement context.

3 Methodology

This chapter elaborates the methodology of this study. The selected research strategy is a single case study. It will be conducted as a desk study to identify a solution to a practical problem in the case organization. In the first part of this methodology chapter, the research design is initiated. Following with the case organizations, the City of Jyväskylä, presentation including a more detailed case description. The data collection is described in the third section. This leads to the description of the data analysis in detail. Lastly, the validity and reliability of this study is discussed.

3.1 Research design

Research can be characterised as a systematic data collection with a systematic interpretation against the defined question in hand. From the business and management fields can emerge a demand for research that rises from the practical basis. As such it can be called as applied research. (Saunders et al., 2007, p.5) The research design describes, how the research questions in hand will be answered (Saunders et al., 2007, p.131). It is a plan of the research process, including the objectives, the methodology and the techniques to be used (Krishnaswami & Satyaprasad, 2010, p.40).

The aim of this study is to investigate how to prioritize procurement assignments. The first objective is to identify the relevant influencing factors for prioritizing. The second objective concentrates to identify the project portfolio selection method suitable for the case. The third objective is to evaluate those as the possible practical solutions. This study tries to find the practical solution how prioritize the procurement assignments by analysing the suitability of the different project portfolio selection methods.

Based on the available literature and objectives of this study, the research design was established. This study contains a qualitative research design and it is conducted as a single case study. The selection of the research design was based on the assumption that the existing academic research and the available information concerning the case

organization will provide a sufficient amount of applicable information to answer the research questions and the problematic nature of this study. Additionally, the selection of the research design was influenced by the limited time and scarce resources available for this study as a master thesis.

In this study the qualitative research method was chosen to answer the research questions. The qualitative data is non-numeric data and as the numbers are missing the qualitative data is based on words. The qualitative data requires classification into categories and conceptualisation to understand meanings (Saunders et.al., 2007, pp.470-472).

The abductive research approach is used in this study. The abductive approach is an iterative process where the theory is used to interpretate the findings from qualitative data but the is also data compared to the theory. The data is collected to explore the possibilities, to test, and to create hypothesis. (Saunders et al., 2019, p. 153).

Desk research concentrates to study the existing research material and to compare it to the case on hand. The main data sources of this study are the existing academic literature and reports, and the documentation from the case organization. All the data is from publicly available sources.

The data analysis will take place in two phases. First, the factors that influence the public procurement assignment prioritizing in the case organization will be investigated. Secondly, the suitability of the project portfolio selection methods will be evaluated in the context of this study through the prioritizing lenses. This will help to compress the group of the suitable project portfolio selection methods. Then the feasibility of each of the selection methods will be assessed.

3.2 Presentation of the case organization

The City of Jyväskylä is the seventh biggest city in Finland with 144 473 residents (31.12.2021). It is located in south central Finland. It serves as a capital of the region (Keski-Suomi). Jyväskylä has regional responsibilities to operate the centralized service units as the rescue department and the environmental health services.

The operations of Jyväskylä have been divided into four main divisions: 1) city administration, 2) social and health services, 3) education, culture, and sports and 4) urban planning and city infrastructure. In addition, the City of Jyväskylä has subsidiaries concentrating on the facility services, the catering services, and the rescue services. (The City of Jyväskylä, 2021). In the City of Jyväskylä, the political decision-making body includes the city council, the city board, the committees, and the sub-committees (Figure 1) that are composed of the elected representatives. They approve the strategy, annual budgeting, and the most important initiatives. The practicalities are run by the executive team, and in addition, each division has its own administrative decision board that decides the operative level activities.

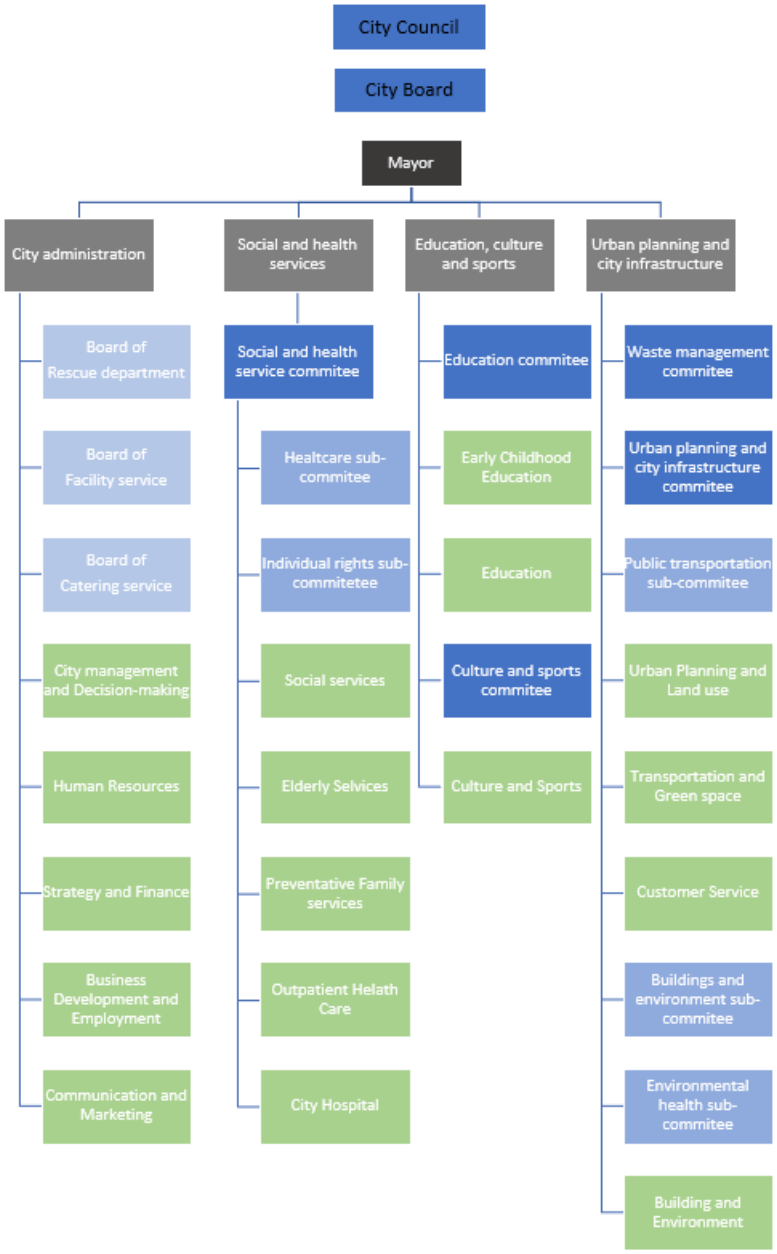

Figure 4: The decision-making body in the City of Jyväskylä (adapted from the Organization of the City of Jyväskylä, 2021).

In the City of Jyväskylä the procurement service unit works as a supportive unit under the city administration. The team includes nine positions. The main responsibilities are leading the procurement strategy in the organization, administrating the general shared purchasing contracts and support the organization in the procurement processes and assignments. In 2021 there were 170 procurement assignments conducted in the City of Jyväskylä. The values of the procurement assignments vary from thousands to millions

of euros. The list of the upcoming procurement assignments is generated and updated in the organization on a regular basis. Each unit will add their procurement assignments needs for the coming year. In the list of upcoming procurement assignments, it is required to report the object, type, threshold level, planned schedule and responsible unit concerning each of the procurement entities. In addition to given information, additional data that impacts the priority is already known in planning phase: estimated value, related risks, criticality in relation to the public welfare, health, safety, security, strategic importance, pressing need, object relation to the other entities. As an example, the list of the procurements is attached to this study (Appendix 1.).

The procurement service unit works in a hybrid model in the organization. The hybrid model is a combination of the decentralized and centralized procurement (Khan, 2018, p.11). In the case organization the hybrid model means in practise that the centralized procurement service unit is responsible of the strategic procurement management and the shared contracts in the organizational level. In addition, the procurement service unit gives procurement expert support for other units with the procurement assignments. The centralized co-ordination aims to increased efficiency through consistency and reliability. In addition, it enables the economy of the scale in the larger volumes where the users or needs are spread around the organization. (Khan, 2018 p.13-14).

