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Feasibility of In-house vs. Outsourced Project Management in Public Facility Implementation

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Foreword

I am so grateful for this opportunity to study in the Master Programme at Metropolia University of Applied Sciences. I am a big fan of the Finnish education system, I must say. I started the studies in September when pandemic restrictions were in effect and to have new things to think about in the form of studies and learning gave me a great pleasure - it was so refreshing. I also started a new job a month later. What could possibly be a better introduction to a new job than a thesis study made for the new workplace? I feel that I have learned so much in such a little time.

I want to thank all the teachers of Industrial Management studies, Mr. Haimala, Mr. Collins, Mr. Rohweder, and Mrs. Holappa. You are doing such an important job of educating us students by offering your professional knowledge and giving precious advice.

I thank all my colleagues whom I talked to during my thesis writing. Isn't it annoying when a novice chases answers, and asks questions nonstop? And still, you were a great sport. I am astonished by the amount of experience which lies in these project management teams, and how the team leaders of these teams are so aware of the city procedures and how capable they are. Thank you all.

What an experience this was!

May 26, 2022, Helsinki
Tarja Holopainen

Abstract

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The Urban Environment Division of the city of Helsinki implements several smaller construction and renovation projects annually. The project management function of these projects is undertaken either by the city personnel or hired project management consultants. The objective of this thesis was to establish a concept to evaluate the feasibility of internal versus external project management, since a systematic approach to analyze project management between internal and outsourced project managers was missing.

After setting the objective, the study started by searching ideas on evaluating project management feasibility from relevant literature in order to find a suitable evaluating concept. However, a suitable ready-made concept was not found. Instead, three parameters were discovered to be suitable for both internal and external project management. The parameters were cost, expertise, and flexibility, which formed the conceptual framework. The approach of the case organization's project management was studied with the help of the conceptual framework by exploring two examples implemented during past years, one executed by internal and other by external project managers. An initial concept was adjusted by improving weaknesses found in studied examples and by interviewing stakeholders. The initial concept was validated by simulating it with completed projects. For this study several project managers of the case organization were interviewed, as well a couple of team leaders of the project units. Internal databases and informal conversations were used for information gathering as well.

The outcome was a concept in the form of an excel spreadsheet for evaluating project management choices between in-house and outsourced project management functions before the implementation for the small projects. The in-house project manager is the appraiser for the project when evaluating cost, expertise, and flexibility aspects in project management.

Keywords: In-house project manager, outsourced project management, project managers, public facility implementation

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1 Introduction

A large amount of literature exists on the project management topic. It is often said that important measures for the project management are cost, time, and quality (e.g. Atkinson, 1999:338). In the construction business safety is generally added to this list as well (e.g. Hughes et al., 2004:31). In the municipal context successful project management also requires knowledge of the legislative framework and organisational understanding on public institutions (Berman et al., 2004:35).

1.1 Business Context

The Helsinki Urban Environment Division manages public facilities and properties owned by the city of Helsinki. The city owns around 2000 buildings; some of them are considered as landmark buildings, such as the Finlandia Hall, the Central Library Oodi, or the Olympic Stadium. However, the larger part of these facilities affects the daily lives of Helsinki residents and are located in residents' own neighbourhoods. These facilities can be schools, day-care centres, libraries, or sport facilities.

The budget of the city of Helsinki allocates money annually for its public service facilities investments, e.g. new constructions, renovation, demolition. The 2022 budget allotted over 250 million euros for these building investments. (Helsinki Budget, 2022).

1.2 Business Challenge, Objective and Outcome

The implementation of the city of Helsinki construction investment project is coordinated and monitored by the city Facility service. The project management of these projects is either carried out by the project manager of the city, or by a hired consultant contracted from an external company, or it can be a combination of both.

The project management tasks are related to the phases in the project life cycle: project initiation, project planning, project execution and project closure. (Van der Waldt, 2010:252). One measure of project success is the project management: the degree to which implementation meets the budget, schedule and technical specification. (Dvir et al., 1997:5).

Some of the project management tasks are required by the law and authorities, while some of the tasks are required by the employer. The tasks of consultant project managers are specified in an employment contract. The city of Helsinki functions must follow the municipal administration legislation and acts on public authority.

The construction work, and the site management duties are carried out by a competitively tendered construction company. The tendering process is organised by the city procurement unit according to the requirements of law. Smaller construction projects can be executed by Stara, which is an internal construction service provider for the city of Helsinki, or by a company which is on the list of the annual contract agreement composed by the city procurement unit.

The Project Unit of the Facility service is the commissioner of projects. There are two project units, and these project units have around 50 persons specialised in project management tasks. The Project Unit appoints the project manager for a project, and the project manager evaluates how to conduct the management of the project. The questions they need to ask include: to do it by themselves, or shall a management consultant be hired? Does the city project manager work alongside a consultant, and if so, how involved will the city project manager be?

The organization of the city of Helsinki consists of the central administration and four divisions. One of the divisions is the Urban Environment division. The Urban Environment division consists of three units, and one of these units is Building and Public Areas. The unit of the Building and Public Areas has three

subunits and one of the subunits is the Facilities. The Project Units are located under the Facilities in the organizational chart.

Figures 1, 2, and 3 below show the city of Helsinki Urban Environment, Building and Public Areas, and Facilities, which are highlighted in grey, organised in a chart format.

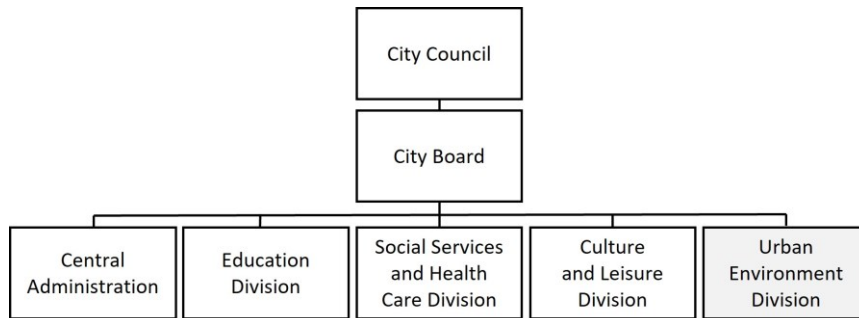


Figure 1. City of Helsinki administrative organization.

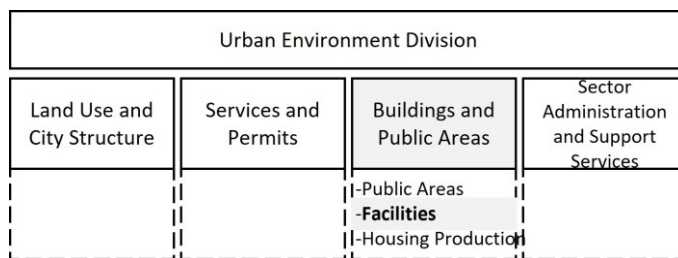


Figure 2. Urban Environment Division organization.

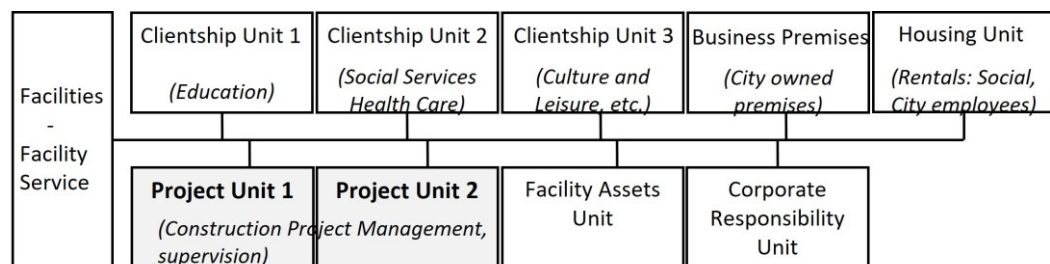


Figure 3. Facilities organization.

Figures 1, 2, and 3 above present the administrative organization of the city of Helsinki and the Urban Environment Division.

The specific objective of this study is to establish a concept to evaluate the feasibility of internal versus external project management in the city of Helsinki public facility construction projects.

1.3 Scope and Outline of Thesis

The scope of this thesis is to establish a concept to evaluate the feasibility of the construction project management in the case organization between in-house project management or outsourced hired management consultant.

This study contains a traditional type of the construction project, not alliancing or public-private partnership, and it is a study regarding construction of a new building and renovating or demolition projects. This study concerns smaller city projects, not big or mega-projects.

This study is organized in seven sections. The Introduction is followed by Section 2, which explains the research approach, the research design, and the data collection plan.

Section 3 describes ideas on evaluating project management feasibility from relevant literature, both in-house and outsourced project management, and it creates a conceptual framework in order to have a united approach on how to evaluate projects carried out in the case organization.

Following Section 3, Section 4 focuses on analysis of feasibility evaluation done in the case organization so far with the help of the conceptual framework created in Section 3.

Section 5 is built on the outcomes of Sections 3 and 4 and establishes an initial concept for evaluating project management feasibility in the case organization.

The initial concept created in Section 5 is validated in Section 6 by using the case organization's data of in-house and outsourced examples.

The final section, Section 7, of this thesis provides the conclusions with a summary, suggestions for next practical steps towards implementation, and a self-evaluation of the thesis project credibility and some final words.

2 Project Plan

In the previous section the business context, challenge, objective, and outcome of the study were introduced. This section describes the selected research approach and the research design of the thesis. It explains how the data collection for the thesis was carried out as well.

2.1 Research Approach

The research approach of the thesis is applied action research. Applied action research is used for practical development projects where the researcher is closely involved in the project. It uses mainly qualitative methods, such as interviews and workshops for data collection. It is conducted in organisations in order to improve operations. (Kananen, 2013).

The research project of this thesis is a practical type of problem; how to evaluate the feasibility of in-house versus outsourced project management. The author of the thesis is an employee of the organization in question. The author is aware that this insider's view may subconsciously affect thinking; to keep the research values neutral and open is essential. However, the practical experience on the matter facilitates the author to communicate with the informants of the research, who have a close relationship with the subject and are directly involved in the matter at hand.

The findings of the thesis have practical value to the case organization and the content of the thesis improves the overall understanding on the matter.

2.2 Research Design

This section describes the research strategy the thesis is based on. The research design provides the explanation of how the thesis project was conducted and the different stages of the research process.

The research design plan shows the objective and four successive stages of the research. The purpose of the first stage is to find ideas from the literature and the outcome of this stage, the conceptual framework, works as input for the second stage, which is analysing the current state. The outcome of the current state step, the pros and cons of the current evaluation approach, provides input for the next stage which establishes the initial concept. The outcome of stage three, the initial concept, is the input for the final stage four, the validation. The outcome of stage four is the validated concept.

Figure 4 below shows the objective and the four stages of the research. The input data for the stages is presented, as well as the outcome of each stage. The content of every stage is presented in grey boxes.

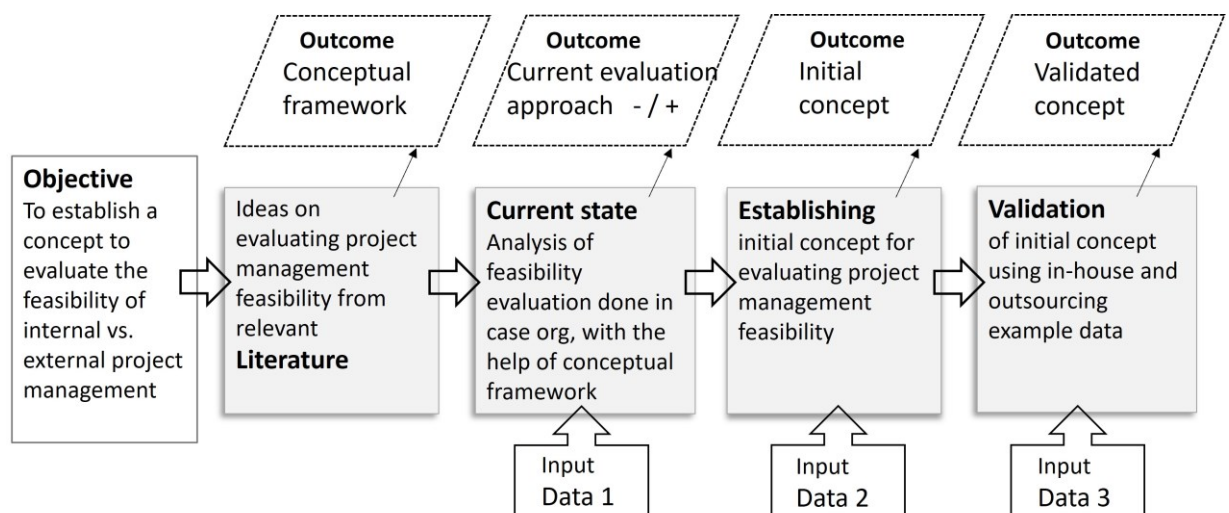


Figure 4. The research design plan.

