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Measuring project portfolio management maturity

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The thesis is researching portfolio management maturity in organizations that have project type of work. The objective of the thesis is to define what factors affect portfolio management maturity, how the maturity level can be evaluated and create a method for measuring current level of maturity. The thesis also provides maturity level improvement suggestions.

Why is maturity measurement useful? The organizations that have project type of work often have some standardized practices. But the level of usage and knowhow in the organizations vary. Even the best processes and practices are useless if they do not bring any business value to the organization. Therefore it is important to maintain and develop processes, which enhance efficiency in operations and business benefit creation. This is where portfolio management plays the key role, acting as a mid-level executive management function, aligning strategic level objectives to the actual program and project work. Portfolio management ensures the realization of expected business benefits.

The theoretical framework of the thesis compiles the basis for project portfolio management maturity level classification. The thesis examines portfolio management practises, related literature, articles and earlier studies. Maturity models provide organizations with a starting point for benchmarking the current level of portfolio management performance and provide guidelines for improvement. Portfolio management maturity is not industry specific or dependable of the size of the organization. Therefore the created theoretical contribution as a synthesis of the thesis can be applied to any organization that runs project type of work.

The beneficiary of the thesis is Tieto Corporation's Practical Project Steering (PPS) product line, which established a need for a method that could be used for measuring organizational portfolio management maturity. The thesis is a public document excluding the confidential measurement method created for PPS.

Keywords
Capability, Maturity, Measurement, Portfolio Management, Process, PAP index, SAFe

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Abbreviations

ART	Agile Release Train
BCG	The Boston Consulting Group portfolio matrix
BPR	Business process reengineering
CMM	The Capability Maturity Model
CMMI	Capability Maturity Model Integration
FCF	free cashflow
IPMA	International Project Management Association
IPMA OCB	IPMA Organisational Competence Baseline
ISO	International Organization for Standardization
HR	Human resources
KPA	Key Process Areas
KPI	Key Performance Indicator
OGC	Office of Government Commerce
PAP	Project Allocation Percentage
PfMP	Portfolio Management Professional
PM	Project Manager
PMI	Project Management Institute
PMO	Project, Program or Portfolio Management Office
PPM	Project Portfolio Management Maturity
PPM	Program and Portfolio Management (Gartner abbreviation)
PP&P	project, programme and portfolio
PPS	Practical Project Steering
P2MM	PRINCE2 Maturity Model
P3M3	Portfolio, Programme and Project Management Maturity Model
RACI	Responsible, Accountable, Consultative, Informative
R&D	Research and development
SAFe	Scaled Agile Framework
SEI	Software Engineering Institute
SWOT	Strengths, weaknesses, opportunities, threats

1 Introduction

The thesis is researching portfolio management maturity, and focuses on organizations that are running project type of work. Different project management certifications have become an indication of competence for organizations that aim at improving project management capability. However, the certifications only prove that the required amount of knowledge have been achieved. Skilled employees can utilize approved methodologies in executing the corporate strategic goals, but an applicable organization wide project infrastructure is required, in order to successfully integrate and align single projects and programs to the strategy.

Therefore portfolio management practices and processes have been developed for ensuring the delivery strategic initiatives in the most efficient ways. Changes in the competition, markets or other environmental challenges entail organizations to react. Portfolio management provides contribution to executive level strategic decision making, strategy alignment down to portfolio components such as projects, it assists with selection and prioritization of the most beneficial projects as well as optimizes resource allocation.

According to Matti Haukka (Haukka. 11.3.2014.) from Project Institute Finland, organizations should have practical knowledge of project portfolio management basic principles and implementation, before they can reach for a higher level of portfolio management maturity. The basic principles such as project ownership, standardized processes and strategic alignment should be collectively understood throughout the organization. Portfolio maturity models are describing how well the organization is performing in its project related activities. They give direction how an organization could improve its processes in order to align corporate strategic initiatives with maximized value creating capability.

Theoretical part of the thesis studies different maturity models and factors that are affecting portfolio management. Qualitative data have been collected for conveying practical relevance for construction of theoretical framework and for the synthesis of the thesis. As an end result, thesis brings new theoretical contribution, creates a maturity measurement method and provides suggestions for maturity improvement.

The need for the research arises from Tieto Practical Project Steering (PPS) product line. The thesis would support and benefit Tieto's PPS services, by producing a maturity level measurement method. The method could be applied when PPS services would be evaluating customer company's current portfolio management capabilities and further road mapping the needed improvement activities for reaching a targeted level. The PPS cus-

tomer organizations would benefit from the research results by being able to evaluate their own organizational portfolio management maturity level as well as identifying development needs.

1.1 Purpose and objectives

The thesis project is result-oriented and the priority is to deliver results in high quality rather than to deliver them in minimal time or with lowest possible effort.

The purpose of the thesis is to study what factors can be measured for project portfolio management and how a maturity level measurement method can be defined.

The thesis aims at identifying different levels of portfolio management maturity based on theoretical frameworks and methodologies, and developing portfolio management maturity measurement method.

The thesis report will be published at Theseus.fi and will be available in public. The created measurement method delivered for PPS services as a thesis result, will be a confidential part of the thesis.

The objectives of the thesis are:

- Identify what factors affect portfolio management maturity
- Create measurement method for identification of current state of portfolio management maturity for PPS services
- Provide development suggestions that would help enhance portfolio management maturity improvement

1.2 Research questions

Three research questions are selected to form the base for achieving the thesis project objectives. The research questions are:

1. What factors affect project portfolio management maturity?
2. What are the maturity levels of project portfolio management that are meaningful in practice?
3. How portfolio management maturity can be measured?
4. How the current level of portfolio management maturity can be improved?

1.3 Research scope

The chapter describes the scope of the thesis project as well as limitations and exclusion to the scope. The scope has been limited to study theoretical context of portfolio management maturity and methods how the maturity could be improved. Measurement method will be delivered to PPS services as a result of the thesis. Suggestions for portfolio management maturity improvement will be delivered within the scope of the thesis. The thesis will also provide development ideas for further research.

Implementation plan of the portfolio management measurement method to PPS services has been excluded from the scope of the thesis. Any material as such directly used for commercial purposes is out of scope. Either thesis does not measure the improvement of the PPS services, or maturity improvement in organizations that would use the measurement method. Organizational investment decisions or decision making processes are not covered by the topic of the thesis.

2 Research methodology

The thesis research utilizes constructive and qualitative research methodologies. Constructive research allows the use of versatile sources for gathering the theoretical framework for the study. Previous researches, portfolio management frameworks, standards and theories would be applied as a theoretical base for the development of specification methods. The theoretical body of knowledge would be supported by qualitative interviews, which would be used as a source of data for creating the solution to the research problem.

Constructive research

The selected research method for the thesis is a constructive research. With this method variable program and portfolio management frameworks can be applied in creating an innovative solution to a problem or the subject of development. The key elements in the figure one visualizes the constructive research, and that the research problem exists and requires problem solving.

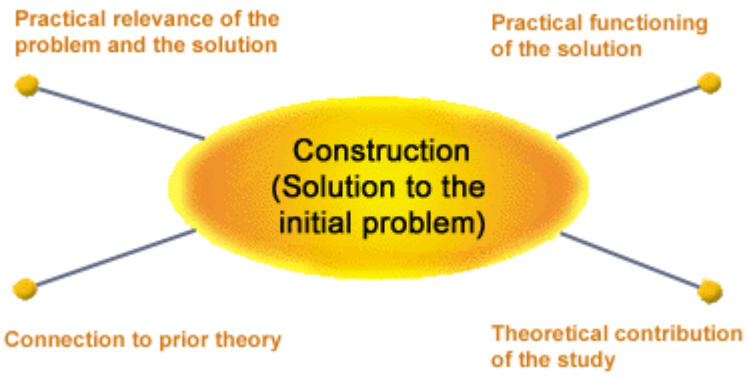


Figure 1: The central elements of the constructive research approach. (Lukka 2001.)

What is constructive research?

The solution and the final outcome of this thesis is a specification method that can be used for identifying organization's project portfolio management maturity level. The secondary outcome of the thesis is to provide suggestions to future improvement. The theoretical and practical sources used varied from unstructured data to theoretical frameworks, which connect the thesis to prior theoretical substance. Unstructured data was received from specialist interviews based on work experience related to the topic. The other sources used in this thesis were articles, literature, related researches and generally recognized theoretical standards and frameworks.

The constructive research method enables continuous creation of new theoretical contribution within the subject of the thesis. The need has been brought up by the PPS product

line as they wish to take the project portfolio maturity specification further to researching maturity level improvement. The selected methodology allows an opportunity to provide suggestions for further improvement, which would fulfill the secondary requirement of this thesis.