According to the Procurement Strategy of the City of Jyväskylä (Hankintojen linjaukset 2021-2024), procurements are based on a wide co-operation within the organization. The co-operation includes the operational responsible person, the supportive units, the procurement steering group, the executive team and the administrative decision boards. Each division is responsible to conduct their own procurements according to the procurement plan. There is a procurement steering group in the organization that has responsibility to prepare the procurement operating principles, collecting the 3- year procurement plan and to evaluate the strategic procurement entities and to co-ordinate the co-operation in the procurement activities through the organization.

The Procurement Strategy of the City of Jyväskylä (Hankintojen linjaukset 2021-2024) highlights the importance to identify the strategically important procurements. This should be done by interpreting the importance of the different kind of procurements in comparison to the organizational objectives and responsibilities. The strategic importance is based on the impacts of the procurement instead of the monetary value. For example, the strategic importance can emerge from the significant impact on the citizens, environment, the regional commercial activities, or the internal activities of municipality. The strategic importance can also arise from the recognized risks, criticality to the service production of the municipality, the emergency planning or from the extensive public interest. The strategic importance requires case-by-case evaluation according to the commonly agreed specification by identifying the special characteristics of the assignment in the case. The essential success factor is consistent practices. The comprehensive and regular planning ensures economical procurement activities with the high quality.

3.3 Data collection

The data collection technique is determined to answer the research questions (Saaranen-Kauppinen & Puusniekka, 2006). In this desk study the data is collected from different documents and reports by the author. The data used in this study has been publicly available and no ethical restrictions for its use exists.

In order to identify the relevant factors impacting the procurement assignment prioritization in the case organization (the first objective of the study), the data was collected from the following documents of the case organization: the Strategy of the City of Jyväskylä (Kaupunkistrategia 2022), the Financial Statement of the City of Jyväskylä (Tilinpäätös 2020), the Report of the Financial committee of the City of Jyväskylä (Taloustoimikunnan raportti, 2021), the Guidelines for Procurement of the City of Jyväskylä (Hankintaohje 1.1.2019 lukien) and the Procurement Strategy of the City of Jyväskylä (Hankintojen linjaukset 2021-2024).

To identify and analyse the project portfolio selection methods (the second and third objective), the main sources of data were the academic reports and literature concerning the project portfolio management. The selection of the data sources was made based on extensive review on the existing research sources. The data was collected from the research reports as secondary data. The written reports and the research sources provided an extensive review of the existing project portfolio selection methods, their utilization and the assessment in the different contexts and applications. According to Saunders et al. (2017, p.259) the advantage of the secondary data is its coverage and comparisons. But at the same time, controlling the data quality is difficult and there can be difficulties on the availability. Saunders et al. (2107, p.263) describe the problem of evaluating the quality of the data. During this study many of the originally identified sources proved to be unsuitable for the research question in hand. However, in this case the data for this study was easily available. The reports covered wide timespan, were diversely international and from the different fields of the applications. However, the information was scattered in small details in the different reports. It required a time-consuming review of several reports.

The data concerning the applicable project portfolio selection methods were delimited due the enormous number of the solutions available. The limitation was done based on the discretionary decision. This was done to outline the research scope to reasonable entity for the master thesis study and to focus on the specific part of the process. Many of the project portfolio selection methods are incompatible when assessing the procurement assignment and/or unable to create information for the prioritization purposes. The solutions using a mathematical programming were excluded due the complex nature, understandability, knowhow, and the lack of the author's resources and expertise. The methods supporting the strategic consideration in the selection, and one's that were considering economic factors, were excluded. This was done because the fact that the strategic consideration and the economical evaluation should be done already in the

budgeting phase for the procurement assignments, not when prioritizing. The same reasoning applies to the individual project evaluation for the approval purposes.

3.4 Data analysis

The data analysis concentrated on the research question how to prioritize public procurement assignments. To answer the question, the analysis was divided in two parts. The first part of the analysis concentrated on the relevant factors influencing the public procurement assignment prioritizing. The relevant factors were collected from the documents of the case organization and were interpreted to understand the impacts for the procurement assignment prioritization process. Based on the identified factors also the requirements and needs for the prioritization method were identified.

In the second part of the analysis the identified requirements were compared against the project portfolio selection methods. The analysis aimed to find out if any of the project portfolio selection methods can be utilized in public procurement prioritization. Based on the data collection and the delimitations, the set of the project portfolio selection methods was compared and analysed. The analysing of the suitable project portfolio methods was done as a feasibility test. The test contains an assessment against the practical properties required from the method. The selection of the requirements was based on the authors analyse of the case organization.

3.5 Validity and reliability

Validity, reliability, and generalisation of the study are evaluated to reflect the quality of this study. The validity evaluates if the proficient and thoroughness of the research leads to the correct findings and conclusions. Reliability considered the possibility to get similar kind of findings in a repeated study with the same methodology. (Saunders 2007, p.149).

Validity considers if the analysis and its findings are accurate. When considering the operational activities used in this study, the validity of the findings is relevant to be evaluate. The sources of the data collection and analysis were carefully selected. The factors influencing on the decision-making in the municipality context are widely researched and are seen as generally approved facts. The interpretations concerning the case organization suffer from single researcher's view and interpretation. However, there were no novel findings discovered in the first part of analysis, the validity can be confirmed. For the second part of the analysis, in terms of validity, this study lacks verification. The validity of this desk study is based on the authors judgement. Previous examples to utilize the project portfolio selection methods in the public procurement prioritization were not found in the literature review. This shows the presented solution to be novel. The relevant factors may be overlooked. This poses a risk to end up with too simplistic conclusion. However, the author's opinion on these methods is that they are suitable for the use and provide the solution to case in needed depth. To increase the validity, the detailed feasibility study of the project portfolio selection methods is enclosed the attachments of this study for future validations.

Saunders (2007, p.151) refers to the external validity when considering the generalisation of the results in another research environment or situation. This study considers the municipalities generally as similar environments. However, there might be a risk on the validity and generalisation of the study as it is conducted only based on a single case. With one case study it is not possible to generalize as such. The adequate single case research can provide information beyond the case but the findings cannot be generalized as such. (Saaranen-Kauppinen & Puusniekka, 2006). The results of this study cannot be applied directly to other organizations as the findings are based only on one organization. However, the results can be applied to similar organizations when the characteristics are comparable.

The reliability of the study should be considered through the repeatability of the study. This study is a qualitative analysis-based study. The reliability of the study is under risk as the project portfolio concept in the public procurement environment is a novel concept. The possibility to researcher's error and bias is relevant. The author has a role in the case organization as a procurement manager. There for it is possible that author's insight and assumptions concerning the research topic might cause error or bias. According to Saunders (2007, p.144), the role as a practitioner-researcher in a familiar organization is both beneficial and risky. For the insider-researcher, the complexity is well-known. But at the same time, one's influences and opinions take easily over the professional research attitude. The authors own expertise and judgement is used in this empirical case study to reflect the findings. However, the setting and its risks should be taken into consideration. Throughout the research, the aim has been to ensure as objective view as possible to avoid any interference of authors assumptions on the results.

Another risk for the reliability in this study emerges from the fact that author is only single researcher. It is possible that if the same study would be conducted by a different researcher, the results might be different due the individual perspectives.

4 Analysis and findings

This study aims empirically investigate, how to prioritize the public procurement assignments as a case study. The first part of the analysis concentrates on the first research objective to identify the relevant factors impacting the prioritization of the public procurement assignments. It is analysed by investigating the document of the case organization and categorizing the found data. The second part of the analysis answers the second and third research objectives. Those objectives relate to the project portfolio selection methods identification and evaluation. In the second part of analysis the project portfolio selection methods are delimited and assessed. The aim is to find out if any of those can be utilized for prioritizing the procurement assignments.

4.1 Factors influencing on the prioritization

When investigating the prioritization of the procurement assignments, it is crucial to understand the relevant factors influencing the process in the case organization. First, the prioritizing of the procurement assignments is considered as process in the municipality environment. Then, the relevant factors of the public procurement and those impacts the prioritization are taken into account. These two dimensions are examined in the case organization context. Finally, the identified factors are categorized and refined. Those factors will be reflected to the practical process of prioritizing the procurement assignments.

Public welfare, including health, safety, and security is in the heart of municipality. A wide range of different service areas exists in the case organization (The City of the Jyväskylä, Organization 2021). Some areas and activities have a clear link to public welfare, other have not that obvious relation. When considering the procurement assignments in the daily operations, the link to public welfare might be even more difficult to recognize. However, the procurement assignment’s relation to public welfare is something that should be considered as a high priority in the actual prioritization process.

