Pietari Pöntinen

Recommended Guidelines for IT Project Portfolio Management Practices for The Case Companies

Helsinki Metropolia University of Applied Sciences

Master's Degree

Industrial Management

Master's Thesis

30 May 2019

Author Title Number of Pages Date	Pietari Pöntinen Recommended Guidelines for IT Project Portfolio Management Practices for The Case Companies 94 pages + 1 appendices 30 May 2019
Degree	Master of Engineering
Degree Programme	Industrial Management
Instructors	Dr. Thomas Rohweder, Principal Lecturer Zinaida Grabovskaia, PhL, Senior Lecturer Tuomo Koskenvaara (Head of PRY certification body, PRY)

This thesis was done for Projektiyhdistys (PRY) - the Finnish chapter of International Project Management Association (IPMA). As PRY believes that currently IT project portfolio practices leave room for improvement, this Thesis targets to advance IT project portfolio management practices in the selected case companies with recommendation how to improve.

The research was carried by interviewing and investigating five case companies how they perform IT project portfolio management and identifying their strengths and weaknesses in it. Once the weaknesses were identified, solutions for overcoming the most critical shortcomings were investigated using best practice and relevant business literature. The study compiles its recommendations into set of practical IT project portfolio management guidelines, which were iterated multiple times together with PRY to provide the final outcome of the Thesis.

The guidelines provide recommendations for IT project portfolio management practices in relation to (a) Prioritizing work in portfolios, (b) Portfolio capacity planning, (c) Justifying management decisions, (d) Enabling different delivery models for portfolio components, (e) Leading change energized culture, (f) Portfolio Management KPIs, and finally (j) supporting practices which consist of Project management office (PMO), Project models and PPM system.

Project portfolio management practices target to ensure that companies focus on the correct projects, programs, and portfolios so that they can fulfil their strategic objectives. With good IT project portfolio management practices, the companies are more likely to contribute towards strategy and hence provide better business results and value for their clients.

Keywords	Project Portfolio Management, Project, Portfolio, Management

Acronyms

CRM – Customer Relationship Management
ERP – Enterprise Resource Planning
IPMA – International Project Management Association
ISO – International Organization for Standardization
IT – Information Technology
KPI – Key Performance Indicator
NPS – Net Promotor Score
NPV – Net Present Value
PMI – Project Management Institute
PMO – Project Management Office
PO – Product Owner
PPM – Project Portfolio Management
PRY – Projektiyhditys
ROI – Return on Investment
SAFe – Scaled Agile Framework
SME – Subject Matter Expert
WIP – Work in Progress

List of Tables

Contents

1 Introduction

The purpose of this Thesis is to define practical recommendations for IT project portfolio management practices for the selected case companies. This study is conducted as the case organization Projektiyhditys (PRY) wants to understand the current state of IT project portfolio management in its member companies and to forward the IT project portfolio management practices in them.

Projects, programs and portfolios provide the most widespread, ever increasing and leading way of managing change towards new improvements for services, products, investments, additions, strategies and skills for the future. (IPMA 2015: 2-7) Organizations with mature project portfolio management practises are less likely waste money and fail in their projects. (Langley 2015: 2) According to business literature, great benefits can be gained through efficient and effective project portfolio management practices.

This thesis focuses on exploring the current state of IT project portfolio management practices in the case companies and proposing a set of recommended IT project portfolio management guidelines for them.

1.1 Business Context

Projektiyhdistys, PRY, is the Finnish member association of International Project Management Association (IPMA). IPMA, a worldwide non-profit organization, consist of approximately 70 member associations and aims to develop project management competences in their geographic areas. In addition to project management practices, IPMA focuses on improving program management and portfolio management practices as they are closely related to project management.

PRY has currently more than 200 companies, from many different fields and all kinds of sizes, as its organization members and additionally more than 400 personal members. However, the case companies selected for this study are all rather big companies operating in Finland and moreover the focus is on the IT departments of the case companies. By focusing on certain type of case organizations, the study aims to achieve concrete results as an outcome rather than providing a generic statistical study.

1.2 Business Challenge, Objective and Outcome

PRY aims to support its member companies by spreading knowledge and good practices in project management, program management and portfolio management. Therefore, the thesis aligns with PRYs aim by providing and spreading knowledge from project portfolio management practices.

PRY's vision of statement is "Together towards a world in which all projects succeed", and it defines its bigger target which this study aims to support with its outcome. PRY wants to forward IT project portfolio management practices of its member companies, which in some instances seem to leave room for improvement. This thesis targets to forward IT project portfolio management practices with its outcome.

The objective of this thesis is *to propose a set of guidelines for PRY's member companies to support them in overcoming the most critical practical shortcomings in IT project portfolio management.*

The outcome of this theses is a set of practical guidelines for IT project portfolio management.

1.3 Thesis Outline

This thesis aims to achieve its outcome by collecting field data from PRYs five different case companies through interviewing selected personnel with depth knowledge about the current way of IT project portfolio practices in their company. The interview questions are based on project portfolio management standard ISO 21504:2015. The data received from interview is analyzed and compared against best practices and business literature in order to come up with the final set of recommended guidelines for IT project portfolio management practices.

This thesis is divided into seven sections. Section 1 introduces the thesis and its business contexts as well as business problem and objectives. Section 2 describes the methods and material used in this thesis. Section 3 presents the results of the current state analysis and summarizes the strengths and weaknesses of the situation in hand. Section 4 focuses on finding answers to overcome the weaknesses found out in the current state. Section 5 compiles the strengths of the current state and recommended solutions for the

weaknesses in order to format an initial set of recommended practices in IT project portfolio management. Section 6 further iterates the recommended set of practices in IT project portfolio management based on PRY instructor's feedback. Finally, Section 7 provides conclusions and targets to develop further discussion about the topic.

2 Method and Material

This section of the thesis describes data gathering and analysis methods used in this study.

2.1 Research Approach

The starting point for the study was to define the business problem and objectives of the thesis. After defining the business problem and objectives, a research approach was selected in order to find answers for the business problem as well as meet the research objectives.

Qualitative research approach was selected to get understanding about the current state of IT project portfolio management practices and the strengths and weaknesses of the situation. The starting point for the current state analysis was to define the set of interview questions, which are to be used when capturing the current state by interviews. Defining the interview questions was a notable part of the study. The aim of the interview questions was to create as open discussion as possible in order to avoid leading the interviewees from provide predefined answers. However, when defining the questions, it is impossible not to add a perspective on, how the research is carried out. (Syrjäläinen, Eronen & Värri 2007: 6-8.)

The individuals selected for the study were based on PRY's recommendations of people and companies considered to be suitable for the study. The companies operate in different fields and all the people interviewed have a long and versatile experience of the topic and a good background in working for the case company. The number of interviews aim to provide wide perspective of the current state.

As the most important part of qualitative research is to add own understating on top of the data, which is captured during the research, the research data needs to be understood and analyzed. In order to provide the outcome of the thesis, it is crucial to understand the generally considered best practices in the field. According to Syrjäläinen, Eronen & Värri (2007: 6-8), it is necessary in order to have the ability to compare the research data to it.

Sub-section 2.2 explains further the research design used in this study and sub-section 2.3 the data gathering for this study.

2.2 Research Design

Research process describes, how the study is conducted and what are the outputs of each stage in the study. Figure 1 below captures the research process how the study is conducted.

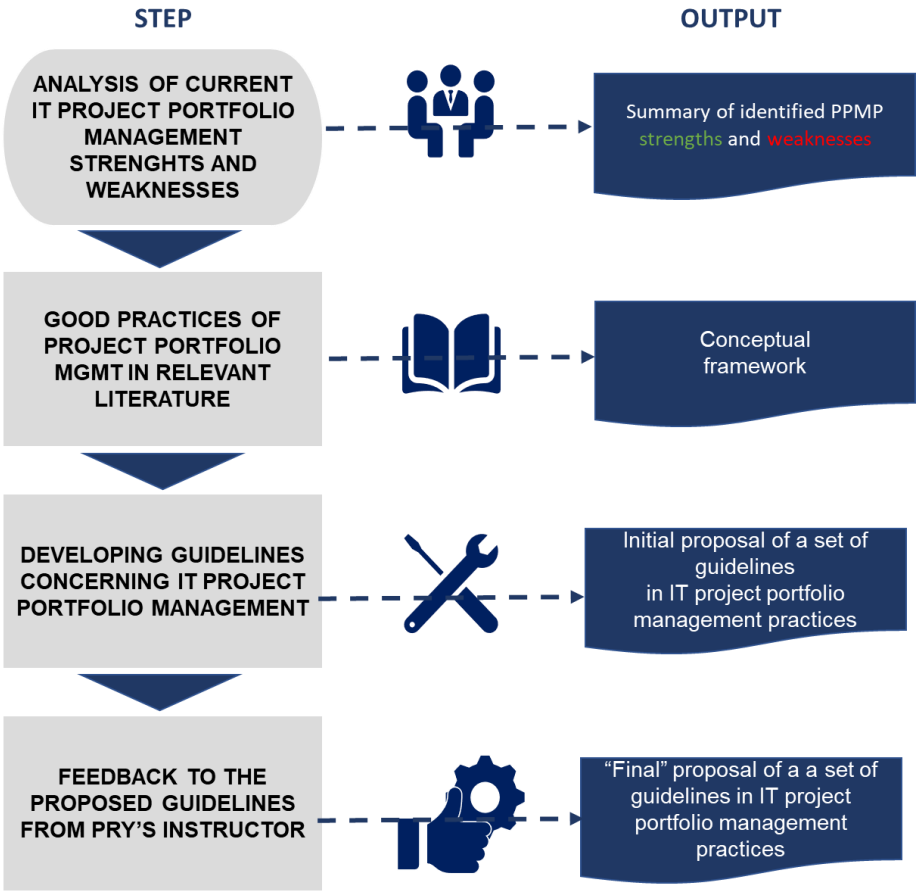

Figure 1. Research design of this study.

In order to get understanding of the current IT project portfolio management practices, the study gathers field data by interviewing experts from the area. The field data interviews aim to collect data from the current state and additionally main points of what works currently properly and where there are room for improvement.

Once the strengths and weaknesses are identified, some solutions to overcome the weaknesses are analyzed from business literature and other best practice recommendations. The strengths and solutions for weaknesses are compiled to a conceptual framework. To validate the content of the proposed conceptual framework, the conceptual framework is being reviewed with PRY's instructor to come up with an initial proposal of a set of guidelines in IT project portfolio management practices.

The initial proposal is built together with the five case companies interviewed for this study. The proposal is validated with PRY's instructor to get the final outcome of the thesis, the proposal for a set of guidelines in IT project portfolio management practices.

2.3 Data Collection and Analysis

This study gathers data from multiple different sources and collects data in different rounds. The table below shows the details of data collection gathered for this thesis.

Table 1. Details of interviews in data 1-3.

Participant role	Type of data	Discussion topic	Date, length	Document as
I. Analysis of the current IT project portfolio management practices				
1.Head of IT PMO	Face to face interview	Current state, strengths and weaknesses of IT project portfolio management	28.1., 1h	Field notes
2. Director, PMO	Face to face interview	Current state, strengths and weaknesses of IT project portfolio management	6.3., 1h 20min	Field notes
3. Development Manager	Face to face interview	Current state, strengths and weaknesses of IT project portfolio management	19.3., 1h 40min	Field notes
4.CIO	Face to face interview	Current state, strengths and weaknesses of IT project portfolio management	2.4., 1h 15min	Field notes
5.Development Manager	Face to face interview	Current state, strengths and weaknesses of IT project portfolio management	8.4., 1h 45min	Field notes
II. Proposal building				

6.PRY's instructor	Phone	Feedback on suitability of conceptual framework	7.5., 1 hour	Field notes
7. PRY's instructor	Email	Feedback on suitability of conceptual framework	15.5.	Comments
III. Validation of the proposed guidelines from PRY's instructor				
8.PRY's instructor	Phone	Feedback based in initial proposed IT project portfolio management model	22.5., 45min	Field notes

Table 1 shows the three data collection rounds, which the research data consists of. The first round, the current state interviews, was done by interviewing the case companies about the current IT project portfolio management practices.

The second data collection round, feedback for the conceptual framework, was an iteration round done together with PRY's instructor. In the iteration, the instructor provided feedback on the conceptual framework, which was adjusted based on the received feedback. The iterated version of the conceptual framework was formatted as the initial proposal of practical sets for IT project portfolio management practices.

The third and final round, was also done internally in Projektiyhdistys, by modifying the initial set of proposed IT project portfolio management practices based on feedback received from PRY's instructor. The final version of the proposed practical set of guidelines for IT project portfolio practices was formatted after the third data collection round.

Table 2 below describes, which data was used to come up with a structure for the interview questions, Data 1 gathering was based on.

Table 2. Standards used to formulate the interview questions for data 1 collection.

	Name of the document	Number of pages	Description
A	ISO 21504-2015	24 pages	Structure for the interview questions
B	The Standard for Portfolio Management, fourth edition	127 pages	Structure for the interview questions

Table 2 shows that the sources for interview questions based on ISO standard as well as the Standard for Project Portfolio Management, 4-th edition. The standards provided a structure, which was used to format the questions for investigating the current state of IT project portfolio management practices as well as the strengths and weaknesses in the current practices.

3 Current State Analysis of IT Project Portfolio Management Practices in the Case Companies

This section of the study describes the results from the current state of IT project portfolio management practices and its strengths and weaknesses for the five case companies, which were interviewed during this study. The last sub-section of section 3 summarizes the key findings from all the strengths and weaknesses in the current IT project portfolio management practices.

The first step on conducting the current state analysis was to define the set of interview questions, which could be asked from the selected case companies. The structure for the interview questions originate from globally recognized industry standard ISO 25104:2015.

While building up the interview questions, the suitable candidates were selected based on PRY's recommendations. By selecting experienced project portfolio management professional and versatile industries, the research aims to capture the current state of IT PPM practices.

Next, Section 3.1 briefly describes how the ISO 25104:2015 standard recommends to do project portfolio management.

3.1 Overview of the ISO Standard for Project Portfolio Management as a Logic behind Conducting the Current State Analysis

Project portfolio management can be defined in multiple variable ways in the business literature, as there are multiple good practices in the industry. However, the definitions in this thesis mainly originate from ISO 25104:2015 standard, which defines guidance on portfolio management. The ISO standard was selected based on recommendations from the thesis instructors.

According to business literature, portfolio as a term can be defined as a collection of projects, programmes and other operations, which are managed as a group to meet strategic objectives. The projects, programmes and other operations included in the portfolio are called as portfolio components. (PMI 2017: 3), (ISO 2015: 1) Organizations can

have multiple different portfolios that all to deliver its different strategic objectives or alternatively none portfolios at all. (ISO 2015: 3)

Portfolio management concentrates on aligning portfolio components according to organization's strategic objectives and business priorities by balancing the different and possibly conflicting demands for portfolio components. (ISO 2015: 1-7) Balancing activities in portfolio management consists of prioritizing work, allocation of resources and optimizing organizational capabilities to maximize the business benefits from investments in the portfolio. Additionally, balancing activities concentrates on managing portfolio risks and changes within the portfolio. (ISO 2015: 11-12), (PMI 2017: 5)

Companies have organizational capabilities, which limit their ability to deliver work in order to achieve strategic objectives. Companies can also have constraints which may keep the portfolio from achieving its strategic objectives. Portfolio management activities control over constraints and maintain capabilities in order to optimize organizational capabilities and minimize the threats from not contributing towards strategic objectives. (ISO 2015: 3)

Portfolio management activities require different roles and responsibilities to ensure efficient decision making. Roles mentioned in the ISO standard (2015: 4) include such as executives, whom set and evaluate the organizational strategy, decision makers whom authorize the changes to portfolios and its components and managers whom control the day to day activities included in the portfolios.

Portfolios should have some objectives, which can be defined based on company's future goals or past and current performance. Objectives can aim for long- or short-term targets and should be under change control and take organizational constrains, capabilities and risk tolerances into consideration. (ISO 2015: 7)

Identifying new potential components into portfolios should be carried out constantly by mapping the potential components towards organization's strategic objectives. Continuous alignment of portfolio components and business strategies should be maintained. (ISO 2015: 7)

In addition to identified components and defined objectives, portfolios should have a plan to describe how the portfolio components contribute towards strategic objectives. And more over, how the portfolios deliver their targeted benefits within timescales, costs and

taking into consideration the organizational capabilities and constraints as well as the interdependencies between the different components and possible other portfolios. (ISO 2015: 7)

To maintain and manage the portfolio, current state of portfolio should be assessed by performing activities recommended in the ISO standard (2015: 7), which include: documenting the relevant information of the components included in the portfolios, prioritizing the portfolio components, evaluating the resource allocation and organizational constraints and additionally by identifying the interdependencies with the different components.

When managing portfolios, alignment towards company's strategic objectives needs to be a constant and concrete activity in a way, which enables to describe the strategic objectives the portfolio realizes by delivering the work included in it. Strategic alignment should be constantly monitored and managed by the portfolio manager. (ISO 2015: 7-9)

Portfolio performance should be evaluated and reported using specific metrics, which address the component performance and as well as the overall portfolio performance. Portfolio performance should be reviewed against agreed baselines, which supports the evaluation. (ISO 2015: 9-11)

Governance of portfolios describes the policies, processes, procedures, authorities, accountabilities, which can be used for managing and leading the portfolio. Companies should maintain necessary governance mechanisms to enable successful portfolio management procedures. (ISO 2015: 13)

The interview questions used for gathering data for the current state analysis, summarized the ISO standard into 11 key questions, which all had multiple detailed questions. The detailed questions were only asked if though of relevant for the case company. Table 3 summarizes ISO standard and the key questions used for this thesis.

Table 3. ISO Standard summarized into 11 questions used for data gathering

	Question
Intro	Does the case company have an IT project portfolio? How is the portfolio(s) being managed?
I.	What kind of roles and responsibilities are there in IT project portfolio management?
II.	What kind of components does the portfolio contain?
III.	How resource and capacity is being managed in project portfolio management practices?
IV.	Do portfolios have any objectives? If so, are they being met?
V.	How are new components being identified to portfolio?
VI.	How are portfolio plans defined? When planning, how are benefits, capabilities, costs, timescales and interdependencies taken into consideration?
VII.	How are portfolio components being assessed or reviewed?
VIII.	What kind of governance model is used for project and portfolio management?
IX.	Are portfolio components aligned with company's strategic objectives? If so, how are they being aligned?
X.	How are the portfolio management activities being measured or evaluated?
XI.	Are there any balancing or optimizing activities in portfolio management?

Table 3 points out the interviews begun with an introduction question in order to understand the project portfolio management outlines. The current state analysis was based on 11 questions listed in table 3 and when relevant, detailed questions were asked. In addition to analysing the current state, the interviews focused on capturing the strengths and weaknesses of IT project portfolio management practices.

Next, following this logic, Sections 3.2-3.6 conducts the current state analysis of project portfolio management practices in the selected case companies. The data in the section is based on interviewing experienced project portfolio management professionals. Structure for interview questions, appendix 1, originate from ISO 25104:2015 standard.

3.2 Analysis of the Project Portfolio Management of Case Company 1

This section analyses the IT project portfolio management practices in case company 1. First subsection tells a brief introduction about the case company, second subsection focuses on describing the current IT project portfolio management practices in the case company and finally, third subsection documents the strengths and weaknesses of the company in its IT project portfolio management practices.