The different stages of the thesis research, as shown in Figure 4, were chosen to be in this successive order as it best supported the thesis objective on how to evaluate the project management feasibility. The case organization had no clear evaluation concept that the author of the thesis had knowledge of, so at the beginning it was unclear how to analyse the project management of the projects delivered in the case organization so far. In order to find the best suitable conceptual framework for that, it was essential to gain more knowledge and search literature to find suitable evaluation solutions. Once the conceptual framework was created with the help of relevant literature, the evaluation of the projects conducted in the case organization were examined. The findings, the strengths and weaknesses of the current state, gave the basics to establish the initial concept. The initial concept was validated by using the example project data of the case organization in order to reach the final validated concept.

2.3 Data Collection Plan

The data collection plan is a structured document where the relevant information needed for the process of the thesis is planned beforehand. It is tightly linked to the objective of the thesis.

The data collection strategy of the thesis consists of interviewing the stakeholders who are also the power holders. The experience, the expertise and the knowledge of the stakeholders are collected with the formal interviews. The informal conversations are used to provide viewpoints to the author of the thesis. The internal databases and documents of the case organization are used to produce insights into the subject.

Table 1 below shows the basic information on data 1, 2, and 3. It describes why the data was collected, what the content and the source of each data was, who the informants were, and what the outcome of it was. The timetable of the data gathering is presented as well.

Table 1. The data collection plan.

Data Collection Plan

		Content	Source	Who	When	Outcome
Data 1	G4	Description of current evaluation approach	Internal documents and databases, 1to1 interviews	Inhouse Project managers, Team leaders, Construction cost estimator	February	Current evaluation approach, its strengths and weaknesses
Data 2	G5	Improving weaknesses of current state	Internal database, 1to1 interviews	Inhouse Team leader , Inhouse Project manager	March, April	Initial concept
Data 3	G6	Improvement ideas to initial concept using example data	Internal project database, 1to1 interviews	Inhouse Team leader and Project manager	April, May	Validation of initial concept

Table 1, the data collection plan, shows the purpose and the content of each data collection stage, from data 1 to data 3, besides the source and the outcome of each stage.

The interviewees are employees of the case organization. They all work at the project management functions. All interviewees, team leaders, project managers, and cost estimator, were interviewed in Finnish. The interviews were documented in Finnish, and then translated to English. The interviews were performed face-to-face. The interviews were semi-structured, since the questions were decided beforehand, but the interviewees decided what to say in relation to the planned questions. All documented interviews are shown in Appendix 1 of the thesis.

The internal databases of the case organization are the real estate management/project investment register, which is a real-time database software, and different network disk drives where the old project information is

stored. Probably the project information is stored on the computers of the employees as well and is available when asked.

The current project information is mostly in the online project bank of the case organization. The project bank is used for the information management of a single project and storing the documents and the plans of the projects conducted for the past years. The project bank is accessible to different parties of the project, for the in-house personnel and consultants via digital rights management. Moreover, the intranet of the case organization is a good and versatile source of information.

This section 2, The Project Plan, consisted of the thesis research approach, the research design, and the data collection plan in a more detailed manner. The next section describes the ideas on how to evaluate project management feasibility from the relevant literature.

3 Ideas on Evaluating Project Management Feasibility from Relevant Literature

The purpose of section 3 is to discuss ideas on how to evaluate the project management feasibility from relevant literature. The outcome of this section is a conceptual framework which is needed to evaluate the current state of the project management of the case organization. In section 4 the project management of a few selected projects carried out in recent years are analysed with the help of the conceptual framework created in this section.

Pinto (2022: 4-8) reflects on the past 40 years of the literature on project management theory. It praises e.g., *The Anatomy of Major Projects* by Morris and Hough (1987) and emphasises a life cycle view of the project management research and practice on an s-curve as shown in Figure 5 below. It is significant to notice that an s-curve is in use in project management. The s-curve is a mathematical illustration of the cumulative data for a project, for example costs.

It tracks the progress of the project over time, and it is a way to monitor past, current, and forecasted data in a diagram.

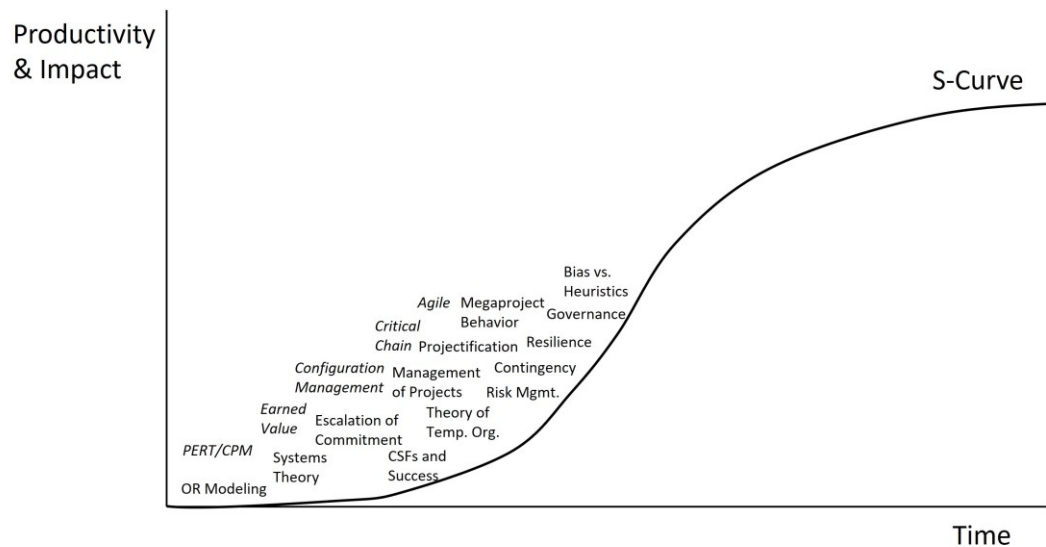


Figure 5. A life cycle view of the project management research and practice (Pinto, 2021: 5)

In Figure 5 above a life cycle view of the project management research and practice over the past decades is presented on an s-curve by Pinto.

The “iron triangle” of cost, time and quality is the essence of project management (Atkinson, 1999:338). The success in project performance is based on all of these, or any of them (Bjeirmi and Munns 1996:81). The project success or failure is perceived differently by the parties who are involved in the project (Alias et al., 2014:61). Using the project, as opposed to project management, as the unit of study enables the development of an understanding of the role and dynamics of projects (Dalcher, 2012:647).

In project management there are factors related to the project, the project managers and the team members, the organization, and the external environment (Belassi and Tukul 1996:143). The project manager competencies can be divided into six dimensions: industry-specific knowledge, project management knowledge over industry specific skills, managerial skills, personal

traits, project management methodology experience and professional qualifications, risk management over a project life cycle (Chipulu et al., 2013:506).

This study concentrates on the project managers: costs and benefits between in-house and hired project manager functions. Therefore, factors related to the external environment were ruled out from the start. These include quality, risk management, customer satisfaction, interfacial communication etc. All these aspects are multifaceted, highly important and certainly worthy of studies of their own and are excluded from this study.

During the initial literature search on the topic of the project management feasibility, the shape of the framework crystallized; it is not a mathematical modelling, or a programming approach. Instead, the result must be a practical common-sense type of an evaluation or a template, easily doable without any further investments on resources or instruments.

Several ready-made project management (PM) methodologies are available through different websites. The European Commission offers free to use PM² methodology, which can be tailored to specific needs of the companies. It is an excellent and thorough material on the subject. Many consulting companies have their own project management methodologies, such as the McKinsey 7-S model or the Deloitte PMO. The project management associations and institutes (e.g. PMI, APM, IPMA) offer services on this matter as well. As the ready-made models concentrate on the whole lifecycle of the project with all its aspects, these models do not, however, serve the need of this thesis as such.

In order to organise the ideas on how to search and which topics to explore, the attention of the project management feasibility was in parameters, regarding both in-house and outsourcing feasibility. The feasibility was seen as a matter of costs and benefits. The ideas concerning cost and benefit were searched and the parameters discovered, and after pondering if different parameters were observable, they were selected. After the parameters were settled, the variables

of the parameters were searched. The third part of the search centered on finding different comparison and measure models and the fourth step was to select suitable models. Figure 6 below illustrates the literature search steps in a schematic way as described above. It is designed by the author of the thesis.

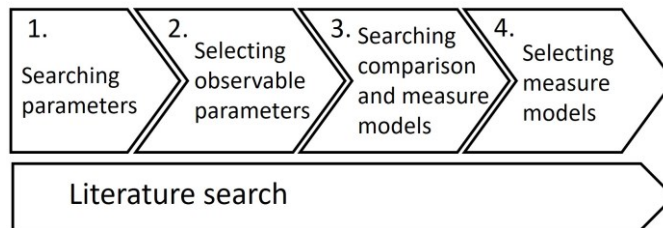


Figure 6. Schematic illustration of the literature search.

As shown in Figure 6 the literature search was composed of four steps: parameters were searched, and observable parameters were selected. Comparison and measure models were searched, and suitable measure models were selected.

Besides the preselected factor, the cost, two other factors regarding the benefits arose in different papers: expertise and flexibility (e.g., Hölzle, 2010:781). These factors appeared especially for the outsourcing topic (Ekezie, 2019). Thus, the below mentioned three factors were chosen for both in-house and outsourced measures:

- Cost
- Expertise
- Flexibility

Table 2 below renders the parameters of cost, expertise and flexibility and the key words how the parameters were found, as well the literature searched around the key word topic.

Table 2. The literature search list.

Parameter	Key words	Supporting literature
Cost	Public sector, cost analysis, efficiency, cost-efficiency	Boardman et al., 2017; Stevens, 1984; Chong et al., 2009; Pinto et al., 2008; Grönroos, 2018
Expertise	Project management, project management competences, success in projects	Atkinson, 1999; Baylor, 2001; Belassi et al., 1996; Hölzle, 2010; Adler et al., 2018; Hughes et al., 2004; Acar et al., 2021
Flexibility	Contracting out, outsourcing, consulting services, decision making, comparison, evaluation	Autry et al., 2007; Lahajnar et al., 2015; de Boer et al., 1998; de Boer et al., 2001; Michalak et al., 2006; Jude et al., 2005; Kee et al., 2003; Poutvaara, 2014; Appelbaum et al., 2004

Table 2 above summarizes the literature searched on the parameters. The parameter of cost was chosen from the start. The content of it was not clear though. Thus, different key words were used to find out possible dimensions for the parameter of cost. The parameters of expertise and flexibility were selected during the literature search, including the specific content for them. Flexibility was seen as a matter of outsourcing, evaluation, and decision making as well.

The selection of the parameters cost, expertise and flexibility was confirmed during the informal conversation between the author of the thesis and the team leaders in January 2022. Team Leader 1 expressed that substituting is an important factor (=flexibility) since the management of a project should not be at the hand of one person but more. This secures the smooth advancement of a project, even if the project manager falls ill or leaves the job. Team Leader 2 argued that an important thing is the master's voice, meaning that there are different policies to look after in a municipal project, and without the knowledge on the public functions, it is a difficult task to deliver (=expertise). While the person in charge of the project cost calculation wondered about the ever-growing project management costs during past years (=cost-efficiency).

3.1 Cost

To measure and compare costs, three key cost evaluation systems were investigated: cost-benefit analysis (CBA), cost-effectiveness analysis (CEA), and cost allocation, which is also called economic evaluation or efficiency assessment. These three systems are shortly presented below. (Boardman et al., 2018).

- The **cost-benefit analysis (CBA)** is a systematic cataloguing of impacts as benefits and costs, pros and cons, valuing in euros, and then determining the net benefits of the proposal relative to the status quo. CBA applies to projects, and it is used when choosing an alternative over another. Traditionally a cost-benefit analysis has been conducted for a feasibility analysis (Jo et al., 2015:1864). The challenging task in the CBA is monetizing all relevant impacts as benefits and costs. All impacts should be measured and valued.
- The **cost-effectiveness analysis (CEA)** can be useful when the major benefit is difficult to monetize. The CEA focuses on an impact on a single metric. It examines the cost per outcome. It is used commonly among the health economic studies, or the energy efficiency investment exploration. The CEA is a method for choosing among alternatives. In this method the parameter's uncertainty arises, as well as in the CBA.
- The **cost allocation** is an approximate method. The process starts with the identifying an object (e.g. a programme, a product) and then establishing all the elements of the cost for this (e.g. labor cost, office rent, fuel). When identifying the costs an appropriate base is needed where costs can be allocated. There exist two types of costs: direct and indirect (overhead) costs. The direct costs can be material and labour costs, and the indirect costs are any cost that is not traceable to direct costs. The cost allocation result is arbitrary as costs are not directly traceable.

The cost allocation method was considered the most suitable for calculating the feasibility of in-house vs. outsourced project management. Though all these approaches are such where inputs or outputs can be distorted to match the needs.