In addition, municipality has also other organizational obligations and responsibilities. The procurement assignments that are related to obligations and responsibilities can be seen as second group of priority. The order of importance should be clearly emphasized in the prioritization of the procurement assignments either in the criteria or other way in the process.

The influence of the legislation on the prioritization of the procurement assignments can be viewed through the obligations set on the legislation. For example, a municipality has obligations by law to organize some services. On the other hand, the legislations guide the operations and might cause timely pressure for conducting some tasks in timely manner. This applies to all municipalities, and as such, to the case organization as well. An example of this could be the IT-system needed to fulfil the requirements set in law for human resource management or the requirements of the Procurement Law to purchase only after the tendering process. Either way, a municipality should operate according to law and these compelling reasons need to be considered as one criterion in the prioritization.

Each municipality should have strategy according to the Local Government Act(410/2015). The case organization has its own strategy (the Strategy of the City of Jyväskylä 2022). Prioritizing the operations should strongly rely on the strategic fit. However, the link between the procurement assignments and the strategy and its objectives is not always clearly visible. The strategic procurements are mentioned in the Procurement Strategy of the City of Jyväskylä (2021). The problem on determining the definitions of the strategic procurements remains unsolved. However, the definition of the strategic procurement should be same one than used for the prioritization. The strategic fit of the procurement assignment and its priority through that should be evaluated in the planning phase. The reliable process should include commonly agreed principles for the prioritization. This creates requirement for the prioritization method to enable transparent assessment of the procurement assignment.

In the case organization the political decision-making influences the procurement assignments mainly in two ways. The major make-or-buy decisions in the municipality context normally concerns services, whether those are produced as an own service or purchased as an outsourced one. In the cases where the political decision is required, the decision defines the existence, extent and schedule of the procurement assignments. In addition, the political decision-making influences on realization and timing of many projects. The procurement assignments are often in relation to bigger entities or projects. How these political decisions reflect to prioritization of the procurement assignment related, should be defined in the prioritization process. The procurement assignments requiring the political decision are often important ones but uncertain to be carried out. Those should be evaluated as any other assignment. But the process should register the uncertainty of this kind of assignment somehow.

The nature of the procured goods, services and work differ greatly. Otherwise, the purchased entities and values vary. For each procurement assignments the importance and the effectiveness should be evaluated. Another way to consider the relevance of the prioritization is the criticality of the procurement in question. The judgement of the criticality and nature of the procurement is related to the results and impacts of the conducted procurement entities. The timeline is impacted by the relationship of the procurement subject with other purchased entities or projects. For example, the timeline in the procurement of the preliminary assessment of IT-system impacts on the timeline of the actual IT-system. Another viewpoint to the prioritization is the economic efficiency. The budgeting is normally done annual basis. That creates timely pressure for some of the investments. In addition, there are several risks related to procurement activities. For example, the financial risks may be relevant in time context as the commercial markets are influencing the availability, the pricing, or other terms of the contract.

When the actual subject of the purchase in the case organization is examined, the contractual situation of the purchased entities influences on the upcoming procurement assignments and timelines. By the Procurement Law (1397/2016), the purchases beyond

the thresholds are obligated to be purchased according to the outcome of the tendering process. Many purchased entities have regular demand. This causes time pressure for the renewal of the old contract or a totally new contract through the tendering process. These are considered as the new procurement assignments. These predetermined timings should be managed within the prioritization process.

The prioritization of the procurement assignments should also consider the risks. The risks can relate to procurement assignments in many ways for example in relation to public welfare, the actual tendering process, or economy. As in every organization, also in the case organization, the economy influences the operations. The annual budgeting is not a directly determinant factor on the prioritization of the procurement assignments. But it influences the point of time when certain expenses need to be enrolled. In the case organization the annual budgeting follows certain timetable (Financial statement 2020).

In the case organization the new procurement assignments occur throughout the year which causes puzzle for the planning and resource allocation. This creates clear requirement for the process. The process needs to be reproduceable as the urgent and new assignments occur outside the planning cycle. The renewal of the procurement assignment prioritization is needed in a regular basis. As the list of assignments is always wider than the usable resources are able to conduct, some of the assignments are postponed. This means that the assignments will be included repeatedly in the prioritization process and the list of the procurement assignments is changing. These factors elicit a requirement for scalable and reproducible method.

In the City of Jyväskylä exist a wide range of different service areas (The City of Jyväskylä, The Organization 2021). Each unit has their own responsibilities and objectives, that require attention and creates pressure on the shared resources and planning practicalities. The operative fragmentation and lack of co-operation creates place for development and need for commonly agreed way of prioritizing the assignments. When thinking the

organizational structure and distribution of the work, additional requirements for the process and the method can be identified. The selected method needs to be simple to introduce, implement and construct. A complex organization with different objectives creates requirements for the method. The method should be adaptable for usage of both groups and individuals. The results from method should provide reliable results. This can be ensured through transparent evaluation, which can be reviewed.

Many of the factors identified influences the requirement for the method used for the prioritization. The needed information versus available information of the procurement assignment can also be delimiting factor in the method selection. This compatibility should be ensured in the selection of the method. The organization should define the most critical factors that will be evaluated. The detailed information should be provided to each procurement assignment by the responsible unit.

Based on the analysis about the influencing factors in the case organization, following practical requirements are identified for the prioritization method: user-friendliness, usability, reusability and continuous assesment, reliability, scalability, compatibility, and suitability. The requirements are explained in more detailed manner in the following table (Table 1).

Table 1: Requirements for the prioritization method.

Requirement	Explanation
User-friendliness	User-friendliness is defined in terms of the simplicity of the method and the ease of understanding, implementing, and using it.
Usability	Usability is evaluated in actual application context; how easy the evaluation is to conduct.
Reusability and continuous assessment	Reusability as a requirement means that continuous assessment should be possible as the new assignments will be added to the list constantly. The process should be able to conduct in a practical manner at least several times in a year, so that some of the same objects may stay on the list.
Reliability	Results based on the prioritizing needs to be reliable and acceptable in the organization. The reliability is associated with the commonly agreed criteria and reliability of the decision makers.
Scalability	Method should be scalable as there is a need to compare and prioritize up to 200 different assignments at the same time.
Compatibility	The compatibility of the method is viewed through the needed information for the method versus the information available.
Suitability	The suitability of the method and its results are evaluated in the defined case context.

4.2 Suitability of the project portfolio selection methods

The finding of the first part of analysis showed that there are many factors that influence the prioritization of the procurement assignments in the case organization. When looking into the portfolio selection methods as practical applications, those identified factors help to delimit and define the group of the possible candidates.

First, the analysis narrows down the possible project portfolio selection method candidates. The delimitation is based on the three-phase framework of the project portfolio selection methods introduced by Archer & Ghasemzadeh (1999). The framework includes first a strategic consideration, then an individual project evaluation and finally a portfolio selection. The methods mentioned for the portfolio selection phase are

relevant as this study aims to compare different assignments and how to prioritize them. In the portfolio selection phase several projects are compared simultaneously through the selected method. In the portfolio selection phase Archer & Ghasemzadeh (1999) recognized following categories of the methods: ad-hoc approaches, comparative approaches, scoring models, portfolio matrices and optimization models. In the analysis the categories through example methods are introduced. The methods included from each category are listed in Table 2.

Table 2: The category lists of the project portfolio selection methods included in this study.

Categories of the Methods	**Example Methods**
Ad-hoc approaches	Forced ranking
	DICE
Comparative methods	Q-Sort
	Pairwise comparison
	Analytical hierarchy procedure
	Dollar metric
	Standard gamble
Scoring models	Unweighted scoring model
	Weighted scoring model
Portfolio matrices	BCG analysis
Optimization models	-

The factors that influence the prioritization and the interpretations in the case organization context were analysed in the previous chapter. Those analysis helped to identify the requirements for the project portfolio selection methods. The analysis is done as a feasibility study containing an assessment against the following practical requirements: user-friendliness, usability, reusability and continuous assessment, reliability, scalability, compatibility, and suitability. The requirements are explained in a more detailed manner in the Table 1. (p.51).

The following analysis present the method categories and the example methods. Each method is first shortly introduced and then evaluated against the identified requirements. The analysis consists of the highlights of the main strengths and weaknesses of each method. The full evaluation of each method can be found attached at the end of the study (Appendix 2.).

Ad-hoc approaches

Ad hoc approaches are generally simple and crude methods. These methods are developed to identify the champions. The Forced Ranking- method and the DICE Framework are introduced below as examples of the Ad-hoc approaches.

