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# DEVELOPING IT PROJECT MANAGEMENT MODEL WHICH AFFECTS CUSTOMER SATISFACTION: CASE STUDY OF GOVERNMENT ICT CENTRE VALTORI

# TIIVISTELMÄ

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Tämän tutkimuksen tarkoituksena on selvittää tekijöitä jotka johtavat asiakastyytyväisyyteen projektinhallinnassa ja joiden avulla asiakastyytyväisyyttä voidaan arvioida. Tavallisesti asiakastyytyväisyys on nähty osana projektien onnistumista projektin tuotteen osana. Projektin onnistumisen määrittäminen on haasteellinen termi määritellä, mikä tekee aiheen tutkimuksesta arvokkaan. Tämä tutkielma sisältää kirjallisuuskatsauksen aiheesta sekä tapaustutkimus kohdeorganisaatiossa Valtion tieto- ja viestintätekniikkakeskuksessa Valtorissa. Tutkimuksia julkisella sektorilla ei ole saatavilla runsaasti, mikä tekee tutkimuksesta tarpeellisen.

Kirjallisuuskatsauksesta ja tapaustutkimuksesta saatiin tietoa 14:stä erilaisesta tekijästä asiakastyytyväisyyteen ja niiden sovellettavuutta arvioitiin kohdeorganisaatiolle. Useat tekijöistä ovat organisaation saavutettavissa, mutta tulokset osoittavat että ne tekijät, jotka saavutettaisiin agiilien metodien avulla ovat saavuttamattomissa. Tämä tutkimus esittää, että agiilit tai hybridi metodit voivat johtaa asiakastyytyväisyyteen IT-projekteissa. Näiden metodien toteutettavuus julkisen sektorin organisaatiossa vaatii kuitenkin lisää tutkimusta jotta niiden käytännöllisyyttä voidaan arvioida.

Asiasanat: projektin onnistuminen, projektin hallinnointi, projektin elinkaari, onnistumisen mittaaminen, IT-kehittäminen, asiakastyytyväisyys, ketterät menetelmät, hybridi menetelmät

# ABSTRACT

The purpose of this thesis is to identify factors leading to customer satisfaction in project management and how customer satisfaction can be evaluated. Conventionally customer satisfaction in projects has been defined as a part of project success with project deliverables. Project success itself has been a challenging concept to determine which makes the research on it valuable. The study contains a literature review on the subject and empirical research on the target organization government ICT centre Valtori. Research on customer satisfaction in the public sector is limited, which makes the research on it needed.

From the literature and the case study results 14 different factors for customer satisfaction were determined and analyzed for their applicability for the target organization. There were several factors found to be achievable for the organization, but the results suggest that factors that are achieved via agile methods are currently unfeasible for the company. This study suggests that using agile or hybrid methods could lead to customer satisfaction in IT-projects. The feasibility of such methods in public organization should be tested further for concrete measures on practicality.

Keywords: project success, project management, project management model, project life cycle, measuring success, IS development, customer satisfaction, agile methods, hybrid methods

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# 1    INTRODUCTION

In the field of information technology (IT), project work is one of the main ways to produce products and services. This stems from the distinctive nature of IT as a field; the Project Management Institute (2003, p. 3) defines projects as an organized way of producing unique and carefully planned product which compliments the multisectoral nature of IT-companies and -ventures. However, according to a survey conducted by Bonnie (2018) from studies and reports from a five-year timespan, only 64% of all projects succeeded in meeting their original goals and business objectives. The survey also lists several alarming challenges in IT project management, including 75% of IT project leaders believing their projects are "doomed from the start." (Bonnie, 2018).

Failure is a common occurrence in the field of IT. Nelson (2007, pp. 67-78) studied this phenomenon from different angles, including from the perspective of ten of the more famous cases in the field of IT-project management, that are considered massive failures in all aspects. The cases revolved around implementation of modern IT-systems in different fields, such as aviation and clothing business.  As projects are multifaceted, complex entities, reasons for such a high rate of uncertainty must be studied from several perspectives. Therefore, studying success and failure of IT-projects thoroughly is necessary to evolve the ways IT-companies manage and operate.

Measuring information system (IS) success has been a hot topic for several decades. The most prominent and often cited study for IS success, is the DeLone & McLean IS success model (DeLone & McLean, 1992, p. 87). The framework has been updated and refined over the years (DeLone & McLean, 2003, pp. 9-30), but the core of the model is still intact and relevant. However, when looking at IT-projects in general, there is no clear consensus on the requirements and necessities for IT-projects success, as every project should have them determined by the various project stakeholders (Wateridge, 1995, pp. 169-172). The study suggests that project managers put too much emphasis on certain types of criteria, for example project resources, to be fully effective in achieving the more important goals of the project. This dissonance between different IS success criteria can be hard to determine, as information systems and projects are complex

and can have several different stakeholders, with several different needs for the entity at hand. Thomas and Fernandez (2008, pp. 733-742) studied the importance of defining and measuring success in IT projects. The study suggests that IT -project success is heavily dependent on the perceived and connected importance of different success criteria within stakeholders. The paper also confirms that IT-project success is positively affected by determining the success factors at the start of the project (2008, p. 740). This requirements acquisition from stakeholders is integral for gaining stakeholder and customer satisfaction and ultimately project success.

In the interest of providing new information in the field of IT-project success, this case study will focus on the project life cycle and the methods which the project organization use to determine and achieve their projects success and customer satisfaction. This study has two parts: the literary review and the empirical research conducted on the target organization. The purpose of this research is to identify factors for greater customer satisfaction and project success for the target organization. The research question in this study is as follows:

*How can greater customer satisfaction be achieved in IT-projects through project management?*

As Finland solidifies its place as a world leader in information and communication technology (ICT), which is linked to economic growth (Watanabe & co., 2018, pp. 21-38), the problems and successes of the ICT institutions must be studied to maintain the quality of IT-project work in Finland. The subject of this case study, the Government ICT Centre Valtori provides ICT services to more than 40 different government agencies in Finland and as of 2022 employs more than 1400 people from different fields such as IT development, cybersecurity, and marketing. In 2022, the company released their new strategy for the period of 2022 – 2024, with the focus on maximizing customer satisfaction. The top management has deemed their current project management model to be insufficient in achieving the goals of the new strategy. The purpose of this study is to determine what problems the current model and the project management culture has and how the project management model and prevalent methods could be developed and modified to reach those goals.

# 2   PROJECT MANAGEMENT

This chapter contains information about project management: the important definitions, projects phases and the project team composition are described to provide context for the research. The Project Management Institute (PMI) has created a global standard for conducting projects, called the Project Management Body of Knowledge (PMBoK). The organization maintains the vast amount of information for the betterment of project work. However, information-systems (IS) development is a growing industry, with new innovations and methodologies for more efficient and productive ways to work emerging frequently. Perhaps the most well-known methodology for software development are the Agile methods. The purpose of Agile methods is to produce iterations of the product incrementally, by creating new versions of the product over time (PMBoK, 2013, p. 46). This makes Agile suitable for software development, as the products and services contain many different components, which are different in their importance. Agile methods such as Scrum (Sliger, 2011) also provide a natural environment for IT-project teams: Scrum enables the work to be divided to smaller subsections, which require specific knowledge and skills.

Even though IT-projects can be conducted in many ways, they have several common principles and concepts which makes them comparable to each other: the projects have a distinct life cycle, project team and a manager. In IS development the teams required skillset can wary dramatically depending on the purpose of the project, but the team still has designated roles and responsibilities, which must be conducted accordingly. The project manager is responsible of designating the workload to knowledgeable members, for the progress of the project (Project Management Body of Knowledge, 2013, p. 16).

## 2.1 Definitions

This subsection contains definitions for concepts in project management, that are relevant to the research of IT-project teams and their success. The following table [Table 1] contains basic definitions used in project management:

| CONCEPT | DEFINITION |
|---|---|
| **project team** | "… [project] team is comprised of individuals from different groups with specific subject matter knowledge or with a specific skill set to carry out the work of the project" (PMBoK, 2013, p. 35) |
| **project team role** | "the function assumed by or assigned to a person in the project" (PMBoK, 2013, p. 264) |
| **project manager** | "project manager is the person assigned by the performing organization to lead the team that is responsible for achieving the project objectives" (PMBoK, 2013, p. 16) |
| **project stakeholder** | "… an individual, group, or organization who may affect, be affected by, or perceive itself to be affected by a decision, activity, or outcome of the project" (PMBoK, 2013, p. 30) |
| **project management office (PMO)** | "a management structure that standardizes the project-related governance processes and facilitates the sharing of resources, methodologies, tools, and techniques" (PMBoK, p. 10)<br><br>"there are several types of PMO structures in organizations, each varying in the degree of control and influence they have on projects within the organization, such as supportive, controlling and directive" (PMBoK, p. 11) |

*Table 1: Relevant definitions in project management for this study*

IT-project management differs from other fields of project management in terms of project team composition. According to Belassi and Tukel (1996, pp. 141-151), the factors relating to project team members, such as technical capabilities and the commitment to the project team are critical factors for success in IS -related projects. This is not surprising, as IS development is a highly special-

ized field and often requires very specific knowledge from the team members for the project to succeed. For these reasons, the definitions related to project team are vital in quantifying the effects of certain roles in success.