3.2.1 Company 1 IT Project Portfolio Management Context

The case company operates in manufacturing industry on a global level and is an industry leader in its own field. The company employs tens of thousands of employees all around the world. The project portfolio practices in case company 1 are organized and lead by IT Project Management Office (PMO). IT PMO is responsible for the governance of IT projects, programmes and portfolios. IT Project Portfolio Management is one of the four process areas the IT PMO is responsible for. Other process areas being, resource management, maintenance of project delivery model and methodology and additionally demand management.

Next, the analysis of the portfolio management work is conducted in case company 1 and its strengths and weaknesses are identified.

3.2.2 Analysis of Current IT Project Portfolio Management Practices of Company 1

There are currently two types of project portfolios in the case company. One of the portfolios focuses on gathering business demands and needs from different business lines. The second IT project portfolio focuses on delivering the supporting solutions the business needs. This current state analysis focuses on the latter one of the portfolios, IT project portfolio.

Each portfolio has a clearly defined owner role, portfolio manager, and portfolio sponsor, whom comes from business side. Portfolio managers are responsible for managing and reporting their own portfolios. Additionally, the PMO maintains project manager resources, who can be allocated for IT projects. There are currently more than 50 project managers with different background so that they’d be suitable for all sorts of project needs.

Portfolios consists of different components, which aim to contribute to strategic targets of the company. The investments are budgeted during the beginning of the year and prioritized based on their contribution to the strategy.

Resource management and capacity management are managed in the IT PMO by clearly defined process, which has been found efficient. As the IT PMO only owns project manager resources, the resource management process focuses only on allocating project managers to different IT projects. Capacity management has its focus on identifying the possible constrains in between the different IT projects. Capacity management also focuses on balancing the subject matter experts, developers and design owners for the different projects within the portfolios.

Each portfolio has a specific and strategic objective they aim to fulfil by delivering the work included in the portfolio. For example, collaboration portfolio defines and owns the communication tools delivered by IT, such as Skype and Teams. Both of the tools deliver their part of the communication strategy for the company. All portfolios have budgets and objects, which are both tracked on quarterly basis.

When the company identifies new components to its portfolio, the strategic points which the components contribute to are defined. There are currently five different key strategic points in the case company. Currently 99,5% projects out of the portfolio are contributing to the strategy of the company.

All of the projects included in the IT PMO's portfolios need to have a business case, including estimated benefits, when they are taken into the portfolios. The company has invested lot of effort on measuring the actual business benefits the projects are delivering.

Portfolio status review is mostly based on evaluating the individual project statuses included in the portfolios. The company uses gate-based project model to provide structure for its IT projects. The gate-based model provides guidance to support decision making whether projects can proceed forward or not.

The IT PMO maintains Globally used IT project model and its templates. The PMO monitors on the gate meeting that the project model is used. The PMO also constantly further develops their project model as new better ways of working are noticed. The PMO trains all needed employees to use the project model and its templates.

The portfolios are maintained aligned by ensuring the projects and programmes included in the portfolio maintain justified business case, which is reviewed throughout their lifecycle and evaluated during gate meetings. It is crucial that all projects maintain the business case and therefore alignment to the strategic objectives. The portfolios monitor that all the work included in them contribute towards the same business case. The business cases are documented as an outcome of the project deliverables.

The portfolio evaluation criteria are set on the project level using multiple different KPIs, which measure the project performance. Project delivery is responsible for ensuring the KPIs are met and if the IT PMO notices the KPIs aren't being met, corrective actions are taken. Some KPIs measure the project delivery time to market, some the quality impact, whilst other measure the scope and budget to mention few.

The balancing activities the PMO does for the projects and programmes included in the portfolios are dependent from the situation. Some of the most common ones are such as adjusting the project or programme scope according to the business needs and timescales. When making balancing activities, such as adjusting the scope, it needs to be ensured that the projects, programmes and portfolios are still contributing towards the strategic objectives they have set to deliver.

3.2.3 Strengths and Weaknesses of IT Project Portfolio Management of Company 1

Table 4 summarizes the strengths and weaknesses of case company 1.

Table 4. Case company 1 strengths and weaknesses.

Strengths	Weaknesses
• Effective and clearly defined process for IT project portfolio management provides usable guidelines, especially in strategic alignment • Project Model provides support and structure for project management • IT PMO provides good support for the case company in IT project portfolio management	• No concrete weaknesses identified

Overall, case company 1 believes it has a very effective and working process in project portfolio management activities. The process ensures constant project delivery and alignment with strategic objectives. The effective project portfolio process is being supported by the company's project model. The PMO is seen as enhanced project management office, rather than just a normal project management office because it is contributing so much for the company what comes to managing project governance and providing clear processes for prioritization of projects.

The weak points in IT project portfolio management in case company 1 are difficult to identify. It is recognized that everything can always be improved but it is difficult to provide any concrete examples of the activities which should be improved as the current IT project portfolio management practices seem to be working very well.

3.3 Analysis of the Project Portfolio Management of Case Company 2

This section analyses how IT project portfolio management activities are done in case company 2 and what are its strengths and weaknesses. Case company 2 operates in insurance business and employs thousands of employees, mainly in Finland.

3.3.1 Company 2 IT Project Portfolio Management Context

Since its establishment in 2008 the project management office has had its primary focus on project portfolio management activities, therefore more suitable name would be portfolio management office.

The PMO currently provides three kinds of services for the company: operative portfolio management, strategic portfolio management and development management services.

Operative portfolio management services focus on evaluating, managing and monitoring the existing project portfolios in order to ensure the projects within the portfolio are delivering their expectations.

Strategic portfolio management services have their focus on ensuring the strategic goals, such as increasing the digitalization in the services, are being met and the estimated business benefits received. Strategic portfolio management activities are performing strategic analyses for the projects to evaluate that the portfolio contributes towards the strategic goals.

Development management services, which the PMO provides are all captured in a service catalogue. Some examples from the development management services are such as advanced portfolio management services, which are providing support services for project managers. Support services such as project evaluation, benefits evaluation and resource management services. Communication services, such as hosting company-wide project forum meetings. The development management services also include training services, which the PMO provides for the employees of the company, whom are working in projects.

Trough out its history the PMO has had changes in its scope of services. Earlier it was responsible for BI-models and process development services which aren't currently included in the service catalogue. As the PMO has had increase in its scope it has been though of to be renamed as DMO development management office.

The company does not have a separate portfolio for its IT projects as IT is usually always involved in the projects and the IT services which the projects provide as an outcome are aimed for business. IT project portfolio would most likely include only too technical "data migration" projects or such.

3.3.2 Analysis of Current IT Project Portfolio Management Practices of Company 2

Currently, the PMO has three types of resources in its resource pool: Project subject matter experts (SME), project managers and development managers. Project SMEs ensure that the project delivery instructions available and they are responsible for operative activities such as ensuring information in the company wide portfolio management tool are up to date. PMO's own project managers can be assigned to different projects within the organization, if the business operations cannot manage the projects themselves due to different reasons. The PMO project managers are usually assigned to business line projects, if the people from the business lines are too busy to manage a project or the projects are so complicated that it requires to have an experienced professional project manager. The PMO project managers are used instead of consultants but in a similar way so that the project assignments are always just temporary cases. In addition to project SMEs and project managers, the PMO also has development managers in its resource pool. The development managers can provide support on managing programmes or then facilitation services for the different development initiatives. There have also been other roles and functions in to PMO but those are the current ones.

Portfolios currently include components such as projects, programmes and release type of development. Smaller development cases, which aren't really projects. The company has one portfolio for all development initiatives.

Management of project resources and capacity is based on project portfolio management system, which the company is using. The constraints in between the projects can be difficult to identify but the portfolio management system provides some support on identifying the constraints. Overall the relationships and constraints in between the different development initiatives is considered to be a difficult area of work. The company has also been trying to use BI-planning process as it is recommended in SAFe framework. Whilst the PPM system might help identifying the constraints in between the different projects, it is more dependant from the skills of the employees that they recognize the relations and then document those into the system. Especially the project managers' identifying skills are crucial when recognizing the relations between different projects.

The primary object of the project portfolio is to meet the strategic objectives of the company. The project portfolio management system provides strategic analyses using the data and metadata of the projects which are documented in the system. These analyses aim to map the different projects and other development initiatives to strategic goals. The analyses are then used to prioritize the importance of the projects and development initiatives. The system also provides gap analyses to see, how the strategic goals are being met and did the projects deliver the estimated business benefits. For example, the projects are evaluated one year after they have been done that are they now delivering the benefits they promised to deliver. However, it is noticed that there are room for improvement when evaluating the received business benefits and meeting of strategic targets. There are currently many key performance indicators (KPIs), which could be squeezed into fewer metrics.

The company is currently further developing its demand management process in order to increase the maturity of the demand management and requirement gathering processes, so that there would be a clear identifying process for undertaking new development initiatives under work. Currently the new development initiatives are based on gate-based ABC-project model, which has been structured as instructed by IPMA. The first gate of the project model, gate 0, can be given by any one. Gate 0, the phase where the ideas of the new development initiatives are captured. Especially the beginning of the project model has room for improvement as currently it is difficult to prioritize the projects

and therefore initiate only the correct projects. The actual starting of the project is done on the next gate, gate 1. The projects always require a starting permission from the project management office and no project can be started without the permission of the PMO. The identifying of new projects is not currently as clear or structured as it could be.

While the development work included in the project portfolio aim to fulfil the strategic goals, there aren't that clear goals or concrete metrics, how those strategic goals are met. There are lot of strategic goals and some of those strategic goals may turn out to be a development project but mapping those strategic goals to project deliverables or portfolio plans isn't currently done. It can be said that therefore the company is currently more managing the project portfolio than leading the it thoroughly.

Assessing of the current portfolio state is done on an individual project level and documented in the project portfolio management system, where the project managers update their project statuses, including scope, schedule, risks and overall state, using traffic lights. There used to be clear percentages, when to use green, yellow and red colours but it was found out to unsuitable as some long-lasting projects can be late for several months and still when measured using the percentages, they were documented to be green. Therefore, currently it is up to the project managers to document the lights as they believe is most suitable. In addition to the traffic lights, there are arrows pointing the direction where the traffic light colours are going to move next. It is not PMOs responsibility to lead through the projects as all of the projects have their own steering group committee and dedicated project managers, whom lead the project through.

PMO owns and maintains the project governance, which is used to manage the project through. In other words, the PMO owns the ABC-project model, its supporting document templates and the project portfolio management system. The PMO does not act in a police role so that they would require all the projects to use the templates or the model. Instead the PMO provides support for all projects and recommends them to use the previously recognized good practices and templates. The only mandatory requirement related to project governance is to document the project details in to the project management system. The ABC-project model classifies the projects in different categories A, B and C based on its complexity and size. Dependent from the project category, the project governance is slightly different. Type A means the most demanding project and usually those are resourced with experienced project manager and owners.

The strategic alignment of project portfolio development initiatives is currently under development. Currently PMO facilitates the documentation of the strategic goals towards development initiatives. Still the PMO recognizes that there is room for improvement in documenting the strategic alignment, as usually everyone believes that most or all of the projects are contributing towards the strategic goals.

The metrics of the project portfolio management activities are currently not that clear in the company. There are two key metrics on the project portfolio management level but in addition to those, other metrics are defined on the project, programme or development initiative level. The most important metric on the portfolio level is work in progress (WIP) level, which aims to minimize the ongoing development work on a portfolio level in a way that there would be as minimum as possible that kind of development work simultaneously ongoing which have not been yet deployed into production use. The goal of the WIP level is to ensure that as much development work as possible is deployed into production because only when the development is deployed into production and used, it is delivering real business value. The WIP metric also drives to divide the development initiates into small packages in order to provide constant production deployment capabilities. There are no baselines on what a good level of WIP work is and it is not tied to any monetary bonuses of the employees. In addition to the WIP level, there are no other portfolio level metrics as the progress of the individual projects are managed by the project managers and steering groups and not by the PMO or the portfolio management level.

Related to balancing activities in portfolio management work the biggest pain point comes from transferring from gate-based development model into iterative sprint-based development model. The work is not currently as transparent as it would need to be, and the current project portfolio management system isn't fully supporting the sprint-based development model. The balancing activities, such as amending project scope or transferring of project resources is therefore not as optimal level as it could be. The company is currently further developing their ways of working in order to enable the sprint-based development better. If there's a need to transfer project resources from one project to another, it is done on skill basis and based on knowing the strong and weak points of the company employees.

There are no portfolio level change management processes as the portfolio is constantly evolving and therefore the change is constantly being managed as part of the project

portfolio management activities. However, the risk management procedures exist on a portfolio management level. The portfolio risks are maintained in a risk register and the risks evaluated on a regular basis.

3.3.3 Strengths of IT Project Portfolio Management of Company 2

The strengths of project portfolio management practices in case company 2 come from using the system as it provides clear reports and give good information which can be used to measure the project progress and WIP levels. Employees can be trusted so that they keep the project details up-to-date even though it can be at times require quite much effort.

The biggest strengths from the tool is the overall picture on how much resources, i.e. people and money, are tied the different development initiatives and when can they be expected to be ready. The system also provides visibility for the company that what sort of changes are expected to come and when so that the managers and teams can be prepared to take in the changes. Reports related to upcoming changes and their schedules are particularly beneficial for the company. The project owners can also use the tool to evaluate the project afterwards. Did it deliver the expected benefits, and did it replace the old ways of working or the old solution.

3.3.4 Weaknesses of IT Project Portfolio Management of Company 2

The biggest weaknesses of IT project portfolio management practices in case company 2 are related to identifying the correct development initiatives, i.e. which projects and programmes to start, and how to change the business demand and requirements into development initiatives.

Also, formatting of business cases and project prioritization are both considered to be difficult tasks, which should be improved. The company has had business controllers whom made the business cases for the projects as they had the best overview of financial calculations. Currently the business controllers are not that much used and therefore the estimated benefits in the business case calculations can vary very much and are not easy to compare to each other. As the business cases aren't as optimal as they could be, it becomes difficult to prioritize the different projects. Quite often the situation is close to comparing apples to oranges as the business case calculations very so much. Ideally the prioritization could be done on a value stream based so that the budgets for the

projects could be aligned based on their value contribution towards the strategic goals of the company.

Next, the unclarities related to initiating the correct projects, estimating the business cases and prioritization of the projects are all related to each other and the company is hoping to solve some of the paint point by renewing its operation processes. Currently, the company does not have good visibility on the upcoming business demands and therefore it is impossible to know what kind of “jewels” can be expected to arrive in the future. There can always be more beneficial business ideas or proposals with better business case but based on the current operating models it’s not possible to know the future demand of the business needs.

Another weak point relates to the complexity of the current IT architecture of the company services. There are many vendors and systems involved in the IT ecosystem and managing those vendors and systems has become really complex for the company. The enterprise architecture could be improved to overcome this situation. As the architecture situation is complex, the projects easily become vendor driven, as they understand the technicalities usually better. Some of the employees currently working in project manager roles, are subject matter experts in their own area but might not be that familiar with the project management work tasks. This can also affect to the situation, why some of the projects are so vendor driven. The company has tried to remove the vendor driven project situation by training its own employees with project management practices, but it hasn’t significantly improved the situation.

In addition, the company has tried to implement SAFe-operating models for few years without good benefits, therefore the SAFe-operating models have been left with less attention. However, the company would need to have more agile ways of working and more dedicated project teams than currently. The PMO believes that with dedicated project teams and agile ways of working, the development velocity would increase significantly.

Mapping strategic goals to user stories or development features is also something the PMO would like to do in the future. Currently the strategic goals aren’t tied that close to the projects and not as in detailed as user story level. By mapping the strategic goals to user story or feature level, it would be significantly easier and efficient to prioritize the

correct work tasks. This would enable portfolio level prioritization of work tasks and provide better capabilities for the development teams to be self-guided.

The PMO also believes it could have better metrics and KPIs to measure its own performance. However, the company has not required the PMO to provide its own business case to justify its existence. The PMO is generally considered to be so important function for the company that no PMO business cases have been needed.

Finally, the project portfolio management activities in case company 2 seemed to be more focused on measuring and managing the existing portfolio than compared to leading the project portfolio management activities. It is the project manager, the project owner and project steering group which are leading the projects and then the company executives whom are leading the strategic goals, therefore the PMO does not have a clear leadership position.

Thus, the PMO believes that once the biggest weak points are corrected or solved then it is already providing better benefits to the organization than currently. Other than correcting the weak points, which are already being corrected, the PMO believes it is providing great support for the organization.

3.3.5 Strengths and Weaknesses of IT Project Portfolio Management of Company 2

Table 5 summarizes the strengths and weaknesses of IT project portfolio management in case company 2.

Table 5. Strengths and Weaknesses of case company 2.

Strengths	Weaknesses
• PPM System supports portfolio management practices • Reports from PPM system provide support for making management decisions • PPM system provides good big picture and overview of used money and resources, which eases the management of portfolio	• Difficulties identifying correct development initiatives, which should be taken into portfolio • Transforming business demands into development items can be problematic • Business case calculations tend to be too complex to provide any meaningful results • Prioritization of projects is unclear and inconsistent at times

	• Lack of proper visibility on the upcoming projects in the future complicates the prioritization activities • Complicated IT architecture results in state where vendors need to drive projects • Weak experiences received from using agile models in project management • Projects' do not have dedicated project teams • Unclear mapping of strategic goals and development items • Better KPIs needed for portfolio management • Focusing more on measurement than leading

The biggest strengths for case company 2 come from using the project portfolio management (PPM) system to support its portfolio management practices. The PPM system supports portfolio management by providing useful reports and good overview of time, money and working hours the company has invested in its projects.

As for the weaknesses, the case company has difficulties identifying the most beneficial development initiatives, which should be started. Furthermore, the company has challenges transferring business demands into development items. Performing business case calculations has been somewhat problematic area for the company. Project prioritization as well as having a clear visibility on the upcoming projects are seen as areas the company would need to strengthen its portfolio management practices. Additionally, some of the projects seem to be rather driven by the vendors than the company itself. Whilst agile has not caused any clear benefits for the company neither have the scattered resources, which are working on multiple projects at the same time. Currently the company lacks good KPIs to support measuring its project portfolio management activities. Lastly, the company seems to be focused more on measuring its project portfolio than leading it.

3.4 Analysis of the Project Portfolio Management of Case Company 3

Case company 3 operates only in Finland and employs 7700 people of whom 700 work in the IT department. The company provides services in the government section. The next sections analyse the project portfolio management practices of case company 3.

3.4.1 Company 3 IT Project Portfolio Management Context

The case company started to define its project model during 2011 as the IT project weren't done in a common structured way previously. The company established their IT PMO and implemented their project portfolio management system year later. During 2013 the company focused on training IPMA certifications for their employees as well as performing IPMA delta evaluations for their project portfolio management activities. Additionally, in 2013 the IT PMO was enhanced to be a company-wide PMO. The case company started to focus its management practices on resource management and project portfolio management during 2014 to 2017. This year the focus has been on utilizing agile methods and the company targets to increase the use of agile methods for the following years to come.

Currently, the company is in the middle of moving from project-based delivery to more rapid sprint-based constant product delivery. In the new target state, the company does not use the word project as the transformation work targets to be constantly on-going and delivered in small product increments. Instead of project management, the company will focus on IT product management and management of development item backlogs.

3.4.2 Analysis of Current IT Project Portfolio Management Practices of Company 3

The case company groups its projects based on business areas into different project portfolios and then all those are grouped into one big project portfolio. The business area level project portfolios inside the project portfolio consist of programmes and projects. The company maintains all its projects in different project portfolio views, which are grouped into in big project portfolio - or portfolio of portfolios in other words.

The case company currently manages its projects using their own project model, which is based on traditional project management model also known as waterfall model. However, the case company is currently in the middle of renew their project delivery model, which will contain the most suitable parts from Scrum and SAFe frameworks. The most suitable parts have been selected based on experience and trial in using them.