In the Forced Ranking- method the objects are compared against each other and ranked in order by the decision-makers. The ranks of all the decision-makers are calculated together for each object. The total rank sum determines the final order of the objects. (Kodukula, 2014, p. 157). The Table 3 presents an example of ranking four projects.

The Forced Ranking is a simple method but bigger amount of the project lines might cause difficulties and requires precision from the decision-makers. The biggest downside of this method is that it does not define the criteria that the evaluation is done against. That creates uncertainty concerning reliability of the results as the evaluation is based on an individuals' intuition. This kind of ranking requires also wide understanding from the decision-makers of all objects. Another difficulty occurs with the reusability. The continuous process is not possible as the ranking of one object influences the ranking of other projects. The scalability of the evaluation exists but the process is heavy and requires a total renewal every time the assessment is needed. The Forced Ranking does create ranking order that could be used as a prioritizing order, albeit some objects may get same rank.

Table 3: An example of the Forced Ranking- method.

Project	Decision maker 1	Decision maker 2	Decision maker 3	Decision maker 4	Total score	Project rank
A	4	3	2	2	11	3
B	1	1	3	3	8	2
C	2	4	4	4	14	4
D	3	2	1	1	7	1

DICE Framework is originally created for the companies' transformation projects. The DICE stands for the following factors: project **d**uration, performance **i**ntegrity, the **c**ommitment and **e**ffort. The scores for each factor are given in score 1-10. The lower score is better. (Sirkin et al., 2005). The DICE Framework as such is not applicable for the prioritizing purposes as the assessed factors (DICE) are not relevant for the procurement assignments and for the prioritization.

Comparative methods

In the comparative methods the objectives are set first, then objects are compared against the objectives and finally the benefits of the objects are evaluated. The process enables the succession of the projects that are included in the portfolio. The comparative methods enable the usage of the different kind of criteria: qualitative, quantitative, and general judgement. (Archer's & Ghasemzadeh, 1999). Following methods are presented as examples: Q-Sort, the Pairwise Comparison, the Analytical Hierarchy Procedure, the Dollar Metric and the Standard Gamble.

The Q-Sort is originally developed for the psychological evaluations to explore complex problems. In the project portfolio context, it is used to analyse alternative options. The evaluation is strongly dependent on the decision-maker's perspectives and opinions. The sorting requires several rounds of evaluation and discussions. For the ranking, the objects are written in cards and sorted in piles. Each decision-maker does their own assessment by prioritizing the objects. This might require several steps. The pile is first divided in two piles and then further to reach the precise order. All the results are condensed in the table for discussions. The iterative process is reproduced until the final order is reached with consensus among the decision-makers. (Previte et al., 2007; Silvius et al., 2017).

The weakness of Q-Sort is seen in the time-consuming process that requires active participation from the decision-makers. The process is easy to understand and implement as the decision-makers give their scores. Reliability can be reached through the fact that

the evaluation is based on group opinion through the discussions and iteration. The process is required to renew when new objects appear. The method is suitable for the prioritization, but the evaluation more numerous objects is time-taking and demanding.

In the Pairwise Comparison each object will be compared to all other objects one by one. The pair is always rated 0 or 1. The value 1 is the higher in the priority. In this case the total rating defines the ranking. (Kodukula, 2014, p. 157). An example about the Pairwise Comparison is given in Table 4.

In the Pairwise Comparison the evaluation is done in an evaluation group of the decision-makers or by a single decision-maker. In both cases, the decision-makers should have a wide understanding and knowhow of all the objects so that a reliable ranking would be possible. This method is simple to conduct with few objects but time consuming for a comparison of larger number of objects. The end result is applicable for the prioritizing purposes. Complications may occur in the case of the objects getting same total score and same rank number. However, the Paired Comparison can be reproduced between the objects sharing the same position.

Table 4: An example of the Pairwise Comparison**.**

Project	A	B	C	D	Total
A		1	1	1	3
B	0		0	0	0
C	0	1		1	2
D	0	1	0		1

Dollar Metric is a paired comparison method with value for the preference also called the graded pair comparison. The preferred alternative is additionally rated in predefined numerical scale. (Bech et al., 2007).

The Dollar Metric comparison has the same difficulties in reliability and scalability as the Pairwise Comparison. The difference occurs in the results as they are more accurate level and informative to the prioritization.

Analytical Hierarchy Procedure can be used in an evaluation of a multi-objective case. The process requires the criteria hierarchy with allocated weights to start with. The objects are compared against the criteria. For example, in the scale 1 to 5. Value 1 presents low importance with weight 0 and value 5 high importance with weight 1. The result for each object is calculated by multiplying the evaluated weight by the weight of criteria and then summed up. (Pinto 2010 p. 78-80). The final weight gives the rating. The Analytical Hierarchy Procedure is suitable for the situations such as product selection, policy decisions and prioritization. (Fohrman & Gass, 2001). An example about Analytical Hierarchy Procedure- model is given in Table 5.

The Analytical Hierarchy Procedure is more complex than other comparative methods. It is still easy to understand and conduct. Before starting, the process requires definition for the criteria, hierarchy, and weights. The evaluation can be made together as a group or so that each decision-maker's final values are calculated together. The evaluation does not need data as such but the evaluation requires understanding of the criteria and knowing the project in hand. The evaluation against each criterion is visible. It makes the evaluation more open and transparent. The final results are suitable for ranking and as such for the prioritizing.

Table 5: An example of the Analytical Hierarchy Procedure (adapted from Pinto 2010).

1- Poor (0)	2- Fair (0,1)	3-Good (0,3)	4-Very good (0,6)	5- Excellent (1,0)

Project	Hierarchy level 1	Criteria 1 0,50		Criteria 2 0,25		Criteria 3 0,25	Total 1
	Hierarchy level 2	Criteria 1a 0,15	Criteria 1b 0,35	Criteria 2a 0,10	Criteria 2b 0,15	Criteria 3a 0,25	1
1		Poor	Fair	Poor	Good	Excellent	0,658
2		Good	Good	Very good	Poor	Good	0,285
3		Excellent	Excellent	Excellent	Excellent	Excellent	1
4		Poor	Poor	Poor	Poor	Poor	0

Project 1 as Example: =0*0,15+0,1*0,36+0*0,1+0,3*0,16+1*0,25= 0,36+0,048+0,25

In the Standard Gamble the pairwise comparison is done between the different outcomes in an uncertain situation. The traditional example is from the health sector. In the example the patient can choose from the different treatment options that lead to different outcomes. The first alternative gives two possible outcomes; returned normal health or immediate death. The second alternative gives chronic state. (Gafni 1994). An example about the logic of the Standard Gamble is given in the Figure 5.

The Standard Gamble is suitable only with few options that are alternative for each other. It is not scalable and it does not give the prioritizing order as result.

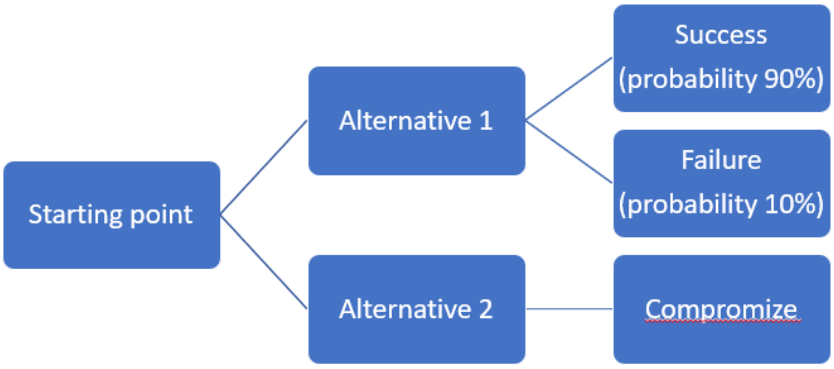

Figure 5: An example of the Standard Gamble (adapted from Gafni 1994).

Scoring Models

In the Scoring Models the object is considered against multiple criteria. The scoring can be based on both numerical and non-numerical measures. (Morris, Pinto, 2007, p.101). In addition, the scoring can be conducted with or without weight. In this method the weight presents the importance of the criteria. The pre-selected evaluation criteria should be based to the type of the project portfolio and the organizational needs. Generally, the Scoring Models are simple, easy, and commonly used for ranking the projects. However, the successful model requires thorough work to identify the appropriate criteria and weights to fulfil the commonly agreeable priorities and objectives. (Kodukula, 2014, p. 148). Below is presented the Unweighted and Weighted Scoring Models.