## 2.2   Project quality management

Project quality management refers to processes and activities that affect the quality of the project and its' deliverables. Quality management is divided into three processes: planning quality management, performing quality assurance and controlling quality (PMBoK, 2013, p. 227). The following figure [Figure 1] provides details on these three processes.
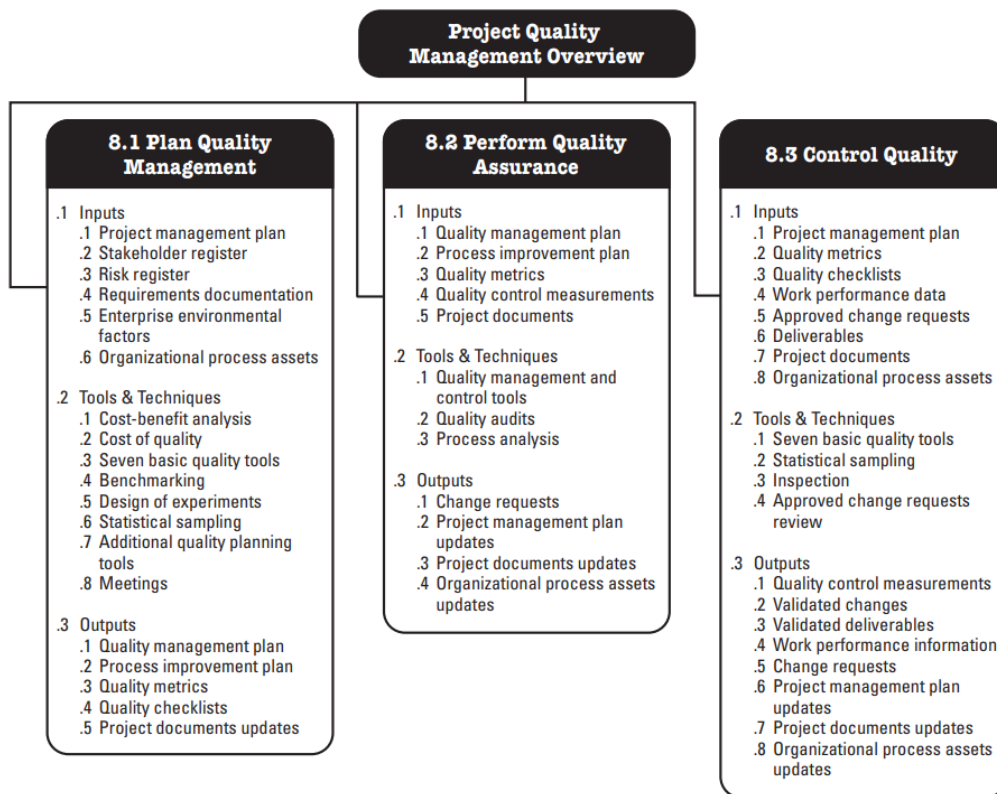


*Figure 1: Overview of the aspects of Project Quality Management (PMBoK, 2013, p. 227)*

The act of quality management aims to ensure that the project and deliverables are in accordance with the goals and standards that are expected of the project. Quality measures are dependent on the project: Cronin & Taylor (1992, pp. 55-67) created a model for service quality called SERVPERF, stating "that customer satisfaction exerts a stronger influence on purchase intentions than service quality" (1992, p. 65). Therefore, appropriate quality procedures must be chosen according to the purpose of the project. The challenge of ensuring the highest possible customer satisfaction level within quality management is evident, as fur-

ther studies suggest that service quality and customer satisfaction should be examined as separate entities (Cronin & Taylor, 1994, p. 131). Applying this to a project management methodology would mean using different factors for determining service quality and customer satisfaction.

## 2.3   Project life cycle and project management methodology

Project life cycle refers to the project in its' entirety from the initiation of the project to its closure, which is carried out via several project phases. Projects can be generalized to have four stages: starting phase, preparation phase, project work phase and finally the closure of the project, which all can be divided into several smaller phases according to the needs of the project. In IT-projects, the life cycle can be carried out by different methodologies, such as the waterfall model (Royce, 1970, pp. 328-338), iterative development such as Scrum (Schwaber, 1997, pp. 117-134) or the spiral model (Boehm, 1988, pp. 61-72). Methodologies are created for different purposes and should be used after the organization has determined which methodology suits their projects the best. Munassar and Govardhan (2010, pp. 94-101) compared five different methodologies to each other with their differing effects on software engineering projects. They conclude that "each model has advantages and disadvantages for the development of systems, so each model tries to eliminate the disadvantages of the previous model" (2010, p. 100). Therefore, the choice of an applicable model is important to meet the goals and needs of the system that is being developed. This paper will introduce a few relevant models to be considered for the case study.

The waterfall model and modified waterfall models are seen as classical project management methodologies. The credit for waterfall models' conception is attributed to Royce (1970, pp. 328-338), who published his critique on prevalent project methodologies, which popularized the model in project management literature. With the waterfall method, the projects life cycle is conducted sequentially without backtracking to previous life cycle phases. These models are classified as plan-driven methods, as the models' advantages include thorough planning and documentation, which are essential for the project work to be completed. Boehm (2002, p. 66) compared the usefulness of this planning focus to other methods, stating that "plan driven methods reduce the risk of irrecoverable architectural mistakes by investing in life-cycle architectures and plans, and using these to facilitate external-expert reviews". The documentation focus enables further analysis of the project after the project is done for further betterment of project work. However, this rigidness of determining needs thoroughly in the planning phase has been determined to be problematic. A case study (Petersen et al., 2009, pp. 386-400) on the effectiveness of the waterfall model in large-scale development projects found out, that defining, using, and implementing all the requirements were problematic due to various reasons. First, the requirements had to be defined early in the project, but sometimes

they had to be discarded or reworked later in the largescale project, which is not efficiently possible in the waterfall. Second, the roles for implementing certain requirements in specific project phases were not clearly defined. Finally, the impact of the requirements was not isolated to just particular parts of the system, but also other subsystems. This highlights the importance of determining the dependencies requirements have in the system.

Agile methods were created for the purpose of distancing project work from the rigidness of waterfall model. Fowler and Highsmith (2001, pp. 28-35) published the Agile Manifesto, which defined the principles and values of agile software development. The declaration states that "our highest priority is to satisfy our customer through early and continuous delivery of valuable software "(2001, p. 35). An empirical study on the effects of choosing a project management model (Guntamukkala et al., 2006, pp. 265–278) was conducted on IT-projects. The study states that "use of suitable life cycle model (exhibiting a specific degree of flexibility) will lead to successful software projects that are delivered on time within budget and to the customer's satisfaction" (2006, p. 277). In their study, the rigid models such as the waterfall model were preferred when the needs of the customer were understood and the systems would need more maintenance and monitoring after the project work had been executed (2006, p. 275). This is supported by the characteristics of each methodology. When comparing agile methods to plan-driven methods such as the waterfall model, the book for agile methods by Boehm and Turner (2004, p. 55) declares that there are five critical factors that favor for either approach. The factors are explained in the following table [Table 2]:

| Decision factor | Agile methods | Plan-driven methods |
|---|---|---|
| Project size | Small teams can work well within agile methods | Over the years the methods have been tailored to work with bigger teams and projects |
| Project criticality | Criticality requires meticulous planning and documentation, which doesn't fit agility. | Methods have been made to handle needed planning for critical projects. If the criticality is low and preplanning not as needed, other methods would be more suitable |
| Dynamism | Continuous iteration suits well for dynamic environments, so agile methods are preferred | If the needs, requirements, and resources are evaluated to be stable, plan-driven methods should be preferred. If the environment in which the project is conducted in changes in these aspects, other methods should be preferred |

| Personnel | Highly capable personnel are needed to be available for project work at a moment's notice | Highly capable personnel are needed to be available during project definition and planning but are not essential to be available all the time later in the project. |
| Culture | Freedom and authority on making quick decisions and changes when needed are essential for the best performance in agile methods | Well defined roles, objectives and processes complement plan-driven methods well |

*Table 2: Decision factors driving for different project management methodologies (Boehm & Turner, 2004, p. 55)*

The information presented in the table suggests the need for distinct environments for either methodology. However, this isn't to say that the methods cannot be mixed: Boehm and Turner studied hybrid methodologies where agile methods were implemented in bigger, critical projects: with enough stakeholder support and highly skilled personnel, hybrid approaches can be successful, if the decision factors would suggest it would be feasible (2004, pp. 95-98). The comparison between plan-driven methods and agile methods has been done vigorously in the field of IT-project management, with a clear conclusion. Van Casteren (2009, pp. 1-6) concluded in their literature review on the subject, that smaller, faster projects are well suited for agile methods, while the waterfall method is appropriate with bigger projects. They also note that medium-sized projects do not have clear indicators for which approach would be better implicitly (2009, p. 5). All in all, the choice of correct project management model is relevant to projects efficiency and success.