Two other formulas concerning costs emerged, interestingly, the break-even point (Patrick, 1958: 577) and the Pareto Principle (PM², 2021:104). The break-even point (BEP) is the point where the worth of the efforts or inputs equals the

worth of the result or outcomes. At this BEP point there is no gain or loss. The BEP point helps to understand better if the task is viable. The break-even point can be a practical method when comparing the unit prices with the budget, or when calculating the percentages.

The Pareto Principle is called the 80-20 rule as well. It is a concept, or an observation where 20% of the inputs causes 80% of the outputs. The Pareto Principle helps to identify, and to concentrate on inputs which are most productive as 80% of results comes from just 20% of the action.

3.1.1 In-house and Outsourced Project Management, Cost

The cost-allocation appeared to be the most suitable approach for the cost comparison. The method of the cost allocation was chosen for the framework creation. The cost components of the cost allocation are direct and indirect costs. The allocated costs are related to human resources, facilities, and equipment.

The main cost component of the direct costs is the hourly fee for both in-house and hired project managers. The indirect costs, or the overhead costs, are costs related to other expenses, such as the office rent, electricity, maintenance etc. The cost-components of the in-house and the outsourced functions for the cost allocation are described in Table 3 below.

Table 3. The cost-components of in-house and outsourced project management.

In-house cost components	Outsourced cost components
Hourly wage, €/h	Hourly wage, €/h
Overhead costs: office space, internet, electricity, maintenance	Overhead costs: contract, invoicing, communication with in-house PM, cost of tasks performed by in-house PM

Absentee hours, injured employee	-
computer, telephone, public transport season ticket, staff training	-
Employee costs: pension TyEL 17%, holiday bonus, holiday pay, health care, insurance	-
In-house support units: HRM, IT, Finance, Communication	Support units of the client
How many other projects ongoing? Dividing the salary among projects.	-

Table 3 above explains how the cost of the in-house and outsourced project manager can be detected. Direct and overhead costs exist for both in-house and hired project managers. For in-house project managers the employee costs are more numerous though.

3.2 Expertise

In construction business a certain level of technical expertise is required (Alias et al., 2014:63). According to Hölzle (2010: 783) a survey concerning the experience and expertise of project management showed that these qualities were highly significant for 22 of the surveyed 25 companies. Hölzle also states that small projects are usually led by project managers, medium-sized projects by more experienced senior project managers and big projects the most senior project managers i.e., project directors.

The expertise component is related to the project size:

- Small projects
- Medium projects
- Big projects

The expertise is a personal condition where knowledge and skills required to perform actions in an educated manner are possessed. The project management and the construction work qualifications, degree, education,

knowledge, and expertise are important, and they can differ between project managers. The professional expertise helps a problem-solving ability in project management. The expertise may increase when the work experience increases. (Chan, 2016: 472-474).

The hired consultants are specialized in the knowledge of project management and the consultants of the project management business perform their role and duties with quality and expertise. The business of the consultant companies focuses on project management and its effectiveness. Their core competency is project management. (Michalak and Williams, 2006: 34).

The consultants provide competence not available elsewhere, they are professionals and independent, and they have time to study the problem (McKinsey). The outsourcing arguments can be contradicted by stating that many of the skills should presumably be available internally in large companies (Appelbaum and Steed, 2004: 70). By hiring a consultant, a company can attain the latest and fresh knowledge on the subject. The consultant often provides the latest specialized knowledge. In the literature on the outsourcing functions a common statement is that it will increase efficiency and reduce costs, increase managerial choice and flexibility, and increase expertise. Techniques and knowledge are best learned through exposure to and experience with many different companies (Appelbaum and Steed, 2004: 69).

The level of expertise influences the level of intuitive thinking; a novice is more immature in the availability of the intuition, and with the growing level of expertise the maturity of the intuition grows (Baylor, 2001: 237). Experts in a domain are more likely to make better gut decisions (Acar and West, 2021).

3.2.1 In-house and Outsourced Project Management, Expertise

The expertise components of the in-house and outsourced project management are employee related, such as the amount of the working years and the degree education. At this point of the study, it is uncertain how to evaluate the expertise

between in-house and outsourced operations since it is not a numerical valuation. The expertise components are described in Table 4 below: education, competencies, work experience, and field of expertise.

Table 4. The expertise components of in-house and outsourced project management.

In-house expertise components	Outsourced expertise components
How many years in project management and/or construction	How many years in project management and/or construction
Degree	Degree
Technical background	Technical background
Competency recognized by the employer	Competency recognized by the employer
In-house supporting units offer expertise which is lacking	Special type of expertise, which is lacking from in-house PM

Table 4 above shows how the expertise can be evaluated between in-house and outsourced project managers. The expertise is the number of working years, degree, and other competencies recognized by the employer. Lacking expertise in a certain task can be substituted or increased by an input of another employee.

In the project management function, the learning curve of the employees is growing after every project. The spread of best practises is diffused during the informal conversations and in the meetings, knowledge can be shared. Best Practice is a universal term including techniques, procedures, or methodologies reliable to enhance project performance (Hwang et al., 2010: 957).

3.3 Flexibility

Flexibility concerns the resource management, the flexibility of personnel structures. It is a scheduling approach of the projects and staffing the projects. With the flexibility of resources companies can manage their activities with fewer employees. The flexibility is also a personal flexibility, the ability to change, the way project managers build new competencies and adopt new technologies (Alias et al., 2014:63). It is an ability to adapt to the strategies of the organization. It is the ability to estimate, budget, and control cost.

Flexibility relates to the expertise parameter of competency. By staffing together in a project for example a beginner and an expert, the company stimulates the learning process of a beginner and will achieve benefit later with the increased staff competency (Michalak and Williams, 2006: 30).

The flexibility of the personnel structures is one of the main benefits in outsourcing. Consultants can be hired based on the ongoing projects, personnel expenses during the no-project time are non-existent. A flexible process allows multiple solution possibilities (Autry et al., 2007: 4).

3.3.1 In-house and Outsourced Project Management, Flexibility

The outsourcing level in the projects of the case organization is such where consultant participation varies. However, the owner owns the responsibilities for the project manager functions ruled by the law. That is, the owner of the project is the city Project Unit, which is represented by the in-house project manager, even when different tasks of project management are outsourced. The ultimate responsibility lies always with the owner.

The project management functions are such that the everyday presence at the real construction site is not required. The construction site management is carried out by the construction company. The responsibility of the construction work implementation according to the requirements of the contract and by the

regulatory environment lies in the construction company. The construction work is competitively tendered and outsourced.

Commonly the outsourcing level of project management of the case organization is described as a team of two persons, an in-house project manager and a hired project manager. This type of an extended team model is typically in use in the IT sector, where the existing internal team is complemented with the knowledge of a hired consultant (e.g., Babar et al., 2013). In the case organization the participation level of the hired project manager depends on the evaluation and decision of the in-house project manager. The decision to outsource depends usually on the project size and duration, the number of outgoing projects simultaneously, or on the skills which consultants can provide.

All the construction implementation projects of the case organization are executed in the Helsinki area, the outsourcing level of project management can hardly be such where the function is outsourced offshore, even if the constant presence during the pre-construction and the construction stage is not necessary and online services are evolved. Tools for remote project management are evolving though, and a hybrid office with remote working already exists.

The level of outsourcing or the degree of partnership is following (adapted from Autry et al., 2007:7).

- in-house only
- out-tasking
- co-managed service
- managed service
- outsourcing

Table 5 below illustrates the degree of the outsourcing or the partnership level between two parties. The degree of partnership and/or outsourcing is an imaginary level at this point of the study. It is a scale from the in-house function

only to the total outsourcing. The total outsourcing of project management needs certain in-house functions; thus, it is not 100 % outsourced.

Table 5. The degree of partnership between in-house and outsourced project management.

Degree of partnership	In-house	Outsourced
In-house only	100 %	-
Out-tasking	70 %	30 %
Co-managed service	50 %	50 %
Managed service	20 %	80 %
Outsourcing only	5 %	95 %

Table 5 above shows the flexibility in the project management function. The project management can be carried out according to a diverse partnership or outsourcing level between in-house or hired project managers.

3.4 Conceptual Framework

During the literature search the author of the thesis aspired to find a conceptual framework which is for evaluating both in-house and outsourced project management functions. The ready-made concept was not found, but the parameters of cost, expertise and flexibility seem to meet the need for the project management evaluation.

Figure 7 below explains the conceptual framework principles. The conceptual framework is a combinatory framework of the elements of cost, expertise and flexibility and was created during the literature search by the author of the thesis.

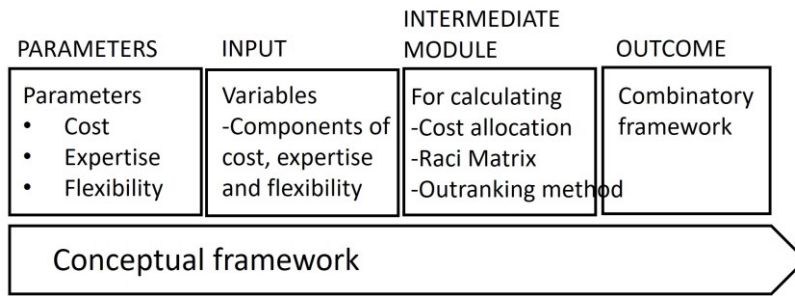


Figure 7. The conceptual framework.

As shown in Figure 7 above, the conceptual framework consists of three parameters: cost, expertise, and flexibility. The components of these parameters are calculated and ranked via intermediate modules. The outcome of this is a combinatory framework, which forms a conceptual framework.

The conceptual framework starts with the identification of the budgeted project management cost and the estimated duration of the project in weeks. The budgeted project management cost can be divided in different scenarios depending on the outsourcing/partnership degree i.e., flexibility. The cost components formulate the hourly wage for the in-house and hired project managers, and this fee affects the different scenarios. The expertise parameter is used to judge the expertise of the project manager and if a need for special expertise in the project at hand is required.

Figure 8 on the following page shows three elements which form the conceptual framework: cost, expertise and flexibility, and the content of each element.

Conceptual Framework

EXPERTISE

In-house expertise components	Outsourced expertise components
How many years in project management and/or construction	How many years in project management and/or construction
Degree	Degree
Technical background	Technical background
Competency recognized by the employer	Competency recognized by the employer
In-house supporting units offer expertise which is lacking	Special type of expertise, which is lacking in-house PM

Atkinson, 1999; Baylor, 2001; Belassi et al., 1996; Hölzle, 2010; Adler et al., 2018; Hughes et al., 2004; Acar et al., 2021

Feasibility of internal vs. external project management?

FLEXIBILITY

Degree of partnership	In-house	Out-sourced
In-house only	100 %	-
Out-tasking	70 %	30 %
Co-managed service	50 %	50 %
Managed service	20 %	80 %
Outsourced	5 %	95 %

Autry et al., 2007; Lahajnar et al., 2015; de Boer et al., 1998; de Boer et al., 2001; Michalak et al., 2006; Jude et al., 2005; Kee et al., 2003; Poutvaara, 2014; Appelbaum et al., 2004

COST

In-house cost components	Outsourced cost components
Hourly wage €/h	Hourly wage €/h
Overhead costs: office space, internet, electricity, maintenance	Overhead costs: contract, invoicing, communication with in-house PM, cost of tasks performed by in-house PM
Absentee hours, injured employee	-
computer, telephone, public transport season ticket, staff training	-
Employee costs: pension TyEL 17%, holiday bonus, holiday pay, health care, insurance	-
In-house support units: HRM, IT, Finance, communication	Support units of the client

Boardman et al., 2017; Stevens, 1984; Chong et al., 2009; Pinto et al., 2008; Grönroos, 2018

Figure 8. The conceptual framework.

As shown in Figure 8 in order to evaluate the feasibility of project management, if it is carried out by in-house personnel or hired consultants, the conceptual framework was created with parameters of cost, expertise, and flexibility.

This section consisted of searching the relevant literature with the focus to have deeper ideas on how to evaluate the project management feasibility of the case organization. The conceptual framework was created. The next section describes how the feasibility of project management is carried out recently in projects of the case organization. A few projects are evaluated with the help of the conceptual framework created in this section. In section 5, an initial concept will be established and in section 6 the initial concept will be validated.

4 Analysis of Feasibility Evaluation Executed in Case Organization so far with Help of Conceptual Framework

In this section an analysis of the project management feasibility of the public facility implementation projects in the case organization is studied. A few projects and their project management executed so far are analyzed with the help of the conceptual framework created in previous section 3.

The case organization is a municipal entity, which is a non-profit organization. The basic public services are mostly financed by municipal tax revenue, central government transfers to local government and service charges (Association of Finnish Municipalities). Despite the non-profitability, the municipality functions still can be cost-efficient (e.g., Grönroos, 2019:775). The Helsinki City Strategy 2021-2025, A Place of Growth, stresses the importance of efficiency. The city actions strive for efficiency and a better input-output ratio (Helsinki City Strategy 2021-2025).