By using constructive research method, the empirical research was possible to implement in iterative sprints and re-define the interview questions in order to gain more in-depth information in areas that rose up during the interviews. The interview questions we selected to reflect the gathered theoretical framework as well as the described five levels of maturity and the common features that define the maturity levels. The specification method created as a final outcome of this thesis will be delivered to PPS, which will decide how and when the method will be tested, used and developed in practical use. Even though the testing of the method is not in the scope of the thesis, the method will be reviewed and accepted by PPS. Therefore the results of the study can be reflected in real life situation. The benefits of the study have potential for long-term utilization.

The empirical research should be done in close involvement with the practitioners. In this thesis the empirical research has been used for gathering the practical information to answer the questions “what” and “how” project portfolio management has been applied and measured in real life. The primary goal is to find out how well the theoretical framework of the thesis apply in practice. This would provide a justification for the utilization of the theoretical framework of the thesis. Secondary goal is to observe how well the created specification method would match with the composed maturity levels and key process areas. The empirical findings collected from the study were reflected to the gathered theory and with the selected key process areas. PPS as a beneficiary of this thesis will review the created method and estimate how well it match with the original requirements as well as evaluate the potential for practical usage.

How constructive research can be utilized?

In constructive research there is an assumption that the solution to the research problem has expected effects, and the research should describe how the expected state will be achieved. The process of the constructive research include different phases. Kasanen, Lukka and Siitonen pondered the constructive research methodology approach in management accounting. (Kasanen, Lukka & Siitonen 1993.)

Kari Lukka has described constructive research is a seven phased process (Lukka 2001.)

1. Find a relevant problem
2. Find out research opportunities
3. Obtain in-depth knowledge of the subject
4. Innovative solution model and develop construction
5. Implement and test the solution
6. Discuss the application area of the solution
7. Identify and analyze the theoretical contribution

The first and second phase focus on finding a practically relevant problem that has possibility for long-term contribution for the target organization. The problem in question should be justified for being worth of researching, by bringing up the benefits for the target organization as well as for the researcher of the time consuming academic input. In this thesis the definition requirements are fulfilled as PPS product line aim at utilization and further improvement of the specification method. For the researcher, the thesis complement the degree study and bring up theoretical context that increase professional competency.

The process is being followed by the third and the fourth phases by gaining the theoretical and practical knowledge of the researched topic. The difference compared with other research methodologies is that constructive research method enables later identification and analysis of the created theoretical contribution of the study. Constructive research method highlights the importance of an innovative solution to a problem, which is formed together from theoretical contribution and practical construction.

An iterative way of gaining practical knowledge requires several sprints, until the most suitable solution to a problem can be implemented in practice. The specialist interviews are referred as iterative sprints in this theses. The implementation is the fifth phase of the process, in which the specification method and suggestions for further improvement are created and reviewed by PPS. The final empirical feasibility study of the specification method will be out of scope, as PPS product line shall make the decision if and when the solution, the specification method, will be taken in concrete use. However, during the sixth phase, this study shall be able to ponder the applicability of the solution by analyzing the learning process and reflect the findings to the created end results.

The seventh phase reflects the researcher's own discussion on the validity of the research, in which the thesis study must be able to be observed objectively. The study should be explicated by observing the constructed research and its opportunities for further development and analysis, as well as observing the applied constructive research as

an integrative attempt to use the gathered knowledge in practice. Constructive research should be evaluated both from practical and theoretical point of view. (Lukka. 2001.)

Qualitative data collection method

Qualitative research method was used for collecting research supportive data. Qualitative research provides an opportunity to observe without interpreting, but also possibility to ask for in-depth questions to gain more precise information about the subject. (Qualitative Research Consultants Association 2015.)

The interviews were arranged as one-to-one meetings and group interviews. The main topic and purpose of the interview were described to the interviewees. Some supportive material was presented to the interviewees, such as Project Management Institute's organizational context of portfolio management model (presented in Figure 2 in chapter 3.1), as well as briefing to the topic and research questions on high level, but also the reason why the interviewee was chosen for this study was explained.

The interview duration varied from 60 to 90 minutes. The meetings were recorded and notes were written during the interview. The complete interviews have not been littered in written form, but notes of the interviews have been attached to the thesis. The results of the interviews have been summarized in Chapter 4.

Common for the qualitative research is that usually the interviewees have been selected to represent the most applicable sources related to the topic. In this study the interviewees were chosen according to their roles and expertise, which varied from project, program and portfolio management, process specialists, product specialist, sales and marketing management, business and operative management and team leading.

The interviews were carried out in iterative cycles. The first interviews had themes that aimed at mapping the factors that affect portfolio management. The thesis work alternated between research of theoretical framework and interviews in order to verify that the thesis was on right track. After the first interviews a list of questions was formed and presented at the becoming interviewees. The questions were based on the original themes, but also focused into existing portfolio management practices that had been researched at the theoretical part of the thesis. The interviewees answered the questions based on their own knowledge and work experience. As a result, based on the theoretical framework and data collection, the synthesis of the thesis was compiled.

After each interview the questions were reviewed according to the interviewee's responds and requests for detailed interview questions. The interviews provided information and viewpoints of what are the most common development areas in portfolio management, how the level of portfolio management maturity could be identified and measured as well as what kind of frameworks and standards are commonly used in practice at portfolio management. (Evaluation toolbox 2010; Tilastokeskus 2015.)

3 Project portfolio management and maturity

The thesis focuses on portfolio level management. To be able to measure the maturity level of organizational portfolio management, the relationships and interaction between the portfolio components must be understood. In order to utilize portfolio management in a value adding manner, an organization must follow management practices and processes that are selected according to how they fit to purpose. These practices should be measurable and support the implementation of strategic objectives of the organization. The management practices that are closely linked to portfolio management are project and program management. There are several frameworks and generally recognized standards related to project, program and portfolio management. This thesis is studying portfolio management maturity and focus on strategic planning within portfolio management and integration with program and project management.

3.1 Organizational interdependence with portfolio management

In organizational context portfolio management has a parent relationship with management of programs, projects and on-going operations. The direction of hierarchical interaction in from top to down. Together they play a role in organizational context ensuring that strategic objectives will be achieved by balancing the use of organizational resources and capabilities.

Figure 2. The Organizational Context of Portfolio Management. (PMI 2013, 8.)

Figure two describes the hierarchical structure of organizational strategy and alignment to portfolio, program and project management. An organization has a vision and mission that it aims at accomplishing by creating a strategy. The strategy is an outcome of planning cycles, in which a strategic plan will be formed. The strategic plan includes variable organizational initiatives which take into account the external factors affecting them. These factors are for example changes in the market area, requests of customers, partners and stakeholders as well as competitor activities. The portfolios gather the initiatives that are going to be implemented in a certain time line.

Portfolios provide programs with a specification of expected results. The programs, projects and on-going operations will be authorized and prioritized. Most important is that the produced business benefits and deliveries they are measurable. Measurable benefits only can be investigated in order to find out how well the investment has fulfilled its goals. A business case will be created at the definition phase for a program or a project. The business case is a formal and authoritative statement that clarifies the value of the program or project. (PMI 2013, 26.)

3.1.1 Strategic alignment

The strategic alignment in organizational context is expected to enhance business value generation. The value can be measured with tangible or intangible components such as monetary assets or brand recognition. The organization mission and vision can reflect the corporate strategy that positions the organization to the competitive field and markets.

Strategic planning and management are applied to ensure that strategic goals would be successfully turned into business value, and therefore defined directions for development and growth initiatives are needed along with measurable performance metrics. Strategic goals are long-term and have a broad scope. Goals provide the organization the direction and purpose, while objectives are often short-term, more specific, measurable and assist with evaluation of progress. (Johnson & Parente. 2013, 36.)

Portfolio management is enabling the strategic alignment of the portfolio components, which are projects, programs and on-going operations. The components are collected under a portfolio that provides applicable governance management, authoritative function for resource allocation and visibility for the organization to follow the accomplishment of strategic goals. The portfolio enhances optimization of resources, risks, dependencies, business benefits and costs. (PMI 2013, 10.)