The Unweighted Scoring Model is a simple and easily understandable method. Reliability increases with the transparency of the criteria and evaluation. The model is easily scalable for a larger number of objects. New objects can be evaluated in any time and added to the summary. This impacts the ranking of the other objects but does not require the evaluation of each line again. The end result is applicable for the prioritizing purposes. Table 6 shows an example of the Unweighted Scoring Model. The scale is between 1 to 10, so that the higher the score, the more attractive the project is.

Table 6: An example of the Unweighted Scoring Model.

Project	Crite-ria1	Crite-ria2	Crite-ria3	Crite-ria4	Total score	Project rank
A	1	5	8	7	21	3
B	1	7	10	9	27	2
C	5	1	5	2	13	4
D	10	2	10	9	31	1

The Weighted Scoring Model is also simple and easily understandable method. Before using the method, the process requires definition for the criteria and weights. The weighting of the criteria enables the emphasis of the certain criteria and more precise total scores for the ranking of multiple objects. Otherwise, the Weighted Scoring Model has the same benefits and downsides as the Unweighted Scoring Model. Table 7 presents an example of the Weighted Scoring Model. The scale is between 1 to 10. The higher the score, the more attractive the project is. Each score per criteria is multiplied according to the selected weight to get the total score.

Table 7: An example of the Weighted Scoring Model.

Project	Criteria 1 10 %	Criteria 2 40 %	Criteria 3 25 %	Criteria 4 25 %	Total score	Project rank
A	1	5	8	7	**5,85**	3
B	1	7	10	9	**7,65**	1
C	5	1	5	2	**2,65**	4
D	10	2	10	9	**6,55**	2

Project B example calculation (1*0,1)+(7*0,4)+(10*0,25)+(9*0,25)=0,1+2,8+2,5+2,25 =**7,65**

Portfolio Matrices

In the Portfolio Matrices the project evaluation is made in a graphical representation where the projects are placed in the matrix. The dimensions of the matrix need to be defined. (Archer's & Ghasemzadeh, 1999). The Boston Consulting Group (BCG) Matrix is presented as an example of the Portfolio Matrices.

The BCG Matrix is more widely known as a growth share matrix developed by the Boston Consulting Group. It is a portfolio planning technique where objects are divided into stars, question marks, cash cows and dogs. This method is widely used in the portfolio evaluation of the products. (Madsen, 2017). Example about the BCG Matrix is given in the Figure 6.

The BCG Matrix and other portfolio matrices suffer from a narrow viewpoint as the dimension allow normally only two options to evaluate against. The evaluation is too simplified for a complex prioritizing puzzle and the reliability suffers easily.

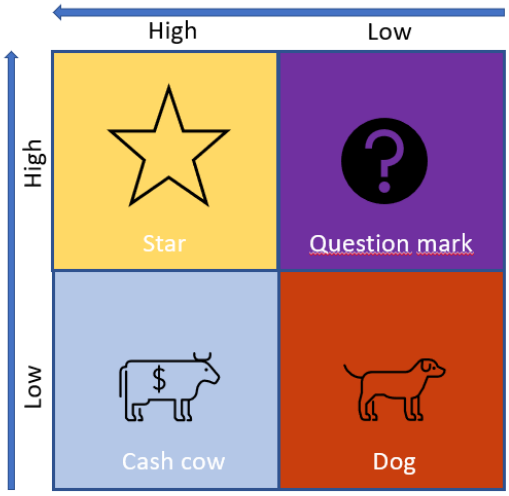

Figure 6 : An example of the BCG Matrix.

The Optimization Methods

The Optimization Methods are based on the maximal benefit with the defined objectives. These models often include mathematical programming. (Archer's & Ghasemzadeh, 1999). These two characteristics are not relevant in this case study. The optimization methods are excluded from this study. The models are not presented further.

4.3 Findings

In this study, the question about how to prioritize the procurement assignments, was addressed. First, the factors that influence the prioritization of the public procurement in the case organization was investigated. Then, it was explored, how the identified requirements are met in the selection of the project portfolio selection methods.

When considering the factors that influence on prioritization of the procurement assignments in the case organization, following finding were made. In the municipality level there are several factors as public welfare, legislation, obligations and responsibilities, strategy, political decision-making, risks, organizational structure, and distribution of the work. In addition, the factors were examined especially from the public procurement point of view. The additional factors that should be considered in prioritization process relate to law, budgeting, procurement nature, entity, value, and relation to other entities. When considered in practical level, the factors can be differentiated and categorized to influence more precisely on the process, the method used for the prioritizing or the assessment of the actual priority of the assignments.

The prioritization process is greatly influenced by the organizational structure and the distribution of the work. The co-operation between the service areas and the shared service functions create demand for the prioritization of the assignments. The extent of the organization also creates the requirements for the prioritization method. The assessment should be transparent and the method easy to understand. Many of the identified factors impact the timeline of the prioritization process. This should be taken into account when developing the framework in later stages. Almost all the factors identified should also be registered in the assessment of the priority. The strategic fit, obligations by the legislation, the risks and the relation to other project should increase the priority. Those can be set as a criterion or taken into account otherwise in the prioritization process.

In this study, the project portfolio selection methods as a practical solution to answer the research question, how to prioritize the procurement assignments, was investigated. The identified factors impacting the prioritization of the procurement assignments in the case organization helped to identify the requirements for the selection methods. When the delimited group of the project portfolio selection methods were evaluated, it was discovered that the main limiting requirements seem to be the scalability and the format of the results.

To the requirements that were set, following three methods seem to be giving the best response: the Q-Sort, the Analytical Hierarchy Procedure, and the Weighted Scoring Model. The Analytical Hierarchy Procedure and the Weighted Scoring Model share many similarities. The main difference is the details of the criteria. The Analytical Hierarchy Procedure considers more on the criteria levels that supports the complex evaluation needs. These both methods are possible to conduct without teamwork. The information can be given by the responsible person or several persons separately as the scores are visible also afterwards for the others to re-assess it if needed. The Q-Sort is a different kind of method from the process point of view. In the Q-Sort the prioritization requires an iterative groupwork and an active participation of the decision-makers to define the outcome.

5 Discussion and conclusions

This chapter contains the discussion, the concluding remarks, the managerial implications, and the limitations. In the end, the recommendations for the future research are presented.

5.1 Discussion

The literature supports the idea of utilizing the formal process in the prioritization process. A formal and monitored project portfolio management and its processes improve the quality of the decision-making and increase the possibility to success (Maceta & Berssaneti, 2019). In the public procurement, the success is often considered as a tendering procedure that have been conducted without any appeal to the Market Court. Instead, the success should be evaluated through the real results, the impacts and efficiency of the contract period. In the public procurement the best result is possible to gain only through careful preparations. This requires planning. In practice, it means that the best competences and enough time are allocated for the task. With the scarce resources this requires prioritization of the procurement assignments.

As mentioned already in the background discussion, the procurement assignment in the case organization varies greatly on difficulty and laboriousness. This causes a puzzle in the prioritization, how to compare the different assignments and define the ranking. The ultimate aim is to improve comparability and create common rules that different parties can approve the results. This study concentrated on establishing the main factors and proposing the suitable method. The definition of the priority and criteria remains to defined later in the case organization.

The in-depth literature review outlined the municipality as environment where the public procurement process is conducted. Both the municipality specific factors and factors rising from the procurement process should be taken into consideration in the

prioritization process. The analysis of the main factors that influence the public procurement practicalities in the case organization were mainly similar to ones identified in the literature review. As the literature review showed, the operations of the municipality are strongly directed by its position as a public organization where the regulations outline activities. In addition, the municipality sets themselves obligations and responsibilities. The strategy of the municipality should emphasize the central objectives and goals. The strategy is created to guide operations in long-term. At the same time, the political decision-making influences the course of actions and their timelines. At the root of the operations is the public welfare that arouse from the public interest, expectations, and accountability. When previously mentioned factors are looked from the case organization point of view, those all are identifiable and should influence the prioritization of the procurement assignments.

As recognized also in the literature review, the organization structure and distribution of the work is sometimes challenging in a matrix organization. Generally, the organizational structure, distribution of work and existing resources was defined as highly influencing factors to the public organization's decision-making. This seems to apply also on the case organization. But in addition, those are also the main factors creating the demand for the prioritization process. In the matrix organization can exist objectives, which might be conflicting when considered in operational level. This creates a puzzle for the resource allocation in the shared service units.