## 2.4   Measuring IT project success

This chapter describes the phenomenon of IS success, IT-project success, and the methods of measurement for them. The basic way to evaluate success in projects has been the trio of finishing the project within the allocated budget, schedule, and requirements, also known as the iron triangle (Atkinson, 1999). However, the success of an IT-project cannot be fully evaluated with such a narrow mindset. IT-projects typically have several different stakeholders such as the project customer, end-users for the product and other teams that are dependent on the progress of one project. The authorized stakeholders for the project are responsible for determining the success factors (PMBoK, p.35), which can range from easily quantifiable goals such as satisfying the iron triangle, to abstract goals such as creating a product which can provide boundary resources for other companies to use. Ghazawneh and Henfridsson (2013) studied the

concept of boundary resources in the context of platform-based ventures and third-party partnerships. The idea of boundary resources is to provide other companies means to create co-existing products and services for the benefit of all platform networks stakeholders. This means that the product from a project can have multiple use-cases and value opportunities, which cannot be measured by generic success measurement frameworks.

The DeLone & McLean model (1992) is a hallmark in IS success measuring and every consequent model has been and will be compared to it, for a good reason. But, as the authors themselves state: "it is apparent that there is no consensus on the measure of information system" (1992, p. 80). The ISs can be measured from the end-users, project teams, stakeholders or even the society's point-of-view, when applicable.

Success measurement is a broad concept, that has been actively studied for decades. However, the success of a project or a system is always relative to the entity itself. Therefore, the success itself cannot be defined conclusively, but the methods of measurement on the other hand can be described. For example, Pinto and Slevin (1988, pp. 67-75) studied the critical success factors (CSF) in the project life cycle. Critical success factors are general tasks and requirements within the control of the project team, which need to be satisfied for the project to succeed. CSFs are a strong indicator for the project success: determining the success and the goals at the start of the project is a CSF in and of itself (Thomas & Fernández, 2008, pp. 733-742).

However, the field of IS is not only IT-projects and management: the systems themselves are created for the benefit of a company, to create value for the owner of the system. The following table [Table 3] contains relevant concepts and definitions for the purpose of better understanding of the phenomenon of IS success measurement.

| CONCEPT | DEFINITION |
|---|---|
| critical success factor (CSF) | "critical success factors are inputs to project management practice, which can lead directly or indirectly to project success" (Alias & co, 2014) |
| project stakeholder | "an individual, group, or organization who may affect, be affected by, or perceive itself to be affected by a decision, activity, or outcome of a project" (PMBoK, p. 30) |
| platform business model | "an environment established to allow multiple groups such as suppliers and consumers to exchange their views for fair transactions" (Kim, 2015, p. 2113) "a platform can exist in five different layers: content, service, network, system, or physical layer" (Baldwin & Woodward, 2008) |

*Table 3: Concepts for measuring IT project success for this case study*

IT-projects can be measured from several different angles. The budget, schedule and minimum deliverables are something that must be taken to account at every project phase, as per the iron triangle (Atkinson, 1999). For this research paper, the focus is on the perceived success by the project team. Literature review is conducted by selecting especially project team related success measurement using studies, which would provide context for the case study. The literature is going to be used to create the eventual questionnaire, with which the study is conducted with.

The problem of finding consistent key factors for project success stems from the unrefined nature of projects themselves. Even though there are several frameworks, studies and books constructed for aiding project management to succeed, the measuring of those tools and practices has not provided nearly enough results for determining clear instructions for success. Only recently Bjorvatn and Wald (2018, pp. 876-888) conducted in their study that project complexity has a deterring impact on project success. This should not come as a surprise, as projects are naturally complex entities that must manage technological factors in conjunction with organizational influences (Xia & Lee, 2005, pp. 45-83). Predicting project outcome takes more effort, when the number of factors and interdependencies between them grows (2005, p. 55). Even though determining these factors is difficult for universal usage, trying to achieve satisfactory results in certain factors can have positive effects on the project in other ways. Diegmann et al. (2017, p. 94) state that "taking client satisfaction explicitly into account will improve project evaluation and project performance." Customer satisfaction itself has been identified as an important factor in conjunction to the iron triangle (Agarwal & Rathod, 2006, p. 369).

# 3   CUSTOMER SATISFACTION

This chapter contains information on the concept of customer satisfaction in IT-projects. The major definitions regarding the phenomenon are introduced and the ways of measuring customer satisfaction in IT-projects are established. The characterizations for customer satisfaction are discussed and compared to each other for the purpose of focusing on relevant factors for this case study.

## 3.1   Definitions

Customer satisfaction is a term that is often used in marketing, as customer satisfaction can be classified as "the number of customers, or percentage of total customers, whose reported experience with a firm, its products, or its services (ratings) exceeds satisfaction goals" (Farris et al., 2010, p. 57). In IT-projects, this definition isn't applicable, as IT-projects produce deliverables that are not meant for mass consumption but are made for specific needs and requirements in mind. The Project Management Book of Knowledge defines customer satisfaction as "a state of fulfillment in which the needs of a customer are met or exceeded for the customer's expected experiences as assessed by the customer at the time of evaluation" (2013, p. 536). This classification puts emphasis on meeting predefined expectations from the customer, which makes customer satisfaction a subjective factor that must be established on a case-by-case basis.

Customer satisfaction is deeply intertwined with project success. The iron triangle (Atkinson, 1999) is not only a determinant of project success but can also be indicative of customer satisfaction: Matzler et al. (2004, pp. 276-277) concluded in their study, that the performance of the product and basic factors of schedule and cost are inversely correlated with their importance to customer satisfaction, depending on the quality of the product. This makes the process of requirements acquisition at the beginning of the project important for achieving

greater customer satisfaction. This relates to greater organizational success, as customer satisfaction can be achieved even if the conventional success measures of time, scope and resources are not met, given that the customer satisfaction is achieved by other methods such as the relationship quality between the project organization and the customer (Haverila & Haverila, 2019, p. 217).

In project management, customer satisfaction is a part of quality management aspect of project management. Customer satisfaction as a concept has been widely used in marketing and consumer research: a study conducted by Churchill and Surprenant concluded that customer satisfaction factors differ for products that are nondurable and durable, as for the latter the performance of the product was the only key factor for customer satisfaction (1982, p. 503). This, however, isn't solely sufficient for determining customer satisfaction in IT-projects, as there have been numerous studies regarding customer satisfaction in IT-projects. For example, a study conducted by Woźniak (2021, pp. 1-21) defined 5 key areas for assessing customer satisfaction in IT-projects: tangibles, activities, effectiveness, competencies and finally empathy and individual approach. (2017, pp. 10-11). This distinction to five dimensions is similar to the widely used SERVQUAL questionnaire devised by Parasuraman et al. (1988, pp. 14-20), which focuses on assessing service quality. According to the study by Woźniak, matching the project management methodology to the client is connected to higher client satisfaction levels in the context of those five key factors (2017, p. 15). However, this lean approach in choosing project management methodology isn't suitable for the context of this paper, as the organization works in the public sector without the flexibility to change according to various other public sector client organizations. This highlights the importance of choosing correct criteria for customer satisfaction for accurate measurement.

Schwalbe (2015, p. 15) states that customer satisfaction can be seen as a separate definition for project success altogether, with companies employing rating systems to evaluate customer satisfaction to determine project success for organizationally relevant metrics. According to their study, focusing on educating employees and giving the staff responsibility for customer satisfaction in projects lead to higher quality in projects (2015, p. 327). This makes the importance of measuring customer satisfaction evident.

There are several different key factors driving better customer satisfaction results. Ireland (1992, pp. 123-127) studied the effect of the project manager has on customer satisfaction. In the study, they state that project managers authority to determine, analyze and manage all customer expectations makes them the key contributor to customer satisfaction. As the highest authority on the given project, the managers abilities in technical, interpersonal, and managing skills are important for project success.

## 3.2  Measuring customer satisfaction in IT-projects

As a broader concept, customer satisfaction can be measured by various methodologies and models. In the field of IT, one of the first was the SERVQUAL instrument (Parasuraman et al., 1988, pp. 12-40). The SERVQUAL instrument assesses the quality of the given service via five dimensions: tangibles, reliability, responsiveness, assurance, and empathy (1988, p. 22). The model is used by creating a customer questionnaire which is given to the users of the service and evaluating the answers to determine the quality of the service. As the instrument is meant to be used for service quality assessment, it per se is not sufficient for determining customer satisfaction for IT-projects. Cronin and Taylor argue in their rebuttal, that "customer satisfaction exerts a stronger influence on purchase intentions than does service quality" (1992, p. 65). This makes the modification of proven models important for specific needs. A further study on the subject (Cronin & Taylor, 1994, p. 131) suggests that service quality and customer satisfaction should be evaluated separately to gain greater insight into the phenomenon of customer satisfaction and its implications to customer behaviour.