3.1.2 Portfolio management

Portfolio management is according to Project Management Institute, “a component collection of programs, projects, or operations managed as a group to achieve strategic objectives” (PMI 2013, 3). Portfolio management’s purpose is to ensure alignment with organizational strategy of projectized activities, which must be:

- selected
- prioritized
- resourced

An organization manages a portfolio, which is a portrait of how organizational efforts of meeting business objectives are progressing. Portfolio management can often be seen as a generally recognized set of good practices. However, they are not automatically applicable to all portfolios, the organization itself must be able to determine which practices will be applied in order to bring measurable value to the organization. Portfolio management requires agility, as portfolio is presenting the progress of previously agreed business investments, and therefore should be reviewed and re-estimated if the strategic direction changes. By using portfolio management, the organization is able for strategic planning and selecting the most beneficial projects and programs, as well as reflecting them to the organizational risk tolerance.

Portfolio management is not industry specific, as it can be applied to any types of organizations, regardless of the field in which the organization is running its operations. An organization can be a non-profit, profit or governmental institution. Portfolio management is used for implementing organizational strategy and there is a measurable benefit of applying portfolio management in practice, which is on the quantifiable features of portfolio components. Portfolio components must be measurable as well as they must be able to be ranked and prioritized. (PMI 2013, 3.)

Common for all portfolio management definitions is that they highlight the importance of portfolio management as an enabler for organization to achieve strategic objectives. In practice the term enabler means, that portfolio management assists organization to balance the use of resources by creating an operational plan for the execution of the business beneficial initiatives. (PMI 2013, 3.)

3.1.3 Program management

A definition for program is according to PMBOK (2013, 9) “a group of related projects, subprograms and program activities managed in a coordinated way to obtain benefits not available from managing them individually. Programs may include elements of related work outside scope of the discrete projects in the program”. Program always contains projects, but an individual project does not have to be part of a program.

Program management concentrates in achieving strategic objectives by delivering business benefits and capabilities. A program may benefit only a small part of organization or various business lines. The term benefit refers to “desired result of an initiative undertaken to meet a need or solve a problem” (Walenta 2013). Benefits will be achieved by directing the work translating the requirements to subprograms and projects, as projects’ purpose is to produce the expected deliverables.

Program management is focused on outward interaction, while project management focuses on efficiency within its own objectives, delivering results in agreed scope, time and costs (Walenta 2013). The projects and programs underneath the portfolio do not need to have relationships with each other, however they may be linked to same resource pool and shared funding. Program progressing is being reviewed in cycles, in which program provides status data for portfolio management purposes and responds to the needs of benefits stakeholders.

The maturity of the organization’s policies, controls and governance practises define the degree of advantage that program management will bring into business operations. Program governance function assists with evaluating the current state of benefit delivery during the program. The progress of benefit creation can be identified with measurable predefined parameters, and corrective changes may be appointed to program components. The ability to implement the changes should be applied in similar techniques as in portfolio management. Project Management Institute defines the program management supporting processes as communications, financial, integration, procurement, quality, resource, risk, schedule and scope management. (PMI 2013, 73.)

3.1.4 Project management

The purpose of a project is to produce deliverables that are acceptable quality and will be delivered in agreed scope, budget and costs. Project management is a methodology used for leading the project towards the deliverables. Project Management Institute defines the project management as “the application of knowledge, skills, tools, and techniques to pro-

ject activities to meet the project requirements" (PMI 2013, 11). Project management includes management processes such as:

- communication
- financial
- integration
- procurement
- quality
- resource
- risk
- schedule
- scope

Project manager is responsible for managing and controlling several factors within the project, and therefore also entitled to evaluate the cumulative impact what a single change in one factor may cause to others. For example changes in schedule may have impact on project budget and costs as well as resource needs. Project stakeholders may impact project execution with their own expectations and opinions of the priority of project factors such as quality or scope. That increases the importance of project management to assure that the project team is able to balance the stakeholder expectations in order to meet the project requirements.

The requirements and benefits realization have been aligned from the portfolio level and further up from the corporate strategy. By implementing efficient portfolio management processes, improving strategic alignment and maintaining organization wide communication, the project team would have better understanding how the project's prosperous delivery is linked to organization's measures of success.

3.1.5 SAFe - Scaled Agile framework

Scaled Agile framework is a relatively new framework for implementing lean and agile methods to portfolio management. SAFe was first published in 2011, but has been developed up to version 4.0. Agility and Lean are the key concepts in SAFe, but the main focus is on providing guidelines for improving quality, value creation and efficiency in operative functions by reducing lead-time and aligning business strategic objectives throughout the organization to the delivered value. When the organizational relationships and interaction with portfolio management are clearly defined, the SAFe model can bring efficiency in

operative functions enabling an organization to faster product establishments and faster time to market delivery.

SAFe consist of different layers. The bottom layer is team layer that uses agile methodology for development work. In project type of work the methodology fits to purpose, as it enhances a cross-functional team to work in short sprints concentrating on creation of small pieces of selected work items.

On program layer the focus is on Agile Release Train (ART) and value streams. In SAFe model, a program defines and collects the most applicable value streams and release trains. Each release train work as an independent entity carrying the needed assets, such as competent resources and documentation, from beginning to end in a predefined budget and schedule. The delivered outcome however, is dependable on scope that in agile methodology is allowed to vary. The importance is on delivering requested value. SAFe model applies well with program management as it enables organization to lead the work proactively. However the time scale of agile program level roadmap is usually short from three to six months. Therefore the communication management plays important role in aligning strategic objectives and changes throughout the organization to the delivery project teams. Compared to traditional waterfall models, agile methodology enhances reacting rapidly at changed situations. (SAFe 2016; Vesterinen, P. 2015, 22.)

Portfolio layer in SAFe model communicates the organizational business strategy and vision to programs. “Primary elements of the portfolio are values streams (one or more), each of which provides funding for people and other resources necessary to build the solution that delivers the value (SAFe 2016)”. Strategic themes focused from business objectives give directions to the portfolio level decision-making in order of making sustainable investment decisions related to agile release trains and value streams. Value streams are implemented in trains and should be tracked. According to Vesterinen (2015, 23), Value Stream Mapping is a good tool for defining value stream as “it is a toll where the flow of information needed to produce product or service to the customer is defined, documented, analysed and improved”. (SAFe 2016. Vesterinen, P. 2015, 22.)

A portfolio backlog consists of business needs, which are divided further to several release trains. Business needs are called epics, which have a business case analysis to ensure the potential for return on investment. Once the epic is approved for implementation, it will be included in portfolio backlog. In SAFe model, an epic is an equivalent for PMI’s portfolio component, which are both selected, reviewed, analysed and prioritized on portfolio level. In SAFe model instead, the release train has its own backlog and contains

input from several sources that product management has profoundly taken from portfolio backlog, architecture and internal and external feedback sources. SAFe model mainly focuses on how the work on operative level is implemented, yet aligning the strategic objectives and portfolio management level and allows efficient change management when reviewing achieved results and mapping value creation regularly (SAFe 2016).

3.2 Portfolio management maturity models and frameworks

Maturity models in general provide organizations with a starting point for benchmarking the current quality level of portfolio management activities and provide improvement guidelines. There are several best practises for identifying the organizational project portfolio management maturity. Common feature for maturity models is that the maturity have been categorized in five different levels. The maturity improvement is described as a time consuming progress from lower level upwards to a more advanced level. An organization does not need to aim at the highest level immediately, instead the targeted level should match with organization's current business needs, the organization's capability to accept the becoming change and the availability of the resources that would construct the change. (Murray, A. 2015.)

3.2.1 CMM - Capability Maturity Model

Capability Maturity Model (CMM) developed by the Software Engineering Institute (SEI) in 1980s, can be applied to an organization in any field of business. CMM was originally created after a research suggested that there was a relation between the quality of software applications and quality of used development processes. The model provides best practices for development and identification of maturity of processes in an organization. It takes into account the current state analysis, the past experience, shared practices, framework for prioritizing actions and future dimension as the organization should be able to set a target state and improvement needs to reach it.

CMM model has definition for five maturity levels; initial, repeatable, defined, managed and optimizing. The first level "Initial" offers as a starting point for implementing new processes to a disordered situation. Individual efforts play remarkable role for project success. The success of a single project or program cannot be transferred to becoming projects as there is no definition and documentation for the processes used. The second "Repeatable" level emphasizes the disciplined repetition of documented processes. The earlier success can be repeated and projects benefit for defined essential processes and basic project management methods. On third level the organization has gained benefit from the repetition and processes are being defined as a standard processes. CMM refers

to standard software processes, but the model may be applied to business processes as well. Standardization, documentation and integration play the key role on “Defined” level. On fourth “Managed” level processes are managed, monitored and measured by examining the gathered data. On the fifth level the organization is improving the processes through monitoring feedback from the processes that are in use. The level is “Optimizing”. (Select Business Solutions 2015; Rouse April 2007).