The factors particularly relating to the public procurement should be also included in consideration on the prioritization of the procurement assignments. The literature review reveals that the main characteristic for the public procurement is its regulated nature. The regulation outlines the procedures by giving the timeline for the actual tendering procedure.

The main factors influencing the public procurement practicalities were identified in the analysis and were verified in the literature review. The identified factors are generally

recognizable. So it is relatively easy to acknowledge that those factors should be taken into consideration in the prioritization. However, the actual problem how to capitalize the factors in actual prioritization still exists. The factors need to be put in a practical context, as those impact differently on the actual priority of assignments, the timeline of the process and the method used for the prioritization.

The organizational structure and distribution of the work can be seen as the main reason for the demand for prioritization of the procurement assignments. The process influences many units and persons in the organization. They might not necessarily see the need for the prioritization as they consider only their own procurement assignments. When developing the actual practical framework for the process, this should be acknowledged. The process should be simple, light to conduct and commonly agreeable. The prioritization process is not one-time activity, whereas there is constant need for prioritizing new and ongoing projects. The successful process needs shared rules and practises for the schedule and the protocols that are redactable for sudden urgent activities

The timeline of the prioritization process should be linked to other timelines in the organization. In the case organization exist already the procurement strategy that could be used as a foundation for the prioritization process. The main process can be fixed to the annual clock of the procurement planning that is described in the Procurement Strategy of the City of Jyväskylä (2021). The Procurement Strategy defines the responsibilities of the Procurement Steering Group. The Steering Group could also take charge of the verification of the prioritization process.

The selection of the method used for the prioritization is probably the most straightforward part of this case. Albeit, it needs to be taken into account that the project portfolio selection methods should be considered as supporting decisions, not as decision-making tools (Archer & Ghasemzadeh 1999).

The relevant alternative methods were identified. The Q-Sort, Analytical Hierarchy Procedure and the Weighted Scoring Model are all possible solutions to the case in hand. The Analytical Hierarchy Model can be recommended be used for the procurement assignment prioritization in the case organization. The strength of this method lies in the hierarchy of criterion. The hierarchy enables the selection of several criteria and different emphasis for each. From the process point of view, the assessment of individual assignments can be made by responsible person or unit. The final ranking can be verified by the decision-makers or the Procurement Steering Group as the evaluation can be examined afterwards.

Meredith et al. (2006, p.44) highlights that no selection method can present the complex reality of the organizational situation and the project environment. The methods provide only guiding information for the decision-making process, where decisions are made by the people. The continuous development and learning are important aspect in the way of creating the method. The method should support the current organizational situation and strategy instead of making bureaucratic and constrained new process phase.

In the heart of the prioritization are the criteria defining what does the organization value. However, setting the criteria for the public procurement assignments is not that simple matter. There are also other impacting factors that should influence the final ranking as identified in the analysis. Choosing the right criteria is the most challenging part of the prioritization. This will remain as a task of the case organization to define.

5.2 Conclusions

The research question of this study, how to prioritize the public procurement assignments, is answered in the scope defined in the beginning of this study. This study aimed to identify what is needed to take into consideration when prioritizing the public procurement assignments. The relevant factors that influence on prioritizing in the case organization were investigated. In addition, this study identified the existing project

portfolio selection methods and evaluated the suitability in the public procurement context. Regarding the findings the following conclusions are taken place.

The identified relevant factors impacting the prioritization are generally recognizable and acknowledgeable. The analysis show that those factors influence differently on the prioritization of the procurement assignments as some relate to the actual process, some create requirements for the selected method, and some give input for the criteria.

The portfolio selection methods delimitation was based on the framework introduced in the academic literature. The suitability of selected methods was evaluated in the public procurement prioritizing in case organization context. The requirements definitions were based on the analysis of the relevant factors in the case organization context. The main decisive differences of these methods were identified in the scalability and in the format of the results. Three most suitable solutions are the Q-Sort, the Analytical Hierarchy Procedure, and the Weighted Scoring Model.

As a conclusion, the findings of this study can be utilized in the actual development of the public procurement prioritization process in the case organization. Recommendations for the process development and the definition of the prioritization criteria were given in the discussion part of this study.

5.3 Managerial implications

The main managerial implication of this study is the project portfolio selection methods. Due to the big number of different techniques and methods for the project portfolio selection introduced in academic research, several taxonomies have been introduced to clarify the field. This study introduced two different ways of grouping the selection methods. However, the complexity and confusion are created through the different classifications and definitions. The terminology is confusing, whereas some researchers evaluate an induvial project with the selection method, others consider the portfolio as an entity.

This will cause a puzzle for any practitioner seeking for an applicable project portfolio selection method.

During the study, several managerial implications were recognized in the relation to this practical case study. In practise, the most challenging part of developing the prioritizing process will be the definition of the fitting criteria and their weights. Those need to be agreeable throughout the organization. The criteria need to be specific enough to create difference between the assignments but at the same time general enough to be able to evaluate different kind of assignments.

Another implication considers the actual prioritization process. For the wide-ranging pool of the procurement assignments, the information for the prioritization should be produced in the same format for each procurement assignment as the information needs to be comparable. In the optimal case, the information would be provided in agreed format by the responsible persons. When applied in the selected method, the results would be in an understandable and easily agreeable format.

The transparency and reliability requirements for the process cannot be highlighted enough. Those should be taken into account when defining the practicalities of the process. The framework for the prioritization of the procurement assignments should define, will the evaluation be done by individuals or group and who approves it. In the case of a group, the defining the sufficient number of the decision-makers is critical. These requirements relate also to the selection of the prioritization method. Some methods base the assessment on intuition or opinions without any transparency, where others rely on a group work. Some methods can be conducted in the way that the evaluation against criteria can be reviewed. The information and opinion behind the result should be visible and transparent. The procurement steering group can act as a decision-making body for the procurement assignment prioritization. But the group members should have enough information to support the evaluation.

In the case organization the long-term planning of the procurement assignments is lacking. The challenge in the planning of the procurement assignments occur due the many decisions depending on budgeting. The long-term planning suffers also about budgeting process which is done only in annual basis. In addition, each unit has probably their own planning practises. It does not cover and consider the full organization entity. That causes the planning puzzle in the shared services.

Based on the previously mentioned implications, it is recommended carefully implement a uniformly applied process across all procurement assignments and units in the case organization. The implementation process could include workshops together with the key stakeholders in order to involve the participants. The most suitable criteria and weights need to be agreed as well as the practises for the process and its governance.

5.4 Limitations

The main limitation of this study is related to the previous narrow research made concerning the project portfolio selection methods used for the prioritization in the public sector. Especially lack of the comparative cases in relation to the public procurement assignments.

Another limitation concerns the narrowness of the study. This study concentrates only to the process in the municipalities. The actual analysis is based on a case study of one such organization. For a generalized result, it would have been interesting and fruitful to compare the practicalities to other organizations.

The thesis faces time limitations. The original practical problem in the case organization will require still further work to realize a framework. This study provides a starting point. The development of the comprehensive prioritization process will require still development of the actual framework. The best possible outcome from the case organization point of view would require involvement of the key persons in workshop to reach the

mutual understanding about prioritization principles and criteria. The shared development project would also increase the commitment to the valuation process.

This study concerned only the procurement assignments. The delimitation was set because the variety of the assignments and projects in the municipality are wide. The definitions nor the prioritizing factors are comparable. The public procurement has its own characteristics with its regulated nature and complexity of the assignments that influence on the prioritization and the resource allocation.

5.5 Recommendations for the future research

This study concentrated only on the project portfolio selection methods with clear delimitations. This leaves open many possibilities for the future research. In the methods could exploited other solutions, as an example, mathematical programming. One clear research area could be the prioritization criteria for prioritization as a case study. Another research objective could be distinguishing the suitable process and the framework for the assignment prioritization. Maceta & Berssaneti (2019) highlight that the deployment of the process requires defining the structure and flow of the process and establishing the governance. The future research could also investigate the results of such implemented process and evaluate the possible further development needs.

In addition, the solutions for the prioritization of the procurement assignment could be investigated from other sources in academic research. From the prioritization and the resource allocation point of view, this study examined only workable solutions from the project management research. There are probably theories existing in other sciences or on the other application fields. The industrial engineering and the human resource management could have suitable solutions. On another hand, the different application possibilities for the prioritization process could be interesting to investigate. For example, the IT- projects benefit from the similar prioritization approach and there seem to be already more practices in use.