In IT-projects, customer satisfaction is a metric that can be used for estimating project success and for driving profits for the organization. Kujala and Ahola (2005) studied the effects of using surveys for determining customer satisfaction in IT-projects. Their study found that customer surveys do not yield technical value, but rather symbolic value (2005, p. 409). This means that customer satisfaction should be determined by other means to gain technical benefits for the betterment of future projects. However, in the context of user experience and end-user satisfaction with IT services, a study (Sun et al., 2012) argues that the quality of the IT service itself has two moderating effects from cognitive and relational interactions between the end users and the IT staff for customer satisfaction (2012, pp. 1206-1207). This would indicate that the technical benefits that could be gained from customer satisfaction surveys are not as important for the betterment of customer satisfaction if the social aspects of the product are not considered. This is backed by a well renowned study (Nahapiet and Ghoshal, 1998, p. 260), which argues that "differences between firms, including differences in performance, may represent differences in their ability to create and exploit social capital". This approach implies the importance of acquiring and maintaining social resources. These social resources can be managed via project portfolio management, as portfolio managers monitor contextual strategic changes and performance results regarding the portfolio (PMBoK, 2013, p. 8). The purpose of portfolio management is to respond to necessary changes and "attain effective investment management and business value realization (2013, p. 16). In project quality management, this can be achieved with cost-benefit analysis' and reviewing the end surveys collected from the end-users. The betterment of the relationships between the project organization, the product and the customer has been found to be positively linked to customer satis-

faction (Lam et al., 2004, p. 307). This phenomenon has been rigorously studied and customer satisfaction has been determined to be realized from the perceived quality and cost which lead to perceived value attained from the product and which leads to customer satisfaction (Gallarza et al., 2011, pp. 179-191).

To measure customer satisfaction from IT-projects, the organization must gather data and information about satisfaction levels from the customers. The data must be then analyzed and processed to gain further information on customer satisfaction. One of the more popular strategical frameworks that can assess such data is the balanced scorecard (Kaplan & Norton, 1992, pp. 71-79). The below figure [Figure 2] describes the basics of the balanced scorecard, shows the four basic dimensions of the framework and key aspects of those dimensions.

*Figure 2: An illustration of balanced scorecard with customer satisfaction as a factor*

The responsibility of integrating data and information from projects to organizational frameworks such as the balanced scorecard is usually given to the project management office (PMO). The purpose of this integration is to give preemptive context for the planning phase - especially need acquisition - and to monitor possible changes in customer satisfaction after projects. This need of context for better project quality is emphasized by the fact while customer satisfaction has been found to be significant to a project's success, customer satisfaction is still under-researched as the differences in customer satisfaction levels between the project lifecycle hasn't been researched enough (Haverila & Fehr,

2016, p. 580). As the assigned project manager is responsible for the project's lifecycle and success, this information gathered by the usage of surveys and the organizational framework should be used within the context of the project.

# 4    THEORETICAL BACKGROUND SUMMARY

This chapter contains a catalogue of literature, containing information about past research about project management and customer satisfaction. The catalogue is divided into two graphs: the first table [Table 4] contains summaries of previous studies considering IT-project success and failure. The latter table [Table 5] contains a summary of 14 studied key factors which have led to greater customer satisfaction in IT-projects.

| The source | Focus of the study | Findings |
|---|---|---|
| de Bakker, Boonstra, Wortmann (2009) | "Does risk management contribute to project success?" – meta-analysis on empirical studies | Risk management does have an effect, but the findings are inconclusive, as project success was too broadly determined. |
| Sumner, Bock, Giamartino (2006) | "Do managers of more successful IT projects exhibit positive leadership behaviors, in contrast to less successful project managers according to LPI Self-Assessment and LPI Observer Assessment frameworks?" – a quantitative study | Use of the self-assessment instrument did not provide significant project success indicators, but the observer assessment instrument did: the evaluations by supervisors, underlings and peers were a predictor of success in IT-project management. |
| Randeree, Ninan (2011) | "What is the level of IT-project team effectiveness in the United Arab Emirates? What is the maturity level of leadership in IT- | Team goals was a key aspect in all researched teams: the willingness to work towards a common goal and knowing the importance of each team |

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| | | |
|---|---|---|
| | project management in the United Arab Emirates?" – a qualitative study | members role was evident. The importance of effective leadership is detected for the purpose of bettering the IT-project team effectiveness |
| **Jetu, Riedl (2012)** | "What are the determining factors for project team success?" – a literature review | Researchers created a conceptual model for project team success from 53 different determinants, categorized in three dimensions. The dimensions, which are interrelated to each other in context of team success, are project team working spirit, learning and development, and lastly, leadership. |
| **Scott-Young, Samson (2007)** | "What gaps are there in the literature for project management and success measurement? How does the model derived from the literature perform?" – a model testing study | The unified model and the consequent testing revealed that key success factors in one part of the IS field were not predictive of project performance in another. The studies conducted on project management and success measurement should not thrive for a common, unified model for success measurement, but to study the different aspects of project management success. |
| **Dvir et al. (1998)** | "What are the specific factors that influence the success of various kinds of projects?" – a quantitative study | There are a number of key similarities, but the factors are not universal at all. The type of the project dictates the success factors in a major way. |

*Table 4: A summary of related project success literature*

| Factor | PM model | Source |
|---|---|---|
| Meeting basic requirements for the end-product | Any | Matzler, Bailom, Hinterhuber, Renzl & Pichler (2004); Diegmann, Basten & Pankratz (2017); Schwalbe (2015) |
| Performance factors (cost, schedule) | Any | Matzler, Bailom, Hinterhuber, Renzl & Pichler (2004) |
| Excitement factors compared to competitors | Any | Matzler, Bailom, Hinterhuber, Renzl & Pichler (2004) |
| Customer involvement throughout the project | Agile | Mann & Maurer (2005) |
| Skillful project manager: Balancing customer expectations and technical goals with interpersonal and technical skills | Any | Ireland (1994); Geoghegan & Dulewicz (2008); Webber (2011); Diegmann, Basten & Pankratz (2017); |
| Product expectations rather than process expectations | Any | Diegmann, Basten & Pankratz (2017) |
| Project team stability | Any | Narayanan, Balasubramanian, & Swaminathan (2011) |
| Functionality of the product over the quality of the software | Any | Agarwal & Rathod (2006) |
| Implementation of Scrum and agile methods in project management | Agile | Mann & Maurer (2005) |
| Project managers identification for both the product provider and the client organization | Agile | Webber (2011) |
| Project portfolio management | Any | Schwalbe (2015) |
| Top management providing necessary skills to enable employees to being responsible for customer satisfaction | Any | Schwalbe (2015) |
| Engagement and involvement from all stakeholders | Any | Schwalbe (2015) |
| Industry specific customer relationship management (CRM) | Any | Aiyer, Panigrahi & Das (2018); Haverila & Haverila (2019) |

*Table 5: Factors leading to greater customer satisfaction in IT-projects*

# 5   METHODOLOGY FOR THE STUDY

This chapter contains a description of the chosen study method, the research methodologies used for the research, and the current project management model created and used by the project management office (PMO) in Government ICT Centre Valtori.

## 5.1   Basis for the study and the adopted study method

The literature review was conducted by using Nelli-portal, JYX services, Google Scholar and Scopus database for searching relevant literature. The material has been collected by using certain key phrases, such as "IT-project success", "IT-project failure", "project measurement", "customer satisfaction" "project management success" "project management methodology" and "project team success". The search results were narrowed down to involve IT-development and IT-projects. The literature was chosen by evaluating the relevance to the case study at hand and the literature was mainly chosen from proper journals and sources, with a score of at least 1 according to Julkaisufoorumi database.

The research will be conducted as a case study. Darke et al. (1998, pp. 273-289) state that case studies can provide greater insight into the studied field with a mix of data collection and analysis. As the company in question is in the middle of great organizational changes, the evaluation and comparison of obtained data on project success and customer satisfaction before, during, and after the changes is impossible, since the company has changed the metrics, processes, objectives and even the personnel involved with project management. Nevertheless, as the purpose of the research is to provide new information - and concrete suggestions for changes, if possible -, a qualitative case study can be suitable for such endeavor. McIntosh and Morse (2015, pp. 1-12) studied the different aspects of qualitative case studies conducted via semi-structured interviews (SSI). The study argues that even though SSIs can't be used for creating new general theories, they can provide knowledge that is new or already known (2015, p. 10). Therefore, the data for the case study will be gathered via

SSI, where the participants are chosen for having intrinsic knowledge of project management and project management methodologies used in the company. The interview contains a set of questions which the participants are asked to answer according to their knowledge and insight from their role in project management.