There are currently more than 100 ongoing projects in the company. In the new model, the company aims to have "Epics" instead of projects, programmes or portfolios of which all contains their development items, which are divided into different IT product development backlogs.

The roles and responsibilities the company has defined for managing the project portfolios consist of line management roles and project portfolio managers. However, the new portfolio management model, the company currently develops has development managers and additionally portfolio manager roles instead of the old roles. In the new model the development manager manages over his or her IT product development backlog and the portfolio manager, whom manages the entire portfolio of portfolios.

Additionally, the old and the new model both contain project management office (PMO), which provides project portfolio services - such as reports, resource allocation support, quality assurance services or support using the project portfolio management system and the project management model of the company. Moreover, the company executives have strong interest on the project portfolio management and monitor its performance, investments and profits. The executives also provide their opinions and make management decisions on prioritizing the work included in the project portfolio.

For few years ago, the company was in a situation where the amount of ongoing projects was close to 300 but that has been decreased now into 100 as the company has put effort on keeping down the number of ongoing projects.

The risk management activities are done on a project level and the risks can be further escalated into programme level. It is unusual that portfolio management activities would need to get involved into risk management activities. More commonly the risks can be escalated into business area managers or to line management instead of escalating risks to portfolio management. This concerns risk management procedures especially related to resources. Occasionally, the risks are managed on a project portfolio level but then they have been first escalated out of the project tolerances and out of the programme tolerances. The project portfolio management system, which the company uses supports on performing risk management activities. Few years ago, when the company wasn’t so experienced in managing project portfolios, all sorts of calculations were done for mitigating the risks, but those have been found out to be too complex and time consuming compared to the benefits they provide. Hence the portfolio management practices related to risk management are mainly mitigating the risks by adjusting risk priorities. Based on the risk priorities it has been easier for the company to manage risks on a portfolio level.

When performing project portfolio management practices, what comes to managing constraints in between different projects, the case company utilizes its project portfolio management system for detecting the constraints and balancing them. Often the same employees are allocated for multiple different projects simultaneously and system can be used to balance the utilization of the employees in a way that the employees wouldn't be over or under-utilized. Still, regardless of what has been documented in the system, the balancing in between different projects might differ quite much in real life as well as the real utilization as some work task take more than originally estimated.

The company has noticed that it becomes easily messy as the same employees are allocated for multiple projects and then the required work efforts tend to change back and forth. Therefore, the company aims that with agile models, such as Scrum, the development teams would be allocated only in one Product Backlog Item at a time. With 100% or close utilization rate to one Product Backlog Item, the resource allocation becomes more straightforward. Currently assigning individuals to single project at a time causes two headaches for the company: it easily runs short on the required set of skills so that the project teams have all the required skills available and secondly as there are limited amount of people working in the project delivery organization, focusing the resources becomes more difficult as they cannot be assigned for more than one project at a time. Both pain points make the 100% dedicated development team a challenging equation to manage.

The different business areas, which have their own project portfolios, define the target objectives for each project instead of defining one or multiple objectives for the entire project portfolio. The business areas have their project portfolio roadmaps, which show the current and upcoming projects but there's no objective set in portfolio level, as the objectives are either defined on a project based or by the business areas. The PMO monitors over the business area-based project portfolios. The monitoring focuses mainly on tracking the hours and euros spent for the project portfolios and the projects in them. Additionally, the PMO oversees the progress of each project in order to understand it is progressing as planned.

New project portfolio components - such as projects, programmes, or portfolios - can be identified from multiple different sources, such as legal obligations or from investigating the different opportunities available on the business areas. Projects, which the law requires the company to perform, always have top priority as they are mandatory for the

company to deliver. After mandatory projects, the business areas prioritize the different project needs and evaluate how much capacity its resources can deliver. Each of the business areas prioritize their own development work and decide on which projects they undertake. The business areas control over their own resources and budgets and therefore have the decision-making authority. The new portfolio model talks about epics and development backlogs but the process of identifying new items to the backlog remains unchanged.

When the business areas prioritize the different development initiatives, the work with strategic alignment is more likely to be started than work, which isn't fully aligned with strategic goals of the company. However, it is not that uncommon to initiate new projects, which aren't fully aligned with strategy. Development work, which might be important but hasn't got strategic support, can occasionally still be undertaken. Especially some of the smaller development work can be undertaken without strategic objectives. Nevertheless, all the bigger projects must meet some of the company's strategic targets as it is required in the official project model of the company.

Defining plans for project portfolio is based on strategy and the targets, which are mutually agreed with the business areas in a way that all portfolios aim to have a plan why they exist. Determining whether the plans are met or not isn't that straightforward.

During the project portfolio planning activities, the constraints between different projects are mostly looked on project level but for bigger programmes, the constraints such as capacity, resources and capabilities, planning is thoroughly done on programme level to ensure the delivery possibilities. If the planning is done programme level, there's usually no need to further plan the activities on single project level. The case company prefers to calculate the return of investments on programme level, instead of portfolio level as this has been found out to be more accurate and beneficial. The resources, budgets and timescales need to be checked for each project before starting them and before they can be included into any of the company's project portfolios. Identifying the interdependencies between portfolio components always requires manual human work and once the interdependencies have been spotted, they can be logged in to project portfolio management system. Even though, the system can be found useful, it is the employees, whom need to spot and understand the dependencies and the tool just maintains the documentation of the interdependencies.

Multiple different management levels asses the state of the portfolios. The company level asses the portfolio state once a month and the expanded executive board of the company asses the portfolio state every quarter. The PMO evaluates the current project portfolio state every month and additionally evaluates the smaller business area based portfolios bi-weekly. When evaluating the portfolio state with multiple different management levels, the company has possibilities of performing balancing activities, such as amending the portfolio scope, adding or reallocating resources, changing priorities of the projects within the portfolio or delaying some projects, within their own agreed management limits. If some variable needs to be changed, often the project schedules can be stretched as it can be easier to give more time than resources or money for a project.

At times, when the project schedules cannot be stretched, the company tries to reallocate more resources to it from other projects or then by acquiring temporary external employees. The recommended balancing actions originate usually from the project manager or from the portfolio manager.

The company has noticed that the more projects it tries to deliver at once, the more likely the schedules need to be delayed, therefore the new agile delivery model suggest only to have limited amount of parallel work in progress and constantly deliver small products. Managing projects or programmes with a big scope or long-lasting schedule easily becomes more complex than compared to managing constant product increment delivery on a sprint basis.

The project portfolio management office of the company manages and maintains the project governance model. The PMO is responsible of managing the templates included in the project governance model, including its checklists and instructions. The current model provides guidelines for managing the project as well as guidelines for the project steering group, whom can use the guidelines to direct the project manager. As the business areas who owns portfolios, manage the delivery work included in portfolios, the PMO is not responsible of leading the delivery work. In addition to owning the project model, PMO is responsible of keeping up the basic project data and its metrics in the project portfolio management system.

The new agile delivery model, which the company currently builds, aims to have a dedicated portfolio manager whom leads through the prioritizing activities, including discus-

sions with multiple different management levels and verifies the portfolio maintain realistic scope, schedule and budgets to deliver the expectations. Nevertheless, this currently exists only in paper on the target state. At the moment performing balancing activities tend to take some time.

Currently, the business areas have the authority of setting up priorities for the development work inside their project portfolios, therefore prioritizing development work between different project portfolios has big challenges. The sub-section 3.4.4 describes more detailed the management of project portfolio changes, schedules and priorities and especially the challenges in them.

3.4.3 Strengths of IT Project Portfolio Management of Company 3

The strengths from project portfolio management activities have been received throughout the journey of developing project model, PMO and current set of project portfolio management practices. The case company could have not leaped to its current state without going through the necessary development steps, which all gained useful lessons on how to improve the ways of working. This has been a huge effort from the company and from its employees as everyone who have contributed to the development work, has truly seemed to be doing their best effort.

First, currently, the biggest strengths from project portfolio management activities are received when project managers and portfolio managers keep their project and portfolio information in the PPM system up-to-date. Correct information on project level enable the information to accumulate correctly in the portfolio level and hence the information can be used properly. The current level of documenting the project and portfolio information to the PPM system satisfies the company as it can use the information in its reports.

Second, the PPM system also provides noticeable advantages as it helps to identify interdependencies between projects or project portfolios. The system provides good support on resource allocation, reporting and easies and management decisions with its clear reports. The system provides better visibility on the overall status of projects and portfolios compared to the situation before the system wasn't used and the company was using spreadsheets instead. The usage of PPM system has been adopted properly throughout the IT department and that can be considered as a true advantage for the company. However, as the company targets to move towards agile ways of working, it

remains unclear how properly the current PPM system provides support on agile based delivery.

Additionally, the IPMA delta evaluations provided good insights, which the company used to improve their project portfolio management activities. Receiving such kind of external feedback was required highly important as the company can be easily blind on its own weaknesses. There could have been more of the delta evaluations but perhaps their strengths have not been that obvious for the entire company or the executives of the company.

3.4.4 Weaknesses of IT Project Portfolio Management of Company 3

The case company has gone through long journey to reach its current state in project portfolio management practices, but it still recognizes lot of improvement needs in its current practices. The biggest challenges relate to resource management and management of portfolio level changes and priorities.

First, currently, the project portfolio management allow to scatter same resources for multiple different project at a time. One developer can be easily allocated from 3 to 5 projects at a time and this slows down the development work as switching between tasks takes a lot of time. Additionally, as the amount of needed work is based on estimations, resource allocation easily becomes difficult and inaccurate as the real-life situations are not the same as documented in the PPM system. The company sees the scattered resources a key improvement area in their project portfolio management practices and hence it has tried to find a working solution from the agile delivery model and more focused resource allocation. Matching the employee skills with the needed set of requirements has not been found that straightforward though, therefore allocating developers one project at a time has not been truly possible. The company feels the resource allocation is not close to being in optimal stage.

Second, managing the project portfolio wide changes has improvement needs especially what comes to managing the project schedules. Currently the schedules can be postponed quite easily, and this should be further improved. The projects tend to target too perfect output as their end results, even though the company could deliver up to the business expectations with lower quality solutions. There could be more prioritizing of work instead of delivering so much at once and then rescheduling the projects. The company should be more critical, when someone recommends delaying the schedules. The

high-quality delivery may originate from the company culture as no one wants to deliver low quality solutions and then maintain them.

Third, prioritizing the work is currently considered as challenging work, particularly in projects which run on multiple different business areas. The business areas define priorities for their own projects and therefore there can be multiple high-priority projects running parallel in different business areas and as the company lacks a clear portfolio level or company level prioritization process, it becomes very difficult to decide which of those projects has the biggest priority. Currently the business areas may argue whose project has the highest priority or impact for the company.

Fourth, managing portfolio level changes and priorities have big improvement needs as well as defining of the quality levels the projects aim to deliver. Overcoming the challenges on those can provide a key to success as clear model would then ease the pain where everyone cannot be pleased. Providing clear model for managing prioritizes, changes and setting up the quality targets on a project level, would justify the management decisions, even if someone would disagree with them.

Another weakness in the current practises comes from making efficient decisions during project steering groups. Quite often the steering groups can not decide the correct actions for the project, which they aim to direct, and this leads on escalating the decision making to portfolio management level. The root causes may lie in not seeing or knowing the dependencies in between the different ongoing development initiatives in the company or the just due to inefficient use of time during steering group meeting. If the PPM system data and especially the relationships between the different projects could always be trusted, perhaps it could allow more efficient decision making.

At times, some of the legal obligations require the company to be prepared on upcoming legal changes and hence the IT department needs to develop solutions to be prepared. This causes the company to develop solutions, which might not be ever needed. Developing unnecessary solutions can be seen as a waste of time on multiple different levels. The company believes that preventing unnecessary development work and unnecessary management effort needed for guiding the development should be avoided at all costs, even though it isn’t that easy.

Also, the company focuses very much on becoming agile and trying to transform from project mindset towards smaller product enhancements despite the traditionally delivered projects can be still useful as well. The company knows that the agile delivery models are not solving every issue and believes that most likely there can still be troubles with managing the delivery portfolios.

One additional service, the company's portfolio management actives could do relates to providing report on where the spent cost have gone or what has been received with the given amount of euros. There could also be metrics describing how much have the projects, programmes or portfolios contributed towards the strategic objects of the company. The enhanced reporting capabilities is not seen as important success factor as overcoming the previously mentioned challenges though.

3.4.5 Strengths and Weaknesses of IT Project Portfolio Management of Company 3

Table 6 lists out the strengths and weaknesses identified from the third case company.

Table 6. Strengths and Weaknesses of case company 3.

Strengths	Weaknesses
• Multiple lessons have been learned when the case company has developed its portfolio management practices • PPM system is properly used and therefore, the system provides useful reports and big picture of resources and investments • PPM system provides support in detecting dependencies between different development initiatives, which easies the portfolio management • IPMA delta evaluations have helped the case company to strengthen its portfolio management practices	• Project teams have scattered resources which slows down the development • Allocation of resources is difficult as same resources are needed by multiple projects at a time • Management of portfolio-wide changes, especially delaying schedules is not as consistent as it should be • Prioritizing work especially over business areas is considered as difficult • Inefficient decision-making process and too complex structure in portfolio wide decisions delay decisions • Lack of clear quality criteria definitions cause projects to overdeliver quality • Unneeded development is work done occasionally • Agile seen as a "silver bullet" regardless of good experience from waterfall projects

	• Portfolio management could provide better reporting on spent euros

Case company 3 has had a long and successful journey to define its current state of the project portfolio management practices. The lessons learned during the journey are recognized as the biggest strength of the company. PPM system gives good support for portfolio management by providing useful reports and a good big picture of the resources and investments. Moreover, PPM system supports the detect the possible dependencies between projects within portfolios. The company has also received good experiences from IPMA delta evaluations.

The weakest link in the case company's portfolio management practices relate to scattered project resourcing and resource allocations. Furthermore, management of portfolio-wide changes is considered as challenging, especially when it comes to delaying project schedules. Prioritizing work, especially over business areas was recognized as a difficult area for the case company. Prioritizing the work nor managing portfolio changes are not easy areas particularly, as the decision-making process in portfolio management seems to be complex and inefficient. Additionally, the company lacks a clear definition of the quality its projects need to deliver, which easily causes projects to over deliver and hence delay project schedules. At times the company runs into situations where it has done development work, which isn't needed after all. The company has invested in agile ways of working and believes that it could make everything better, even though the company has had good results from using waterfall approach to deliver projects. Finally, as the last weak part, the company believes it could provide better reporting on the euros it has spent for investments in portfolio.

3.5 Analysis of the Project Portfolio Management of Case Company 4

Case company 4 operates in research business and employs more than two thousand employees who are all located across Finland.

3.5.1 Company 4 IT Project Portfolio Management Context

Case company 4 delivers projects for its customers and has their internal development projects, such as IT projects. This current state analysis focuses more on analysing the internal development projects of the company.

3.5.2 Analysis of Current IT Project Portfolio Management practices of Company 4

The case company manages their internal development initiatives in company-wide backlog. The backlog can be divided into three different portfolios, which all aim to fulfil the strategic objectives of the company.

The case company has been taking advantages of agile project management methodologies for the past year. The most suitable parts from methods such as Scrum and SAFe were included in their own project management methodology.

The use of agile ways of working started out as a pilot but as it has been continuing more than a year it cannot be called a pilot any longer. Currently the agile ways of working are expanding from their internal development projects to business line and customer delivery projects.

The development initiatives are all managed using a single backlog, which helps the company to limit their work in progress. The target is that only certain backlog items are taken under design phase and even fewer into development phase during the same time. As soon as some backlog items are ready and deployed into production use, next items are taken under work. The current project management model includes a separate design phase and after that a development phase, even though some agile models, such as Scrum might recommend something other. However, the company requires to have clear business requirements and specification before starting any actual development work and this has been found very positive for the company. The requirements need to be captured into use cases in a clear level before undertaking them into development phase.

The roles and responsibilities, which the case company utilizes to carry out its project portfolio management activities consists of product owners (PO), project level steering groups and IT architects. In addition to those, the project delivery teams are needed to

carry out the development initiates. POs maintain a key role in managing the development initiatives and deciding what backlog items are taken to design or development next. There are currently many POs inside the company and their responsibility areas are divided in different focus areas. Product owners are responsible for ensuring that by the end of few sprints there is some development work, which can be deployed into production. Quite often it requires more than one iteration round to have working backlog items ready to be deployed into production.

It has been noticed that steering groups, which are not that experienced may have their focus increasing the scope and demanding of new requirements instead of providing better capabilities of managing the project through with its current scope. The iterative sprint-based development has provided better results for this as the focus is on continuously deploying something into production use instead of justifying long lasting projects which might not deliver anything in the end.

The case company highlights the importance of performing reviews and making corrective actions in project portfolio management procedures to ensure the ways of working are evolving and getting better. If there are some new better ways of managing the portfolio, those should be implemented after they have been identified during the reviews. It is important to ensure the operating ways or project delivery model has not become too complex to use and that they are providing real value for the company.

The components in current IT project portfolio includes all sorts of development initiatives from small development items to projects or even programmes, which consists of several different projects. However, all the projects and other development initiatives as well, need to be broken into smaller pieces once inserted into the portfolio level backlog. The company-wide backlog enables the company to control the development work on a backlog item level, regardless of if the backlog items belong to a project or to a bigger programme. Currently, as the agile ways of working has been ongoing for just over a year, the development initiatives are scattered in such small pieces that it can cause difficulties mapping them into project portfolios or programmes.

The internal development work is currently divided into three different groups, which each can be considered to be an own portfolio. Dividing the work into different development portfolios is a rather fresh point of view for the company.

The division of the portfolios is based on core processes and business areas of the company. The common divider of the portfolios aims to verify, there won't be too many different portfolios within the company as the portfolios could be then arguing each other. In addition to fighting over the same resources they could disagree from some development policies or company alignments. Three different portfolios have been found suitable number of portfolios to manage the current development work.

The resource and capacity management within project portfolio management practices is based on sprint-based project delivery model. The idea of sprints has made it possible not to overload project resources or not trying to deliver everything at once. There are lot of big development needs for the internal projects such as renewing of ERP system and renewing of CRM system but currently the constantly ongoing backlog-based development model allows the company to deliver faster solutions that those kinds of big and complex renewal projects haven't been even started. With a big internal development pressure inside the company, the backlog-based resource and capacity management activities pay an important role.

The sprint-based delivery model also provides support for identifying the possible constraints the different delivery project may have. Sprints provided structure for managing the delivery work therefore it is easier to notice the dependencies in between the different delivery work. Of course, there are still occasions when many projects would need to fight over the same resources, but the situation has been getting better now that the usage of agile project management models has increased. The development initiatives or projects can also be paused or cancelled, if needed. Even though, sprint-based delivery model has made it easier to react early and made it possible to make corrective actions so that there would become situations that some development would have become unnecessary.

The risk management activities are not yet done on a portfolio management level. Instead the risk management activities are executed on an individual project level. The company has been thinking of including risk criteria to its backlog items and then use that to prioritize the development items.

Defining of the objectives, which the portfolios aim to fulfil is based on company vision-level but not described in concrete numeric level, which could be possible to truly reach. It is generally known and understood how come the portfolios exists and what are the

vision states they aim to reach out but in addition to high level visions, there aren't any concrete portfolio level objectives.