3.2.2 Gartner program and portfolio maturity model

Gartner has developed their own maturity model that could be applied to any business function that needs to be improved. Gartner (2014) states that the model however suits best for program and portfolio management maturity, which they refer with an abbreviation PPM. In Gartner’s model each level has their own specific dimensions that are characteristic for the business functions on that specific level of maturity. The improvement and raising up to a higher level is cumulative.

In Gartner’s model there are five interdependent core dimensions:

- people
- PPM practices and processes
- value and financial management
- technology and relationships

The five dimensions have competing demands and the organization must aim at emerging a balance among them. People dimension describes the organization’s resources’ availability, their current competence level and competence development desires.

For advanced level of PPM maturity, the focus is on leadership skills needed to support PPM activities. PPM practices and processes demonstrate the management practices used and the launching of PMO as a supportive function. The management practises may involve portfolio, program or project management, including risk and resource management. Value and financial management focuses on return on investment, ensuring that the investment creates the expected value.

Technology dimension assists on understanding the technological requirements on a certain maturity level in order to gain the most benefit for supporting the business. Relationships dimension reflects the communication and stakeholder management, but also takes a viewpoint of traditional RACI matrix, as the different roles (responsible, accountable,

consultative and informative) should be identified to guarantee the best outcome in PPM practices.

In comparison to other portfolio maturity models, the Gartner's model states that portfolio management is not essentially applied until the organization has reached the level 3. Instead it describes the portfolio management maturity to be a progressive process that stops at level three. After that the organizations start to focus on contributing value to the business.

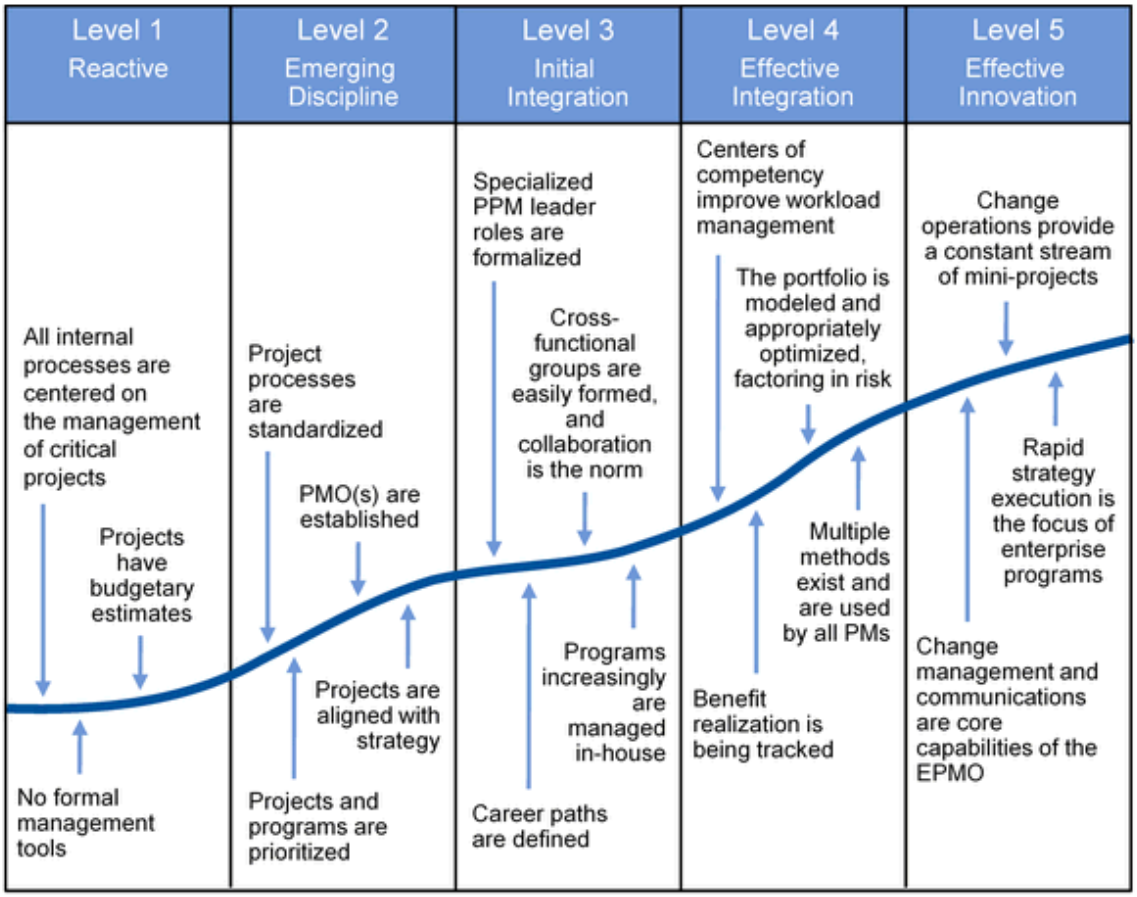


Figure 3. Five Progressive Levels of the Maturity Model. (Gartner 2014.)

Level 1

Figure three describes the Gartner's PPM maturity model. Characteristic for level one in this maturity model is that there are no standards for project or program management that would be in use in an organization. Resource management is limited to critical projects and do not support the resourcing requirements of less critical projects. As the organization has no capability to manage larger projects, they may be outsources to external vendors. There is no financial management for projects and programs, instead they may be funded out of a departmental budget.

Tools for managing projects and programs are modest and not commonly used, the tools are often used by a single person such as project manager (PM) and thus serve no bigger purpose providing valuable information to higher level of organization such as portfolio and executive level. Therefore the organization has no visibility over the entity of projects and programs, and cannot react proactively to changes until they have occurred. That is the reason why the level one has been named “Reactive”. An external factor may awaken the organization for improvement of internal processes and practises. A change in the demand is a positive external factor that can consequently lead the organization to put effort for raising up to a higher maturity level.

Level 2

Level two in Gartner’s model describes an organization that is driven by repeatable processes, a terminology that has been introduced as Capability Maturity Model Integration (CMMI). On level two, the organization benefits from visibility to single projects, which provides the organization with an ability to make proactive and accurate decisions, however there the benefits do not reach the portfolio level, as there is no oversight into multiple programs or projects and the data may be unreliable for value and financial management purposes.

The organization may have taken project and program management tools in use as well as supportive functions and practices such as workspaces for team working. The internal relationships and interdependencies between the business and IT are not steady as IT does not necessarily have capability to adopt huge amount of processes, but business either may not recognize IT within the organization as a service provider or as a reliable partner. The level two organizations have established some required processes and practices that serve the purpose on operative level, but the organization is not quite capable to manage the entirety and come across with hindrances. Hence level two is “Emerging Discipline”.

Level 3

Level three maturity refers to “initial integration”, where the organization has started to reach a systematic and balanced way of working among the five core dimensions. On level three the organization is capable for proactive resource allocation that is being managed from portfolio level, where also projects and programs are being approved according to predefined project benefits that are described in the form of a business case. The organization is also focusing on individual performance improvement and career paths are defined as mentioned in figure three.

Along with the portfolio management thinking comes the visibility over multiple areas that enhances effective decision making. The organization is able to take into account the effects of changes and plan how the changes should be executed in order to maximize benefits. Also the communication flow and knowledge transfer is improved as the portfolio perception provides organization with an understanding of the selected projects and programs, their expected results and business benefits as well as the chances for the success. However, on level three the organizations do not have the adequate technology and tools to support the intelligent analysis behind the decision making. The lack of tools prevents real time visibility over reliable financial data.

Level 4

According to the Gartner's model, on level four organizations change their focus from building portfolio management maturity to capability of business value generation. The organization is mature enough for effective project and program management practices, which consequently are aligned with the corporate strategic execution. On portfolio level portfolio optimization takes place along with risk management, and there is monitoring processes established for value and benefit realization. The people dimension is being affected by the competence development and centres of competency, which enable advanced workload management, on-going capacity planning as well as resource pools to utilize for finding experienced internal candidates. Level four requires internal integration within the organization and has therefore been named as "Effective Integration" that improves the enterprise adaptability and resilience.

Level 5

The highest level five is "Effective Innovation". The level emphasizes change management and communications as core competencies. IT is expected to bring strategic and tactical value and is seen as a future market facilitator. The established project, program and PMO practices are in place and fulfilling their expected roles and responsibilities. The technology provides accessible and up to date data, resources are being managed across the organization to serve project initiatives in the most expedient way. Constant innovation is being encouraged and expected across the organization, as the foundation is now mature but requires continuous innovation that the organization may stay on top of operations and markets. The organization is running both change operations and innovative development initiatives.