## 5.2 Target organization: Government ICT Centre Valtori

Valtori provides ICT services to more than 40 different government agencies. The main purpose of Valtori is to act as an integrator for governmental partners and agencies by creating ICT solutions that match the needs of the customers. This role as an integrator is illustrated in the figure [Figure 3]. The end users of the systems work in vastly different fields and in some cases in critical governmental areas, which makes reliability and accessibility very important for Valtori to provide with their services. Valtori employs approximately 1400 people, ranging from system specialists to project managers, communication technology experts and cybersecurity professionals. The highest Finnish governing bodies such as the ministry of foreign affairs and the Finnish Defence Forces are customer organizations for Valtori. Therefore, the security of communications and other ICT services must be guaranteed for the customers. This means that there must be strict scrutiny involved in not only creating the products and services, but also employing right personnel and providing them with the resources necessary for high quality products.
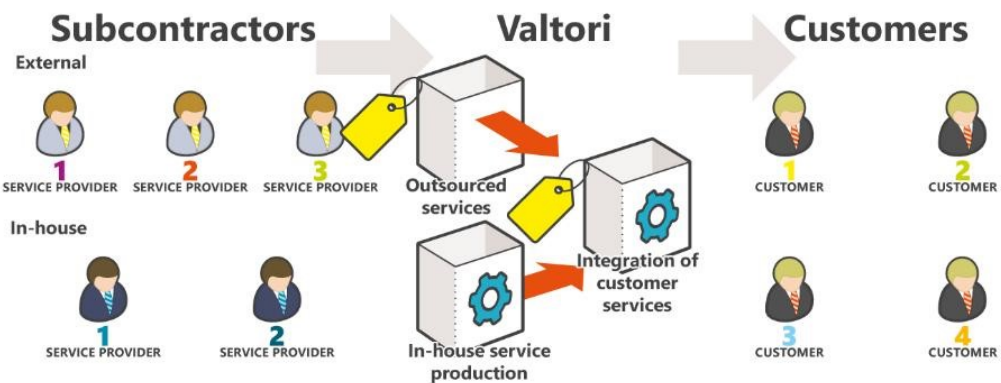


*Figure 3: Illustration of Valtoris role as an integrator of IT services for customers*

As of 2022, the organization is divided to seven profit centres:

- customer experience
- joint services
- Tori services
- Tuve services

- personnel experience
- finances and efficiency; and
- communication and marketing

These profit centres are responsible for actualizing the new strategy of the company, which centers around the company's vision to enable success for their customers. In this paper the focus is on the IT project management of the company, which is conducted on two of these centres: Tori and Tuve services.

Valtori provides services to two distinct business areas. The first area consists of information and communication technology responsibilities for the sector-independent ICT tasks and services in accordance with the governmental guidelines. This business area is known as the Tori project. The second area is called the security network, also known as Tuve, which is used for the communication, transferal, processing and handling of confidential governmental information and processes. Services in Tuve have rigorous criteria for them to be applicable, as most information managed within the network is considered confidential. As such, the security measures are a vital factor in determining the viability of any process, project, and product within the area.

The company published their new strategy for 2022-2024, where project management is mentioned as a key part of their new approach. The strategy aims for better performance in all areas of work, including projects, where the goal is complete projects faster, customer and service development projects ensure active customer participation and that the project activity models and tools are optimized. As the new project management models haven't been published yet, this paper contains the existing model currently used in project management.

## 5.3 Project management model in Valtori

The company uses a waterfall model as their project management methodology. The following figure [Figure 4] illustrates the current project management model used by the company.
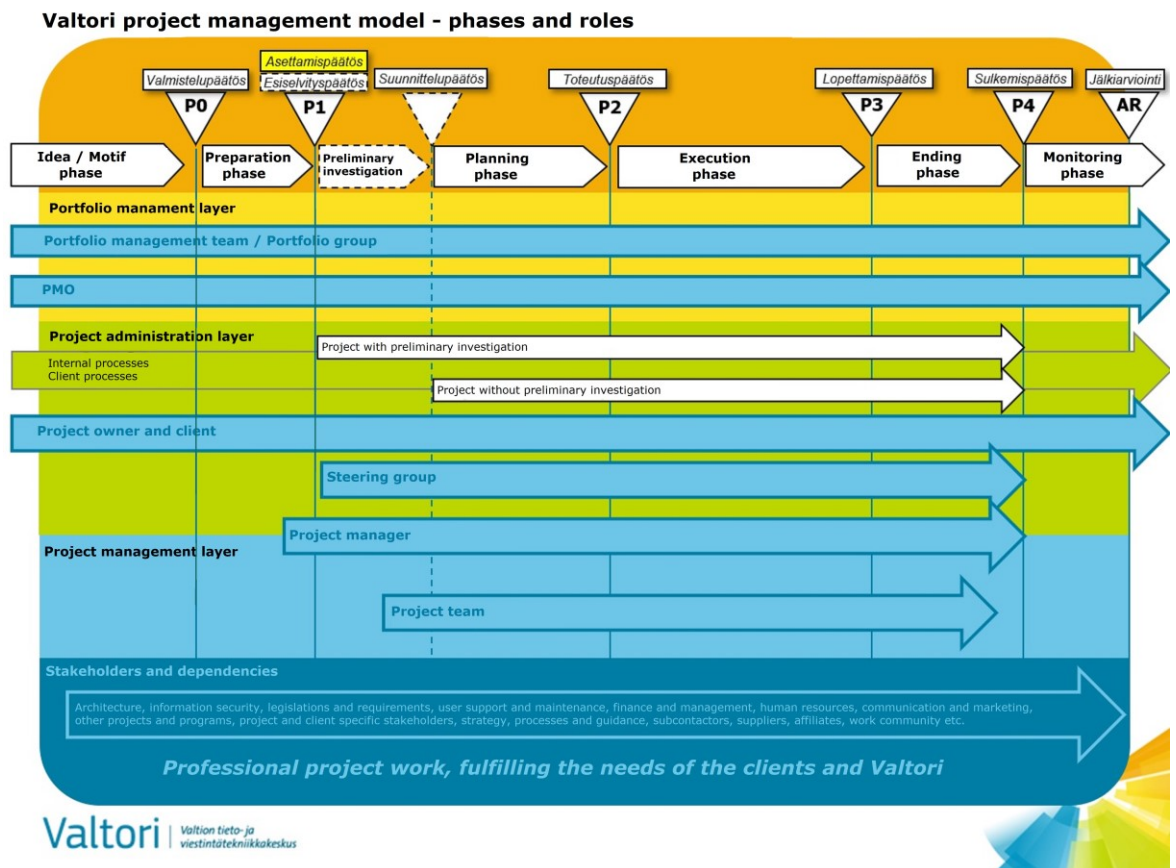
**Valtori project management model - phases and roles**



*Figure 4: Valtori project management model (Valtori, 2022)*

The model follows a structure consisting of six phases which all have distinct conclusions. Phases are categorized as: ideas, preparations, planning, execution, ending and finally monitoring. According to the model, the project will proceed from one phase to another after certain decision points (P0, P1, P2, P3, P4, AR) have met their criteria. These points are classified as such:

- P0, decision to start preparations
- P1, decision to start planning
- P2, decision to start execution
- P3, decision to start finalizing
- P4, decision to start monitoring
- AR, evaluation of monitoring phase and conclusion of the project

After P1 is successful, the planning phase can start with an optional preplanning phase, where the project steering group including the project manager start evaluating the project before project team is fully assembled. The purpose of the steering group is to evaluate the projects resources, benefits, and the scope of the project. The project steering group is appointed by the project owner and consists of at least the project owner and the project manager, but also such personnel that have the authority and the skills to make decisions

regarding the project. The steering group is committed to the project at hand, as decision-making requires full knowledge of the project and its surroundings. For this purpose, the steering group is usually built to have personnel from different project stakeholders to make the situation clear for all affected parties. Both Tori and Tuve services act according to the same project management model, but they use different IT-systems and personnel because of the different criteria for security and staff.

At the time when the interviews were conducted during the summer of 2022, the model described in Figure 4 has been dismissed from use by the top management of Valtori for the purpose of creating a new project management model for the new strategy. At the time of writing this research paper, the company has not introduced their new model and the interviews have been conducted with this change in mind.

## 5.4   Conducting the interview

The case study will be conducted via semi-structured interview (SSI). The interview will focus on providing context for the usage of the current model used in Valtori and its usefulness for project quality and achieving customer satisfaction. The interview questions that were asked in the study are shown in Appendix 1.

The use of SSI allows for further elaboration from the participants if necessary and applicable. The interviews were conducted in Finnish and then transcript to English. Recordings of the interviews were destroyed after the transcripts were done.

At the time of the interviews, all the respondents were experienced workers of the organization, with at least 3 years of experience with project work in Valtori. Due to the structure of the organization, roles in IT-projects are assigned as deemed fit for individual projects. This role assignment depends on many factors, such as the customer who the project is for, the needed expertise of the current IT-solutions relevant to the product and other currently running projects within the organization. As such, most of the participants have comprehensive insight on projects and project work in Valtori

The following table [Table 6] describes the respondents by their roles within the company, their employment years with the company and their role in their last project. During this case study Valtori has had an organizational overhaul, where the Project Management Organization (PMO) was dismantled and removed from the organization structure in the spring of 2022. As such, most of the respondents have had their roles changed from last year. The respondents' employment years vary between 3 years and 7 years.

| Respondent | Current role, employment years | Role in last project | Interview duration |
|---|---|---|---|
| A | ProjectManager_7years | Project team member | 45 min |
| B | ProjectManager_4years | Project manager | 46 min |
| C | PortfolioManager_4years | PMO assistant | 39 min |
| D | PortfolioManager_7years | PMO member | 42 min |
| E | PortfolioManager_5years | Project manager | 52 min |
| F | Developer_3years | Project team member | 35 min |

*Table 6: Basic information on respondents*

At the time of the study, new bigger projects are on hold as the organization wants to introduce the new project management model before taking on new customer projects. The projects the interviewees were involved with could be categorized to two main sectors: internal projects and customer projects. These differ mostly in scope and need acquisition, as the need for a new project in internal projects comes from within, which leads to clear definitions for success. Interviewees involved with internal projects reported that the teams were well equipped for their work and the projects were mostly successful. All the interviewees also pointed out, that the organizational changes for projects were directly aimed at the customer projects, which is seen as the main output of the organization by the top management. Because of these factors, the interviews focused on customer projects when discussing the current project management model. In customer projects, the ideas come from the customer with the collaboration of the marketing and sales team of Valtori. The interviews are analyzed and compared to existing literature on Table 7.