Identifying the possible components, which could be added to backlog can either have its origin on the company-wide idea management process or originate from the product owner's opinion. Employees can suggest development initiatives simply by filling a form and then it is taken under evaluation and perhaps under development if it seems to be providing value for the company. All the development ideas should be filling some strategic goals, but it is recognized that it might not be the real case. Most likely the development needs are done on what is needed most at that time and it might not be looking at the wider picture or strategy properly. However, the agile delivery models have made it possible to constantly deliver small solutions that there are less needs of bigger changes. The identifying of potential components is more managed on operative or tactical level than on a strategic level.

Even though anyone in the company can suggest new development initiatives, none of them are taken in backlog under design or development phase unless it is clearly defined on what are the expected business outcomes. All development initiatives need to define and document clearly the expected business outcomes before they can be included in any of the development portfolios. The evaluation of business outcome realization is not yet on an optimal level, but it is currently under development.

The evaluation of the portfolio state is not currently on anyone's agenda properly. The projects are followed individually and the development work on the backlog-level, but the portfolios overall state isn't evaluated currently.

The company has defined its agile project management model, including templates how to use the sprint-based model. The company policies do not monitor that the individual projects are using the model but instead the outcomes of the sprints, i.e. product increments, then provide concrete evidence, if the project team is able to use the agile model properly or not. The company provides training for the model and additionally project management methodology trainings, such as training for Scrum and SAFe for its employees. The target is to be proactive towards the employees so that employees are encouraged to undertake the trainings as the trainings are considered to be beneficial.

The company still performs certain calculations and performs checks before any project can be initiated but after the initiation permission, there's no project auditing. After the projects have been done, the company performs feedback surveys in order to learn, how did the project go according to all project stakeholders.

All of the different project portfolios, which are currently ongoing in the company are contributing towards the strategy. The company recognizes the need to prevent undertaking development initiatives or establishing project portfolios, which aren't contributing towards the strategic goals of the company. However, it is not clearly documented, how the project portfolios maintain alignment towards the strategic goals. The company has not yet thought of cases, where entire portfolios might not be contributing towards the strategic targets they were originally aiming for.

The metrics used in project portfolio management mainly monitor project start times and finalization dates. The individual backlog items are tracked in order to follow-up the business outcome realization. Metrics are also used for managing the amount of work allowed simultaneously different stages of the delivery, such as how much work can under development at once. The metrics focus mainly on the individual backlog items rather than measuring performance on a portfolio management level.

3.5.3 Strengths of IT Project Portfolio Management of Company 4

The biggest strengths of IT project portfolio management activities have been received now that the agile ways of working have been adopted properly in the company. The sprint-based development model has a good management support and the company employees seem to be enthusiastic about it.

The portfolio-level backlog has provided full visibility for the development initiatives inside the development portfolios. It has made the work more transparent and it has become easier for the employees to keep on track where their own development ideas go in the pipeline. Moreover, better visibility provides the management more capabilities on seeing, if the projects get stuck. Earlier the risks and issues weren't properly seen in the whole company level.

The agile ways of working also enable the product owner and the steering group to closely co-operate and the sprints ensure that the projects are delivered in manageable

junks. The agile ways of working and especially the sprint-based development has decreased the number of long-lasting projects, which are uncertain to deliver anything. Sprint and increments have made it possible to constantly deliver valuable solution into use. The agile project management model has already provided a huge difference even though it is still rather fresh. In general, the agile model has gotten people enthusiasm about the project delivery work.

3.5.4 Weaknesses of IT Project Portfolio Management of Company 4

First, some of the weaknesses, which the case company would like to solve relate to the difficult position of product owner role. As agile ways of working are rather new for the company, the product owner easily gets in between rock and a hard place and therefore it requires certain type of personality from the people working in the role. The product owner lacks proper support when prioritizing the product backlog items and additionally it has been found difficult to sign-off the development work to continuous support after the work has been completed. The company would need to get a better prioritization process and more thorough sign-off process to support the POs role.

Another sub-optimal part in the current project portfolio management practices relate to documenting the business requirements for the development initiatives in the beginning. It requires lot of effort from the IT to truly understand the requirements, which the business hopes to have. Even regardless some agile models might encourage to start development as soon as some requirement are received, the company needs to have proper and more detailed requirements for the target solution before they can start the development work. The IT currently lacks clear understanding of what the business needs and expected from them to deliver.

Third, the company also struggles to keep the train moving now that it has deployed lot of development initiatives into production environment and POs stagger handing over the development work to continuous service delivery. It takes time before they are truly ready to take new development items under work. The development items could be still divided into smaller packages in order to ensure truly constant delivery.

Fourth, Agile has provided more visibility to the ongoing development initiatives as stated previously, but the company still hopes to increase the visibility in a way it would be possible to see the problematic cases before they escalate into being company level risks.

Fifth, some of the project managers working for the company, use their own creative ways of working instead of utilizing the model and management practices defined in the company. Especially the certified and experienced project managers struggle to work according to new agile practices, which the company would like to take more broadly into use.

Occasionally, it seems that people expect the new agile ways of working or the IT backlog tool to provide some sort of silver bullet, which would solve every weak part in the current operations. The agile model or any system won't fix the issues if the biggest issues are in operating models.

Sixth, strategic alignment should be done more constantly to provide capabilities of ramping down entire IT project portfolios in case they aren't contributing towards strategic goals any more. Current management practices review the strategic alignment before undertaking new projects or development initiatives but not afterwards.

Seventh, as the company has three different IT project portfolios, sometimes the different portfolios compete over the same resources or argue about the company alignments on where they believe the company should aim for. Additionally, the cross-department IT projects are more complex to manage and tracking their costs is not always clear.

Finally, the case company believes its customers and business care more about the outcomes of the project delivery rather than correctly managed and prioritized project portfolio. The project deliveries depend more from the project manager than from the state of the project portfolio, even though investing in furthering project portfolio management the case company believes it could ease their pains and provide lot of opportunities.

3.5.5 Strengths and Weaknesses of IT Project Portfolio Management of Company 4

The strengths and weaknesses identified in case company 4 portfolio management practices can be seen on table 7.

Table 7. Strengths and weaknesses of case company 4.

Strengths	Weaknesses
• Sprint-based development enables continuous product delivery • Agile development provides faster results and better visibility than previous development practices • Agile provides efficient risk management by providing transparency of work status and progress • Agile model provides positive mood and inspires people to work in projects	• Role of product owner is seen as difficult • Handover of projects into continuous service delivery works suboptimal • Prioritization of work mainly relies on POs own decisions • Documenting business requirements in the beginning causes headache • People expect “silver bullets” from agile or from IT backlog tool • The work should be still divided into smaller packages in order to ensure truly constant and transparent delivery • Strategic alignment should be more constant so that even entire portfolios could be ramped down • Portfolios compete over the same project resources • Portfolios argue about the company-wide alignments • Difficult to manage and track costs on cross-department projects • Experienced project managers use their own models instead of company’s agile project delivery model

Most of the IT project portfolio management strengths for case company 4 come from agile ways of working. The company has received great results with agile as there are no ever-lasting projects and the company can deliver concrete results faster using sprints. With agile the work has become more transparent, which has made the management of risks efficient. Overall agile ways of working have uplifted the entire mood of the IT delivery department to be positive and excited about the work.

While agile brings many benefits, there’s another side of the coin as well. The role of product owner has pointed out be difficult as the company lacks clear project prioritization and handover processes. The product owner would need more support on making the prioritization decisions as well as handing over the projects to continuous service delivery. Furthermore, some of the experienced project managers aren’t eager to start using

the agile ways of working as they have received good results using other project management models. The company has also challenges in documenting the business requirements in the beginning of the project. Some people in the organization seem to be expecting the agile to be some sort of a “silver bullet” which would solve everything in project deliveries, regardless of that isn’t the case. Additionally, development initiatives could be still divided into smaller packages to enable transparent and constant delivery. At times, different portfolios argue about the company wide-alignments that which direction the company should proceed. The company also recognizes room for improvement in tracking costs of cross-department projects. The company should evaluate more constantly the strategic alignment of its development items so that even entire portfolios could be ramped down in case they are not contributing towards any strategic goals.

3.6 Analysis of the Project Portfolio Management of Case Company 5

Case company 5 operates in manufacturing industry and employs around 1800 people out of which roughly 130 employees work on the R&D department, which this analysis focuses on. Even though the other case companies in this study were interviewing IT departments, the fifth analysis focuses on interviewing portfolio management practices in research and design department. The R&D department was considered to be suitable for the thesis as it provides similar support functions as IT departments provide to their companies. Additionally, the project portfolio management practices were considered to be not so different depending on which support function of the company, the project are located in.

3.6.1 Company 5 Project Portfolio Management Context

The case company has been performing project portfolio management activities for the past 15 years. The company has divided its project portfolios in two different categories and this analysis focuses on one of the categories. The portfolio this analysis focuses on has 15 million annual budget and 20 projects in it.

3.6.2 Analysis of Current Project Portfolio Management Practices of Company 4

The 20 projects in the portfolio are divided into two different baskets, one for making brand new innovations for the business and another basket which provides smaller updates and bug fixes for the existing products. The bug fix basket has 13 projects in it and the other basked maintains 7 projects currently. Three of 20 projects contribute towards a same programme hence the portfolio includes a programme and projects.

The roles and responsibilities the case company has established to support its project portfolio practices consist of portfolio steering group, R&D vice president who owns the entire project portfolio and additionally development manager who manages the portfolio. The entire R&D department contributes to the portfolio management activities as they are responsible of delivering the projects.

As stated, the projects in the portfolio are grouped into two different categories. Both categories have their own resources which simplifies the resource allocation activities in portfolio management. In case there are interdependencies between the projects, the projects within the new innovation basked have usually always more priority than the projects in small update basked. If there's a need to reallocate some resource in between the projects, the project manager who needs more resources facilitates the prioritization discussion with other project managers.

Management of project risks are done as a part of operative project management activities, whereas portfolio level risks management activities are done by portfolio steering. The steering group reviews the portfolio risks few times a year. The portfolio steering meetings focus on risk management on a higher level than the operative project management focuses. The portfolio steering decides which risks should be tackled and how much of money and resources can be allocated to the risks. Portfolio steering also makes the decision in case some projects can't be started or if some needs to be traded off, in case money, timey or people need to be allocated to tackling critical risks instead of delivering projects. Some critical risks may cause situations, where new projects won't be started before the risks have been fully mitigated. Occasionally projects may face such a huge risk, they need to be stopped. The company tends stop 1-2 projects yearly due to high risks.

The objectives portfolios aim to deliver, originate from the strategy of the company as it is up to the R&D division to deliver new solutions, which fulfils the business strategies.

The company has established their own process for ensuring strategic alignment with its R&D portfolio. The process evaluates the projects by urgency and potential business value and then prioritizes the projects and allocates resources to them based on the priority. Portfolio management monitors the projects in the portfolio maintain aligned to the business strategy.

The portfolio management ensures the projects in the portfolio contribute to the strategy with business review meetings, which are held minimum of five times during the project lifecycle. Bigger programs with bigger budged have more business reviews, usually after every few million euros.

Identifying of new portfolio components is based on market analysis and business potential estimations. The analysis and estimations are done by business and then given to portfolio management under review. Portfolio steering reviews once a year, during fall, the projects it takes to development portfolios. New development projects are evaluated and estimated how much money, time and effort they require. In order to start a new development project, there needs to be available capacity in the portfolio. What comes to capacity, portfolio management has clear limits for money, time and resources, which cannot be exceeded as the portfolio cannot deliver over its capacity or capability.

During the portfolio level planning, usually there’s no need to investigate the possible interdependencies between the different portfolios or different projects as the company has established clear portfolios and moreover divided the projects in the portfolios into different baskets. The possible interdependencies between different projects inside the same basket in the same portfolio are managed by project managers by facilitating open discussion and by asking priorities from business.

In case project portfolio management needs to perform balancing activities, such as adjusting scope or modifying schedules or expanding budgets or allocating more resources, the decisions originate from open discussion with the business stakeholders. Open discussion targets to find a mutual understanding which satisfies the business needs and fits into portfolio capacity and capability limits. Management of changes in project and portfolio level is also based on open discussion with the business stakeholders. Business stakeholders know the market needs and customer demands and hence can prioritize the changes and support on trade-off decisions.

Portfolio steering reviews the portfolio status 3-4 times a year. The portfolio steering reviews the overall state of the portfolio but not the individual projects statuses as review of project statuses is an operative project management task. The portfolio steering uses traffic lights and metrics to assess the state and health of the portfolio. The case company could benefit from better portfolio level metrics and that is explained more detailed on the upcoming sub-section of this thesis.

The case company uses stage gate model to deliver its R&D projects. The model includes stages and milestones and it is up to the portfolio management to ensure all projects are managed using the model. The stage gate model also helps to ensure the projects maintain their strategic alignment.

Portfolio management owns and maintains the stage gate model used for project management. The development manager responsible for the portfolio has an own dedicated resource for maintaining the model. The company has found it to be beneficial and only truly working way that it dedicates an employee to own the project governance, provides trainings for using it and ensures it is being used. The company didn't receive successful results previously when it didn't have a dedicated employee for owning the project governance model. The model contains checklists for each project stage and furthermore contains quality criteria, such as ISO 9001 requirements, the project products need to fulfil. External project auditing is also done irregularly in order to ensure the company deliver good quality with its R&D projects.

The company sees that its portfolio management activities focus on leading and managing the portfolio instead of just providing metrics and measurement for the business. Ensuring projects contribute towards strategic goals is one of the most important focus areas in project portfolio management.

3.6.3 Strengths of IT Project Portfolio Management of Company 5

When thinking about the project portfolio management strengths of the company, four key points can be mentioned.

First, one of the biggest strengths in its current project portfolio management practices is that the company has a good support on its projects once they have been initiated. It is seen as a whole company level target to finalize the projects once they have been

initiated. When the project receives a good management support throughout their lifecycle and if the projects run into troubles the management targets to find out solutions for them, for example by giving more money, time or resources. Management support is gained by giving the project manager a wide roles and responsibility to manage the projects through. The project managers act as a kind of CEO for their projects and it is up to them to describe the project statuses and keep people up-to-date with the project news.

Second, the most important success comes from the depth of project management skills, which the company has. All project managers have an industry recognized project management certification. 90% or the people working as a project manager or project portfolio manager positions have IPMA certificates in project management, most have the IPMA-C level certificate and the rest have the more advanced IPMA level B and two have PMI's PMP certification. All project managers are dedicated to their project manager roles instead of just trying to manage projects in addition to their primary jobs. Dedicated project managers are seen as a strength for the company. Additionally, the company supervisors have been trained to understand the project culture of the company. Over all the project culture, which the company has is seen as a strength.

Third, a strong aspect in the project portfolio management practices originate from the company culture as the company culture enables open dialog throughout company structure regardless of the functions people work in. Open dialog makes it easier to co-operate in the projects.

The fourth strength comes from the good reputation the company's R&D department has. The company targets to manufacture the best products in its field worldwide and it is the responsibility of the R&D department to make the new innovations, which can be used to produce the best products in the world. This helps the R&D department to receive a good management support.

As the R&D has provided good innovations during the recent years, it has gained more and more management support and resources, which has made the work in the R&D more comfortable. The work can be considered to be nice and a true forerunner as the R&D targets to deliver new solutions, which do not exist. One project manager said the work makes him feel like a Columbus who tries to find out new sea routes to unknown continents.

The previous sub-section of this thesis pointed out that dedicated employee for managing and further developing the project model has been providing great results for the case company. With dedicated employee the company can provide good support for project managers and project teams, how to use the project management model.

Some of the contributing factors to the strengths originate from the fact that the development manager who manages the portfolio, has had a chance to select his own employees. It has made it easier to select the individuals who can co-operate fluently together.

The most important target in project portfolio management practices is that the company's business provides great results and that the project teams feel that they're contributing to the company's results. It creates positive mood for the people delivering the work in the project portfolios and great mood helps the projects to achieve great results.

3.6.4 Weaknesses of Project Portfolio Management of Company 5

The weak parts in project portfolio management practices in case company 5 relate to few concrete points mentioned in this sub-section.

First, in project portfolio management there's often a fundamental problem where the business wants more deliverables and projects than possible to take into the portfolio. The business becomes easily hungry for new interesting opportunities and demands the R&D to deliver more. The expanding business needs have escalated into situations, where the R&D has had to hire new external employees or acquired some outsources resources. The situation is considered to be challenging as the new ideas and demands from the business side tend to be tempting and interesting opportunities for the whole company and therefore they are difficult to turn down. Still the R&D hopes it could have a common agreement with the business on the amount of work which the portfolio can deliver.

Another point which has room for improvement relates to making trade-off decisions when making balancing activities on the projects included in the portfolio. When the capacity allocation is so close to its maximum limits, it becomes difficult to react and provide more resources to any project as there tends to be no buffer where to rely on. Management decisions hence often escalate to portfolio steering which is always slower than making the decisions on the project level. The current management mechanism seems

to be too heavy what comes to trade-off decisions. This could be improved by including less projects into the portfolio and hence leaving some free capacity or buffer that could be used in case needed. There could be, for example, 18 projects instead of 22 projects in portfolio. This could improve the timely based decision making and therefore improve the project delivery time. The case company currently tries to find out solution for this by sending its project managers to PRY's portfolio management trainings.

The third identified improvement point comes from the company's desire to operate in way of a start-up company where they aim to deliver great results or fail fast. The company has had few experiences from its projects of which other one failed and other one succeeded. The company executives should accept the state that once costs are invested in the risky start-up projects they are sunken costs, and no ROI calculation should be made. The start-up projects should have their own benefit evaluations and guiding principles.

The fourth point – not as big issue as the previously presented – relates to fighting over the resources allocated to the projects. Even though the project manager acts as a CEO on his or her project, the project team members have their own line managers, who aren't always agreeing with the work priorities with the project manager. The team members may have their table full of work and still expected to work on the project. This creates problems when line managers and project managers can't agree on the work priorities.

The company has tried to solve the cases, where same resources are needed by project manager and line manager, by allocating the resources 100% utility to their project work. The solution didn't gain good support from the line managers though.

Fifth, portfolio management uses mainly project level measures and metrics and lacks a good metric, which could define the overall situation of the portfolio. The portfolio level metric wasn't seen that important as the business appreciates more the successful delivery of the projects, therefore the metrics mostly focus on the delivery of the project. Portfolio management uses pie chart to monitor the resources it allocates to different projects. Resource allocation is considered as an important task of portfolio management actives as if the resources are allocated to some delivery projects, it is always away from the other possible work tasks and projects. The portfolio management would like to allocate resources to the most important and valuable projects but lacks proper metric to support on the decision making.

Currently, the portfolio management can only dream of some magic metric or portfolio guru whom could provide the correct answers on, which projects or risks to focus and how much money, work and time can be given to them. This always requires conversation and balancing in-between the different solutions and it tends to take too much time. Still the portfolio management believes it is better to make the decisions based on open feedback than compared to some metric, which a manager would use to make decisions without asking from anyone.

Additionally, there could better metrics to support the line managers to align strategy through different line functions. Good KPIs could support the line managers to see the strategic contribution of the projects and hence the impact the projects deliver. This KPI could be used while making trade-off decisions such as prioritizing work from line managers or from project managers.

The company could use lean models to maximize the portfolio throughput. The lean methods could be used to eliminate the waste from the current work processes and hence then portfolio could improve its project delivery capabilities. Waste could be eliminated by limiting the work in progress for example. The work could be also turned from push-mode to pull-mode as suggested by lean principles. Pull-mode could be achieved by having fewer projects in the portfolio. Portfolio management trusts that regardless of some slack capacity in resources, the projects usually find a way to make the most out of its resources. To improve the lean principles in portfolio management, the company has invested on training Toyota lean principles for the company.