The Project Units of the Urban Environment division implement around 250 projects per year. The budgeted cost and size of the projects vary, the total annual cost of the projects being 250 million euros. The scale of the public facility implementation project is from small to mega-projects.

In the summer of 2017 over 30 different city of Helsinki administrative offices were closed, and a new structure of the four divisions was established. The Urban Environment division was created by merging seven technical offices. The employees, as well as diverse information systems of different technical offices moved to the new division of the Urban Environment.

In the city of Helsinki, the purchasing authority power concerning orders of the public facility implementation is presented in Figure 9 below. The team leaders of the project teams may authorize orders costing maximum 0,5 million euros, the leaders of the Project Units one million, the manager of the Facilities may authorize costs of maximum two million, the technical director three million, the sub-committee of the Buildings and Public Works five million, the City Board up to ten million and the City Council over ten million euros.

Purchasing authority (€)		
Team Leaders, Teams 1-5	< 0,5 million €	SMALL € 150k – 1M
Leaders, Project Units 1 and 2	< 1 million €	
Manager Facilities	< 2 million €	MEDIUM € 1M – 10M
Technical Director Buildings and Public Areas	< 3 million €	
Sub-committee Buildings and public works	< 5 million €	
City Board	> 5 million €	LARGE over € 10M
City Council	> 10 million €	

Figure 9. The purchasing authority power for orders, and the project size.

As shown in Figure 9 the projects are divided into three categories: small, medium, and large. This categorizing based on the project size in euros is not the official model, instead a choice of the author of the thesis.

In 2021 the execution of roughly 60 projects were initiated where project cost was at a maximum of a million euros i.e., small projects.

The project phases are similar to all project sizes, it makes no difference if the project size is small, medium, large, or mega. They all follow the phases of initiating, planning, executing, and closing. The duration of the phases is shorter in smaller projects. The tasks of the project manager are monitoring and controlling over these project phases, as seen in Figure 10 below.

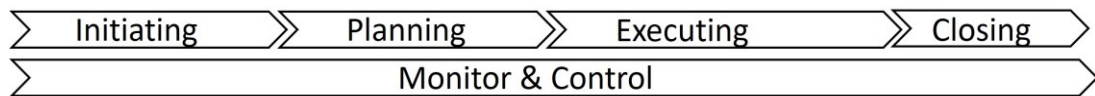


Figure 10. The main phases of a project and tasks of project manager during the project. (PM², 2021: 14).

As seen in Figure 10 above, the tasks of the project manager are monitoring and controlling over project phases of initiating, planning, executing, and closing.

Figure 11 below shows the tasks and activities of the project manager of the case organization. These tasks are organized in project phases: project start, pre-planning, implementation planning, construction, and post-construction. The project management approach is tailored to the needs of the project.

Tasks of project manager

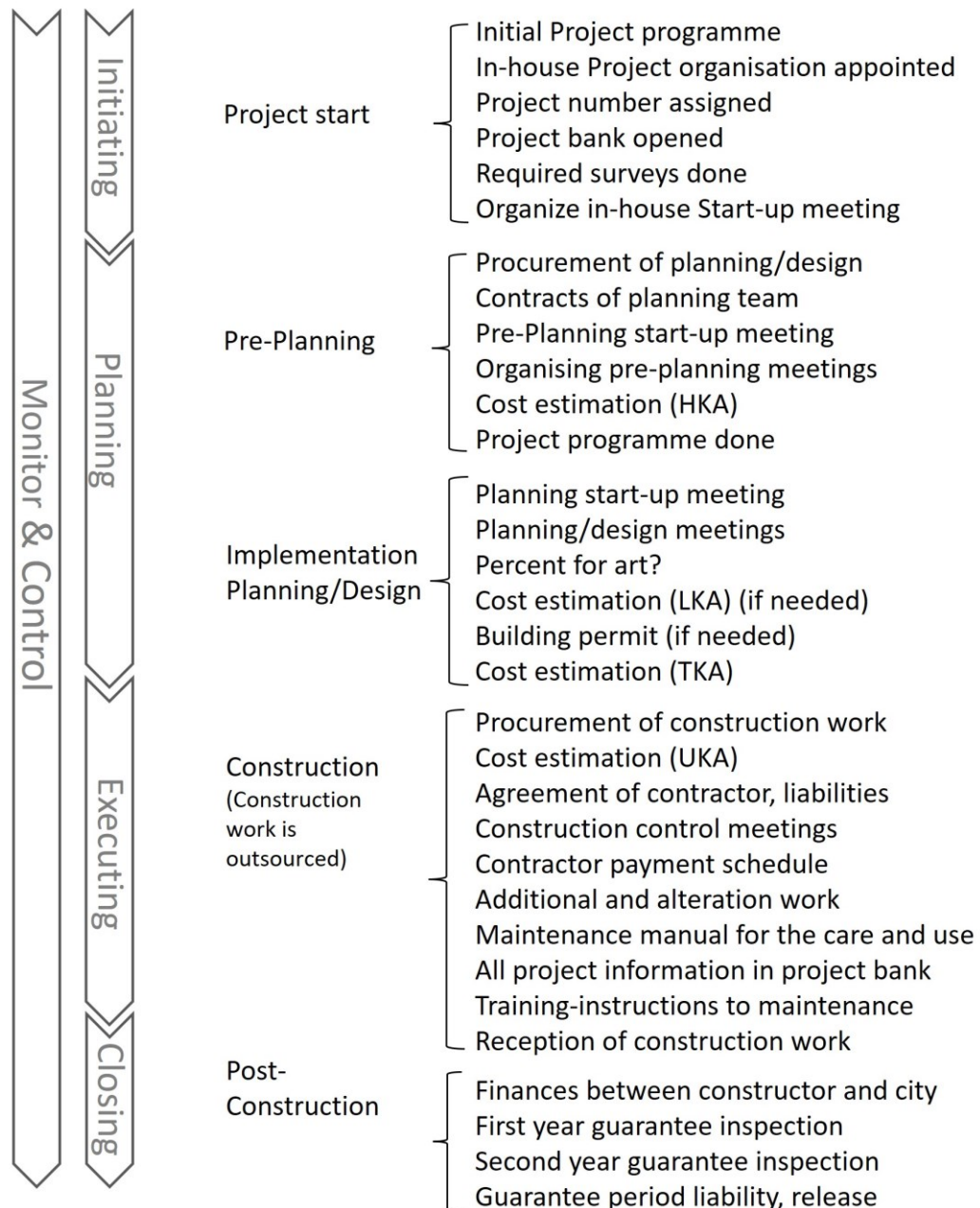


Figure 11. Tasks of the project manager during project phases.

In Figure 11 the activities of the project management in the case organization during different project phases are listed. The monitoring and controlling by the project manager are composed of several tasks. According to Rakennustieto Oy “control means providing information, instructions, and regulations to the other party to help them perform their task in accordance with the contract”, or “the

measures that are taken to observe, record, and report situations that endanger attainment of the set goals and intervening when deviations occur”.

Large projects of the case organization are carried out by two in-house project managers. A project manager takes care of the initiating and pre-planning phases, and another the implementation, construction, and post-construction phases. In large projects the expertise of the in-house project managers is usually either on planning or execution, i.e., commonly, the initial phase project manager tasks are carried out by a project manager, who is an architect by profession, and the execution phase by a project manager, who is a construction engineer. Figure 12 below shows some details on the education and the work experience of the senior project managers of the case organization.

	Project director	Project director	Project director	Project director	Project director
Degree	M.Sc. Eng	M.Eng	M.Sc. Arch	Technician	M.Sc. Arch
Education	Construction	Construction	Architecture	Construction	Architecture
City employment yrs	1,5	22	1	30	2
Work experience yrs	38	28	28	39	39
Phase of project	Planning+execut	Execution	Planning	Execution	Planning
Project cost	>10 MEUR	1-10 MEUR	>10 MEUR	>10 MEUR	5-10 MEUR

Figure 12. An example of the senior project managers of the case organization.

As shown in Figure 12, the most senior project managers i.e., project directors are involved with the big projects. These projects require previous experience of the same magnitude, and these projects require not just an in-house project manager contribution, but the hired consultant as well. The extra pair of hands and eyes, the hired consultant project manager is in general selected from the annual contract of the consultancy providers. This list is composed and controlled by the city procurement unit. The consultant can be tendered as well, but commonly the project timetable is too restricted for that. The negotiation between in-house and consultant project managers is held, the appointed duties

of the consultant are described according to the task list of the RT HJR18, and the consultant contract is signed according to the RT KSE 2013.

RT is Rakennustieto Oy, a company which provides industry-specific contracts within the building industry. The project management task list of RT HJR18 is a list of 32 pages, detailing the tasks of the project manager. The ready-made contract of the RT KSE 2013 means “general conditions for consulting and are applied to all assignments concerning the client and the consultant”.

The phases of smaller projects are similar to bigger projects. However, the project management procedures are not as established as in larger projects. Smaller projects, when speaking of public facilities, may refer to many different types of implementation work: demolition, renovation, alteration, repairing, and refer to diverse functions e.g., repair work concerning service buildings of sport fields, public toilets, distribution substations, classroom alterations, or accessibility alterations. It is quite difficult to perceive two projects alike in this small project category.

Since the small public facility projects differ significantly between one another, the projects selected for the examples of the in-house and the outsourced project management are among the middle sized projects. These two selected example projects provide more uniform surroundings for analyzing the current situation with the help of the conceptual framework created in the previous section.

4.1 Overview of this Data Stage

The objective of the thesis is to establish a concept to evaluate the feasibility of internal vs. external project management. The author of the thesis interviewed a team leader, a project manager and six project directors of the Project Units in February and in the beginning of March 2022 in order to clarify the procedures and how the project management is performed in projects currently. The interviews took place at the office of the case organization and were face-to-

face interviews. Summary of these interviews is presented in Appendix 1, Data 1.

The databases of the case organization were used to find suitable projects for this study. Two projects of the case organization were selected to be examined in order to find out how the project management is carried out. The parameters of cost, expertise, and flexibility were examined in both projects. The analyzing process is as follows:

- To detect the cost of the project manager. For an in-house project manager, the hourly fee includes both direct and indirect costs. The hired consultant cost per hour is taken from the annual agreement of the selected consultancy providers, or in this case, from the invoices.
- To detect the expertise of the project managers. Is there a difference between the expertise of the in-house and the hired project manager?
- To detect the outsourcing degree of project management in a project. Is the project management performed with internal resources only? What is the outsourcing level for the hired project manager?

The in-house project managers of the selected project were interviewed by the author of the thesis in February 2022 to find out their ideas how the choice between in-house and outsourced function was carried out.

4.2 Analysis of In-house Example

An example of a project with in-house project management is presented in this section. The project size is a medium size of a project, a day-care center of 110 children. The day-care center is situated in Helsinki.

This construction project was selected as an example since a similar enough project in size and cost with an outsourced project management existed as well. The in-house employee cost is not fully accurate since the follow-ups of the project database software are not up to date. The project phases of initiating and closing are excluded from the calculations.

In the case organization the budgeted cost of project management is composed of the following: In-house project managers, hired project managers, in-house technical experts, and hired technical inspectors. Hired technical inspectors are needed for the construction phase, and they are carrying out the third-party inspections on behalf of the city. They are hired by the in-house project manager or by the in-house technical experts.

Example A is a day-care construction project

- The project started in December 2016 and completed in February 2021.
- The project duration: 210 weeks.
- The surface of the building: 1300 m².
- The budgeted cost: 5,46 million euros. The actual cost of the project after implementation: 4,7 million euros.
- Two in-house project managers worked for the project, one for pre-planning phase (=PM1 architect) and another for implementation planning and construction phases (=PM2 engineer). The PM2 followed the pre-planning phase as well.

An overall view of the project costs of the example project A is presented below in Figure 13.

Day-care centre A

		€	vat 0 %
Project start	{	In-house project manager	1 344
Pre-Planning <i>12/2016 - 5/2018</i>	{	In-house project managers	11 679
		Hired project manager	6 459
		Architectural planning	2 288
		Acoustical planning	2 920
		Fire safety planning	4 600
		Cost estimation	4 878
Implementation Planning/Design <i>6/2018 - 8/2019</i>	{	In-house project manager	14 229
		In-house HVAC-el, kitchen plan	77 828
		Architectural+struc planning	109 764
		HVAC planning	48 998
		Electrical planning	34 950
		Structural planning	30 689
		Landscape planning	24 266
		Cost estimation	9 220
		Building permit related costs	11 882
Construction <i>9/2019 - 2/2021</i>	{	In-house project manager	16 779
		In-house HVAC, electr, autom.	60 528
		Hired inspectors:	
		Constructor supervisor	53 340
		Electrical supervisor	26 562
		HVAC supervisor	16 958
		Damp proofing supervisor	12 990
+ Construction work 3 834 323 €	{	Cleanliness supervisor	26 360
Post- Construction <i>3/2021 - 2/2023</i>	{	In-house project manager	5 000
		Other construction work	18 739
		Hired electrical supervisor	900
		Hired constructor supervisor	350

Figure 13. Cost of in-house project management in day-care center A.