# 6   RESULTS

This chapter contains the results from the interviews, with the respondents' answers to the interview questions. The results are presented in chapters which are divided by different subject matters regarding project management in Valtori. Each section contains information gathered by the interviews and quotes from the interviews for insight on the subject matter.

## 6.1   Quality management and customer satisfaction in projects

This chapter will focus on quality management in projects: what were the key success factors in interviewees' projects and how the quality management processes (PMBoK, 2013, p. 227) were used in projects.

When asked about the quality management in their last projects, everyone mentioned that schedule was the most important success factor: customers expected that the product would be delivered when it was scheduled. Schedule is one of the main factors when evaluating the quality of project, but one of the interviewees mentioned that problems and changes from outside of the organizations control were discounted and noted, with the effect that they wouldn't affect the quality rating at the end [E]. When asked about the budget aspect of the iron triangle (Atkinson, 1999), respondents B, C and E replied that the project budgets were changed if necessary for the project to succeed and as such, budget is not considered to be a critical factor in project success. For minimum deliverables part of the iron triangle (Atkinson, 1999), the measurement of it as a factor is complicated: as the assignment and the idea of the project comes from the authoritative section of the customer organization, the actual quality and usability of the product is not considered automatically when closing the project. Because of this, each customer project in Valtori has an end questionnaire send to all participants of the customer project regarding the product and the project itself. This questionnaire asks for the participants to rate aspects of the project on a scale of 1-5, while giving the opportunity for the participants to

write additional comments about the project. The end query is a major part of the conclusion of projects in Valtori, but the respondents familiar with the closing phase of projects raised numerous concerns about the usefulness of these reports. The final report of the project that is made at the end of the project contains all the information gathered from the questionnaires including the written comments, but the information is sometimes very generic and sometimes insufficient in quantity to deduct actual customer satisfaction.

> The end queries are given to everyone involved with the project, with the system automating the relevant questions depending on the respondent's role on the project. The results are an important part of the end report and must be included in the report. The results of those reports are then analyzed by members of the project steering group, which can in an ideal situation authorize personnel to work on possible future research on further needs that have surfaced from the queries. This can be done by for example a process manager, but it depends on the context and content of the project itself. It could also be done by a development director responsible for monitoring and maintaining certain systems, but not by the project manager. (B, ProjectManager_4years)

> The core personnel involved with the project from the customer organization is asked to give ratings and written answers, but the responses are usually generic with no real insight. The results from these queries are mostly used as a rating for the project manager or the project, but this isn't the focus when conducting the project. The reply rate is also usually low. (E, PortfolioManager_5years)

There is also another underlying issue reported by multiple participants: even in the cases where the information that could be gathered from the queries would intuitively meet the criteria for making conclusions about the project and the product, there are no processes in place for the organization to make any use of the final report when the project is concluded. According to participants A and C there are no motivational factors within the organization to make use of the end reports for developing project management, with participants A and C also adding that the current project management model cannot encompass this supposed customer satisfaction factor that could be construed from the reports. It was also noted that the organization might not "be ready" for such analysis to improve project management.

> In principle there are tools available for conducting and analyzing end reports and reviews on customer projects and, to be fair, they are conducted semiregularly, but the problem is that there is no clear agreement on if they are to be used for later projects or not. As is, the project manager can choose how they wish to use the results from queries, for example analyzing them with the project team or just reporting them for the project documentation. There is nothing stopping the project manager to simply ignore the end reports and just close the project without further deliberations, which means that the level of commitment to the processes of the project management model is low. If we had a clear policy from the top management that the projects should be conducted orderly, the reporting would be more consistent. (A, ProjectManager_7years)

The end reports are surely underutilized. I've been conducting the queries and it seems that if the ratings are not 1s or 5s, the numbers are mostly taken as is and nothing more comes from it. In extreme cases, like with getting rated 1s, there are measures for reacting to them, but in most cases the ratings fall into threes and fours, which usually leads to no further procedures. To my knowledge, the written assessments gotten from the customers are also mostly overlooked, barring those extreme cases. (C, PortfolioManager_4years).

I believe that the comparison between end reports and analyzing customer satisfaction from the end queries is possible as is, but the projects are conducted in a strenuous way, without the ability to effortlessly mirror the findings from previous projects on the current project. (D, PortfolioManager_7years)

Participants E and F, who were actively involved with the technical project work noted that projects had inconsistencies between projects. These inconsistencies were related to processes within the project: each project phase went through a relevant P -point, where certain requirements had to be met for the project to advance. The requirements for the project to proceed are unpredictable and depend on many things such as the stakeholders, the project manager, and the project scope, even though the basic list for requirements is basically the same for all of them. These inconsistencies make the evaluation of the project quality and reporting difficult.

With the P1 decision point, the criteria for proceeding with the project is concrete and must be fulfilled. In later P -points, not so much. The available list for possible requirements for each P -decision point is massive, and the fulfillment of those conditions is evaluated by the project manager. There are no universal conditions that must be met, except for matters involving security. (E, PortfolioManager_5years)

In some small projects I've been asked to provide insight on technical details of the system being developed or implemented, but in some other small implementation projects the insight might not have been requested from me. This seems to depend on who is the appointed project manager. (F, Developer_3years)

Participant E notes that there is no definitive and universal checklist that should be met every time in certain P -points, even though something like this would most likely be beneficial to project quality. This has led to other problems within the organization, which will be elaborated upon in further chapters.

## 6.2  Problems in the current project management model

The current project management model is noted to be insufficient for the organizations needs for developing commendable projects [A, B, C, D, E]. The model was made when Valtori as an organization was very small and had only

a few customer organizations to make projects for [D], compared to the 40 governmental organizations they are working with currently.

> The company wants to sell their own productized technologies to the customer organization, but clients are reluctant to switch to centralized services and systems. Clients have their own IT-infrastructure with varying complexities and older components, where the implementation of new already built systems would necessitate changes in their old systems. This is the norm nowadays with company's clients, which wasn't the case back when the project management model was built. (D, PortfolioManager_7years).

The current model works well enough when the project consists of implementing Valtoris own already made products [A, E, F], but this is not the case in many projects: most customer organizations have their own IT-infrastructures, systems and security issues that have to be taken into account individually, which leads to complexities in not only the technical side, but also in decision making [A, C, D], communication [C, D] and quality management [A, D].

The project management model has many practical problems regarding the start of the project. Currently the project manager gets involved with the project after the planning phase has already started. With this process schedule, the customer has already been discussing about the feasibility of the project with the project portfolio managers and the presumed PMO. Because of this, multiple respondents describe the planning phase being poor, with multiple projects needing additional planning after the project manager has been appointed and has made their own evaluation on if the project is feasible [C, D].

> The currently discussed new model seems to not solve issues that the current model has, as the P0 and P1 decision points would be decided outside of the project team, by the customer experience sector. This would still leave the original problem, where the project manager would be appointed to a project which has been sold to a customer organization without the project managers assessments on resources and insight on if the project that has been sold can be done as is. This would still lead to slow project starts, as reassessments are necessary for the execution of the project. (C, PortfolioManager_4years)

> In my opinion the current model isn't suited for maximizing customer satisfaction, as the projects start poorly planned; the concept of the project changes after the project manager joins the project, because of unrealistic allocated resources and schedules by those who were in charge before the project manager. This leads to delays and reassessments for costs in projects, which makes the planning phase the biggest issue in projects. (D, PortfolioManager_7years).

The problems with the planning phase are reported by participants A, B, C, D, and E, stating that the model and the processes within the model do not include concrete plans for need acquisition, allocated resources, needed support from the stakeholders or the authoritative rights for carrying out different parts of the project. Without these concrete plans and measurements, every project is

planned differently and is very dependent on the project manager that is assigned to the project.

In conjunction to problems regarding the planning phase, respondents from the now defunct PMO also noted that resource management in general has been lacking: the personnel for each project is gathered from different areas of the organization depending on their expertise [A, B, C, E], in addition to the documentation and knowledge management being neglectable for various reasons [B, E].