Last but not least, the decisions made on portfolio management should rely more on the future or target state rather than the history. Currently the resource allocation and all other activities performed by portfolio management are based on data and reports from the past. It would be reasonable to try predicting the future that what kind of changes or opportunities are there upcoming and what are the projects and solutions needed most in the future. Is there for example some trend affecting the markets or some other disruption in the fields, which the company should tackle with its future offering. However, as the financial department has the final word from the budget and they prefer their numbers in the same report, this is not that easy to change the management decision on future predictions.

3.6.5 Strengths and Weaknesses of Project Portfolio Management of Company 5

Table 8 documents the strengths and weaknesses of project portfolio practices, which were identified.

Table 8. Strengths and weaknesses of case company 5.

Strengths	Weaknesses
• Portfolio management is being properly supported by company management • Project managers role as project CEOs has made work effective • Good project skills and project culture within the company support on delivering projects • Positive energy helps portfolio management to achieve its targets • Dedicated owner for project model has provided successful results	• Business demands more than portfolio can deliver • Balancing the trade-off decisions in portfolio is not as straightforward as needed • Line management and project management have conflicting needs • Metrics measure individual projects instead of entire portfolio • Company measures ROI for start-up projects instead of enabling them to go their own lifecycle • Portfolio management could use more lean operating models • Management of portfolio looks at the history with old reports and numbers instead of preparing for the future

Case company 5 has received a proper management support for its project portfolio management and it strengthens their portfolio management practices. The project managers have a wide responsibility area and they can be considered as CEOs of their projects. The project-CEO role has helped project managers to deliver their projects. Additionally, project managers have all obtained project management certifications, which supports the company to maintain and further develop its already good project skills and culture. The company has also received good results when it has allocated a full-time employee to manage the project governance and the project model used in the company. As the portfolio management has been delivering good results and received good management support it has provided a positive spin for the mood. The company sees that positive mood helps them to co-operate and hence support in project portfolio management activities.

When considering the weak points, business demands more work than it is possible for the portfolio to deliver and in case something needs to be re-prioritized or traded-off, the company struggles to find a clear answer for it. Occasionally, projects run into situation where they have different priorities or point of interests together with line management. The company hopes it could use more lean ways to run its projects. The metrics used in portfolio management focus mainly on individual projects rather than the entire portfolio. The case company has also challenging in measuring the return on investments for the "start-up" type of projects, especially as the portfolio management hopes that those projects would not be counted using ROI but instead seen as investments, which have sunken costs and expected benefits. Finally, the company believes its portfolio management decisions should be made based on future needs instead of historical numbers from old reports.

3.7 Summary of Strengths and Weaknesses Identified IT Project Portfolio Management Practices of the Case Companies

This sub-section summarizes the strengths and weaknesses identified in the current state analysis in Section 3.

Figure 2 points out the strengths in IT project portfolio consist of: (a) clearly defined project management office, which leads and manages the IT project portfolio; (b) project portfolio management system, which eases the management and provides useful reports as well as gives good visibility for the portfolio; (c) project management models, which support on managing the projects and understanding their state on the portfolio level; (d) agile based development, which makes the delivery of work more efficient and constant and (e) lastly the energized change culture, which the companies have to support its IT project portfolio management practices.

Next, Figure 3 shows the weaknesses of IT project portfolio management practices in the case companies. The weak points identified in the case companies consist of: (a) prioritizing the work as everything seems to be top-priority for the companies; (b) slow and inefficient decision making policies, especially when making balancing decisions to the portfolios; (c) agile ways of working are seen as a silver bullet, which would solve all pain-points in project deliveries and development work regardless that companies have

received good results with waterfall-based development models; (d) weak portfolio management measures and metrics as most of the measurement focuses on individual project delivery; (e) scattered resources, where same people work with multiple different projects simultaneously and different development initiatives compete over them and additionally; (f) lastly decisions in project portfolio management are justified by the past rather than the upcoming possible events, which should be taken into consideration as well.

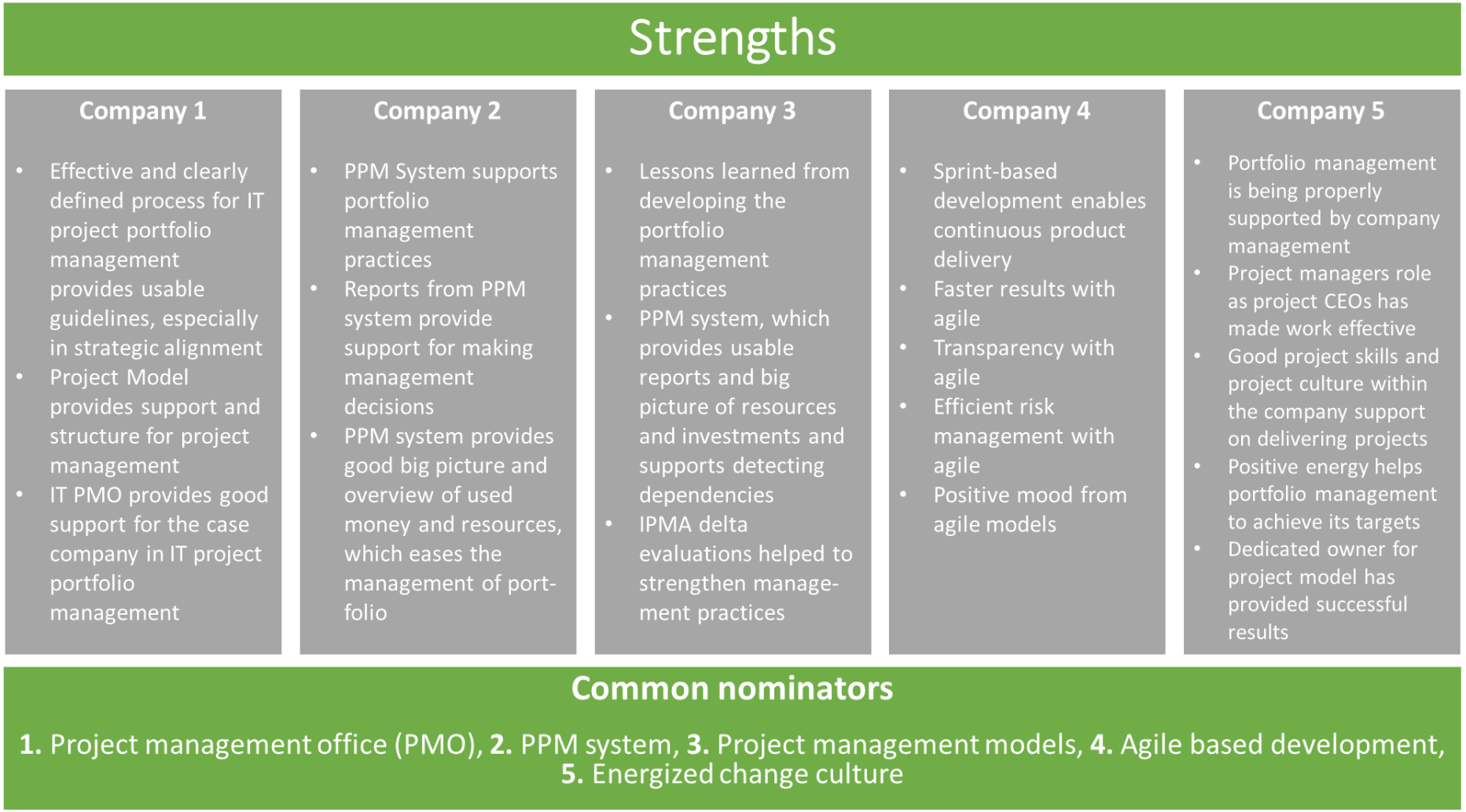

Figure 2. Strengths of IT project portfolio management practices in the case companies.

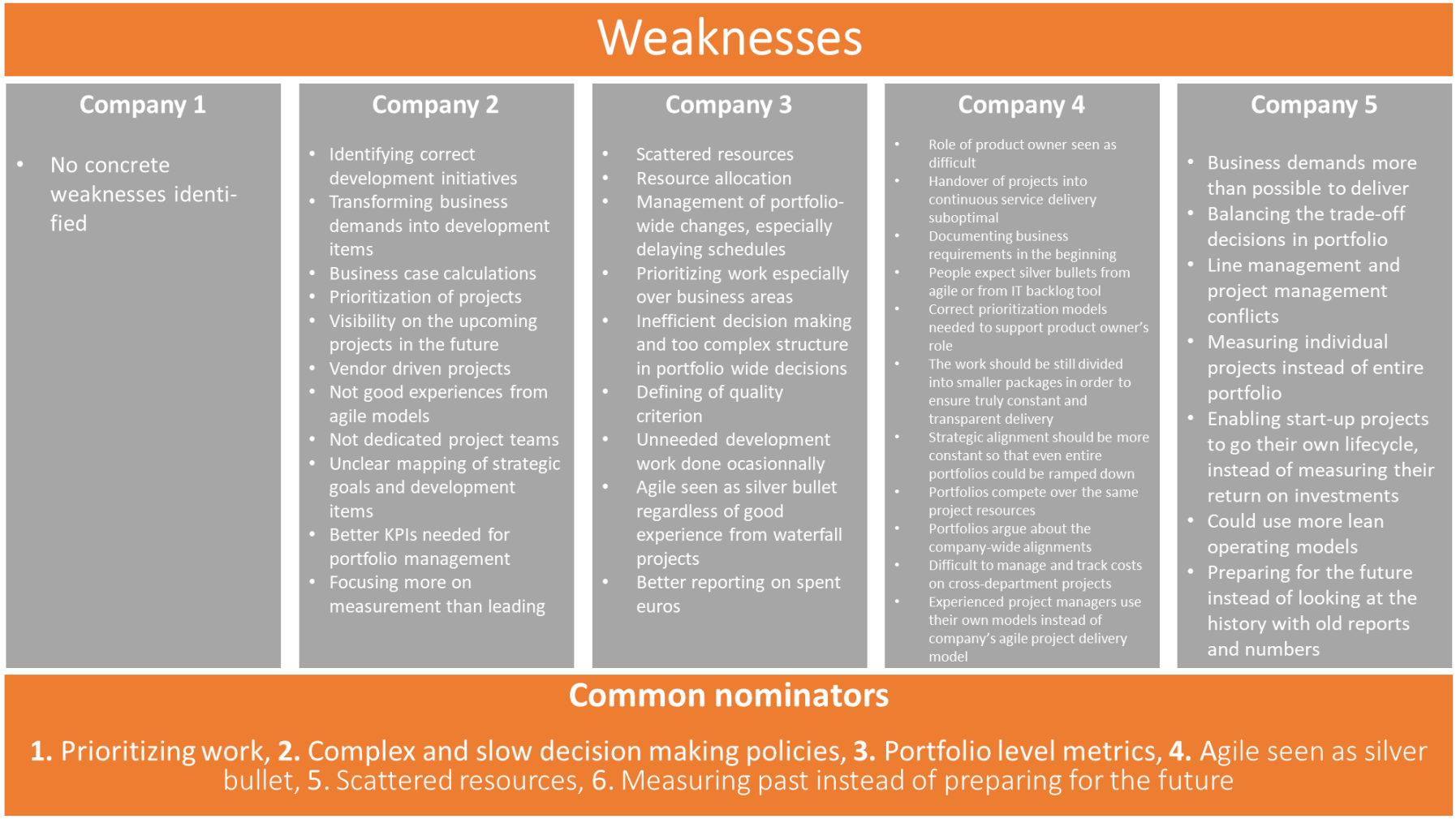

Figure 3. Weaknesses of IT project portfolio management practices in the case companies.

Finally, Figure 4 summarizes the strengths and weaknesses in IT project portfolio management practices identified in this current state analysis.

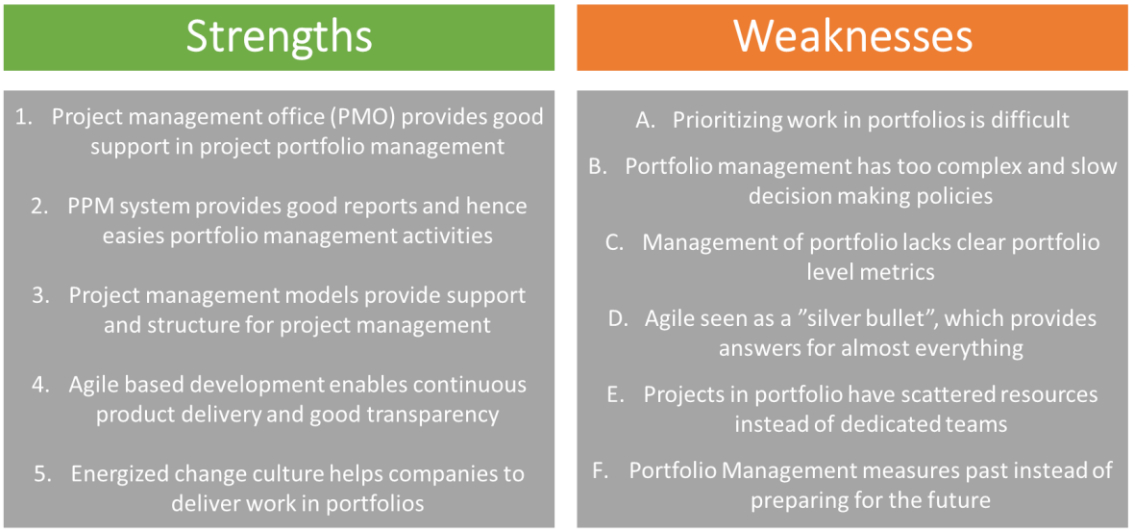

Figure 4. Summary of strengths and weaknesses in IT project portfolio management practices in the case companies.

The strengths listed in Figure 2 are taken into the set of recommended guidelines for IT project portfolio management practices, which this study builds in chapter 5. As the case companies listed similar strengths for their IT project portfolio management practices, they can be considered to be generally good guidelines.

The study concentrates only on four of the identified weaknesses listed in figure 4: (1) Prioritizing work within the portfolios; (2) Lack of proper project portfolio management metrics; (3) Scattered resources, where same resources are needed in multiple different projects simultaneously; (4) And additionally, Decisions in project portfolio management are justified by the past rather than the upcoming possible events, which should be taken into consideration as well. The four weaknesses were seen as the most critical shortcomings in IT project portfolio management practices in case companies. Furthermore, all four weak points seem to be related to each other.

Next, Section 4 explores literature and best practice to overcome the weaknesses. Based on searching recommendations from the business literature, the study will propose development points for the case companies to further their IT project portfolio practices.

4 Best Practice of Project Portfolio Management

This section focuses on searching business literature and good practices in order to overcome the most critical weaknesses in IT PPM practices identified in the case companies.

Before going into the solutions proposals in sub-sections 4.2-4.6, the following sub-section briefly describes the target of project portfolio management and the management activities identified as weaknesses.

4.1 Outline of Project Portfolio Management

Portfolio management practices consist of coordinated set of strategic processes and decisions that together enable the most effective balance of organizational change and normal business operations. (Axelos 2013: 11). In other words, portfolio management means centralized management of one or more portfolios to achieve strategic objectives. (PMI 2017: 5). According to IPMA (2015: 24) portfolio management can be considered as a dynamic management process where new projects and programmes are evaluated, selected and prioritized in order to meet strategic objectives. Management of portfolio concentrates on aligning its components with organization's strategy, optimizing organization's capacity and capability and additionally maximizing benefits from investments in the portfolio. (ISO 2015: 2). Project portfolio management aims to ensure the right things, i.e. projects and programmes, are being done. (PMI 2017: 29).

Portfolio components may have interdependencies and they can be executed in parallel or one after another. In order to enable effective portfolio management, the components should be measured, ranked and prioritized. Defining the key components in the portfolio streamlines the management of portfolio. (PMI 2017: 36) The portfolio components, which contribute most to the organization's strategic objectives should have the required resources. (PMI 2017: 15).

Projects and programmes in portfolios need resources to meet their targets. Portfolio management focuses on managing resources by allocating resources for projects and programmes in the portfolio. The resource availability can be seen as the biggest constraint of projects and programmes and needs to be taken into consideration when se-

lecting new components to the portfolio. Resource needs may change expectedly or unexpectedly constantly and hence the resource management activities need to be regularly performed. (IPMA 2015: 112)

Portfolio management needs to provide up-to-date reports to its stakeholder regarding on the portfolio performance. Portfolio should establish and maintain a baseline of its performance and then measured using the baseline. The reports should provide information such as current resource utilization and forecasted need of resources, contribution towards strategic objectives and also current and forecasted issues and risks. Portfolio management should provide metrics to keep track of schedules, technical and financial performance of the components in the portfolio. Metrics should provide performance indicator, including alerting values, so that management can perform balancing actives in case needed. (ISO 2015: 9-11)

4.2 Solutions for Prioritizing Work within Portfolios

Prioritization of work tasks should be made in a consistent and transparent way across portfolio. In order to provide transparency and consistency, portfolio management should use a prioritization model. Work prioritization can be seen as an area where sophisticated management models are not necessarily better than simple ones as there are always risks and inaccuracy in the models used for prioritization decisions. Moreover, the prioritization model should just be used to support the decision making but it is always up to the people to do the judgement and management decisions what come to prioritization of work in portfolio. (Axelos 2013: 57-59)

Business literature points out multiple different prioritization models and a simple solution proposal was selected for overcoming the difficulties of prioritizing work tasks within portfolio.

The table below points out, how to use simple five step model to prioritize components within portfolio.

Table 9. A five-step prioritization model (Axelos 2013: 57-61).

Step	Activity performed to compile prioritization model	Sample
1	Decide prioritization criteria, which are to be used to support in prioritization across portfolio. Multi criteria analysis recommended to use.	Criterions such as: • Monetary (NPV or Payback) • Strategic contribution • Risk involved in portfolio component
2	Agree the importance of each criterion by assessing a percentage of relative importance	Percentages should be 100% E.g. strategic contribution weights in 50% of the importance, whilst monetary weights in 30% and risks involved 20%
3	Agree rating system to apply to the initiatives base on contribution	0 = contribution 10 = highest contribution
4	Rate each portfolio component using the ratings and percentages above	Some components may have 10 points from strategic contribution, 1 from monteray benefits and 9 points from risk criteria in case of low risks. The rates mentioned would provide scores 7,1 out of 10. 10*50%+1*30%+9*20%=7,1
5	Collect all prioritization information and analyse them in order to make decisions	Rating received by applying prioritization model can be used to prioritize components in portfolio.

The table above points out the steps, which need to be performed in order to achieve scoring for all components included in project portfolio. The model starts by agreeing on the variables used for evaluating the importance of components of portfolio. Companies need to define their own evaluation variables or criterion that are most suitable in their IT portfolio. However, good industry practice suggests (Axelos 2013: 57-61) that monetary metric, such as net present value (NPS) or payback time should be used, as well as strategic contribution of components and risk rating at least. Once the criterion have been

defined and their importance relatively assessed and rating system agreed, all portfolio components should be rated using the same model.

When agreeing on the evaluation criterion, importance of each criterion and the rating system, it can be seen as crucial success factor to get proper management support for the rating model. Without good support from the managers, the prioritization model is less likely to provide meaningful information.

The component scoring need to be reviewed constantly as the components, projects and programs, evolve during their lifecycle. Additionally, evaluation criterion needs to be reviewed on a regular basis as there can be changes, internal or external of the company, which may affect the company's portfolio evaluation criterion. Companies may also adjust the importance of each criterion, after gaining experience on using the model. (Axelos 2013: 57-61)

According to Axelos (2013: 57-61), the European Parliament uses similar model as described in Management of Portfolio -guidance to manage its IT project portfolio. The criterion used to prioritize the EU parliament IT project portfolio consist of criticality, expected business benefits, foreseen business, risk, compatibility within the IT systems strategy, request maturity, cost, IT risks and political impact.