As final remark, it would be interesting to study the prioritization practises of other Finnish cities as well as other European cities. Apart from the municipalities, also other public organizations have similar procurement assignments, so the applicability of the process or existing practises could be studied also in those.

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Appendices

Appendix 1. The list of the procurement assignments

Retrieved 2022-9-21 from https://www.jyvaskyla.fi/hankinnat/avoimia-ja-tulevia-tarjouspyyntoja

Kilpailutus (Procurement assignment)	**Tyyppi (Type)**	**Taso (Level)**	**Suunniteltu julkaisu (Schedule)**	**Yksikkö (Department)**	**Yksikkö (Unit)**
Avosairaanhoidon (ml OmaKS) puhelinpalvelu	Palvelu	EU	Mar-22	Sosiaali- ja terveyspalvelut	Sosiaali- ja terveyspalvelut, tarvikkeet
Energiakatselmukset 2022	Palvelu	Kansallinen	Mar-22	Tilapalvelu	Energia
Henkilöstön osaamisen kehittäminen	Palvelu	Kansallinen	Mar-22	Henkilöstöpalvelut	Henkilöstöpalvelut
Heinälammen asuinkatujen ja vesihuollon saneeraus	Urakka	Kansallinen	Mar-22	Liikenne- ja viheralueet	Rakentaminen, tarvikkeet, urakat
Joukkoliikenteen liikennöinti	Palvelu	EU	Mar-22	Liikenne- ja viheralueet	Muu
Jäähallien ja tekojäiden kylmälaitteistojen huolto ja kunnossapito	Palvelu	EU	Mar-22	Kulttuuri- ja liikunta	Huoltopalvelut
Katuvalaistuksen rakennusurakka	Palvelu	Kansallinen	Mar-22	Liikenne- ja viheralueet	Rakentaminen, tarvikkeet, urakat
Kotihoidon tukipalvelut	Palvelu	EU	Mar-22	Sosiaali- ja terveyspalvelut	Sosiaali- ja terveyspalvelut, tarvikkeet
Liukkaudentorjuntamateriaalien (hiekka,sepeli) hankinta	Tavara	Kansallinen	Mar-22	Liikenne- ja viheralueet	Rakentaminen, tarvikkeet, urakat
Muuttopalvelut	Palvelu	EU	Mar-22	Kilpailuttamispalvelut	Ajoneuvo- ja logistiikkapalvelut
Pukkalan alueen katujen saneeraus 1. vaihe	Urakka	Kansallinen	Feb-22	Kaupunkirakenteen toimiala	Rakentaminen, tarvikkeet, urakat

Säynätsalon kirjaston kalusteet	Tavara	Kansallinen	Mar-22	Kulttuuri- ja liikunta	Kalusto, Kalusteet
Talvihoidon valvontapalvelut	Palvelu	Pienhankinta	Mar-22	Kaupunkirakenteen toimiala	Asiantuntija- ja suunnittelupalvelut
Tapahtuma- ja harrastekalenteri	Tavara	Kansallinen	Mar-22	Konsernihallinto	IT-laitteet, ohjelmistot ja -palvelut
Uimahallien kemikaalit	Tavara	Kansallinen	Mar-22	Kulttuuri- ja liikunta	Puhtaanapidon palvelut ja tarvikkeet
Vaajakoski-Jyskä alueelle uusi koirapuisto	Urakka	Pienhankinta	Mar-22	Liikenne- ja viheralueet	Rakentaminen, tarvikkeet, urakat
Vesinäytteiden näytteenotto-, kuljetus-, ja tutkimuspalvelut	Palvelu	Kansallinen	Mar-22	Kulttuuri- ja liikunta	Asiantuntija- ja suunnittelupalvelut
Videoiden ja podcastien tekstittäminen	Palvelu	Kansallinen	Mar-22	Kilpailuttamispalvelut	IT-laitteet, ohjelmistot ja -palvelut
Ateriakuljetuspalvelut	Palvelu	EU	Apr-22	Kylän kattaus	Ajoneuvo- ja logistiikkapalvelut
Kehävihreän opasteet ja asennus	Urakka	Pienhankinta	Apr-22	Kaupunkirakenteen toimiala	Rakentaminen, tarvikkeet, urakat
Paikallisliikennekeskuksen saneeraus ja laajennus	Urakka	Kansallinen	Apr-22	Kaupunkirakenteen toimiala	Rakentaminen, tarvikkeet, urakat
Psykologipalveluiden kilpailutus	Palvelu	EU	Apr-22	Sosiaali- ja terveyspalvelut	Sosiaali- ja terveyspalvelut, tarvikkeet
Ulkovalaistuksen keskussaneeraukset 2023	Urakka	Kansallinen	Apr-22	Liikenne- ja viheralueet	Rakentaminen, tarvikkeet, urakat
Tourujoen kunnostusurakka	Urakka	EU	Apr-22	Liikenne- ja viheralueet	Rakentaminen, tarvikkeet, urakat
Sisäilma- ja kuntotutkimukset	Palvelu	Kansallinen	Apr-22	Tilapalvelu	Asiantuntija- ja suunnittelupalvelut
Työturvallisuusriskien- ja vaarojen kartoitus- ja raportointijärjestelmä	Palvelu	Kansallinen	Apr-22	Konsernihallinto	IT-laitteet, ohjelmistot ja -palvelut
Vaajakosken kirjaston kalusteet	Tavara	Kansallinen	Apr-22	Kulttuuri- ja liikunta	Kalusto, Kalusteet
Valaisinvaihdot 2/2023	Urakka	Kansallinen	Apr-22	Liikenne- ja viheralueet	Rakentaminen, tarvikkeet, urakat

Geosuunnittelu, puitesopimus	Palvelu	EU	Vuonna 2022	Tilapalvelu	Rakentaminen, tarvikkeet, urakat
Hammashoitokoneet	Tavara	Kansallinen	Vuonna 2022	Sosiaali- ja terveyspalvelut	Sosiaali- ja terveyspalvelut, tarvikkeet
Hammastekniset työt ja uniapneakiskot	Tavara	EU	Vuonna 2022	Sosiaali- ja terveyspalvelut	Sosiaali- ja terveyspalvelut, tarvikkeet
Hissien ja nostolaitteiden huolto- ja kunnossapito	Palvelu	Kansallinen	Vuonna 2022	Tilapalvelu	Huoltopalvelut
Hotellimajoittuminen Jyväskylän keskustan alueella	Palvelu	Pienhankinta	Vuonna 2022	Kilpailuttamispalvelut	Muu
Kaupungin arkiston digitointipalvelun hankinta	Palvelu	Kansallinen	Vuonna 2022	Päätöksenteon tuki	Muu
Kallionlouhintaurakka	Urakka	Kansallinen	Vuonna 2022	Liikenne- ja viheralueet	Rakentaminen, tarvikkeet, urakat
Kiinteistönhoidon palvelut	Palvelu	Kansallinen	Vuonna 2022	Tilapalvelu	Huoltopalvelut
Kiinteistöpalvelujen laadunohjauksen ja kilpailuttamisen konsultointipalvelut	Palvelu	Kansallinen	Vuonna 2022	Tilapalvelu	Asiantuntija- ja suunnittelupalvelut
Kodinkoneet	Tavara	EU	Vuonna 2022	Kilpailuttamispalvelut	Muu
Kotoutumispalveluiden jälkihuoltonuorten liikkuvan tuen palvelut	Palvelu	Kansallinen	Vuonna 2022	Sosiaali- ja terveyspalvelut	Sosiaali- ja terveyspalvelut, tarvikkeet
Kustannussuunnittelu, puitesopimus	Palvelu	EU	Vuonna 2022	Tilapalvelu	Rakentaminen, tarvikkeet, urakat
Lastensuojelun jälkihuollon tukiasumisen palvelut	Palvelu	EU	Vuonna 2022	Sosiaali- ja terveyspalvelut	Muu
LVIA-suunnittelu, puitesopimus	Palvelu	EU	Vuonna 2022	Tilapalvelu	Rakentaminen, tarvikkeet, urakat
Maanrakennus-, piha- ja vihertyöt	Urakka	Kansallinen	Vuonna 2022	Tilapalvelu	Rakentaminen, tarvikkeet, urakat
Pää- ja arkkitehtisuunnittelu, puitesopimus	Palvelu	EU	Vuonna 2022	Tilapalvelu	Rakentaminen, tarvikkeet, urakat