> Something like working in sprints would demand allocated resources from the company, which isn't the case as currently the resources including personnel are shared with the production sector, and if the production needs personnel for a certain task, it takes precedent over project work. The current planning phase isn't fully equipped to tackle these problems. (A, ProjectManager_7years)

> We haven't had a specific quality management sector for projects, even when the PMO was still in commission. The PMO was supposed to monitor the quality in projects, but there are no official rules or measurements for quality that the PMO would oversee. Their role was mostly to give loose guidance and quantitative instructions on fulfilling the necessities in project reporting and documentation. In practice this would mean random sampling during the project to determine if the end reports had everything as they should have been, was resource allocation done properly and if the conclusion of the P -points were in line with what was reported. (E, PortfolioManager_5years)

## 6.3 Problems in project management in general

The interviewees had a consensus on the main issues that hinder project management in Valtori. The indifference for project end reports and project management development emanates from the general indifference to project development from the top management of the organization [A, C, E, F]. This is stated by project managers and technical experts, with different points of view. First, according to the respondent A, the former PMO never had actual authority over the project management model or the project processes in general. This meant that in order to make changes, they had to be presented to the top management before they were greenlit. This was problematic, because according to the respondents, there was no-one in the organizations leaders who would have been the key authority regarding the needed changes and improvements in project management, so often the proposed changes were rarely considered and implemented [A].

> We don't have system in place for documentation management and with multiple different client organizations, projects and project managers, the documentation itself has piled up and the management of it all is painful. The ownership of older documentation might still be unknown, all while the updates to documents might be made without a clarification what was changed, by whom and why. The documents

might also be saved to multiple places, which means that there might be updated or outdated versions of the same document floating around. This hinders the actual work in projects greatly. (E, PortfolioManager_5years)

Second, this laissez-faire attitude for project management and the PMO was consolidated even further after the PMO was removed from the organization. Interviewees said that the leaders justified this for "lack of results and substantive significance" and therefore projects could be done without the PMO [C, F]. Respondent E told that this was further emphasized after an external consulting firm did an audit on project management in Valtori the previous year, where the consulting firm determined that one of the projects only had 15 minutes of workload, because this is what the implementation phase took. In truth the project lasted for almost three weeks, because it involved a serious security audit for the new products to be implemented for the customer. Respondent D saw this as a clear indication that the end reports are not utilized at all by the upper management, mostly because there are no resources for analyzing them in the first place.

> The PMO was shut down after it was seen as ineffective. I'd say, that the PMO could have been effective with the support from authoritative personnel. The commitment to the instructions and guidelines laid out by the PMO should have been enforced for all stakeholders and the importance of this should have been reiterated from time to time. (B, ProjectManager_4years)

Third, the communication between the people involved with project management and other personnel has been a big problem for the organization [A, B, C, D, E, F]. In projects, the project owner and the steering group are very distant from each other: members of the steering group sometimes saw project meetings as a "coffee break" without any actual meaning, because the members either had unclear roles, or no authority over the project and decisions regarding it [A]. This lack of authority was a problem for members from Valtori and the customer organizations. Although respondent D also confirmed this was a problem, it wasn't prevalent with every customer organization, but only with those who were indifferent to the project work or had no technical knowledge on how the projects were done and only wanted the product. This lack of commitment was also confirmed by respondent B, who stated that an experienced project manager would anticipate the project meeting to be inconsequential and make the project meetings with the steering groups as concise as possible, because they had very little substance in them.

> Project meetings initialized by the project manager were seen as a bore. The top management from the company is always invited, but their participation was usually indifferent. Most of the time the personnel involved in the meetings didn't have the authority, resources, or motivation to combat the issues that were raised in the meetings. If there was an issue that should be checked by the client organization, the customer participants in the meeting were usually not able to even comment on these issues. Therefore, the meetings were usually monologues by the project

manager, updating on the status of the project without the ability to make decisions about the project. (C, PortfolioManager_4years)

Finally, multiple respondents talked about the culture surrounding project management being pernicious to project management and human resources; project managers were seen as solely responsible for the projects themselves and therefore if the project failed, the project manager had failed [D]. The attitude was also seen in project meetings with different stakeholders. After being asked about how the respondents saw the future of project management within the company, none of the respondents were able to give a clear indication for optimism. Some respondents were clearly pessimistic about the future, citing the fact that the new project management model that was being worked at the time of the interview wasn't going to solve the problems the old model had. The key problems of communication, indication of authority and the involvement of the project manager from the start of the project would still be unanswered and if they were to be so, the new model wouldn't fix the issues that were being discussed. The top management had indicated their desire for the company and the project management to "perform more agilely", but no concrete measures or processes for such agility were presented [A].

> Something like working in sprints would demand exclusively allocated resources from the company, which isn't possible as currently the resources - including personnel - are shared with the production sector, and if the production needs personnel for a certain task, it takes precedent over project work. (A, ProjectManager_7years)

> Personally, I've worked in sprints in my previous jobs, but I was employed in the private sector. Sometimes the projects here are very quick and would benefit from applying agile methods, but I don't know if the personnel from our company and the clients would be ready for such changes. In my last project we did do some iterative development, but it was more of an internal decision than a planned change. (F, Developer_3years)

# 7   DISCUSSION

This chapter contains discussion on the limitations of the research, the technical and practical contributions of the research and ideas for future research.

## 7.1   Research limitations

The purpose of this study is to give insight on the target organizations current project management models ability to meet the goals of the new strategy. As such, the research cannot be used to infer new theories and does not yield generalizable information on the subject.

The first interview was conducted in March 2022 and the last one in October 2022. The long gap between interviews is due to difficulties of acquiring interviewees for the research: the organizations decision to disassemble the PMO at the start of 2022 transferred the relevant personnel to other areas of the organization, making scheduling the interviews and reaching the interviewees problematic. In addition, for the accuracy of the research, the interviewees had to have some managerial perception over projects to gather and compare information to known research on the subject, which narrowed the potential candidates for the interview.

The research done on government IT-organizations and their project management methodologies is limited. Therefore, finding fully applicable previous research wasn't possible, which makes the validity of the research hard to measure without practical implementations.

## 7.2   Theoretical contribution

In this chapter, the results from the interviews are being compared to the literature in three segments. First, the choice of the current plan-driven methodology

for project management is evaluated from different angles. Second, the model is evaluated for its ability to provide and nourish customer satisfaction. Finally, the processes of the model are examined and suggestions for the future are made for the development of the project management model.

The current model used by Valtori is based on the waterfall model of IT software development. As a governmental organization with 40 different governmental client organizations with high interdependencies and security concerns, this choice seems to be a natural one: the planning phase must be conducted laboriously to fulfill the critical needs and pre-measurements such as security issues of the product. This implies that the criticality decision factor for choosing a project management methodology (Boehm & Turner, 2004, p. 55) indicates towards plan-driven models. The interviews also revealed that the culture surrounding project management in the company is very inflexible with defined roles and authority without a lot of room for changes and experiments during the projects. However, the other factors aren't as clear: Valtori operates projects of varying sizes, sometimes with the assistance of the client organizations experts and with changing requirements after the project has been initiated by the project owner and the client, the decision factors for using agile methods might be fulfilled enough for them to be chosen. This, however, isn't feasible for all projects as recognized by multiple respondents, so the possible switch in methodologies would have to be made cautiously. The rigidness of the current waterfall model used is a detriment to project success according to the respondents because the requirements must be determined before and after the project manager joins the project for the project to be able to proceed through the decision points P0 and P1. This suggests a need for a hybrid method of project management, where the possibility of going back to planning phase on certain aspects of the project as the needs are more clearly defined in the execution and testing phases. Making changes to the plans after customer feedback from testing has been determined to be by itself a driving factor for customer satisfaction (Sun et al., 2012, pp. 1206-1207), which is a clear motivation for using a hybrid model with agile elements. This is amplified by studies that indicate a need for separating service quality and customer satisfaction from each other to determine project success (Cronin & Taylor, 1994, p. 131) and that clear definitions of critical success factors are a success factor in of itself (Thomas & Fernández, 2008, pp. 733-742). This is to say, that if the project requirements and success factors are determined before all stakeholders have been appropriately involved with the project, the later discovered success factors might not be able to be satisfied when using the current model.

The current model and processes within aren't suitable for determining and enhancing customer satisfaction: the company collects data from end questionnaires that are sent to the customers, but according to the respondents, the data is not used after the collection to its full potential. Multiple interviewees stated that the free form answers from the customers are not considered unless critical failures can be uncovered from them. Otherwise, the numerical values collected from the answers are the only thing that is analyzed, and even then,

the information is regularly used for internal evaluation of the project manager, not the project. This isn't to say, that customer satisfaction couldn't be inferred from the current project work in the company. The following table [Table 7] contains a summary if the current project management methodology and processes can achieve the factors for customer satisfaction, according to the respondents of the interview.