In Figure 13 cost of the in-house project manager during the project phases of the pre-planning, implementation planning, and construction are highlighted in grey.

Day-care center A

- Estimated cost for project management (5% of 5,46 M€) 273 000 €
- Cost of in-house project managers 42 687 €
- Actual cost: hired project manager 6 459 €
- Cost of in-house technical experts 60 528 €
- Actual cost: hired technical inspectors 136 210 €
- Project management cost after execution 245 884 €

The project management cost after implementation is 5,2% of the actual project cost of 4,7 M€. The actual cost of project management is 27 000 euros less than initially estimated.

Table 6. Hourly cost of in-house project manager.

Hourly wage €/h	28,30
Overhead costs, office incl. electricity, internet, maintenance (€/h)	3,50
Computer, telephone, ticket (€/h)	0,70
Holiday, pension, insurance, health care (€/h)	17,50
Sector administration and support services	1,00
Total € / hour	51,00
How many ongoing projects at the same time? Project A: duration 210 weeks.	6-10 projects

As seen in Table 6 the hourly fee of the in-house project manager is composed of direct and indirect costs. The in-house project manager cost for project A was calculated with the fee of 51 €/hour. Project manager A has 6 - 10 projects ongoing simultaneously in different project phases.

Table 7. Project A, expertise of in-house project manager.

How many years in construction?	25 years
Degree?	M.Sc. Eng.
Technical background?	Construction engineering
Competency recognized by the employer?	Yes, several day-care center projects
In-house supporting units offer expertise which is lacking?	In-house experts of HVAC, electrical and automation systems are appointed for the project.

As shown in Table 7, the in-house project manager has a university degree in construction (M. Sc. Eng.), 25 years of experience in construction, and experience on several day-care implementation projects.

Table 8. Project A, outsourcing level of project management and number of hours spent on project.

Project A (duration 210 weeks)	In-house PM	Hired	Hours (903 hrs)
Pre-planning phase, 74 weeks. Outsourced 23 %.	PM1: 125 hrs PM2: 104 hrs	66 hrs	295 (4 h/wk)
Implementation planning, 60 wk. Outsourcing 0 %.	279 hrs	-	279 (4,65 h/wk)
Construction phase, 76 weeks. Outsourcing 0 %.	329 hrs	-	329 (4,3 h/wk)

As shown in Table 8, the project management tasks of the pre-planning phase were outsourced by 23 %. The project management of the implementation and construction phases were carried out by an in-house project manager only.

4.3 Analysis of Outsourced Example

The example of a project with outsourced project management is presented in this section. The project management is not totally outsourced since an in-house project manager followed the project as well. Project B is a day-care facility of 140 children and is situated in Helsinki. It is a medium size project.

Example B is a day-care construction project

- The project started in January 2016 and completed in January 2019.
- The project duration: 156 weeks.
- The surface of the building: 1595 m².
- The budgeted cost of the project: 5,87 million euros. After implementation the actual cost of the project: 5,5 million euros.
- Two in-house project managers worked for the project, one for pre-planning phase and other for implementation planning and construction phases.

An overall view of the project costs is presented below in Figure 14. The in-house employee cost of this example does not contain the precise accuracy since the project database follow-up is not up to date.

Day-care centre B

Project start	In-house project manager	3 000
Pre-Planning <i>1/2016 - 7/2016</i>	Hired project manager	8 526
	In-house project manager	12 000
	Architectural planning	49 815
	Other planning	25 000
	Cost estimation	3 000
Implementation Planning/Design <i>8/2016 - 4/2017</i>	Hired project manager	21 560
	In-house project manager	25 000
	Architectural planning	78 000
	Structural planning	61 000
	HVAC planning	65 100
	Electrical planning	36 199
	Landscape planning	24 850
	Building permit related costs	20 150
Construction <i>5/2017 - 12/2018</i> + Construction work 4 703 045 €	Hired project manager	44 394
	In-house project manager	25 000
	In-house HVAC supervisor	25 000
	In-house electrical supervisor	25 000
	Hired constructor supervisor	11 000
Post- Construction <i>1/2019 - 1/2021</i>	Hired project manager	2 210
	In-house project manager	2 000
	Hired constructor supervisor	10 300

Figure 14. Day-care center B, cost of hired project manager is highlighted in grey.

As shown in Figure 14 the cost of hired project manager during the three project phases of pre-planning, implementation planning, and construction are presented together with the project timetable.

Day-care center B

- Estimated cost for project management (5% of 5,87 M€) 293 500 €
- Actual cost: hired project manager 74 480 €
- Estimated cost: In-house project managers 62 000 €

- Estimated cost: in-house technical experts 50 000 €
- Actual cost: hired construction work inspector 11 000 €
- Project management cost after execution 197 480 €

The project management cost after implementation is 3,6% of the actual project cost 5,5 M€. The actual cost of project management is 96 000 euros less than initially estimated.

Table 9. Project B, hourly cost of hired project manager.

Hired project manager, Hourly wage €/h	98,00
Overhead costs: in-house invoicing (€/h), cost of contract	1,00
Computer, telephone, ticket (€/h)	-
Holiday, pension, insurance, health care (€/h)	-
How many ongoing projects? The duration of project B 160 weeks.	-

As shown in Table 9, the hired project manager cost in this project is 98 € per hour. For the overhead cost of the in-house function, sector administration and support services, an estimated extra of 1 € should be added for each outsourced hour.

Table 10. Project B, expertise of hired project manager.

How many years in construction	18 years
Degree	B.Sc Eng
Technical background	Construction
Offering expertise which is lacking from in-house	Experience of other projects from different companies

As shown in Table 10, the hired project manager has a degree in construction, B. Sc. Eng., and 18 years of experience in the field. The information of the hired project manager was provided from the CV of the project manager.

Table 11. Project B, outsourcing level and hours spent on project.

Project B (duration 156 weeks)	Hired project manager	In-house, estimated	Outsourced Hours / week
Pre-planning phase, 30 weeks. Outsourced 38 %.	87 hrs	144 hrs	2,9 h/week
Implementation planning, 40 wk Outsourced 43 %.	220 hrs	300 hrs	5,5 h/week
Construction phase, 86 weeks. Outsourced 57 %.	386 hrs	300 hrs	4,5 h/week

As shown in Table 11, the outsourcing level of project B varies during project phases. The planning phases are outsourced around 40 % and the executing phase 57 %. The number of project manager weekly hours varies between 2,9 - 5,5 hours/week.

An example of a small project is presented below in Figure 15. It is a project where project management is fully outsourced and only hired project managers worked for the project.

- Actual project cost 490 000 €
- Project duration: 28 weeks
- Initial estimated project manager cost: 23 530 €
- Actual project manager cost: 28 370 €
- Actual cost of project management: 38 730 €, includes cost estimation and technical inspectors.

School - small project, refitting

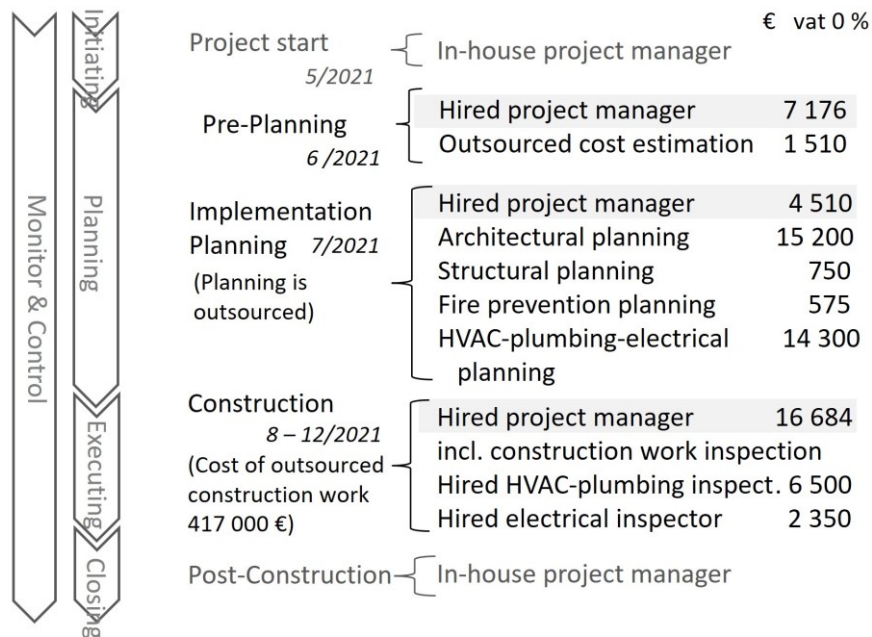


Figure 15. An example of a small size project.

Figure 15 above shows an example of a small size project where only hired project managers worked for the project. The project cost was 0,5 million euros.

Table 12. Small project: hired project managers, hours spent on project.

Small project (duration 28 weeks)	Hired PMs	Hours/week
Pre-Planning, 4 weeks	78 hours	19,5 h/wk
Implementation planning, 4 weeks	49 hours	12,3 h/wk
Construction, 20 weeks	184,5 hours	9,3 h/wk

As seen in Table 12, hired project managers used 311,5 hours for the project, which is 11 hours/week.

The hired project manager cost was 5,8 % of the project cost. All the tasks of project management were hired from the same company, which included

inspecting service during the construction phase, and cost calculation services before the implementation planning. This total project management service for the project was 7,9 % of the project cost 0,49 M€.

4.4 Summary of Current Evaluation Approach

This summary describes the results of a few example projects in the case organization. Two day-care construction projects were studied. Project A had in-house project managers and project B both a hired project manager and an in-house project manager. The result of the day-care project comparison showed some differences between the projects. However, since current project follow-ups of the case organization are imprecise, comparison between projects afterwards cannot be traced in a sufficient level.

A small project with outsourced project management was studied as well. The comparison between all example projects is presented in Table 13 below.

Table 13. Comparison between projects.

	Project A In-house	Project B Hired (+ in-house)	Small project Outsourced
Project cost	4,7 M€	5,5 M€	0,5 M€
PM cost % of project cost	5,2 %	3,6 %	7,9 %
Expertise / experience of project manager	M.Sc.Eng. Exp 25 yrs.	B.Sc.Eng. Exp 18 yrs.	3 different PMs
Project manager hours / wk.	4,3 h/week	4,4 h/week	11,1 h/week

As seen in Table 13, project B contains the lowest percentage in the project management cost. Experience and expertise excel in project A. The project managers used 4,3-4,4 hours a week. The small project differs significantly compared to middle size projects A and B.

When comparing costs of the project managers, they were smaller in project A than in project B. The difference was opposite when looking at the total project management cost during the whole project lifecycle. The construction phase with different technical inspector-supervisors turned the cost composition the other way around.

After analysing the examples, a general observation was that tracking the projects of the case organization was not an easy task since the follow-ups of the projects are not accurate. It is aching to trace the project cost when the database software shows the past costs in a superficial manner with no detailed information and the in-house project manager hours recorded for projects are approximate. Neither is it clear what the hourly cost of the in-house personnel allocated to the projects afterwards is. The hired project manager cost is more reliable since the cost can be detected afterwards from the invoices.

When interviewing in-house project managers (the information is in Appendix 1, Data 1), it became evident that an obvious condition for big projects is a hired project manager. Big projects need additional help, an extra pair of hands and eyes is a necessity, as well as an extra amount of expertise in project management. It is also noticeable that large projects are often alliances, public-private partnership etc. type of projects where understanding the content of a contract is important.

The system on how to manage project management of small and middle size projects appeared to differ more. The interviewees argued that contracting out is related to various aspects of the project e.g., special characteristics of the project (ecolabels etc.), if the construction work is tendered (“contracts need a lot of paperwork”), if the construction company is an internal service provider for the city (“more trustworthy and easier to use”), or how many ongoing projects or personal preferences the in-house project manager has, and what are the personal timetables in the near future.

Based on the interviews and observations performed in the case organization, and the examples studied in this section, the strengths and weaknesses of the current approach of the project managers are presented in Figure 16 below.

Analysis of in-house and outsourced examples

		IN-HOUSE Project Manager	
		Strengths	Weaknesses
COST		-cost per hour is less than an outsourced hour -employee costs are divided between several projects	-recording of PM hours on project? What is hourly cost? -actual PM cost is not known before implementation -employee costs
EXPERTISE		-PM has previously executed many similar projects -PM has knowledge of city structure and procedures -PM has university degree in construction	-executing same type of projects. Does it increase expertise?
FLEXIBILITY		-PM carries out several projects simultaneously -PM shares her knowledge	-forecasting is difficult for PM: number of projects, personal workload?
		HIRED Project Manager	
		Strengths	Weaknesses
COST		-cost per hour is known and fixed -no other employee costs -no computer, telephone, office space etc. expenses	-actual PM cost is not known before implementation -hourly cost is pricey -in-house functions are still needed (e.g. finance)
EXPERTISE		-PM has degree in construction and has several years of experience -PM is selected for the project (CV, references) -PM works for different companies, latest knowledge	-knowledge of city structure + procedures? Needs tutoring? -consultant is owner's representative, but is decision making authority questioned at construction sites?
FLEXIBILITY		-PM is hired for the ongoing project -PM has colleague experts in the company, this knowledge is available	-assignments between PM and in-house PM are not clear -in-house functions are still needed

Figure 16. In-house and outsourced project managers, strengths and weaknesses.