3.2.3 IPMA Delta Module O

The IPMA Delta model offers a perspective for project management competence by applying a competence baseline on different organizational levels from the points of view of project, individual and organization. IPMA Delta uses similar five definitions as CMM and P3M3, but refers to them as competence classes instead of maturity levels. The IPMA Delta competence classes assist with identification of organization's current project management competence and offer guidance for competence improvement. The classes are initial, defined, standardized, managed and optimizing and numbered from one to five. The classes evaluate the usage of project management standards, structures and processes, the scale varying from the degree of minimal knowledge to active management and continuous improvement. The assessment is based on standards IPMA Organizational Competence Baseline (IPMA OCB), IPMA Project Excellence Model and ISO21500, which is a high-level description of best practices, concepts and processes for project management. (IPMA 2015.)

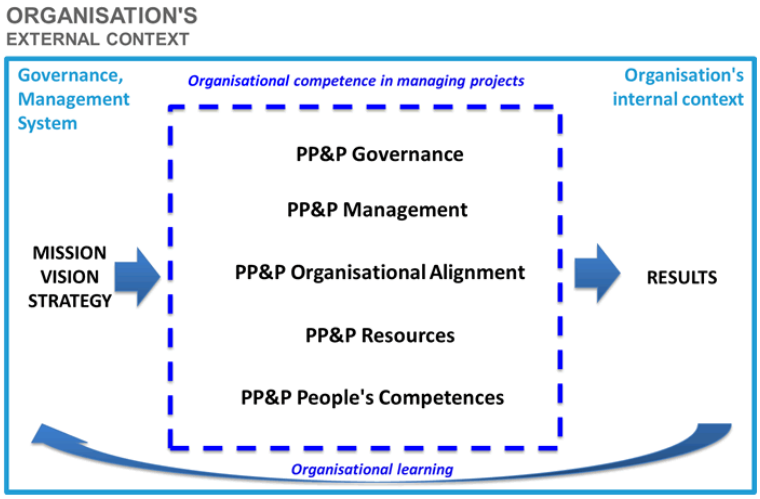


Figure 4. Module O (Organisation). (IPMA 2015.)

The IPMA Delta model has Module P for projects and Module I for individuals, but Module O (Organization) is targeted for organizational competence in managing projects. It provides a project management maturity certification to the entire organization. The Module O offers a 360 degree perspective to five main organizational areas and further down into 18 competence elements. The linkage with organizational strategy is shown on figure four that demonstrates the IPMA Delta Module O's organizational project, programme and portfolio (PP&P) competence areas. PP&P Governance, Management, Organizational Alignment, Resources and People's Competences.

3.2.4 ISO standards

International Organization for Standardization (ISO) has specified ISO9001 that is similar standard to CMM. ISO9000 standards are directed at software development and maintenance practices. ISO 9001 does not provide a larger scale framework for process improvement, instead it determines a minimum level for appropriate quality software processes.

3.2.5 Lee Merkhofer Consulting project portfolio management maturity model

Lee Merkhofer Consulting firm describes five project portfolio management maturity levels in detail. The levels indicate the reasons behind the selection of unsuccessful projects in an organization. The model assists with detecting performance gaps and realistic targets as well as provides practicable advice for improvement.

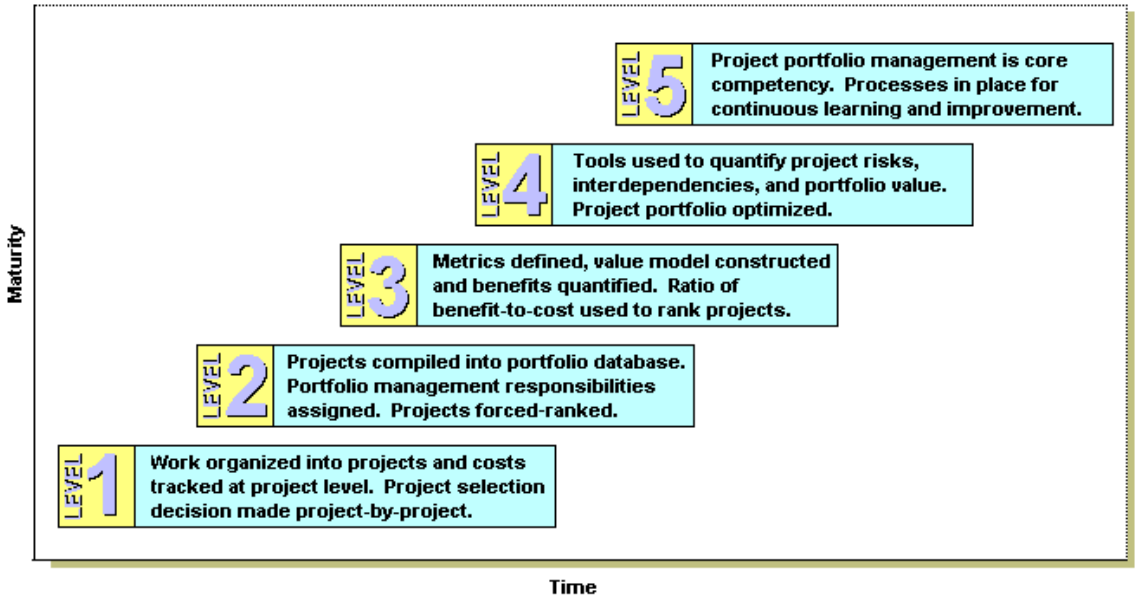


Figure 5. Five levels of project portfolio management. (Lee Merkhofer Consulting 2015.)

Level 1

In figure five the level one is described as a foundation, in which the organization has some project type of work and the business benefits of projects have been introduced on a very general level and there is no proper business case analysis if any. The organization has no selection criteria for project decisions, there is no regular portfolio management that would provide real-time data for business strategic purposes, there is no clear definition for roles and responsibilities, risks may be identified but are not being managed and there is lack of project resource coordination which lead to resource over-commitment. The organization is not able to make proactive decisions based on real-time data as the organization does not manage an entire project portfolio, instead projects are being fund-

ed, reviewed and managed separately from each other with the exception of shared resources that are competed between the projects. Termination of a project is usually executed for the reason of cost or duration overrun.

Level 2

Level two describes the basics for project portfolio management maturity. On the second level the organization is able to collect projects into a portfolio according to the ability to accomplish the projects with the available resources. The organization may be able to create business case analyses for larger projects, but there is no clear connection to value creation. Project prioritization is unpretentious, even though the organization can rank projects based on the resource over allocation that is clearly visible at the portfolio level. However besides of the awareness on portfolio level, the resource needs are not being methodically managed. Projects may have overlapping business benefits. On the second level of project portfolio management maturity the project data will be received collectively and the portfolio data is being updated on regular basis, but there is no performance monitoring or forecasting, and planning is mainly focused on scheduling. Program management exists on technical level, when interrelated projects are being managed under a program. Risks are being identified at the early stage but not managed throughout the project. Knowledge sharing is not organization wide.

Level 3

Level three is the Value Management. Reaching the third level gives an organization a maturity that allows proactive decision making based on reliable and accurate project data. The organization is able to select the right mixture of projects, which create value and return on investment. Project portfolio is being fully managed with standardized, documented processes, roles and responsibilities. Different tools, metrics and processes are applied on portfolio level such as performance monitoring, forecasting, quality assurance, auditing, risk management and for validating the realization of project benefits to business. The projects under project portfolio are being managed and their dependencies have been recognized. In general, the level three provides an organization with a logical and systematic way of aligning business initiatives into value adding projects.

Level 4

Level four is the Optimization, which is a level with mature and systematic business processes. Project portfolio is being proactively and analytically managed and profound quantitative analysing methods are supporting decision making. Characteristic for level four is that risks have clear ownership, risks are being monitored, controlled and evaluated against the organization’s tolerance for them, aiming at supporting the portfolio optimi-

zation. Value management from level three has been brought to an advanced level, as there is a measured and validated model for value estimating. The same model supports several portfolio level decisions such as project prioritization, funding and resource allocation. Stakeholder communication and cooperation is efficient and informative. The senior executives are committed to project portfolio management and they are provided with high-quality and up-to-date reports about progress, costs and risks for enhanced decision making.