To summarize the solution proposal for the prioritization issue, a simple five step prioritization model can be used to identify the most important components or "diamonds" within the portfolio. The model can be only used to support in decision making and it is always up to people who make the decisions.

4.3 Solutions for Resource Allocation

Portfolio level capacity planning offers an excellent starting point for decreasing the amount of on-going projects, where same resources are needed simultaneously. With a proper focus on capacity planning in advance, companies should aim to avoid situations, where same employees needs to be working parallel in multiple different projects or programs. (PMI 2017: 15, 55-57)

According to business literature, dedicated project teams operate more efficiently and increase the throughput time for the work. Hence the portfolio management practices

should plan the project schedules and sequences in a way that the most critical resources are not being scattered for multiple different project simultaneously. Working on multiple projects at the same time requires multitasking, which can be considered as inefficient way of working. Therefore, capacity planning should be aiming for dedicated project teams. (PMI 2017: 45) (Axelos 2014: 57)

Despite of a perfect plan, projects and programs occasionally tend to go differently than planned. In case same resources are needed in multiple place at a same time, the prioritization model introduced in the previous sub-section should be used. When using the model, the urgency and the impact of the task should be also reviewed. In case a lower priority project fails if due to lacking a key person for a short period of time, then a higher priority project could wait in case it causes no big impacts. (PMI 2017: 57).

To overcome the critical resource need in a short term, PMO could maintain “help squads” whom may step in and support on the project delivery, when needed. “Help squad” could provide support on performing the actual project work. (Axelos 2013: 188-189). Usually PMOs maintain pool of project managers (Axelos 2014: 125-138) but the “help squad” could provide possibilities for enhancing the PMOs pool of resources.

In order to solve the critical resource need in a long term, companies should have a succession plan, to grow in new subject matter experts. The plan should provide a career path for new employees to grow into important roles. (Axelos 2013: 178)

4.4 Solutions for Forecasting for the Future

According to Siilasmaa (2018: 48-50), directing companies is mostly based on information and metrics from the past. Instead of preparing for the future, companies look back at their previous performance and use that for making management decision. Siilasmaa points out that management based on historical performance resembles to driving a car where the windshield is replaced with a big rear-view mirror with only a tiny hole to see through and peak to the road ahead. The biggest focus always remains on looking at the rear-view mirror and usually there’s no time or interest to peak through what’s going coming up in the future. If there’s nothing but success behind it does not necessarily mean, there only success ahead. Seeing through the mirror can be defined as a success factor for directing successful companies. (Fredman and Siilasmaa 2018: 48-50)

Siilasmaa suggests that companies need to focus more on indicators, which predict the upcoming rather than focus on the past. He suggests that all data, which correlate the future, should be compiled and used to make management decisions. Customer satisfaction can be seen as a proper metric, which predicts the upcoming. (Fredman and Siilasmaa 2018: 48-50)

Former president and CEO of KONE corporation Matti Alahuhta mentions (2015: 63-68) receiving constantly increasing results on customer satisfaction, when the company decided to invest on customer centric strategy and customer experience. KONE corporation measured their customer satisfaction using simple, yet convenient, metric - NPS. NPS was found out to be usable metric regardless of its simplicity or perhaps due to its simplicity. NPS provides visibility on the current state of customer satisfaction as well as the expectations, which need to be delivered in the future. The value also helps to identify the most crucial development needs. By measuring NPS on a regular basis, it also provides trends, how the customer satisfaction rates have been evolving. The detailed formula of NPS can be seen on the next sub-section of this study.

In addition to using customer satisfaction measurement for preparing for the future, other recommended practices can be found from looking at the project management office (PMO), which Project Management Institute nominated as PMO of the year 2018. The award was given for Australia's largest telecom company Telstra. Providing real business benefits was one of the reasons why Telstra's PMO won the award.

The PMO of the year 2018 award winner works together with the company's business owners and set key targets for the PMO to support their business areas. PMO focuses on supporting the business areas in helping them to increase sales, profitability and customer engagement. The resourcing of the PMO is based on the agreed targets set together with the business owners. Operating closely together with business and strict focus on the business needs, the company aims to manage based on future forecasting and upcoming business needs instead of using historical data for predicting the needs. The PMO has a strict focus on its KPIs, which are introduced on the next sub-section of this study.

4.5 Solutions for Portfolio Level Metrics

The previous sub-section provides background, why the metrics introduced in this sub-section were selected.

As stated by Alahuhta (2015: 63-68), KONE has received successful results by measuring their customer satisfaction using net promotor score, NPS. NPS can be defined as a KPI for measuring over all customer satisfaction and it is a globally used measurement formula.

Data for NPS can be gathered by asking “On a scale 0-10, How likely are you to recommend our product or service to your colleague or a friend?” Answers from 0-6 can be defined as detractors, customers who are less likely to recommend the company. Answers 7 and 8 stand both for neutral values. Answers 9 and 10 can be considered as promoters, customers who are very likely to recommend the company. (Alahuhuta 2015: 63-68). The figure below describes how the NPS value can be calculated.

$$Net\ Promotor\ Score\ (NPS) = (\frac{Promotors}{Total\ amount\ of\ answers} - \frac{Detractors}{Total\ amount\ of\ answers}) * 100\%$$

Figure 5. NPS Formula

The number of detractors divided by the total amount of answers is reduced from the number of promotors divided the amount of total answers provides the NPS value. (Alahuhuta 2015: 63-68).

NPS values should be measured on a regular basis, e.g. after each project, project phase or sprint to receive feedback on constant basis. The received customer satisfaction rates should be looped back to portfolio management practices to and used to make improvement actions.

In addition to NPS, the PMO of the year 2018 used business area based KPIs for defining its targets. The targets the PMO has established relate to customer satisfaction, increased sales and increased profitability. The recommended solution for measuring customer satisfaction was already provided, hence the two other metrics, which could be

used, relate to increased sales and increased profitability targets. By gathering the metrics, the PMO can raise a red flag early if things start to slip. When a situation has been flagged, management involvement is needed until the situation has been solved. Each company should define its own sales and profitability targets and agree the contribution required from PMO to support on receiving those. As the KPIs relate to profitability and financial, they remain classified from the source. (Gale 2018: 35)

The ISO standard for portfolio management also recommends (2015: 11) to track the actual and forecasted benefits. The benefits which are received and those which the company expects to receive with it portfolio, should be measured on a business area based.

Furthermore, the strategic contribution of the portfolio can be required as an important KPI. In order to understand how the portfolios truly contribute to the strategy, it should be measured. (TOG 2016: 45-52)

4.6 Conceptual Framework for Building the Proposal for Recommended Practical Guidelines for IT Project Portfolio Management

The conceptual framework presented in this sub-section contains the project portfolio management practice strengths from current state analysis and the solutions for overcoming the most critical weaknesses. PRY's instructor provided feedback in order to format the previously presented project portfolio management strengths and solution proposals into the conceptual framework.

Figure 6 describes the solution proposals, including their references, on the right side and documents on the left the previously identified good practices in more accurate level than previously presented in Figure 4.

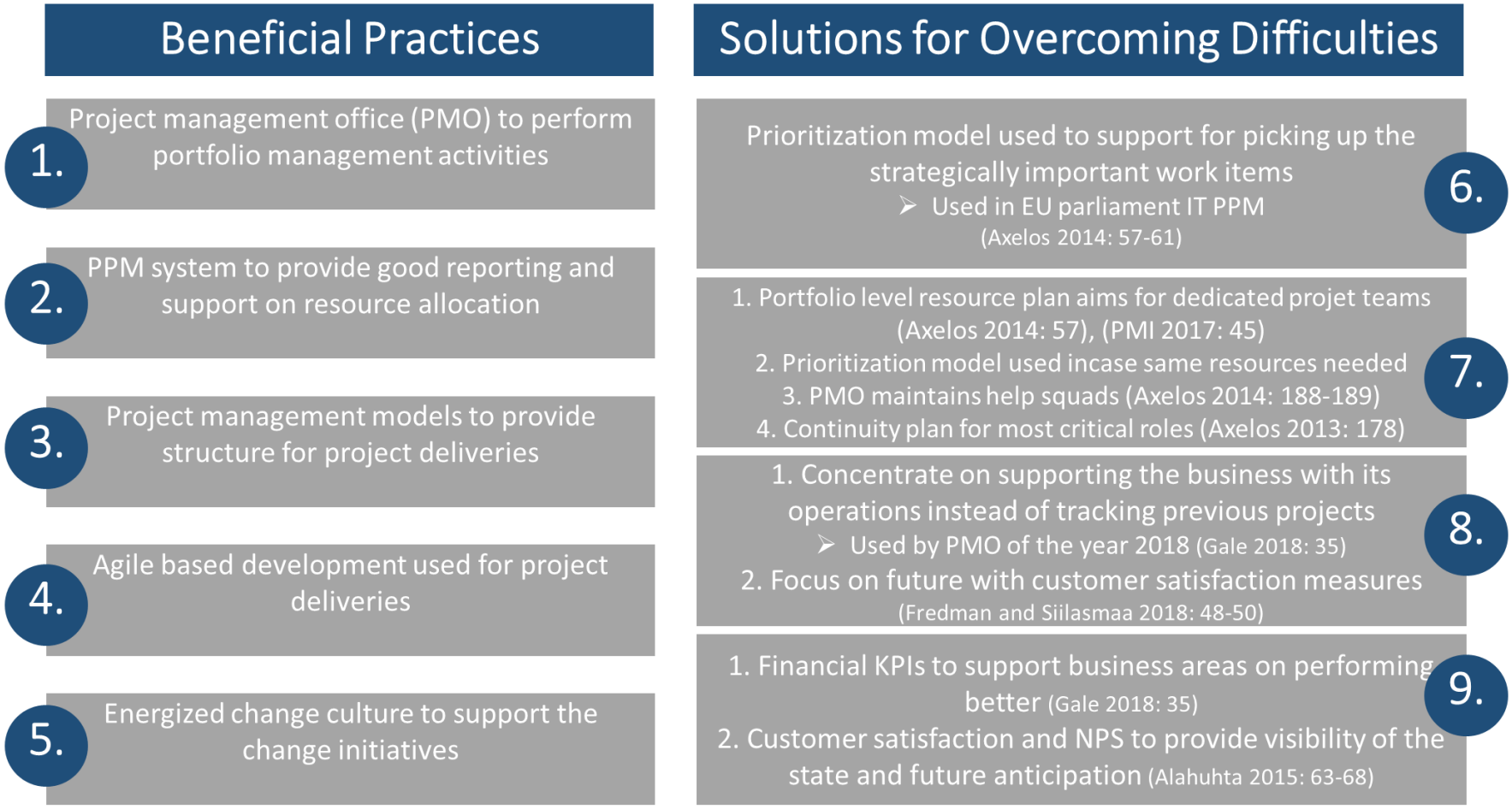

Figure 6. Conceptual framework for IT Project Portfolio Management.

The conceptual framework introduces four different elements to overcome the most critical shortcomings in IT project portfolio management. The elements listed in conceptual framework include: First, (a) Prioritization model used to support for selecting the strategically important development items. The solution originates from Management of Portfolios framework by Axelos and it is mentioned that the EU parliament prioritizes their IT project portfolio using a similar model; (b) the second element suggest that resource management should be tackled with thorough capacity planning that aims to have dedicated project teams to work in projects. The solution also recommends having back-up plan in case everything does not go as planned; (c) the third element recommends the management decisions made in portfolio management should be made based on future forecast and upcoming business needs instead; (d) Lastly, the fourth element suggest that the business needs should be evaluated on a business level by setting up KPIs and that future predictions are based on customer satisfaction which is measured using Net Promotor Score NPS.

The beneficial practices of project portfolio management documented in the figure above consists of: (a) Project management office (PMO) which performs project portfolio management activities; (b) PPM system which provides support for portfolio management with its reports as well as providing visibility of the resource utilization and hence eases the allocation of resources; (c) Project management models which provide structure for delivering projects included in portfolios; (d) Agile based development models, which enable constant product deliveries and transparent ways of working; (e) Leading energized change culture, which provides good environment for companies to support them in delivering changes included in portfolios.

The next section of this study describes the solution proposals as well as the beneficial practices in more detailed and concrete level to come up with initial set of recommended guidelines for IT project portfolio management.

5 Developing Guidelines for IT Project Portfolio Management

This section combines the beneficial project portfolio management practices identified in the current state analysis and the solution proposals for overcoming the most critical shortcomings in IT project portfolio management. The two are merged in order to introduce an initial set of recommended guidelines for IT project portfolio management practices.

5.1 Overview of the Proposal Building Stage

First five elements originate from the strengths identified in the current state analysis. The identified strengths were almost common in all case companies interviewed for this study and most of the case companies mentioned them as their strong areas in IT project portfolio management. Hence the beneficial IT project portfolio management practices are taken as they were identified into the initial set of recommended guidelines.

The remaining four elements described in the sub-sections 5.7.-5.10 were introduced on the previous section as solution proposals for overcoming the most critical shortcomings in IT project portfolio management practices. The solution proposals were identified from PPM best practices, PPM standards, business literature as well as business articles focusing on management of portfolios.

5.2 Project Management Office to Support the Project Portfolio Management Practices (Based on Strengths Identified in the Current State Analysis)

Project management office (PMO) can be defined as a decision-enabling and support function for all change initiatives within an organization. PMOs aim to ensure that companies can realize strategies and performance requirements with its projects, programs and portfolios. PMO focuses on verifying the expected benefits for change initiatives are measured, managed and monitored as well as aligned to contribute towards strategic objectives. Additionally, PMO monitors that projects and other change initiatives are done in the right way and that they are done well enough. (Axelos 2014: 7-19).

Almost all companies – cases 1,2 and 3 - involved in current state analysis had established a project portfolio management office (PMO) to support their IT portfolio management activities. The benefits from PMO originate from its clearly defined ownership portfolio management practices as well as providing ownership of project, program and portfolio governance. Additionally, one of the identified strengths of PMO originate from a pool of project management resources which the PMO owns and allocates for projects when needed.

Case companies 1,2,3 had defined PMO as the responsible function for managing the portfolios. Portfolio managers work within a PMO function of the company and perform portfolio management activities from the function. PMO has been defined as the owner of portfolio management activities in the case companies and it has been identified as beneficial way of working.

PMOs are responsible for owning, maintaining and further developing the project, program and portfolio management models used in the company. By naming a contact person to own models, companies received great results as the person could then allocate most or all of his or hers work time for further developing the models. The models are introduced more detailed in sub-section 5.4.

Moreover, the case companies mentioned that they maintain a pool of project manager resources which they can allocate to ongoing projects. Usually the project managers in the PMOs are allocated to the most complex projects or projects with high risks. Case company 5 mentioned that all its project managers have project manager certifications which require multiple years of project management experience. Sub-section 5.8. mentions additional resourcing recommended to PMO roles.

The table below summarizes the list of recommended actions, which should be provided in PMO.

Table 10. PMO functions.

	Action
1	Perform IT project portfolio management activities for the company
2	PMO should maintain a pool of project managers with versatile backgrounds whom can be allocated for ongoing projects.
3	Provide ownership for project, program and portfolio governance models

The recommended actions consist of performing IT project portfolio management activities, owning pool of project managers as well as providing ownership for project governance models.

5.3 PPM System to Support the Management Practices (Based on Strengths Identified in the Current State Analysis)

Project portfolio management (PPM) systems, i.e. IT system, can support efficient project portfolio management. PPM systems, if kept up-to-date, can provide clear reports, which can be used to support decision making. Additionally, the report may be used to track the realized and expected benefits. PPM systems also provide great support, especially for big companies, in resource allocation. PPMs systems provide visibility for the resource utilization and project resource needs and hence makes it easier to allocate the needed resources for the projects which need them. PPM systems can measure and monitor the performance of projects and make the project state and progress more transparent. Additionally, the systems may support on detecting possible interdependencies of different projects. (PMI 2017: 26-27)

All the case companies interviewed for this study said to have a PPM system to support their project portfolio management practices. Case companies 2,3 and 4 mentioned that the PPM systems provide a good overview for the current state of portfolio. They also described that PPM provides usable reports, which support them in decision making. The case companies mentioned PPM systems to be significantly important and that they have established good practices on maintaining the project data up-to-date. Project data refers to documenting project status – i.e. schedule, scope, resources, budged, risks, benefits – and project relationships to other development items.

All the case companies interviewed for this study mentioned they use systems for capacity planning as well as tracking employee utilization rates. Additionally, companies 2 and 3 mentioned that the system supports to see the interdependencies between different projects within the portfolio. PM system provided great support for them to allocate the employees to projects which needed resources.

Case company 4 mentioned that their PPM system provided organizational wide transparency for their ongoing development items. It provided the company better possibilities to react on the items, which aren't progressing as planned. Furthermore, the system can support on detecting big risks projects may face.

Moreover, most case companies mentioned they have found PPM systems one of their strengths in IT project portfolio practices and therefore it is included as the recommended set of guidelines this study aims to develop. The table below points out the topics, PPM system can be recommended to be used.

Table 11. Recommended set of practices for using PPM systems.

#	Action
1	Maintain project data (status variables and interdependencies) up-to-date
2	Provide KPI reports and use them for supporting management decisions
3	Use for capacity planning and resource allocation

The table above mentions three points where project portfolio management systems should be used. PPM systems should be kept up-to-date and it should provide KPI reports to be used for decision making. Additionally, PPM system should be used for capacity planning and resource allocation.

5.4 Project Models to Support the Delivery of Work Included in Portfolios (Based on the Strengths Identified in the Current State Analysis)

Project management methodologies provide previously found good practices which can be used for guidance, how to deliver projects. (OGC 2009: 1-7). According to Vaskimo's doctoral dissertation (2015: abstract) project management methodologies provide a common way of working, structure for projects and moreover provide a common project

language and vocabulary for organizations. Additionally, they provide consistency and enhance quality of project management. Vaskimo points out, there's no single best practice for project management.

All case companies interviewed for this study had their own project model, which were used for managing through all projects in the companies. Because all of the case companies use their own project model, it was identified as a strength, which should be taken as is to the model.

The models used by the companies, included guidance from agile project management models such as Scrum and SAFe. The companies also had gate-based project models to support the more traditional waterfall approach of delivering projects. The project models used by the case companies include templates and checklists, which have been found useful when managing a project. Companies mention that the models have provided them a common way of delivering projects, which has made their life easier. Case company 1 has found their IT project model especially beneficial and efficient for them.

As the next sub-section recommends providing possibilities for using agile or waterfall approach for project management, companies should have models to support them both. Additionally, case company 5 mentioned that by having a dedicated person to manage over the model, they have received great benefits.

The models also support on project portfolio management to understand the project statuses better, as all projects go by a similar model.

Table 12. Recommended set of practices for using project models.

#	Action
1	Define, maintain, train and further develop a model for agile-based project delivery
2	Define, maintain, train and further develop a gate-based model for waterfall-based project delivery
3	Name an owner for the models, preferably fully dedicated employee

The table above points out that companies should define, maintain, train and further develop models for both agile-based as well as waterfall-based project model. Additionally

the table describes that companies should have a clear owner for both of the project models.