In Figure 16 strengths and weaknesses of the in-house and outsourced project management are summarized in a table. The strengths and weaknesses related to the parameters of cost, expertise and flexibility were studied both in the outsourced and in-house project manager examples. Since the details of the example projects could not be traced in a sufficient manner, the table of the strengths and weaknesses is a mixture of example project findings and matters arisen during interviews.

Section 4 consisted of the analysis of a few projects carried out in the case organization during the last years. Next section 5 establishes an initial concept for the project management feasibility evaluation in small projects.

5 Establishing Initial Concept for Evaluating Project Management Feasibility

Section 5 establishes the initial evaluation concept of the project management feasibility between an in-house project manager and a hired project manager. This initial evaluation concept is designated for the small project purpose of the case organization. The outcome of this section is the initial concept.

A small project in this study refers to projects where the project cost is under one million euros and more than 150 000 euros. Small projects are e.g., small-scale new buildings, renovation, refitting, or demolition projects. They can be projects where a building permit is required or not. If the building permit is required, the number of the project manager tasks increases. Projects costing under 150 000 euros are implemented and looked after in another city unit.

The initial concept for evaluating the project management feasibility is a system based on the conceptual framework created in section 3. It is based on three parameters of cost, expertise, and flexibility, and on the findings of the current state analysis of section 4. It is a system where the initial estimated cost for project management is divided in different scenarios between in-house and outsourced project managers, where the level of outsourcing changes from “in-

house only” to “almost everything outsourced”. The level of the outsourcing decision can be based e.g. on if a certain expertise is needed for the project.

One purpose of the initial concept is to increase understanding on how dividing the project management cost affects the number of weekly hours when performed by an in-house project manager only versus if a different amount of tasks is outsourced. And if the work is divided between in-house and hired project managers, which task belongs to whom. This benefits the overall understanding of how different project management solutions relate to the financial result of the project. The intent is that the budgeted project management cost is not overrun in any cases, whether implemented by in-house or outsourced project managers.

Figure 17 below explains the decision process of the choice between the in-house and the outsourced functions.

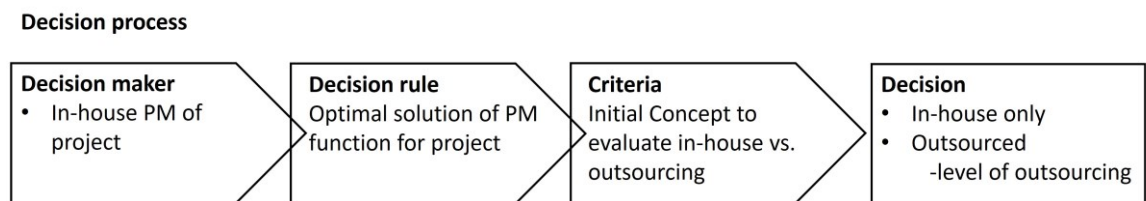


Figure 17. The process of in-house vs. outsourced project management choice.

As seen in Figure 17 the appraiser of how to conduct project management of a project is an in-house project manager. The purpose of this evaluation is to find a suitable solution for the ongoing project which contributes to the actual project management cost staying on the budget, while taking in consideration aspects of cost, expertise, and flexibility.

One of the ideas behind the evaluation of the project management feasibility in small projects is a saying that small savings add up to big savings, or tiny changes can make a big difference.

The strategy of Helsinki stresses the importance of cost efficiency. The number of small projects is numerous and evaluating the project management cost right from the start can really make a difference and provide annual savings.

5.1 Overview of this Data Stage

This section concentrates on creating an initial concept which permits to evaluate the feasibility of project management; if it is carried out by the in-house personnel or by hired consultants. The initial concept created in this section is based on the conceptual framework presented previously in section 3. By improving as many as possible of the detected weaknesses and by interviewing project managers of the case organization, the initial concept is established.

It was learned from the analysed projects in the previous section that the project management cost is composed of several things, not just project manager cost as initially thought. Thus, the feasibility concept needs to be adjusted in this part.

The cost of project management in the case organization includes:

- Cost of in-house project manager
- Cost of outsourced project manager
- Cost of in-house technical experts
- Cost of third-party technical inspecting and supervising during construction phase
- Cost of cost estimation

In the previous section the expertise parameter showed little difference in the examples between in-house and hired project managers. This may be due to the project manager job description, a minimum level of knowledge, education, and expertise is required in this position.

However, the expertise parameter is useful especially for the construction phase where a need for third-party technical inspectors exists. Technical

inspectors are electrical work, construction work, or HVAC and plumbing work inspectors.

The budgeted cost of a project is divided in order to find out the initial cost for project management. It is commonly stated that a percentage of the project management cost is around 4-8 % of the total cost of the project (e.g. Means estimating handbook).

The percentage of the project management cost increases, the smaller the project is. As seen in the example in the previous section, a project costing around 0,5 million euros had a project management cost of 8 %. Thus, eight percent was chosen for the initial concept creation for the smaller project purpose.

The outsourcing degree is a selection process. The in-house project manager chooses between different outsourcing levels, which solution is best for him? Any of the three project phases can be outsourced, or the whole project can be outsourced.

When an outsourcing level is such where both in-house and hired project managers work together, a task matrix describes assignments between in-house and hired project managers. The matrix was created for this study. It was inspired by the Rasci Matrix, and it is a simplified version of the task list used for big projects, RT HJR18 (see p. 35).

The decision between different scenarios-sketching of the initial concept is made by an in-house project manager based on his current and forecasted number of projects i.e., how busy he is, what his preferred project tasks are, or if a certain expertise is needed for the project which is lacking from the in-house project manager. These different scenarios provide the view on how many weekly hours can be dedicated to the project.

A strength of the concept is that if the evaluation is carried out before the project starts, the evaluation is more proactive. It is a mediated approach instead of

reacting to the situation at hand. However, the disadvantage of the small projects is that they are usually quite difficult to predict beforehand. The need for small renovations or space adjustments is often quite sudden, so predicting the workload of the in-house project manager involved with small projects is challenging.

The annual contract for the outsourced project management providers for smaller projects is a list composed by the city procurement unit. Several companies are listed in this agreement. The hired project manager fee commonly ranges between 90 to 110 euros per hour. A list of third-party inspection providers for construction work, electrical work, HVAC, and building automation work is provided by the city procurement unit as well.

For the initial concept creation, a need for the in-house technical experts is excluded. This decision is made by the author of the thesis, since the number of the in-house technical experts is limited, and their contribution is needed for bigger and more demanding projects. To exclude the internal technical experts from the initial concept of small project was confirmed while interviewing a project manager who is involved with small projects (Appendix 1, Data 2).

The technical experts work in the Project Units: HVAC, Electrical Engineering, and Project Expert Teams. These teams are located in the Project Units as presented in Figure 18 below.

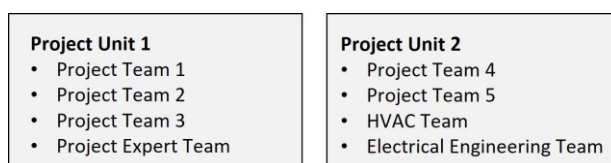


Figure 18. The organization of Project Units 1 and 2.

As shown in Figure 18, the Project Units are composed of five project teams, an HVAC team, an electrical engineering team, and a project expert team. Each of these teams are managed by a team leader. Project teams 1-5 are project

management teams, and the team members of HVAC and electrical teams are the in-house technical experts who usually work for bigger projects or have their own projects which require this type of specific knowledge. They offer special expertise needed for the projects. In the project teams there are around 50 persons working as project managers. The HVAC and electrical teams are both composed of 12 experts. The project expert team is a team, where e.g. the cost estimation function is positioned.

The initial concept includes third-party technical inspecting. These technical inspectors are usually hired personnel. In a small project the need for these inspectors varies: if the implementation project requires a building permit, and/or if characteristics of the project need inspecting/supervising in construction work, or in electrical or in HVAC systems.

Scenarios of initial concept are created with

- In-house project manager, whose participation to the project is between 5-100 %
- Hired project manager, whose participation to the project is between 0-95 %
- Third-party technical inspecting and supervising for the construction phase. This is always an outsourced function.

The initial concept is divided in three parts according to the project phases: Pre-planning, implementation planning, and construction phase. The third-party inspectors are used for the construction phase only.

In April 2022 during an informal conversation with the cost estimator of the case organization, the author of the thesis discovered that a rule of 1/3 inspector for projects under 5 million euros is in use. Thus, a calculation based on this principle is performed, and the number of 4,5 hours per week appeared. This is the number used for the inspector cost calculation during the construction phase for small project purposes.

5.2 Summary of Initial Concept

The initial concept is formed of three elements: cost, expertise, and flexibility. The initial concept is an excel spreadsheet. On the spreadsheet the following numbers must be added:

- Budgeted project cost
- Estimated project duration in weeks divided in three project phases
- Hired project manager and third-party inspector-supervisor (for construction phase only) cost per hour

Previously it was learned that the project management cost in the case organization is not just formed from the cost of the project managers, but the cost of other technical personnel as well. Thus, the initial concept was formed taking in consideration these elements:

- Project manager, in-house and/or hired
- Third-party technical inspector during construction phase

While studying the comparison between the middle size projects A and B, it showed that the cost of the project manager was lower while the technical inspector cost during the construction phase was higher and vice versa. This observation forms the base of the expertise part of the initial concept.

The flexibility in the initial concept is a degree of the partnership or the outsourcing level of the projects. A project is composed of different project phases, and the project managers of these phases can be internal and/or hired personnel.

Figure 19 on the following page presents the initial concept.

Initial Concept

Add number in coloured boxes

COST

Project Budget

VAT 0%
 €

- Estimated project management cost is 8 % of budgeted project cost

Project management cost

Excel formula
 €

- 4 % of budgeted project management cost is reserved for Post-construction phase

In-house project manager

51,00 € / h

- For construction phase: cost of 4,5 weekly hours of third-party inspectors is allocated for the construction phase

EXPERTISE

Hired project manager cost

 € / h

- Hourly rate of hired project manager and third-party technical inspectors is collected from the annual agreement of the case organization.

Hired inspector hourly cost

 € / h

Estimated project duration

Sum A+B+C weeks

Project phases

A. Pre-planning (10%)

 weeks → formula €/week

B. Implementation plann.(15%)

 weeks → formula €/week

C. Construction (70%)

 weeks → formula €/week

D. Post-construction

- 4 % of budgeted project management cost is reserved for Post-construction = guarantee period of 2 years

FLEXIBILITY

Degree of partnership	In-house	Outsourced
In-house only	100 %	
Out-tasking	70 %	30 %
Co-managed	50 %	50 %
Fully outsourced	5 %	95 %



How many weekly hours can be spend on the project, both in-house and outsourced hours?

In-house only	Hours / week
A. Pre-plannig	formula
B. Implementation	formula
C. Construction	formula

Out-tasking	In-house h/wk	Hired h/wk
A. Pre-plannig	formula	formula
B. Implementation	formula	formula
C. Construction	formula	formula

Co-managed	In-house h/wk	Hired h/wk
A. Pre-plannig	formula	formula
B. Implementation	formula	formula
C. Construction	formula	formula

Fully outsourced	In-house h/wk	Hired h/wk
A. Pre-plannig	formula	formula
B. Implementation	formula	formula
C. Construction	formula	formula

Figure 19. The initial concept.

The initial concept presented above in Figure 19 is an excel spreadsheet. Three sets of numbers must be added in the Excel: budgeted project cost, duration of project in three project phases in weeks, cost of hired project manager per hour and cost of technical inspectors. The last-mentioned costs can be found in the annual contracts of the case organization. The annual agreement contracts are available for the in-house personnel in the intranet of the case organization.

In section 5 the initial concept was established. The initial concept was based on the ideas of the conceptual framework created in section 3, and findings in section 4 gave ideas on how to proceed in the initial concept creation. In the next section the initial concept will be validated by simulating two completed projects, a project with an in-house project manager, and a project with hired project managers.

6 Validation of Initial Concept

In this section, the initial concept established in the previous section is validated by simulation, utilizing the data of the projects completed recently. Furthermore, a team leader of the case organization is interviewed in order to make adjustments to the initial concept.

This small-scale implementation approach is carried out by simulating the project management feasibility in two projects of the case organization, a project with an in-house project manager and another with outsourced project management. Both projects were completed in 2021.