Level 5

Level five is the highest level and called Core Competency, in which an organization obtains the best value for project portfolio management. Besides of the company wide competence in portfolio management, there are processes for continuous improvement develop knowledge and skills. The planning and optimization, funding and resourcing decisions are made in order for obtaining the greatest value for business according to the defined strategic objectives. Processes take place for risk, benefit, stakeholder and resource management, as the importance and impact has been acknowledged on portfolio level. Therefore organization is able for proactive future planning as executive level is aware of the future capacity and resource requirements. The value can be measured and tracked for business initiatives and based on the information, crucial decisions can be made to mitigating risks, identifying business opportunities and ensuring sustainability in business operations.

3.2.6 P3M3 Maturity Model

Office of Government Commerce (OGC) provides the most usable set of maturity models. PRINCE2 Maturity Model (P2MM) defines a model for project management best practices, including the project management activities needed to fulfil project according to the triangle; ensuring quality in agreed time, scope and cost. P2MM acts as a subset method under the wider Portfolio, Programme, Project Management Maturity Model (P3M3), which identifies five progressive levels of maturity similar to CMM. The level one “Initial process” ask if the organization is able to identify projects and programs and manage them separately from ongoing business activities. The second level “Repeatable Process” questions organization’s ability to run processes according to standards that are at least minimally specified. “Defined Process” is the third level that examines if the organization have controlled processes that allow adjustment to individual project purposes. Fourth level that is “Managed Process” highlights the quality performance measurability and predictability. Level five “Optimized Process” underline proactive management of technology and continuous improvement of processes. (United Nations Development Programme 2015.)

3.2.7 PPM based on ABC Project Model

Project Institute Finland Ltd. has developed five levels of project portfolio management (PPM) maturity, which is based on their ABC Project Model. According to Matti Haukka (Haukka 2013, 2), there are usually governance models for investment project but not for development projects that use personnel resources. He states that the use of internal personnel resources on project work creates a management challenge for an organization that can only be controlled by reasonably mature project portfolio management. In order to benefit for mature PPM, there are prerequisites that should be fulfilled.

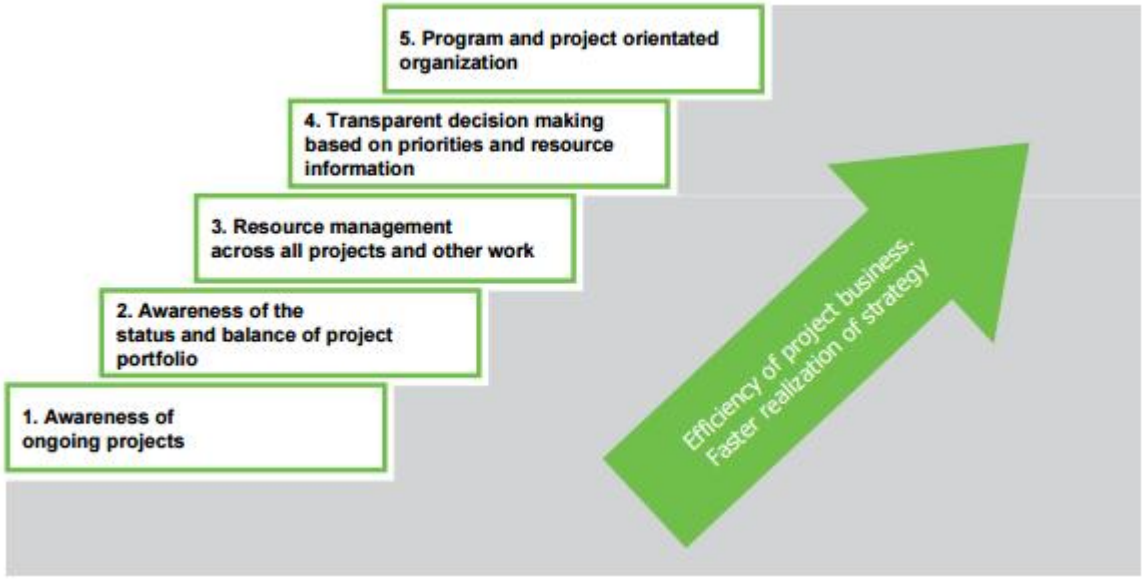


Figure 6. Five levels of PPM maturity or steps to develop it. (Haukka 2013, 3.)

Figure six describes the maturity level model, which is not focused on demonstrating the performance, but purposed to provide information on the deliverables of using PPM. The model assist with setting objectives and offers guidelines on steps for improvement.

Level 1: Awareness of ongoing projects

On the first maturity level the organization is able to collect all on-going projects in a database. The database forms a portfolio of projects. To reach the maturity level, an organization should have project complexity classification methodology in use, definition which type of work is considered as a project and managed under PPM, clear ownership with role and responsibility definition for all projects and harmonized project management model used for project work. Project ownership is the main prerequisite on level one as it guarantees that there is at least one person held responsible for basic project information and awareness of decision-making.

Level 2: Awareness of the status and balance of project portfolio

Regular reporting practises define the level two. Project Management Office (PMO) plays the role of maintaining and developing harmonized project management model that give the instructions for reporting practises. The reporting should serve the purpose on portfolio management by providing accurate data that supports decision making when weighting the balance of portfolio and its alignment with strategic objectives.

Level 3: Resource management across all projects and other work

The continuous resource allocation updating and awareness of the current allocation rate is the key element on level three. Project institute Finland considers that the responsibility of resource allocation is on competent project managers. Technology is mentioned as an enabler, which should bring efficiency in resource management.

Level 4: Transparent decision making based on priorities and resource information

On level four it is suggested that PPM Board can select and prioritize the right projects according to the resources available. PMO is an administrative function that provides data for PPM Board. Project owners create the business cases and hand them out to PMO, which delivers them further to decision making level.

Level 5: Program and project orientated organization

On level five the entire organization has been changed to function according to project and program orientation. Management practices focus on project ownership and management activities that ensure that the business benefits will be realized.

3.3 Key factors and measurement of maturity

Project Management Institute (PMI) provides standard for portfolio management with portfolio process oriented best practices. PMI provides guidelines for portfolio management, but in addition to processes, there are other factors that have influence on portfolio management maturity. Those factors have arisen during empirical research and therefore have been examined in theoretical framework. PMI's standardized processes and practices are examined in order to provide the basis for portfolio management maturity level factors that are essential and are capable to be improved.

PMI states that the purpose of portfolio management is to create a balanced implementation plan that assist the organization achieving its strategic goals. Portfolio plan is linked with corporate strategy and have impact on several areas such as maintaining portfolio

alignment, allocating financial resources, allocating human resources, allocating material or equipment resources, measuring portfolio component performance and risk management.

3.3.1 Methodology and processes

PMI's approach to portfolio management is very process oriented and the processes aim at producing key deliverables such as portfolio strategic plan, portfolio charter, portfolio management plan, portfolio roadmap and the portfolio itself. PMI (2013, 21) describes processes that are typical for portfolio management. The processes are purposed to assist at managing the portfolio components, which need to be:

- identified
- categorized
- selected
- authorized
- monitored
- evaluated
- prioritized
- balanced

The outcomes of the processes are run in cycles, when portfolio managers weigh the component performance in relation to strategic objectives and to the chosen key performance indicators. Through the cycle the components are being monitored, evaluated and validated by the portfolio manager. The components are reflected against the areas that portfolio plan have impact on, in order to maintain alignment with corporate strategy and objectives, the relationship with other portfolio components, the value and benefit of the component, resource requirements and their availability as well as the priority of the component, achievability of the component as part of the portfolio in relation to key performance indicators (KPIs) and risk tolerance. Portfolio manager also reviews the new and deleted components. (PMI 2013, 21.)

The entire organization's leadership, resources, processes and practises should have a common understanding and acceptance of portfolio management. The recommendations and changes that come from portfolio management should be accepted organization wide, not only in the executive decision making level, as the resulting actions would be facilitated constantly throughout the portfolio components. Therefore the organizational support can be seen as one aspect of portfolio management maturity. (PMI 2013, 27.)

Project, program or portfolio management office (PMO) is a supporting function within organization. Depending on organization structure and needs, PMO may have variable supportive roles in portfolio management and its components management. PMO is more likely an administrative function within organization. PMO gathers the agile management methods together, maintaining and developing them and providing a point of contact where the information is easily available when needed. PMO as a supportive function creates a collective understanding of the processes and tools that are agreed to be used in order to respond to the directions given by portfolio management. PMO may provide metric reporting as well as coordinate resources within the portfolio components and between different portfolios. (PMI 2013, 17.)

3.3.2 Performance and resource management

According to PMI (2013, 85) resource, financial and asset management are processed under performance management as their purpose as key resources are to optimize return on investment. Performance management identifies which resources benefits the organization the best and how they should be allocated among the projects as well as justifying that not all resources are needed in order to gain value for the organization.