5.5 Enable Agile Based Development and Provide Possibilities for Waterfall Based Development (Based on the Strengths Identified in the Current State Analysis)

Agile project models such as Scrum are aimed for complex development projects, which contain lot of uncertainties. (Schwaber and Sutherland 2014: 3-4) Agile practices can be considered suitable when there's lot of unknowns and uncertainties involved within the work. Linear approaches can be more suitable when the end product is more accurately known in advance or when the work can be considered rather simple. (PMI 2017: 12-16).

As agile ways of working was identified one of the strengths in case companies it was selected to the set of recommended guidance for this section. However, in some case companies – particularly in case companies 2 and 5 – agile was seen as a "silver bullet" which could solve all the pains of the company. The case companies of course knew that agile wasn't the answer for all their issues, but still struggled to have clear possibilities of working any other than agile way.

Case companies 1 and 5 received great results using gate-based project model for their traditional waterfall-type projects. Case company 3 also received excellent results with gate-based project model but struggled to receive proper results with agile models.

As both models are needed, both should be supported in the project portfolio management practices. There's no reason to strictly focus on just one type of project delivery model.

5.6 Leading Energized Change Culture to Support Development Initiatives (Based on the Strengths Identified in the Current State Analysis)

The implementation of PPM depends on the circumstances of the company. Progress can be sustained by energizing the company from change. Encouraging people to start and motivating them throughout the journey can support gaining positive energy for a

change. Being clear about success criteria and providing “quick wins” can provide positive mood for the company. Positivity increase productivity, which eases the implementation of project portfolio management practices. (Axelos 2014: 45-48)

In addition to “quick wins” and clear targets, positive energy can be maintained by receive management support for implementing PPM practices. Moreover, by changing what does not need to be changed, can significantly impact on the positivity. (Axelos 2014: 45-48)

Case companies 4 and 5 both pointed out that their employees have a great atmosphere and positive mood, which both support the portfolio management practices. As the companies had received fast results early on, when starting to use agile models or project portfolio management, they gained positive energy out of it. Positive energy has boosted them to success in implementation and further development of project portfolio management practices.

Some criticism was noticed in case companies 2 and 3 when the companies decided to change towards agile ways of working and abandon the waterfall project model, which had provided successful results earlier.

All case companies mentioned to have a proper management support for performing IT project portfolio management practices. Management support makes the work more straightforward and hence impacts on the positivity.

Table 13. Recommended set of practices for energizing change culture to support project portfolio management practices.

#	Action
1	Maintain management support for project portfolio management practices
2	Provide project team clear targets and “quick wins”
3	Do not change what does not need to be changed

The table lists management support, clear targets and quick wins and additionally recommendation of not changing what does not need to be changed as recommendations for increasing positive energy towards PPM.

5.7 Use Prioritization Model to Support Decision Making When Prioritizing Work within Project Portfolio

Sub-section 4.2. provides a solution identified from Management of Portfolio's guidance by Axelos. The solution is based on a simple prioritization model, which aims to highlight the importance of strategic contribution of the development work. The model should be used on a regular basis in order to provide possibilities to do prioritization on a constant basis.

The model targets to support portfolio management by defining and maintaining the correct priorities for all projects, programs and portfolios included in the portfolio.

5.8 Capacity Planning Aiming for Dedicated Project Teams & Establish Back-up Plans for Reacting on Situations When Planning Fails

Sub-section 4.3. provides the solution proposal for performing resource allocation in project portfolio management. The solution proposal suggests that resource allocation should be taken into consideration by doing proper capacity planning on a portfolio level. The capacity planning should aim for building 100% dedicated project teams. So that all projects would have dedicated employees working for them.

Additionally, the solution proposes the PMO to maintain a "help squad" – i.e. group of SMEs whom can be allocated to projects when needed. To overcome the challenges where companies a dependant from one or two key individuals, the companies should have succession plans for providing growth paths to key roles.

Growth path and help squad solutions were both identified from Axelos best practice on portfolio management.

5.9 Management Decisions Based on Future Forecast and Business Needs

Portfolio management can often be seen only as a reporting function. Instead of measuring the past with fancy reports, management of portfolio should focus on predicting the future as suggested in the current state analysis weaknesses.

The solution proposal for preparing for the future is based on recommendations from Nokia's ex-CEO and current chairman of the board Risto Siilasmaa. He suggest that companies should gather all the indicator's which predict the future and analyse those to make management decisions. He mentions customer satisfaction as a key indicator. The metrics for measurement are captured on the next sub-section.

Additionally, identified solution originates from Gale and is published in PM Network magazine. The article focuses on describing management practices of the PMO who won PMI's PMO of the year award. The recommendations are to set key targets together with business units so that portfolio management can support. The PMO should look at the future to understand the business needs and use that information to do management decisions.

The recommendations are described in sub-section 4.4.

5.10 Portfolio Metrics Measure Customer Satisfaction and Business Area Based KPIs

Sub-section 4.5. provides suggestions for key performance indicators for measuring management of portfolios. In order to perform correct practices, there must be good KPI's supporting and encouraging to perform them.

The recommendations are to measure customer feedback using NPS. Additionally, portfolio management should be measured on a business level based so that the IT understands, how it supports business in the most suitable way. Recommended KPIs are related to realized and expected benefits as suggested by ISO standard. Third recommended KPI measures of strategic contribution of development initiatives.

5.11 Summary of Recommended Practices for IT Project Portfolio Management

This sub-section summarizes the set of recommended guidelines for IT project portfolio management practices, which were described on the previous sub-sections.

Table 14 lists the suggested recommendations.

Table 14. Initial set of recommended guidelines for IT project portfolio management.

	Recommended practice for IT project portfolio management	Suggestion or development need identified from case company	Description of the suggestion
1	Establish a project management office to support the project portfolio management practices	Case companies 1,2,3	1. Perform Project Portfolio Management 2. Provide ownership for project governance 3. Maintain pool of project managers as well as ”help squads” for most critical roles
2	Use and maintain project portfolio management system to support the management practices	All case companies	1. Maintain project data (status variables and interdependencies) up-to-date 2. Provide KPI reports and use them for supporting management decisions 3. Use for capacity planning and resource allocation
3	Use and maintain project models to support the delivery of work included in the portfolios	All case companies	1. Define, maintain, train and further develop a model for agile-based project delivery 2. Define, maintain, train and further develop a gate-based model for waterfall-based project delivery 3. Name an owner for the models, preferably fully dedicated employee
4	Use agile based development when suitable and provide possibilities for waterfall based development as well	1, 3 and 5 waterfall 2 and 4 agile	Allow projects to be delivered using agile or using waterfall, instead of trying to fit all projects either one of the ways.

5	Lead energized change culture to support development initiatives	Case companies 4 and 5	1. Maintain management support for project portfolio management practices 2. Provide project team clear targets and “quick wins” 3. Do not change what does not need to be changed
6	Prioritize work within the project portfolios using a prioritization model.	Weakness 2,3,4,5 and solution proposal from Axelos	1. Use prioritization model to point out the work, which contributes most to the strategic objectives of the company and use the model to support in decision making 2. Prioritize on a constant basis
7	Capacity planning to aim for dedicated project teams. Establish back-up plans for reacting on situations when planning fails.	Solution proposal from PMI and Axelos	1. Capacity planning at portfolio level aims to ensure projects have dedicated project teams 2. Help squads for overcoming the resource needs on a short term 3. Build and maintain succession path in order to enable growth paths for the most critical roles
8	Management decisions based on future forecast and business needs	Solution proposal from Siilasmaa and Gale	1. Focus on the future instead of measuring the past by focusing on customer feedback 2. Business area based targets to understand future needs
9	Portfolio metrics measure customer satisfaction and business based KPIs	Solution proposal from Alahuhta, Gale, ISO and TOG	1. Use NPS to evaluate the customer satisfaction as well as the customer expectations 2. Measure realized and expected benefits business area based 3. Measure the strategic contribution of development initiatives

The table above lists the initial set of recommended guidelines for IT project portfolio management practices. The table lists nine recommendations on the left column, which are all broken down into smaller more practical recommendations on the rightmost column. Additionally, the table lists the source for the identified recommendation or for the source for the solution proposal.

Next, Section 6 iterates the recommended set of practices and the conceptual framework together with PRY's instructor and provides the final proposal in Section 6.4.

6 Validation of the Proposal

This section further validates the initial set of recommended practical guidelines for IT project portfolio management described in Section 5. Sub-section 6.4 documents the final results of this research.

6.1 Overview of the Validation Stage

In order to enhance the quality of recommendations with the expert opinions, the initial set of recommendations for IT project portfolio management, described in Section 5, was validated by the PRY's instructor.

The validation started with (1) the discussion of the strengths and weaknesses identified in the CSA, Section 3, and continue to (2) the review of the conceptual framework presented in Section 4.6. The validation discussion continued to (3) validation of the proposed recommendations. The initial proposal was further iterated into a more concrete model, which Sub-section 6.4 explains. The validation stage consisted of separate rounds, where, first, the PRY instructor provided feedback to develop the conceptual framework, and second, the instructor provided feedback for the initial set of recommended guidelines. Evaluations and feedback of PRY instructor were based on his vast experience in portfolio management and his extensive practical knowledge of portfolio management practices in best performing companies.

The next sub-section describes how the practical guidelines were modified based on the received feedback.

6.2 Findings of Data Collection 3

Table 15 shows the development needs PRY instructor provided for the strengths and weaknesses in portfolio management practices.

Table 15. Feedback to the identified strengths and weaknesses in portfolio management practices from 5 case companies.

#	Identified Key Point in CSA	Feedback and Development needs
1	Project management office (PMO) provides good support in project portfolio management	PMO can provide support but also complicate management of portfolios in case clear process or function for portfolio management activities have not been defined.
2	PPM system provides good reports and hence easies portfolio management activities	Reports from PPM systems provide support only if they contain correct data and the reports are being used by someone.
3	Project management models provide support and structure for project management	Project management models also provide better visibility for portfolio management about the project progress.
4	Agile based development enables continuous product delivery and good transparency	On portfolio management perspective it should not matter if projects are done using agile or waterfall.
5	Energized change culture helps companies to deliver work in portfolios	Seems to be a good finding and could be recommended.
6	Prioritizing work in portfolios is difficult	This is one of the most common pain points in portfolio management. A solution proposal should be investigated.
7	Portfolio management has too complex and slow decision making policies	This can be true. However, as company structures, cultures and environments tend to differ so much this topic should be left out from further analysis.
8	Management of portfolio lacks clear portfolio level metrics	Agree and this is worth of investigating. This relates to measuring past instead of preparing for the future needs.
9	Agile seen as a ”silver bullet”, which provides answers for almost everything	Can be true on some companies. However, clarifying meaning of agile should no be in scope for this study.
10	Projects in portfolio have scattered resources instead of dedicated teams	Dedicated project manager and project teams usually provide better results than people who need to multitask.
11	Portfolio Management measures past instead of preparing for the future	This relates to that companies tend to measure instead of leading their portfolios.

Table 15 shows the key strengths and weaknesses identified in current state analysis on the left side and lists comments and recommendations from PRY Instructor on right side. Findings 7 and 9 were left out from further investigation on this study as recommended by instructors. Moreover, findings 7 and 9 were not considered as the most critical shortcoming in IT project portfolio management and therefore left out of this study.

Next, Table 16 shows the development needs PRY instructor provided for the initial set of guidelines for IT project portfolio management.

Table 16. Feedback and development needs for initial set of recommendations.

#	Recommended guideline	Feedback and Development needs
1	Establish a project management office to support the project portfolio management practices	Good recommendation and the PMO size should be scaled depending on company size and need. PMOs are used in many other companies as well in addition to the case companies included in this study.
2	Use and maintain project portfolio management system to support the management practices	The information PPM system provides needs to be user friendly. Moreover, it should not contain useless details.
3	Use and maintain project models to support the delivery of work included in the portfolios	Instead of having different models for agile and waterfall, there could be a model, which supports them both.
4	Use agile based development when suitable and provide possibilities for waterfall-based development as well	No matter what kind of model is used to deliver the work, interface towards portfolio management should remain the same.
5	Lead energized change culture to support development initiatives	Important point and good recommendations. Management should not implement unnecessary changes.
6	Prioritize work within the project portfolios using a prioritization model.	It is important to highlight that people are responsible for prioritization not any model. The models should be only used for supporting the decision making instead of making the models responsible for deciding. Metrics used in prioritization model could be adjusted so that risk evaluation is based on euros instead of scale from small-huge. Providing risk evaluation in monetary format makes it more concrete.

7	Capacity planning to aim for dedicated project teams. Establish back-up plans for reacting on situations when planning fails.	Good ideas. Based on experience dedicated projects teams provide successful results for projects. Help squads have been used and branded with a team name. PMOs resource utilization should not matter when evaluating justification for project, program or portfolio existence. To further elaborate, projects should not continue to go on just keep a project manager or pool resources busy.
8	Management decisions based on future forecast and business needs	Sunken costs should not matter when thinking about project's, program's or portfolio's justification to exist. Portfolio management should focus on leading and managing instead of monitoring.
9	Portfolio metrics measure customer satisfaction and business based KPIs	Documenting and tracking the KPIs use time and money hence all documented KPIs should be used for something or not be documented in the first place.

The right column in table 16 documents the feedback and development proposals from PRY instructor. Sub-sections 6.3.1-6.3.3 describe how the feedback was implemented.

6.3 Developments to the Initial Set of Guidelines for IT Project Portfolio Management

This section divides the feedback and development suggestions to the initial proposal into three different categories to provide a structured review. Additionally, the section describes how the proposed guidelines were adjusted based on the validation feedback.

Next sub-sections describe the *Leading*, *Management* and *Supporting principles* from the proposed IT project portfolio management guidelines. All of the proposed IT project portfolio management practices were divided under one of these three categories.

6.3.1 Leading Activities in IT Project Portfolio Management Practices

The IT project portfolio management practices are considered as leadership activities that consists of: (a) Enabling agile and waterfall -based project deliveries in IT project portfolio; (b) Leading energized change culture to support development initiatives; (c)

Portfolio measuring, which should focus on customer satisfaction, strategic contribution and business based KPIs.

When *Enabling both agile and waterfall* development in portfolio, the interfaces between project management and project portfolio management need to stay similar. Portfolio management needs to have similar views to ongoing projects regardless of which kind of development model is used. Project management cannot become a “black box” towards project portfolio management if agile is used. Both models should be reported using similar kind of gates or then reported using percentages. Agile model may have less gates than waterfall projects, but the project states need to be mapped at least on a high-level for portfolio management in order to provide possibilities for efficient portfolio leading capabilities.

When *Leading energized change culture,* it can be considered important not to change that kind of things or practices which have been working good and properly previously. By implementing unnecessary changes, it can be possible to slow down the company’s energy towards portfolio management.

As for *the Project measuring practices*, based on good practices from the best performing companies, measuring should only focus on documenting the most important KPIs and moreover each of the KPIs should be used for some reason or then not documented in the first place. Documenting KPIs and doing reporting out of them causes time and money, hence it needs to have a clear reason. Good practices from the best performing companies prove that portfolio management should not focus on providing useless statistics or metrics which deliver no value. The sub-section focusing on supporting activities in portfolio management practices describe few recommended practical proposals for using PPM systems.

6.3.2 Management Activities in IT Project Portfolio Management Practices

The management activities included in IT project portfolio management practices consist of: (a) Prioritizing work within the portfolio; (b) Justifying managerial decisions based on future forecast and business needs; (c) Capacity planning and establishing back-up plans which can be used when planning goes sub-optimal.

When *Prioritizing different work tasks within the project portfolio*, people need to take the responsibility of prioritization decisions. Prioritization models can only provide support or

suggestions but not be used for making the actual decisions. Strategic contribution needs to have enough importance when prioritizing the work. Risk rating could be provided using euros instead of using scale small-huge. Providing risk evaluation in monetary format makes it more concrete and easier to understand.

Next, *Justifying managerial decisions based on future forecast and business needs* makes a critical practice for effective portfolio management. Sunken costs should not matter when thinking about project's, the program's or portfolio's justification to exist. Instead of using NPV or payback for monetary values in the prioritization model, ROI should be used. Moreover, ROI needs to focus only on future and not take spent investments into consideration. Next sub-section provides reasoning for using future-ROI in the prioritization model. Most importantly, portfolio management should focus on leading and managing instead of monitoring.

Finally, *Capacity planning aiming for dedicated project teams* was considered as a good recommendation. Maintaining pool of project managers as well as help squads in PMO resourcing were considered good recommendations. Next subsection discusses on implementing PMOs resourcing in more detailed.

6.3.3 Support Activities in IT Project Portfolio Management Practices

The supporting activities in project portfolio management practices consists of: (a) Project management office; (b) Project management models; and (c) the PPM system.

The Project management office (PMO) can provide a clear function for performing project portfolio management activities as well as ownership for the project governance. PMO could provide resourcing by maintaining a pool of project managers and additional SME help squads. However, PMOs utilization should not be measured in a way that if PMO resources have "slack" time it could be seen as a negative indicator. PMOs resource utilization should not matter when evaluating justification for project, program or portfolio existence. To further elaborate, projects should not continue to go on just keep a project manager or pool resources busy. In case portfolio management would evaluate or measure PMOs help squad's utilisation in a wrong way, it could easily lead to situations, where unnecessary work continues just so that PMOs resourcing reports show good values. After all portfolio management aims to ensure the right projects, programmes and portfolios are done.

As stated previously, *Project management models* should be used for providing structure and a common way for delivering the work included in portfolios. Project Portfolio should enable both waterfall and agile based project deliveries. In order to provide efficient project deliveries, project models should be used. Furthermore, based on good practices, same project model could be used for agile and waterfall based deliveries if possible. It is worth mentioning, however, that is the project teams, i.e. people, who deliver the work, not the models.

Lastly, *the PPM systems* were recommended for use based on the discussion with the instructor, focused on PPM systems. His recommendation is to keep the logged project data clear, up-to-date and additionally not to over document the projects. Based on good practices from the best performing companies, it pays off to rather document less data than more details, which might not be ever needed, since documenting the project details takes time and effort and from the project team and from the portfolio management in case they provide a report out of the data. This kind of over documentation provides no value, if the reports are not used anywhere in managerial decisions. Also, it was stressed that portfolio management should not focus on inventing “nice-to-know” metrics, which take time to document and provide very little if any benefits. Additionally, the system should point out, in case some of data has not been updated for few weeks. It is important since by providing old or complex information, the PPM systems can cause management to make decisions based on incorrect assumptions. Therefore, the data logged in PPM systems should be user friendly and up-to-date.

6.4 Final Proposal

Finally, this section presents the recommended practical guidelines for IT project portfolio management practices. Figure 7 draws the recommendations into a visual format and table 17 further explains the recommended guidelines.