The simulation is used since the timetable of the thesis does not allow the real-life follow-up in upcoming small-scale projects of the case organization.

6.1 Overview of this Data Stage

The initial concept is tested by simulating public facility implementation projects of the case organization. The selected projects are small projects and are

scrutinized over three project phases: pre-planning, implementation planning, and construction. It is studied if the aspects of the initial concept: cost, expertise and flexibility meet the real-life needs. After the simulation corrective conclusions to the concept are possible.

The initial concept was presented to the team leader and feedback for the initial concept was asked (Appendix 1, Data 3).

6.2 Validation Using In-house and Outsourcing Example Data

First the initial concept is tested with a project of an in-house project manager. The project is a small alteration project in a light industry center in Helsinki. The project cost was 457 000 euros, and it was carried out by an in-house manager only with the help of an in-house electrical expert. During the construction phase, a hired technical construction work inspector worked for the project as well.

Figure 20 below shows how the initial concept works for this example project of the in-house project manager. The numbers of the project budget, duration, and hourly fees were added on the initial concept and the Excel spreadsheet computed the rest. The result of the calculation is shown in the figure on the following page.

In-house project manager, example project

		VAT 0%			
Project Budget	457 000,00	€			
Project management Budget	36 560,00	€ (8 %)	Project Management Budget	36 560,00	
In-house project manager	51,00	€/h	Cost estimating cost	-1 600,00	
Hired project manager		€/h	Post-construction: PM cost	-1 462,40	
Hired technical inspector	99,06	€/h	Hired inspector cost	10 252,71	
				* 23 244,89	€
Estimated project duration	35	weeks			
A. Pre-Planning phase	4	weeks	*10%	2 324,50	€ → 581,1
B. Implementation planning	8	weeks	*15%	3 486,73	€ → 435,8
C. Construction phase	23	weeks	*70%	16 271,42	€ → 707,45
			- Technical Inspector 4,5 h/wk	10 252,71	€
D. Post-construction phase	1 462,40	€ (4 %)			

Initial concept

In-house Project manager

In-house only	PM hours/week
Pre-Planning	11,4
Implementation planning	8,5
Construction	13,8

Project manager	23 244 €
Technical inspector	10 252 €
Cost estimation	1 600 €
	<u>35 096 €</u>

Validation, example project

In-house Project manager

In-house only	PM hours/week
Pre-Planning	11,8
Implementation planning	13,5
Construction	13,5

Project manager	23 750 €
Technical inspector	12 424 €
Cost estimation	- €
	<u>36 174 €</u>

Figure 20. An example project: project management approach with in-house project manager, initial concept vs. real-life execution.

As seen in Figure 20, the project manager cost calculation was quite similar between the initial concept and the real-life execution. The technical inspector cost is not as well calculated between the initial concept and the real-life execution, the difference is around 2000 euros more in the real-life execution (highlighted in grey).

Table 14. Comparison, project manager hours between initial concept and example project.

Project phases	Initial Concept	Example project	
	In-house PM, hours	In-house PM, hours	Difference
A. Pre-Planning	45,2 (11,4 hrs/wk.)	47,2 (11,8 hrs/wk.)	2 hours
B. Impl. planning	68 (8,5 hrs/wk.)	108 (13,5 hrs/wk.)	40 hours
C. Construction	319,7 (13,8 hrs/wk.)	310,5 (13,5 hrs/wk.)	9,2 hours
Total	430,6 hours	465,7 hours	35 hours

Table 14 above shows the number of the hours spent on the project during different project phases. The project manager cost in this example project consists of an in-house technical expert as well. The biggest difference between the initial concept and the real-life execution occurs during the implementation planning phase.

A project with a hired project manager is a small implementation project in Helsinki. The project was carried out by the hired project managers only. During the construction phase, hired technical construction work inspectors worked for the project. This example is the same project which was presented in Figure 15 (p. 44) in section 4.

Figure 21 below shows how the initial concept works for this example of the outsourced project management.

Hired project manager, example project

	VAT 0%		
Project Budget	494 000,00	€	
Project management Budget	39 520,00	€ (8 %)	Project Management Budget 39 520,00
In-house project manager	51,00	€/h	Cost estimating cost -1 600,00
Hired project manager	92,00	€/h	Post-construction: PM cost -1 580,80
Hired technical inspector	87,00	€/h	Hired inspector cost -7 830,00
			* 28 509,20 €
Estimated project duration	28	weeks	
A. Pre-Planning phase	4	weeks *10%	2 850,92 € → 712,73 €/week
B. Implementation planning	4	weeks *15%	4 276,38 € → 1 069,10 €/week
C. Construction phase	20	weeks *70%	19 956,44 € → 997,82 €/week
		- Technical Inspector 4,5 h/wk	7 830,00 €
D. Post-construction phase	1 580,80	€ (4 %)	

Initial concept

Hired Project manager

Fully outsourced	Hired h/wk	In-house h/wk
A. Pre-plannig	7,5	0,7
B. Implementation	11,1	1,1
C. Construction	10,4	1,0

Project manager	28 509 €
Technical inspector	7 830 €
Cost estimation	1 600 €
	<u>37 939 €</u>

Validation, example project

Hired Project manager

Fully outsourced	Hired h/wk	In-house h/wk
A. Pre-plannig	19,5	0,7
B. Implementation	12,2	0,7
C. Construction	9,3	0,8

Project manager	28 370 €
Technical inspector	8 850 €
Cost estimation	1 520 €
	<u>38 740 €</u>

Figure 21. An example project: project management approach with outsourced project manager, initial concept vs. real-life execution.

As seen in Figure 21 above, the project manager cost in the initial concept is almost the same as in the real-life execution example. The technical inspector cost during construction is a thousand euros less in the initial concept (highlighted in grey).

As seen in these two examples, the technical inspector cost in the initial concept is currently too low. The percentages of the budgeted project management cost in the project phases of pre-planning and implementation planning should be checked as well.

6.3 Summary of Concept

The initial concept is presented in this section. The initial concept is created to evaluate the feasibility of project management between in-house and outsourced project managers. It is created with the parameters of cost, expertise, and flexibility.

The validated concept is an Excel spreadsheet. It is for the use of the in-house project manager in the upcoming project: the budget of the project, the hourly fee of a hired project manager and a technical inspector are added to the spreadsheet. The duration of the project is estimated and divided in different project phases. With these numbers the spreadsheet forms different alternatives for how the cost of the project management changes from a solution “in-house only” to the outsourced project management. The in-house manager can evaluate which one of these options is the most viable version for the project at hand. The decision making is based on the judgement of the in-house project manager, e.g., if special expertise is required for the project, or the project is such where the budget for the outsourced project management seems a real option with no cost overruns in the end. For solutions where both in-house and hired project managers work for the project, the tasks can be divided, and the task list of the consultant project manager can be used (see Appendix 2).

The initial concept is presented in Figure 22 on the following page. It is an improved version: the technical inspector hours are examined, and the percentages between the project phases are scrutinized. The feedback for the initial concept was asked from the team leader of the case organization, and according to this feedback no alterations were required to the initial concept.

Initial Concept

COST

Project Budget €
 Project Management Budget € (8%) Project Management Budget - Cost estimation -
 Hired inspector cost - Post-construction = *

EXPERTISE

In-house Project Manager €/h
 Hired Project Manager €/h
 Hired Technical Inspector €/h

Estimated project duration weeks
 A. Pre-Planning phase weeks *10% € → €/week
 B. Implementation planning weeks *16% € → €/week
 C. Construction phase weeks *69% € → €/week
 - Technical Inspector 5 h/wk €
 D. Post-construction phase € (4%)

FLEXIBILITY

Degree of partnership	In-house	Outsourced
In-house only	100 %	
Out-tasking	70 %	30 %
Co-managed	50 %	50 %
Fully outsourced	5 %	95 %

How many weekly hours?

In-house only	Hours / week
A. Pre-plannig	formula
B. Implementation	formula
C. Construction	formula

Out-tasking	In-house h/wk	Hired h/wk
A. Pre-plannig	formula	
B. Implementation	formula	
C. Construction	formula	

Co-managed	In-house h/wk	Hired h/wk
A. Pre-plannig	formula	
B. Implementation	formula	
C. Construction	formula	

Fully outsourced	In-house h/wk	Hired h/wk
A. Pre-plannig	formula	
B. Implementation	formula	
C. Construction	formula	

Figure 22. The initial concept.

This section described how the initial concept was validated by simulating projects and their project management. The last section, section 7, is on the topic of discussions and conclusions of the study.

7 Discussion and Conclusions

The final section of this study contains the discussion and conclusion. The objective of the thesis was to establish a concept to evaluate the feasibility of internal versus external project management. The thesis structure followed the research design plan which was established at the beginning of this study. The thesis began with the introduction, the project plan, and the literature search in section 3, where a conceptual framework was created. The study carried on to section 4 by evaluating the current project management approach of the case organization by studying a few projects executed so far with the help of the conceptual framework and went on to establish an initial concept in section 5 and validating it in section 6. This section 7 covers the topics of the concept, its significance, next steps, and self-evaluation of the thesis.

7.1 Summary

The scope of this thesis was to establish a concept to evaluate the feasibility of project management for small public facility implementation projects of the case organization between in-house project management and outsourced hired management consultants. The small public facility implementation projects in this study are projects costing under a million euros.

Project management of the small public facility implementation projects is undertaken either by the city personnel or by hired consultants. However, a system on how to evaluate the project management feasibility between in-house project management and outsourced project management is missing currently. Since small projects are numerous and the strategy of Helsinki stresses the importance of efficiency, a concept to evaluate the feasibility between in-house versus outsourced project management in public facility implementation is important.

When searching ideas for how to evaluate the feasibility between in-house and outsourced project management, no ready-made concept was found. Instead,

the parameters of cost, expertise and flexibility were discovered and considered central to the concept creation. These three parameters formed the basis of the conceptual framework which covered both in-house and outsourced options. By studying a few projects completed in the past years and interviewing the stakeholders of the city, an initial concept was created. The initial concept for evaluating the project management between in-house and hired project managers is an Excel spreadsheet which includes the components of cost, expertise, and flexibility. The initial concept was validated by inputs of two completed projects, one with an in-house project manager and another with a hired project manager.

The validated concept is an Excel spreadsheet where the in-house project manager sets numbers of the upcoming project: the budget of the project, the hourly fee of the hired project manager and a technical inspector. The duration of the project is estimated and divided between the project phases. With these added numbers, the spreadsheet forms different alternatives for how the cost of the project management changes from the solution in-house only to the outsourced project management. The in-house project manager can evaluate which one of these options is the most viable for the project at hand. The decision making is based on the judgement of the in-house project manager, e.g., if special expertise is required for the project which is lacking in-house, or the project is such where the budget for the outsourced project management seems a real option with no cost overruns.

7.2 Practical Next Steps Towards Implementation

The initial concept is a ready-made spreadsheet composed by the author of the thesis with the help of the other stakeholders and the project data of the case organization. The author of the thesis is a project coordinator for small projects; thus, the relevance of this concept created here is for personal use as well. The initial concept is already in use for evaluating the project management for upcoming projects.

The initial concept for evaluating the project management feasibility is useful also for the introduction to a new job for the newcomers. It could be a part of a presentation of what the project management of the case organization consists of. The initial concept gives an overall view of the elements which affect the outcome of the project management feasibility.

At the beginning of the study the idea was to evaluate project managers, however, the author of the thesis soon realized that project management feasibility concerns not only project managers but the whole project, all its phases, and other personnel employed by the project manager for the ongoing project as well, no matter if the project manager is an in-house person or a hired one. Cost, expertise, and flexibility are matters of the whole entity of project management personnel during all project phases. The initial concept created in this thesis contributes to that. However, it is not clear how it works for more complicated relations in a project. Yet, the initial concept created in this study is a good starting point to elaborate more sophisticated versions of it.

7.3 Self-evaluation of Thesis Project Credibility

In this chapter it is discussed how the logic and credibility of the thesis were ensured during the study to attain the best possible outcome for it. It is also pondered, what could have been realized better.

The reliability and credibility of the thesis is based on the research approach and the research plan stated before starting the thesis project: the research design plan with its different stages and outcomes secured the logic advancement of the thesis, and the data collection plan detailed three sets of data, the content of which was revisited while the study evolved. The objective and the outcome of the thesis were set initially, and the study followed these.

The thesis study was based on multiple methods, the triangulation (Merriam, 1995:54). Literature searched around the thesis topic, the interviews of the key stakeholders, the project databases of the case organization, as the informal

conversations with the stakeholders in the case organization, and the internal documents. The ideas around the topic were shaped and influenced by the above mentioned factors. The decision on how to build the content of the outcome was made mainly by the author of the thesis, based on the material mentioned above.

The thesis was made for the use of a relatively small group of employees in the case organization. The thesis timetable was restricted, thus the period when the data was collected was short, as was the number of persons interviewed (10 persons). All the interviews were not settled on time, this may affect the result, the interviewees had no time to ponder the questions beforehand. Neither is it clear currently how the concept created here works for different types of real-life implementation projects. The validation part was not very exhaustive.