Sydänmaanlakka states (2002, 176) that performance management is an overlapped with competence and knowledge management. It supports organizational learning by steering operations on an individual, team and organizational levels.

Portfolio performance management is a measurable function. The measurement criteria and metrics for performance becomes straight from the organizational strategy that provides the direction which way the company want to expand and develop. Portfolio performance management is needed for strategic alignment, fulfilling the strategic objectives in action. It enables organized and regular planning, monitoring and measurement of the value that portfolio components create. The value is being reflected against the organization's strategic objectives in order to achieve in the best possible value adding manner. Metrics are being discussed in chapter 3.4. (PMI 2013, 85.)

Resource management's purpose is to support organization and employees to accomplish their objectives. Employees are the most valuable asset of an organization. Resource management should create, maintain and develop organizational competence as well as well-being in an organization in order that "employees are motivated and have the energy to work in the long term" (Sydänmaanlakka 2002, 179).

3.3.3 Communication management

Portfolio communication management is managing portfolio information in practice. Portfolio communication management plan is a tool that can be utilized in stakeholder analysis. Communication strategy is needed for identifying the most significant information needs of stakeholders, which enables decision making based on the corporate strategic objectives. Transparency in portfolio priority and status communication may benefit the organization in multiple ways for example increasing credibility for the portfolio manager, stakeholder relationship management and increasing the knowledge for resources to be able to work on efforts that are aligned with strategy. (PMI 2013, 105.)

Instrumental and normative reasons determine the purpose for stakeholder communication. Instrumental reasons refer to the link between stakeholder management and efficiency in corporate performance, such as revenue proficiency and reductions in costs and risks. Managed communication increases transactions between stakeholders. Normative reasons refer to individuals or groups of stakeholders that have legitimate interest and thus economic value to the organization. According to Cornelissen (2014, 43) “these individuals and groups all need to be considered, communicated with and possibly accommodated by the organization to sustain its financial performance and to secure continued acceptance for its operations”.

Dependencies and points of contact are descriptive information of portfolio components that should be taken into account in portfolio communication plan. Part of the plan is to assess stakeholder analysis and define what kind of informative roles and responsibilities portfolio stakeholders have. Other communication related activities should be taken into account in the plan such as status reporting, notifying governance, resource and funding decisions as well as delegation of responsibilities regarding communication. (PMI 2013, 109.)

3.3.4 Risk management

Risks are events or conditions that have either positive or negative impact on portfolio components and therefore may effect on fulfilment of portfolio success criteria. Risks can be predicted, their impact can be estimated and their probability to occur can be evaluated.

PMI states that (2013, 119) “risk management identifies and exploits the potential improvements in portfolio component performance that may increase quality, customer satis-

faction, service levels, and productivity for both the portfolio components and the organization". Risk management on portfolio level is most beneficial in situations where there are highly prioritized portfolio components that have interdependencies or when the cost of failed portfolio component would have substantial negative impact to the organization.

Cleary and Malleret (2007, 41) define risk management as an iterative process that aims at understanding an unpredictable future, which is affected by interrelationships between numerous and complex events. They claim that faultless systems cannot be made, but risks can be managed with expertise and effort. Continuous improvement is essential for an iterative process, in which learning and doing in practice increase capability.

The Office of Government (OGC) defines nine steps for establishment of risk management; define a framework, identify the risks, identify probable risk owners, evaluate the risks, set acceptable levels of risk, identify suitable responses to risk, implement responses, gain assurance about effectiveness, embed and review. OGC also offers critical success factors as suggestions for improvement. The first factor is to identify risk management process owners as well as those who lead and support the process. The other critical success factors are to ensure organization wide understanding of risk management process and corporate policy as an enabler for innovation and prudent risk taking. It is essential to ensure that "a transparent and replicable risk management process has been established and is efficiently implemented" (Cleary & Malleret 2007, 40). Risk management process should be aligned with strategic objectives and embedded with other management processes. Risk management included continuous review and monitoring.

3.3.5 Knowledge management

The objective of knowledge management is to ensure and effective and continuous use of gained knowledge for decision-making purposes. According to Sydänmaanlakka (2002, 138) "Knowledge itself is not important. It must be meaningful and it must be applicable". The concept of knowledge management is quite new and origins from 1990s, when the importance of knowledge for organizations was understood. The organizations found out that they should be able to identify what kind on practical knowledge they already have and where that can be found.

It should be recognized what kind of information is needed by the organization. Knowledge in organizations should be easily available. "Lacking competence and knowledge are the most critical factors restricting the development of operations at many

hi-tech companies" (Sydänmaanlakka 2002, 133). Lack of knowledge and knowledge share are interlinked with lack of competence.

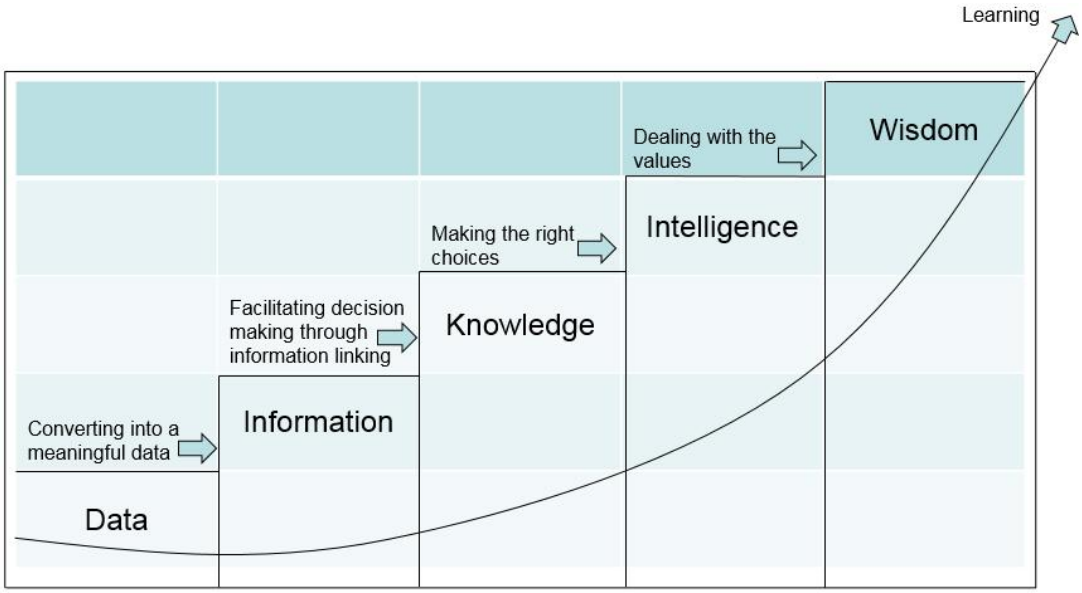


Figure 7. The hierarchy of knowledge. (Adapted from Sydänmaanlakka 2002, 143.)

The hierarchy of knowledge in figure seven describes five levels, in which raw data on the lowest level must be gone through a process that transfers it into information. Knowledge can be obtained from information by comparing similar situations where information is collected, making conclusions of what kind of impact does the information have on decisions, by connecting the information other knowledge and discussing about the information with others.

Knowledge management as a process in an organization can be divided to five subprocesses pictured in figure eight:

- create
- capture
- store
- share
- apply

As an addition to these subprocesses, re-use of existing knowledge is essential as well as exploiting it for creating new knowledge. The subprocesses are purposed for transferring the individual tacit knowledge to explicit organization wide group knowledge. Strategic objectives define what kind of knowledge is significant. Organization's cultural values should support the knowledge sharing. "By values, we mean continuous learning, open-

ness and respect for the individual. Empowerment, open and informal communication and generous feedback are also culture-related factors supporting knowledge management" (Sydänmaanlakka 2002, 135).