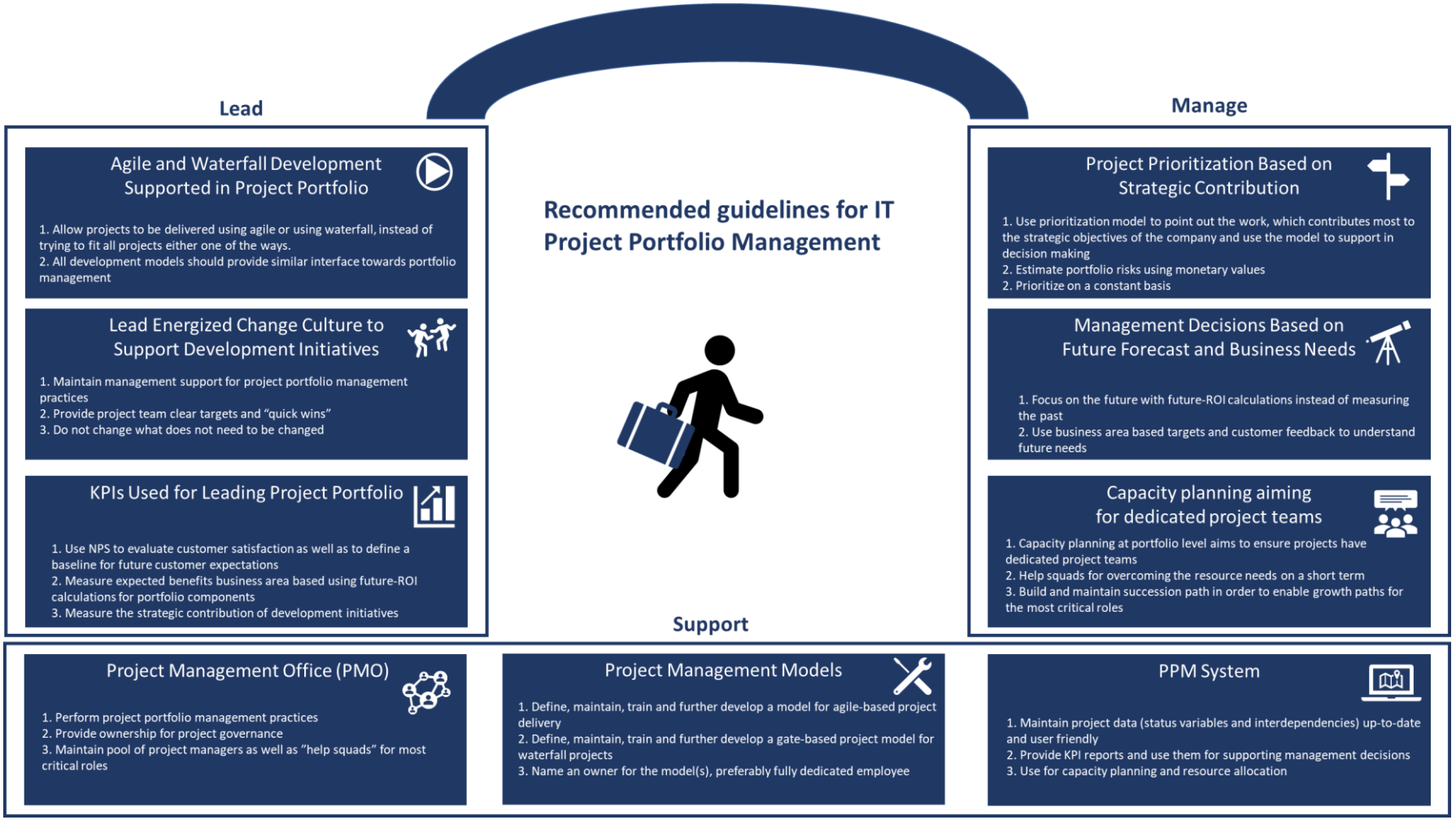

Figure 7. Recommended Guidelines for IT Project Portfolio Management Practices.

Table 17 documents the final proposal for recommended guidelines for IT project portfolio management practices presented in Figure 7.

Table 17. Recommended Guidelines for IT Project Portfolio Management Practices.

Recommended practice for IT project portfolio management	**Description of the suggestion**
SUPPORT	
Establish a project management office to support the project portfolio management practices	1. Perform project portfolio management practices 2. Provide ownership for project governance 3. Maintain pool of project managers as well as ”help squads” for most critical roles
Use and maintain project models to support the delivery of work included in the portfolios	1. Define, maintain, train and further develop a model for agile-based project delivery 2. Define, maintain, train and further develop a gate-based project model for waterfall projects 3. Name an owner for the model(s), preferably fully dedicated employee
Use and maintain project portfolio management system to support the management practices	1. Maintain project data (status variables and interdependencies) up-to-date and user friendly 2. Provide KPI reports and use them for supporting management decisions 3. Use for capacity planning and resource allocation
MANAGE	
Prioritize work within the project portfolios using a prioritization model. Use the model to support in decision making.	1. Use prioritization model to point out the work, which contributes most to the strategic objectives of the company and use the model to support in decision making 2. Estimate portfolio risks using monetary values 2. Prioritize on a constant basis
Capacity planning to aim for dedicated project teams. Establish back-up plans for reacting on situations when planning fails.	1. Capacity planning at portfolio level aims to ensure projects have dedicated project teams 2. Help squads for overcoming the resource needs on a short term 3. Build and maintain succession path in order to enable growth paths for the most critical roles

Management decisions based on future forecast and business needs	1. Focus on the future with future-ROI calculations instead of measuring the past 2. Use business area based targets and customer feedback to understand future needs
LEAD	
Use agile based development when suitable and provide possibilities for waterfall-based development as well	1. Allow projects to be delivered using agile or using waterfall, instead of trying to fit all projects either one of the ways. 2. All development models should provide similar interface towards portfolio management
Lead energized change culture to support development initiatives the delivery of work included in the portfolios	1. Maintain management support for project portfolio management practices 2. Provide project team clear targets and “quick wins” 3. Do not change what does not need to be changed
KPIs Used for Leading Project Portfolio	1. Use NPS to evaluate customer satisfaction as well as to define a baseline for future customer expectations 2. Measure expected benefits business area based using future-ROI calculations for portfolio components 3. Measure the strategic contribution of development initiatives

Table 17 divides the recommended set of practical guidelines for IT project portfolio management into categories support, manage and lead.

First, *Support practices* in IT project portfolio management consists of: (1) Project management office, which performs project portfolio management practices, owns project governance and additionally maintains a pool of project managers as well as “help squads” for most critical roles (PMO); (2) Project model(s) enabling agile and waterfall based project deliveries; (3) PPM system which documents relevant project information in a user friendly way, provides reports and supports in capacity planning.

Second, *Management practices* in IT project portfolio management involve: (1) Prioritizing work in portfolio, where the prioritization is supported by a model, that highlights strategic importance and estimates portfolio risks using monetary value; (2) Additionally, Management decisions focus on upcoming business needs by calculating future-ROI for work included in portfolio instead of reporting the past; (3) Capacity planning, which aims

to format dedicated project teams and additionally recommends to use PMO's "help squads" in case needed.

Finally, *Leadership practices* in IT project portfolio management recommendations contain: (1) Leading a portfolio, that enables agile and waterfall based development, which both provide a similar interface towards portfolio management; (2) Leading energized change culture that supports development initiatives by having a management support, providing quick wins for project teams and by not implementing unnecessary changes; (3) Use KPIs to lead project portfolio by using NPS to evaluate customer satisfaction and the future expectations for customers. Additionally, measure expected business benefits for portfolio components by using future-ROI, where the sunken costs are not taken into account. Furthermore, KPIs measure strategic contribution of development initiatives in portfolio to ensure portfolio contributes towards strategic goals.

7 Conclusions

This section provides an executive summary of the thesis along with recommendations towards implementation. Before providing the closing words, this section evaluates the thesis using four evaluation criteria.

7.1 Executive Summary

The objective of this thesis was to propose a set of guidelines for the case companies to support them to overcome the most critical practical weaknesses in IT project portfolio management practices. Portfolio management focuses on executing the company strategy by selecting the correct development initiatives to portfolio. Therefore, portfolio management plays a crucial role in ensuring that the company does the right things.

The data for this Thesis was collected by interviewing 5 case companies on how they perform IT project portfolio management practices. Based on their self-evaluation, the strengths and weaknesses in their IT project portfolio management practices were identified. The set of interview questions were structured by using ISO standard for portfolio management. After identifying the strengths and weaknesses, the study focused on exploring best practice and relevant project management literature to come up with the solutions to the weak points identified in the current state analysis.

The beneficial project portfolio management practices and solution proposals for overcoming the most critical weaknesses were compiled together to a conceptual framework, which was further clarified together with the PRY's thesis instructor as a basis for the initial set of recommended guidelines for IT project portfolio management practices. The guidelines were iterated once again with the same instructor to have the final outcome of this thesis.

As an outcome, the thesis proposes to perform IT project portfolio management practices, divided into three different categories: Support, Manage and Lead.

First, Supporting activities includes (a) having a Project management office (PMO), which performs the portfolio management practices and maintains a pool of project managers as well as SME "help squads" for most critical roles. Next, it including using (b) the PPM system, which documents the project data up-to-date and in user-friendly format,

supports in capacity planning and provides reports, and can be used in management decisions. Also, it also relies on (c) maintaining, developing and training project models, which can be used for delivering agile or waterfall projects.

Second, Managerial activities in project portfolio management practices recommend to: (a) Prioritize based on their strategic contribution and moreover to use a prioritization model to support the decision making; (b) Focus on future needs and expected business benefits rather than reporting on the past project figures; (c) Utilize capacity planning that should aim for dedicated project teams as they make a more efficient way to deliver projects, and in case capacity planning fails, PMOs help squad should be used.

Third, Leading activities recommended for IT project portfolio management consists of: (a) Leading a portfolio, which enables both agile and waterfall based project delivery and still provide a similar interface for portfolio management; (b) Leading an energized change culture that supports the company to adopt changes the portfolio delivers by having a management support and providing “quick wins” for project teams and not implementing unnecessary changes; (c) Using KPIs to lead the portfolio by measuring customer satisfaction using NPS and also using it for defining a baseline of customer future expectations, (d) Measure expected business benefits on a business area level by using future-ROI, where all sunken costs are ignored and upcoming benefits and investments are evaluated, and additionally, (e) Measuring strategic contribution of the components included in the portfolio.

By implementing the proposed guidelines, the case companies will have a chance to overcome their most critical weaknesses in IT project portfolio management practices. The proposed guidelines for project portfolio management practice provide support on ensuring the companies put effort to the right projects.

7.2 Next Steps and Recommendations toward Implementation

In order to proceed towards implementing the proposed guidelines for IT project portfolio management practices suggested by this Thesis, the case companies should:

First, evaluate the suitability of the recommendations for their companies. Most likely not all guidelines presented in this study cannot be implemented in all types of companies as their situation in hand tends to differ, hence the impact for the most critical weakness in hand will differ.

Second, the proposed guidelines should be scaled to meet the business size of the companies. Regardless of all case companies being big in size, their portfolio management resources differ so that guidelines recommended for other might be too much for another company and wise-versa.

Third, the recommendations should be tailored to meet the business context so that the recommendations fit in to the company environment.

Finally, after selecting the recommended guidelines scaling them in size and tailoring in context, the companies can start to use them by experimenting them and then further adjusting them based on learn on using them.

7.3 Thesis Evaluation

The object of the thesis was to propose a set of recommended practical guidelines for the case companies to support them to overcome the most critical shortcomings in IT project portfolio management. The study provided the set of proposed recommendations in sub-section 6.4. and provided further instructions on how to start implementing them on sub-section 7.2. However, the validity, reliability, logic and relevance of the recommendations need to be further discussed.

In this study, *validity* defines whether the study addressed the correct targets. Or in other words, did the research investigate the topics it was supposed to. In order to be valid, the data used in the research needs to be valid. (Laitinen 2003: 157-159.) Section 3 defined the ISO standard as a baseline, which the research data was measured against. The ISO standard for project portfolio management was used to build up the interview questions and therefore it provided the baseline for the study.

As for *reliability,* the data collected in the interview needed to be accurate enough and hence considered as reliable. (Laitinen 2003: 160–161.) In this study, reliability was ensured by interviewing multiple different case companies to come up with the current state analysis. All case companies were interviewed using the same set of interview questions. When analyzing the interview results, the thesis intended to find out if there were similarities amongst the five interviewed case companies to point out accurate research results. However, the research validity depends from the skills and characteristics of the researcher. (Laitinen 2003: 160–161.) Moreover, by interviewing more case companies the study would have provided more reliability. To improve the validity of this research,

the interview questions were carefully gone through together with the thesis instructor. As stated, the reliability depends from the interviewer and therefore to further the interviewing techniques, each interview asked improvement points for the future interview.

Logic in this research means the cause and effect or the order of reasoning a solution for an existing problem. The logic for this thesis came from concertizing the PRY's suspicion into concrete business problem and then finding a solution for the problem with the current state analyses followed by the literature review to come up with a logical outcome. Section 2.2 pointed out the research design, which aimed to provide logic for the thesis. The research aimed to proceed with the logic even though some of the findings were discovered as early as section 3 and remained almost unchanged to chapter 6 which in some cases caused unnecessary repetition of the same recommendations. To improve the logic, the study could have used less time for evaluating the current practices of IT project portfolio management practices in the case companies and focused more on the strengths and weaknesses.

As for *relevancy,* in addition to delivering accurate and reliable results in a logical way, the thesis aimed to provide results, which were relevant for its case companies. Relevance can be evaluated based on the importance of the topic to its field and its contribution to the literature. (Quinton and Smallbone 2006: 136) In this study, relevance was improved by iterating the final outcome of the research, from conceptual framework to initial proposal of recommended management practices for IT project portfolio management into final proposal of recommended practices for IT project portfolio management. Additionally, the thesis provided instructions towards implementation of the guidelines. However, the thesis left much for improvement on its relevancy as final iterations of the thesis and hence the outcome very based only on instructor's feedback. By validating all the recommended guidelines with all the case companies the study could have provided more relevant outcomes for them.

7.4 Closing Words

Project Portfolio Management targets to support companies' strategy by selecting the correct projects into portfolio and maintaining them aligned with strategic goals. Management of portfolio also tries to provide supporting environment for companies, so that their organizational capabilities can be optimized when delivering the work in portfolios. As

the world becomes ever digitized and discussion from Information Technology (IT) transforms to Business Technology (BT) it has become more crucial than ever that companies have the correct set of tools to support them in the transformation. As portfolios deliver the solutions and services used by the company business, it the management of portfolios that decides and prioritizes, which solutions the business uses to fulfil company's strategic objectives. The guidelines presented as an outcome of this study provide recommendations for the case companies how to forward their portfolio management processes by putting strategy and business needs to the front.

References

Alahuhta M., Häikiö, M. Seppänen P. (2015). Johtajuus. Kirkas Suunta ja Ihmisten Voima. Jyväskylä. Docendo.

Axelos Limited (2014). Portfolio, Programme and Project Offices, P30. – Second Impression Norwich. The Stationery Office.

Axelos Limited (2014). Management of Portfolios, MoP. – Fourth Impression. Norwich. The Stationery Office.

Gale S.F. (2018). 2018 PMO of the Year Award Winner. *PM Network.* December 2018, Vol. 38 Number 12. P. 28-35.

International Organization for Standardization (ISO) (2015). Project, Programme and Portfolio Management – Guidance on portfolio management. ISO 21504:2015.

International Project Management Association (IPMA) (2015) Individual Competence Baseline. Chapter 3 Portfolio Management – Version 4. IPMA.

Laitinen E. K., (2003). Yritystoiminnan uudet mittarit. Helsinki Talentum Media Oy.

Langley M. A. (2015) Delivering on Strategy – The Power of Portfolio Management. November 2015. Available from: https://www.pmi.org/-/media/pmi/documents/public/pdf/learning/thought-leadership/deliver-strategy-portfolio-management.pdf (Accessed 25 May 2019)

Office of Government Commerce (OGC) (2009). Managing Successful Projects with PRINCE2. Norwich. The Stationery Office.

Project Management Institute (PMI) (2017). A Guide to the Project Management Body of Knowledge. PMBOK® Guide – Sixth Edition. Project Management Institute.

Project Management Institute (PMI) (2017). The Standard for Portfolio Management – Fourth Edition. Project Management Institute.

Project Management Institute (PMI) (2017). Agile Practice Guide – First Edition. Project Management Institute.

Quinton S and Smallbone T (2006). Postgraduate Research in Business: A Critical Guide. Sage Publications Ltd.

Schwaber, K. and Sutherland, J. (2017). The Scrum Guide. Scrum org.

Siilasmaa R. and Fredman C. (2018). Paranoidi Optimisti. Näin Johdin Nokiaa Murroksessa. Tammi.

Syrjäläinen E., Eronen A., & Värri V-M (2007). Avauksia laadullisen tutkimuksen analyysiin. Tampere. Juvenes Print.

The Open Group (TOG) (2016). The IT4IT Reference Architecture, Version 2.0. Berkshire. Van Haren Publishing.

Vaskimo J. (2015). Organizational Project Management Methodologies. Aalto University Doctoral Dissertations. Helsinki. Aalto University.

Interview questions

Date:

Company:

Interviewee:

Time in current position:

Introduction

This study is done for PRY, IPMA Finland

Topic is IT Project Portfolio Management

I Current state, II Working good, III Working not so good

Beginning

0. Is it ok for me to record the interview?
1. Are you doing portfolio management here in Case Company IT?
2. How long have the portfolio management activities been ongoing?
3. How are you managing IT project portfolio here? How are you managing the portfolios?

I. What kind of roles and responsibilities do you have to support the portfolio mgmt. practices?

4. What kind of roles and responsibilities you currently have, to support your portfolio management practices?
5. What kind of practices do you have on stakeholder engagement and management?

II. What kind of portfolio components you have in the portfolio?

6. What kind of components do you have in your current portfolios? (projects, programmes, portfolios, other supporting work)
7. How many different portfolios do you have?
8. How are they divided or organized?
9. How many projects are there in each portfolio?

III. How's the resource capacity handled in project portfolio management practices?

10. What kind of risk tolerances have been set for the portfolios, if any?
11. How are organizational values impacting project portfolio management practices?
12. How the capabilities and constraints are taken into consideration in the portfolio management practices?

IV. Do the portfolios have objectives?

13. How are the objectives for the portfolio(s) defined?
14. Are the objectives being met?

V. How do you identify potential portfolio components for the portfolio?

15. How are components selected for the portfolio?
    (component = project, programme, portfolio, supporting work)
16. How are they being mapped against organization's strategic objectives?

VI. Are you defining or setting plans for portfolios?

17. How is the plan for the portfolio and its development targets done?
18. How are the expected benefits, capabilities, costs and timescales taken into consideration, during planning?
19. How are the interdependencies between portfolio components taken into consideration when planning?

VII. How are you assessing or reviewing portfolio components?

20. How do you asses the current state for the portfolio?

VIII. What kind of governance model you're having here for the projects?

21. Are you maintaining any templates for the projects?
22. Are you monitoring the projects are running based on the project governance?
23. Do you have a global defined project governance/framework?
24. Are you providing any training or mentoring services for the projects?

IX. Are the components aligned with strategic objectives of the company?

25. How are they being aligned?
26. How are they maintained aligned?
27. How is the alignment evaluated and documented?

X. How are the portfolio mgmt. activates being measured or evaluated?

28. How is the portfolio performance being evaluated?
29. How is the performance of the portfolio is being managed?
30. How the performance is being reported?
31. Are there any baselines against which the portfolio performance is being defined?
32. How are the integration of benefits being managed?

XI. Are there any balancing activities or optimizing activities in portfolio mgmt.?

33. How are the components being optimized?
34. How is the portfolio being maintained?
35. How are the resources optimized?
36. How are the portfolio risks being managed?
37. How are the changes being managed?

What are the strengths in IT project portfolio management here in Case Company?

38. What works good in the current project portfolio practices?
39. What are the biggest benefits of portfolio management in here?
40. What are strengths?

What are the weaknesses?

41. What are the improvement needs/difficulties?
42. What are the biggest challenges or hindrances or obstacles in your current project portfolio management practices?
43. What would you need to overcome those challenges?
44. What would you do if you'd have control over everything?
45. What should the portfolio mgmt. do better or more?
46. Is project portfolio mgmt. used more as a reporting or controlling/management system?

Finally

47. Anything else which you would like to say about your project portfolio management, especially about the strengths and the weaknesses?
48. How could I improve the interview in the future?

Thank you very much for your time!