Rakennesuunnittelu, puitesopimus	Palvelu	EU	Vuonna 2022	Tilapalvelu	Rakentaminen, tarvikkeet, urakat
Sprinklerihuolto	Palvelu	EU	Vuonna 2022	Tilapalvelu	Huoltopalvelut
Suun terveydenhuollon ostopalvelu	Palvelu	EU	Vuonna 2022	Sosiaali- ja terveyspalvelut	Sosiaali- ja terveyspalvelut, tarvikkeet
Sähkösuunnittelu, puitesopimus	Palvelu	EU	Vuonna 2022	Tilapalvelu	Rakentaminen, tarvikkeet, urakat
Turvajärjestelmätoimitukset (huolto ja ylläpito)	Palvelu	Kansallinen	Vuonna 2022	Tilapalvelu	Huoltopalvelut

Appendix 2. The feasibility study of the project portfolio selection methods

The analysis contains assessment against the following properties:
Properties required from the method:
User-friendliness/ Ease of use: Simplicity, Easy to understand and implement
Usability: Easy to conduct
Reusability and continuous assessment: Continuous assessment must be possible as new assignments are added to the list
Reliability: The evaluation needs to be reliable and acceptable (commonly agreed criteria and/or reliable decision makers group)
Scalability: Need to be able to compare prioritize up to 40 different assignments
Compatibility: Data available versus needed
Suitability: Result suitability for defined case – prioritizing list of assignments

Forced ranking
*User- friendliness: S*imple method, which is easy to explain and take into use.
Usability: Relatively easy to conduct. The great number of lines might cause challenge and requires precision
Reproducibility: Continuous assessment not possible as the ranking of one assignment influences other assignments ranking
Reliability: The evaluation is based on **i**ndividuals' intuitive evaluation without given agreed factors. As the assignments are originally from different functions the decision-makers should represent different functions or be commonly reliable**.**
Scalability: The great number of assignments is possible to evaluate, but the decision-makers should have a wide understanding of all assignments, so that reliable ranking would be possible.
Compatibility: The needed data is not defined, however each decision-maker's evaluation should be based on some assessment
Suitability: The result is applicable for prioritizing purposes. The only complication can be identified if some assignments will get the same total score and get the same rank number.

DICE Framework (project duration, performance integrity, the commitment and effort)
User-friendliness: Simple method, easy to explain and consider.
Usability: Relatively easy to conduct.
Reproducibility: Continuous assessment possible as each project gets own score
*Reliability: T*he assessment of the factors based on decision makers intuitional estimation, which could cause lack of confidence in results.
Scalability: The great number of assignments is possible to evaluate. However, the score would not provide a wide range of variation and several assignments could end up having the same score.

*Compatibility: T*he needed data is not defined, nor do the ready concepts on assessing the factor exist.
Suitability: The assessed factors (DICE) are not relevant for procurement assignments for prioritizing point of view. Even if the effort was high and integrity poor, the high score would not mean lower prioritize.

Q-sort
User-friendliness: Relatively simple, but process is time-consuming for decision makers and requires meeting time for discussions
Usability: The first part is easy to conduct as the decision prioritizes the projects. The discussion requires time, and a workshop needs to be arranged.
Reproducibility: The process is required to renew, when new objects appear. The time-consuming process need to be planned to reserve time from decision-makers
Reliability: The evaluation is based on the opinions of the decision-makers. However, the process requires only one knowing the object deeply as the process includes discussions to get the results
Scalability: The process is scalable, but more projects require more time for processing
Compatibility: Actual data is not needed for the method, however one of the decision-makers need to have deeper understanding about the object
Suitability: Suitable for prioritizing. Time-consuming process requires active participation from decision-makers.

Paired comparison
User-friendliness: Simple method, easy to explain and consider.
Usability: Easy to conduct. Based on pairing of all comparative assignments, requires certain moment for evaluation as the result might change.
Reproducibility: Continuous assessment not possible as the ranking of one assignment influence on others
Reliability: The evaluation must be done in an evaluation group, where shared opinion needs to be found. As the assignments are originally from different functions the decision-makers should represent different functions or be commonly reliable. The decision-makers should have a wide understanding of all assignments, so that reliable ranking would be possible.
Scalability: The great number of assignments is possible to evaluate. But difficult and time-consuming method for comparison of larger amount of objects
Compatibility: The needed data is not defined, however each decision-maker's evaluation should be based on some assessment
Suitability: The result is applicable for prioritizing purposes. The only complication can occur in the case of assignments getting the same total score and same rank number. However, paired comparisons can be reproduced between assignments sharing the same position.

Dollar Metric (Graded Pair Comparison)
User-friendliness: Simple method, easy to explain and consider.

Usability: Easy to conduct. Based on pairing of all comparative assignments, requires certain moment for evaluation as the result might change. The evaluation of the value for each might be difficult.
Reproducibility: Continuous assessment not possible as the ranking of one assignment influence on others
*Reliability: T*he evaluation must be done in an evaluation group, where shared opinion needs to be found. As the assignments are originally from different functions the decision-makers should represent different functions or be commonly reliable. The decision-makers should have a wide understanding of all assignments, so that reliable ranking would be possible.
Scalability: The great number of assignments is possible to evaluate. But difficult and time-consuming method for comparison of larger amount of objects
Compatibility: The needed data is not defined, however each decision-maker's evaluation should be based on some assessment
Suitability: The result is applicable for prioritizing purposes. The only complication can occur in the case of assignments getting the same total score and same rank number. However, paired comparisons can be reproduced between assignments sharing the same position.

Analytic Hierarchy Procedure
User-friendliness: Simple method, easy to explain and consider.
Usability: Easy to conduct.
Reproducibility: Continuous assessment is possible
Reliability: The result is based on evaluators opinion about project against criteria. The evaluation against each criterion is visible, which makes the evaluation more open and transparent.
Scalability: Possible to compare many objects.
Compatibility: The criteria must be defined in the organization. The evaluation does not need data as such, but evaluation requires understanding of the criteria and knowing the project in hand.
Suitability: The results are suitable for ranking and as such for prioritizing.

Standard gamble
User-friendliness: Simple
Usability: Easy to conduct. As based on comparing different outcomes
Reproducibility: The process can be ongoing as each project is evaluated individually.
Reliability: The evaluation must be done in an evaluation group, where shared opinion needs to be found. As the assignments are originally from different functions the decision-makers should represent different functions or be commonly reliable. The decision-makers should have a wide understanding of all assignments, so that reliable ranking would be possible.
Scalability: Not scalable
Compatibility: Not compatible as assignments results are not comparable or alternative solutions
Suitability: Not applicable in this context, creates solution between few options

Unweighted scoring method
User-friendliness: Simple method, easy to explain and consider.
Usability: Easy to conduct.
Reproducibility: The process can be ongoing as each project is evaluated individually. The rank of individual project may change when new assignments are evaluated.
Reliability: Transparent result. The evaluation of individual assignment can be done by the person responsible against commonly agreed criteria. The evaluations are then collected in summery where the final ranking occurs.
Scalability: Easily scalable
*Compatibility: T*he comparable criteria need to be defined, so that information is available
Suitability: The result is applicable for prioritizing purposes.

Weighted scoring method
User-friendliness: Simple method. The method is easy to explain and take into use, but requires definition of criteria and weights
Usability: Relatively easy to conduct.
Reproducibility: The process can be ongoing as each project is evaluated individually.
Reliability: Transparent result. The evaluation of individual assignment can be done by the person responsible against commonly agreed criteria. The evaluations are then collected in a summary where the final ranking occurs.
Scalability: Easily scalable
Compatibility: Challenge in finding the comparable criteria and deciding the weights.
Suitability: The result is applicable for prioritizing purposes. The weighting can help to emphasize the selected criteria and more precise total scores for ranking of multiple projects.

Portfolio matrices group (including different methods)
User-friendliness: Simple
Usability: The method is too simple in prioritizing context as the segmentation of assignments is difficult. The axels enable only two factors to be considered
Reproducibility: New evaluation can be made anytime
*Reliability: T*he evaluation is based on the opinions of the decision-makers. The decision-makers should have a wide understanding of all assignments, so that reliable ranking would be possible.
Scalability: Possible to evaluate many assignments. However, the differences in result are not accurate
Compatibility: Too simplified, for the complex prioritizing challenge
Suitability: The result is not applicable for prioritizing purposes