| Factor | PM model | Source | Fulfilled? |
|---|---|---|---|
| Meeting basic requirements for the end-product | Any | Matzler, Bailom, Hinterhuber, Renzl & Pichler (2004); Diegmann, Basten & Pankratz (2017); Schwalbe (2015) | **Yes** |
| Performance factors (cost, schedule) | Any | Matzler, Bailom, Hinterhuber, Renzl & Pichler (2004) | **Yes** |
| Excitement factors compared to competitors | Any | Matzler, Bailom, Hinterhuber, Renzl & Pichler (2004) | **No** |
| Customer involvement throughout the project | Agile | Mann & Maurer (2005) | **No** |
| Skillful project manager: Balancing customer expectations and technical goals with interpersonal and technical skills | Any | Ireland (1994); Geoghegan & Dulewicz (2008); Webber (2011); Diegmann, Basten & Pankratz (2017); | **Yes** |
| Product expectations rather than process expectations | Any | Diegmann, Basten & Pankratz (2017) | **Yes** |
| Project team stability | Any | Narayanan, Balasubramanian, & Swaminathan (2011) | **Maybe** |
| Functionality of the product over the quality of the software | Any | Agarwal & Rathod (2006) | **Yes** |
| Implementation of Scrum and agile methods in project management | Agile | Mann & Maurer (2005) | **No** |
| Project managers identification for both the product provider and the client organization | Agile | Webber (2011) | **No** |

| Project portfolio management | Any | Schwalbe (2015) | **Maybe** |
|---|---|---|---|
| Top management providing necessary skills to enable employees to being responsible for customer satisfaction | Any | Schwalbe (2015) | **No** |
| Engagement and involvement from all stakeholders | Any | Schwalbe (2015) | **No** |
| Industry specific customer relationship management (CRM) | Any | Aiyer, Panigrahi & Das (2018); Haverila & Haverila (2019) | **Yes** |

*Table 7: Summary of responses to if the factors leading to greater customer satisfaction in IT-projects are achieved in Valtori project management*

As stated by the respondents, the current model was created when Valtori was a smaller IT-company who were conducting critical projects with reduced scopes. The model was constructed with this environment in mind, so it is natural that the model cannot satisfy every factor for greater customer satisfaction, as the goal of the firm was to create functional products that met the technical needs. This is in conjunction to respondents' satisfaction for the model when the projects involve already known entities such as implementing and integrating Valtoris fully designed product to the customers IT -infrastructure. This higher performance stems from the fact, that the technical requirements, needed personnel and possible challenges are already well documented by the previous implementation projects. Now, with the company's much larger clientele who have their own IT-systems in place and who also have specific needs for their own IT-infrastructure, other factors must be considered for greater project success and customer satisfaction.

The methodology delivers satisfaction for the basic requirements of functionality of the product eventually, but according to a study (Petersen et al., 2009, pp. 386-400) the methodology is slow to achieve that due to possible changes in requirements during the project. Respondents also state, that most of the projects are deemed successful, because the projects are conducted in time and within the budget, at least after the project manager has determined them in the planning phase. The skills of the project managers employed by the company received praise for their ability to oversee projects in successful manner, even though some factors such as customer feedback at the end of the project might suggest otherwise. This possible inconsistency between internal and external evaluation can be attributed to the culture and environment of project work, which was described to be bureaucratic by interviewees, but should be investigated more thoroughly in project-by-project basis. This is backed by a study, which states that observer evaluation on project managers abilities was a success factor on project work (Sumner et al., 2006 pp. 43-49).

In contrast to meeting the satisfaction criteria in some aspects, the methodology isn't equipped to meet all of the researched factors. Factors that are invoked from agile methods aren't achievable, due to the contradictory pro-

cesses with agile methods and the current model: even though the customer is involved with the project via project meetings, their contribution to the project is minimal compared to the agile methods ability to continuously collect feedback during the project (Mann & Maurer, 2005, p. 78). The other aspect unique to agile methods is the project managers ability to identify with both the project organization and the customer organization, also known as dual identification (Webber, 2011, p. 124). As the project managers are solely working for Valtori and are involved with various client organizations depending on the project that are currently being conducted, this specific connection to client organization isn't achievable by current means. However, the customer relationship management (CRM), that has been studied to have a strong indication for immediate customer satisfaction (Haverila & Haverila, 2019, p. 215), is reportedly being conducted within the organization, mainly by the portfolio management and the marketing sector. At the current stage however, portfolio management doesn't have all the possible tools for managing customer satisfaction, as the data for customer feedback from questionnaires is stored, reportedly there is no process available for analyzing the data and information included in the reports.

One of the largest issues for the company in terms of modern project management practices - e.g., employing agile methods - is the lack of top management support and communication for those responsible of the projects. With the disassembling of the PMO, currently there is no governing body for project management which could oversee the usage of the methodologies and processes in projects. Schwalbe (2015, p. 327) declares that the top management is responsible for conveying the importance of quality standards and educating all employees to ensure everyone taking accountability on quality for greater customer satisfaction. The laissez-faire attitude for projects reported by the interviewees shows a clear need for improvement on the side of top managements support. Stakeholder involvement can also be concluded to be insufficient, by reported communication issues with marketing, the top management, client organization and the project team. Stakeholder engagement can be managed by clear communication between stakeholders and the project manager, with each stakeholder having a clear role in the project and then being informed about relevant issues regarding their role and responsibility (Schwalbe, 2015, pp. 503-505).

## 7.3   Practical contribution

The results indicate that the target organization should initiate concrete changes for the culture and environment surrounding project management in the organization for them to be able to reach their goals. First, the reinstallation of PMO to the organization as an authority on project work would breach the gap between needs acquisition in other sectors and in the planning phase of a project.

PMO should have authority and resources to analyze information on end reports from projects for the betterment of project work and to achieve the goals of the organization. Second, processes and tools for enabling the project team to take responsibility for customer satisfaction should be established. This would mean educating and mentoring personnel to understand the concept of customer satisfaction, to realize the needs and requirements for specific projects and cross sectoral teamwork, for example by communicating with the sales team on what are the excitement factors or other selling points that made the client approve the project. Third, the communication between the upper management, lower management and all stakeholders should be made clearer and transparent, in addition to clarifying the command chain regarding projects, personnel and resource allocation. Finally, it should be considered that project managers would be better educated on the client organizations environment, systems and needs, for them to be able to identify better with the client organization.

Even though the target organization has indicated a desire for more agility in project work, the methodology should be based on a plan-driven model, such as the waterfall model, due to the criticality of the planning phase. However, the possibility of using hybrid methods when applicable should be studied further, given that the organization would have the required personnel, resources, and support from the client organization and other stakeholders for applying such methods.

## 7.4 Future research

The purpose of this research paper was to give greater context over the current state of project management in the government organization. Additional research is needed for creating concrete metrics, measurements, and processes for the company to be able to evaluate project success and customer satisfaction. Unified models for determining project success factors have been deemed impracticable and as such the success should be determined by the type of the project for accurate measurements (Dvir et al., 1998, p. 931). For this, one would need a greater insight of the organizations processes, tools, and dependencies for creating a perfectly suitable model.

Working on this case study has revealed several research gaps. First, there are very few research papers and case studies on government organizations regarding their success and success measurements. Furthermore, the usage of agile methods in governmental IT-institutions hasn't been research sufficiently enough to determine if agile methods could be applied, given that the decision factors could indicate towards choosing it as a methodology. Finally, the problem of middle-sized projects and choosing a correct model for conducting a project for it still lingers, as the project would require more documentation with plan-driven methodology, but the ability to perform in agile ways could lead to greater project success and customer satisfaction. As this research paper cannot

be used to induce new theories on the subject, the already discussed research gaps are still prevalent.

# 8   CONCLUSION

In this study the effects of choosing a project management methodology for greater customer satisfaction were researched from the literature and from the case study done as a semi-structured interview in the target organization. The government organization is in the middle of organizational change with their new strategy, which necessitates changes in project work.

The literature review was done to research different project management methodologies, customer satisfaction IT-projects and success factors in IT-projects. The results of the literature review indicated 14 different factors leading to greater customer satisfaction depending on the used methodology and the size of the project. The literature review was done to find factors and measurements for the target organization to use for achieving their goals.

The results indicate that the company's current project management methodology is insufficient for achieving greater customer satisfaction, so changes must be made to the model for improved metrics. The application of agile methods isn't fully feasible due to the demands of the project planning and documentation in the target organization, but the usage of hybrid methods should be considered. The ability to communicate and identify with the client organization should be established by concrete processes integrated with a new project management model.

For further research, more case studies on public sector organizations must be conducted. The field remains understudied and the inability to work as agilely as in the private sector due to the criticality of the systems involved means that the possibilities of using more modern methodologies persists as unexplored.

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# APPENDIX 1 INTERVIEW QUESTIONS

**Background**
- Introduce yourself: who are you, what is your role in Valtori and what was your role in your previous project?
- How long have you worked for Valtori?
- Has your job title or description changed over time?

**Nature of project work (last project)**
Reflecting on your last project,

- How was the current project management model used in projects?
- How was the project quality determined in projects?
- How was the product quality determined in projects?
- How did the customer participate in projects?
- How was customer satisfaction ensured in projects?
- Are there any distinctive problems in quality management?
- How are the results of projects considered for future projects?

**Project success and choosing criteria**
- Were you involved in choosing the criteria for decision points? Who were responsible for choosing and evaluating them?
- Did the project meet these criteria?
- In hindsight, if you could have changed something in the criteria, would you have done so and why?
- Valtori created a new strategy for 2022-2024, which focuses on customer satisfaction. One of the key points in meeting this goal is mentioned as "efficient projects". Is the current model compatible with the new strategy?

**Challenges with project management**
- Do you think the current model is feasible for the purpose of fulfilling the goal of the new strategy? If not, why?
- What challenges do you recognize with the current project management model?
- Are there other issues that come to mind regarding project management?