The substance of the thesis process evolved during the study. For example, unforeseen was the scarcity of the information on projects executed during past years in the case organization. The initial idea evolved during the study; thus, a certain amount of creativity was required during the process.

As stated before, the outcome of the thesis has relevance for the use of a small group in the case organization, as for the author of the thesis. Nevertheless, the idea behind the concept created in this thesis may have relevance in other more universal contexts as well. All the situations where evaluating the functions performed between in-house and outsourced personnel or different degrees of partnership and outsourcing is required, can benefit from the conceptual idea of this thesis.

7.4 Closing Words

Theses conducted in studies of Metropolia Master Programme of Industrial Management concern a real-life organization development project. Students entering in the programme have already several years of work-experience and

have a bachelor's degree. This real-life development project was a motivator for the author of the thesis for the content of this thesis as well.

The starting words of this thesis stated that important measures for project management are cost, time, and quality i.e., "the iron triangle", meaning that all these measures support the successful project implementation. This same principle goes for cost, expertise, and flexibility, they form together a sound principle for evaluating the project management feasibility and support the successful and cost-efficient project management implementation.

References

- Acar, Oguz; West, Douglas. 2021. When an educated guess beats data analysis. *Harvard Business Review*.
- Alias, Zarina; Zawawi, E; Yusof, Khalid. 2014. Determining critical success factors of project management practice: a conceptual framework. *Procedia-Social and Behavioural Sciences*. 153, p. 61-69.
- Appelbaum, Steven; Steed, Anthony. 2004. The critical success factors in the client-consulting relationship. *Journal of Management Development*. Vol. 21, 1, p. 68-93.
- Atkinson, Roger. 1999. Project management: cost, time and quality, two best guesses. *International Journal of Project Management*. Vol. 17, 6, p. 337-342.
- Autry, Chad; Locke, Art; Moore, Curtis; Sanders, Nada. 2007. A multidimensional framework for understanding outsourcing arrangements. *Journal of supply Chain Management*. 43, 4, p. 3-15.
- Baylor, Amy. 2001. A U-shaped model for the development of intuition by level of expertise. *New Ideas in Psychology*. 19, p. 237-244.
- Belassi, Walid; Tukel, Oya. 1996. A new framework for determining critical success/failure factors in projects. *International Journal of Project Management*. Vol. 14, 3, p. 141-151.
- Berman, Evan; Bowman, James; Van Wart, Montgomery; West, Jonathan. 2004. *The Professional Edge: Competencies in Public Service*. Routledge.
- Bjeirmi, Bassam; Munns, Andrew. 1996. The role of project management in achieving project success. *International Journal of Project Management*. Vol. 14, 2, p. 81-87.
- Boardman, Anthony; Greenberg, David; Vining, Aidan; Weimer, David. 2018. *Cost-benefit analysis: concepts and practice*. Cambridge University Press.
- Chan, Paul. 2016. Expert knowledge in the making: using a processual lens to examine expertise in construction. *Construction Management and Economics*. 34:7, p. 471-483.
- Cheng, Mandy M; Coyte, Rodney & Loh, Chang-Yuan. 2019. Is a fresh pair of eyes always better? The effect of consultant type and assigned task purpose on communicating project escalation concerns. *Management Accounting Research*. 43, p. 1-14.
- Choi, Yunsik; Delise, Lisa; Lee, Brandon; Neely, Jerry. 2021. Effective staffing of projects for reconciling conflict between cost efficiency and quality. *International Journal of Production Economics*. 234, 108049.

- Chipulu, Maxwell; Neoh, Jun Guan; Ojiako, Udi; Williams, Terry. 2013. A multidimensional analysis of project manager competences. *IEEE Transactions on Engineering Management*. Vol. 60, 3, p. 506-517.
- Dalcher, Darren. 2012. The nature of project management. *International Journal of Managing Projects in Business*. Vol. 5, 4, p. 643-660.
- Deguire, Manon; Thiry, Michel. 2007. Recent developments in project-based organisations. *International Journal of Project Management* 25, p. 649–658.
- Dvir, Dov; Levy, Ofer; Shenbar, Aaron. 1997. Mapping the dimensions of project success. *The Project Management Journal*. Vol. 28, 2, p. 5-13.
- Ekezie, Obinna. 2019. The pros and cons of hiring in-house vs. outsourcing. www.americanexpress.com.
- European Commission. 2021. PM² Project Management Methodology, Guide 3.0.1. Publications Office of the European Union.
- Grönroos, Christian. 2019. Reforming public services: does service logic have anything to offer? *Public Management Review*, 21:5, 775-788.
- Haejin, Jo; Hakyeon, Lee; Yongyoon, Suh; Jieun, Kim; Yongtae, Park. 2015. A dynamic feasibility analysis of public investment projects: An integrated approach using system dynamics and agent-based modeling. *International Journal of Project Management*. 33, p. 1863-1876.
- Hough, George; Morris, Peter. 1987. *The Anatomy of Major Projects: A Study of the Reality of Project Management*. Published by Wiley.
- Hughes, Shawn; Thomas, Warren; Tippett, Donald. 2004. Measuring project success in the construction industry. *Engineering Management Journal*. Vol. 16, 3, p. 31-37.
- Hwang, Bon-Gang; Liao, Pin-Chao; Leonard, Michael. 2010. Performance and practice use comparisons: public vs. private owner projects. *Journal of Civil Engineering*. 15, p. 957-963.
- Hölzle, Katharina. 2010. Designing and implementing a career path for project managers. *International Journal of Project Management*. 28, p. 779–786.
- Jo, Haejin; Lee, Hakyeon; Suh, Yongyoon; Kim, Jieun; Park, Yongtae. 2015. A dynamic feasibility analysis of public investment projects. *International Journal of Project Management*, 33, p. 1863-1876.
- Kananen, Jorma. 2013. Design research (applied action research) as thesis research: a practical guide for thesis research. *Jyväskylän ammattikorkeakoulu*.
- Merriam, Sharan, 1995. Theory to Practice. What can you tell from an N of 1?: Issues of validity and reliability in qualitative research. *PAACE Journal of Lifelong Learning*, 4, p. 51-60.

Michalak, Christopher; Williams, Paul. 2006. Effective use of outsourced project controls. *Cost Engineering*. Vol. 48, 10, p. 29-34.

Mintzberg, Henry. 1996. Managing government Governing management. *Harvard Business Review*. May-June.

Patrick, A W. 1958. Some observations on the break-even chart. *The Accounting Review*, p. 573-580.

Pinto, Jeffrey. 2019. *Project management, achieving competitive advantage*. Pearson.

Pinto, Jeffrey; Venkataraman, Ray. 2008. *Cost and value management in projects*. John Wiley & Sons, Inc.

Pinto, Jeffrey. 2022. Avoiding the inflection point: Project management theory and research after 40 years. *International Journal of Project Management*, 40, p. 4-8.

van der Waldt, Gerrit. 2010. Project Governance: A Municipal Leadership Challenge, *Politikon*, Vol. 37, 2-3, p. 251-268.

Winch, Graham. 2000. Governing the project process: a conceptual framework. *Construction Management and Economics*. 19, p. 799-808.

Interviews

DATA 1.

All the interviews were conducted at the office of the Urban Environment in Helsinki. They were face-to-face meetings. The interviewees are all employees of the city of Helsinki, project managers and project directors. They were selected randomly – persons who were not working remotely on that day and had time for the interview.

Survey questionnaire:

- Job title, education, degree?
- How long have you worked for the city of Helsinki?
- Number of projects in progress, project size/specialization?
- How do you decide whether to use a consultant project manager?
- What do you think are the benefits of the consultant project managers? And what are the disadvantages?

14 February 2022

Project Director, Project manager of execution phase, Engineer M.Eng, City years: 22. Working years 28. Specialization in renovation projects.

“When project is tendered, I always use consultant, so much paperwork with contracts.”

“When dealing with indoor air quality projects, documentation is very important, a lot of papers to do then.”

“When I have smallish projects with Stara, no need for consultant project manager.”

14 February 2022

Project Director, Project manager of execution phase, Technician, City years: 30. Working years: more than 30. Specialization in new buildings, cost > 20 MEUR.

Hired consultant pros and cons:

+ brings experience in the project

- if the consultant is too busy, how many projects has he got at the same time...?

14 February 2022

Project Director, Project manager of planning phase, Architect, City years: 1. Working years: 28. Specialization in new buildings, cost > 30 MEUR.

Hired consultant pros and cons:

- + brings skills that I don't have.
- if consultant has no own initiative, it's a burden...

15 February 2022

Project Director, Project manager of planning phase, Engineer M.Sc. City years: 1,5. Working years: 38. Specialization in new buildings, cost > 20 MEUR.

Hired consultant pros and cons:

- + if I'm busy, it's good to have an extra pair of hands.
- consultant's way of working from project to project is always the same, no novelty there...

15 February 2022

Project Director, Project manager of planning phase, Architect. City years: 2. Working years: 40. Specialization in new buildings, cost 5-10 MEUR.

- splitting the project stages between an architect and an engineer is not a good thing, an engineer is not interested in the quality of the planning during the project, and information is not passed...
- the architecture companies on the annual agreement contract list are quality firms!

10 March 2022

Project Manager, Construction engineer M.Sc Eng., 25 years of experience.

Project phase: Execution, but follows the pre-planning phase, too.

"I prefer to manage the project management of my projects myself, because you can learn best by doing yourself, and it is a question of saving money. And I like the decision-making. Though sometimes it's annoying how much paperwork a project requires. However, I think that hired project manager hourly fee is a lot for the secretary tasks. A hired construction work inspector/supervisor can be a great help in project management, though. I use hired PM consultant when the project cost is over 20 million or the project has special conditions, e.g., ecolabels or such. At this moment I have up to ten projects, new constructions, and renovation projects. My speciality/expertise is the indoor air quality issues."

22 February 2022

Team Leader, Architect (Lic.Sc.), 12 city years, 37 working years.

Current state, resources:

Team leaders hold team meetings every second Thursday where they plan resources for the projects. The request to allocate the project manager for the project is based on the timetable of the annual Building programme and on the e-mail requests from the clientship units. The goal is to establish resources for projects several months before. This is not the reality currently.

14 March 2022

Project Director, Technician, the city employee for 26 years.

“For bigger projects I always hire an outsourced project manager. Small projects, like renovations or small alteration works I do without a hired project manager.”

“The hired third-party construction work inspector/supervisor is a great help.”

DATA 2. The interview was conducted at the office of the Urban Environment, Helsinki. It was a face-to-face meeting. The interviewee is a key stakeholder in small projects.

Friday 1 April 2022, 14.30

Project Director, B Eng in Building technology. City employee for 23 years.

“Using the staff of internal technical experts for small projects is not that adequate since their expertise is needed for bigger projects and the number of internal technical experts is limited.

Therefore, I think it is wise to always outsource small projects. Hired consultants are a good choice since they are available immediately when needed and usually these companies can offer all the expertise required for the project, too. They are kind of multiservice centres.

In small projects the number of required experts is the same as in bigger projects. The implementation of the phases lasts less, though.”

DATA 3. Thursday April 21, 2022. 10 am. A face-to-face meeting, the author of the thesis presented the initial concept to the team leader at the office in Helsinki. The Team Leader expressed that all learning and new tools are welcomed, since the project managers have different backgrounds and experience.

Consultant task list

Consultant Project Manager

Project Management task list

Project phases

A. Pre-Planning

B. Implem Planning

C. Construction

D. Post-Construction

A. Pre-Planning

1. Project planning

- Meetings: Organizing and participating
- Meetings procedures: agenda and minutes
- Financial planning: Participating
- Ordering / organizing analysis/research, which are needed for planning

2. Project supervision and reporting

- Information and communication with project group

B. Implementation Planning

3. Supervising implementation planning

- Organizing planning meetings
- Meetings procedures: agenda, minutes
- Managing project bank BEM
- Tasks related to building permit

4. Procurement

- Contractor selection-> annual agreement, contract administration
- Contractor is tendered-> Paperwork for procedures and contract
- Communication with contractor. Timetables, financials etc BEM

C. Construction

5. Building work management tasks

- Control visits to building site
- Site meetings (client-contractor), taking minutes
- Controlling contractor's quality assurance papers, BEM
- Controlling contractor's schedules, checking records, site diary, BEM
- Final settlement of accounts with contractor

6. Reception and commencement tasks

- Meeting, Handover of construction site
- Ensuring final documents are stored in project bank BEM
- Ensuring instruction session is organised for users

D. Post-Construction

7. Tasks during the guarantee period

- First year guarantee meeting organizing guarantee inspections
ensuring defects observed are fixed
- Second year guarantee meeting organizing guarantee inspections
ensuring defects observed are fixed
- Meeting minutes signed and stored in online project bank BEM