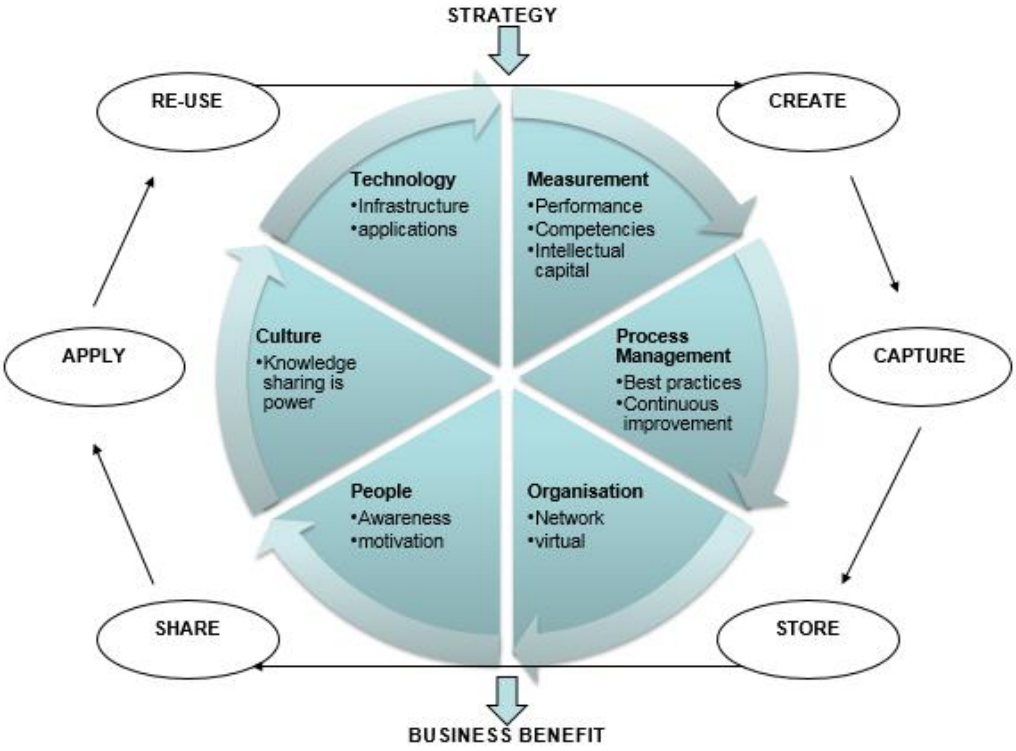


Figure 8. From strategy to business benefit through knowledge management. (Adapted from Sydänmaanlakka 2002, 151.)

Creation of knowledge is experience based, as it can be formulated from group working such as brainstorming session, job rotation or individual studying. Capturing knowledge refers to searching of information or documenting into a form that is easily transferrable. The information can be searched from books, internet, trainings, from the organization itself. Usually the search of knowledge is done by employees, when they for example try to solve a work related problem. Storing the knowledge means that the gained knowledge should be analysed and edited and saved in an easily available form into a database that is available for employees. The storage must be reliable, precise and organized logically in order to utilize knowledge efficiently.

An organization culture should encourage sharing the knowledge and provide tools for sharing. Distribution channels can vary from digital form such as e-mail, to traditional personal and organization wide communication as well as informal networking among colleagues. However, it is important that the information has been stored and is available, but also the shared knowledge must be meaningful and significant. Application of knowledge is what creates the benefit. Five subprocesses should be maintained and developed. Ac-

cording to Sydänmaanlakka (2002, 141) “the processes must be defined and these ways of working must be employed properly. That way knowledge management becomes a very concrete exercise that can be measured and developed”.

Knowledge management is a process that enables alignment from strategic objectives to business benefits. Knowledge management should be established in all business elements of measurement, process management, organization network, people, culture and technology. Knowledge management implementation starts with current state analysis, in which the needs of organization will be defined. Knowledge management is linked to other process, such as performance and competence management. When determining the current level, the organization should ponder if they already have or generate adequate amount of knowledge, do they gain enough knowledge outside the organization, is there an efficient way to store and share knowledge, how is it applied in practice and is it reused for creating new knowledge. If organization is not satisfied with the current state, it should consider improving the processes and reviewing how organizational structure supports knowledge management, in terms of encouraging team working both locally and virtually, determining the importance of knowledge sharing to employees and studying how existing IT tools could be utilized better for knowledge sharing. (Sydänmaanlakka 20020, 152.)

3.3.6 Leadership

Most frameworks and standards provide a concrete and very matter of fact approach to portfolio management. The management approach is directed to executive level and aims at increasing productivity in business operations maximising the return on investment. The theoretical guidelines and best practices do not however take into account the organizational leadership and culture and how they may influence on portfolio management. The success of portfolio management can be measured in numeral metrics and achieved business benefits, but it would be beneficial to measure how successfully the executive level is able to lead the organization to the desired direction.

Stringer (2002, 104) considers that successful management requires leadership and vice versa. He brings out John Kotter’s explanation that an organization needs both management and leadership to handle complexity and change. Complexity can be managed, while changes requires leadership. The difference is on how the work is being performed. Management focus on creating formal structures to work. The formal orders, regulations and clear set of responsibilities and job descriptions assist in handling a complicated organization that has several processes and technologies in use. Leadership concentrate in

dealing with change and creating new approaches for organization to be able to do right things instead of doing the things in a certain way. Leadership emphasizes the open communication, transparency and adaptation to changes in job descriptions and responsibilities. According to Rajegopal (2013, 171) “management is about providing direction and administrative control while leadership is about empowerment”.

Successful leadership generates a behavioural climate that empowers people to perform more productively. According to Stringer, leadership practises and their impact on organizational climate can be measured. The determinants of organizational climate are external environment, leadership practices, organizational arrangements, strategy and historical forces.

- External environment
    - An external environment refers to influencing factors outside the organization for example government regulations and competitive industry. These factors have the most impact on structure, responsibility and commitment in organizational climate.
- Internal determinants
    - The internal determinants such as leadership practises and organizational arrangements effect mainly on standards, recognition and support in climate. Stringer raise up two additional internal determinants of which historical forces refers to a collective memory of an organization. “It includes the norms and values that have grown up over time, along with traditions, work habits, and general expectations regarding future rewards or consequences based on what happened in the past” (Stringer 2002, 82).
    - Another internal factor is the organizational strategy, especially resource allocation, goal setting and prioritization. The organization performance in influenced by strategy, motivation of employees and organizational climate.

Sydänmaanlakka (2002, 177) presents a concept of self-leadership, which concern all the employees on individual, team and organizational level. He states that all successful management is based on the capability of leading oneself efficiently and thus lead the others. The areas that one should led, are divided to professional, physical, mental, social and spiritual contexts. In general self-leadership is about “having clear objectives in work, sufficient competence, feedback about performance and continuous development” (Sydänmaanlakka 2002, 178).

There are leadership related certification provided, as PMI offers certification of portfolio management professional (PfMP), which is directed to executive or senior-level practitioners that fulfil the criteria regarding applicable education, portfolio management work experience and are able to pass the certification exam. Maintaining the certification requires continuous development that must be proved every three years. (PMI. 2015.)

3.3.7 Portfolio strategic management

Strategic management is one of the key processes in an organization. It is a continuous process, which is being planned, implemented, tested and developed. Strategic planning, management and alignment are linked to portfolio management. The interrelation between different organizational is essential as “operative efficiency cannot compensate for strategic mistakes” (Sydänmaanlakka 2002, 174). According the Kotler, Berger and Bickhoff (2010, 15) strategic planning is a process, which can be divided to:

- general planning
- strategic planning
- operational planning
- steering and controlling the operational planning

In order to have a balanced portfolio, an organization can apply a portfolio matrix for analysing and planning the allocation of investments. A portfolio matrix often reflects the results of SWOT analysis as features, such as the distinctions between strengths and weaknesses of the market and competition with the opportunities and threats of the growth of the market to reach out to four generic strategies. In order to utilize the portfolio matrix for strategic purposed, the features in the strategic portfolio matrix should not be dependent on each other. The axes should describe internal criteria and external criteria, both axes should not use reciprocally reliant criteria.

Portfolio mix

The Boston Consulting Group (BCG) portfolio matrix is based on three theoretical fundamentals, and it presents a mix of investments that have low or high market growth and relative market share. BCG matrix was developed by Bruce Henderson in the 1960s. His main finding was the law for experience curve, in which the relative costs of an organization decrease at least by 20%, if the organization’s relative market share doubles. The law applies each time the relative market share doubles. The relative market share is presented as a ratio between organization’s market share and the biggest competitor’s market share. Increase in the ratio reflects the growth in production volume, while the developed

business operations create he advantage by decreasing in relative costs. The first theoretical fundamental is therefore presented as a reflection of organization's relative market share that is connected in internal analysis on strengths and weaknesses. The relative market share ratio associates with organization's position in the market as well as cost and margin benefits. (Kotler et al. 2010, 40.)

The second theoretical fundamental states that young markets that are growing fast require additional investments is several areas such as research and development (R&D), human resources (HR) and brand management. The older and developed markets need less financing for investments as the growth speed of the markets is slow. It is important to endure the business, but it does not require significant investment effort for mature markets, while younger and fast growing markets require investing in but consequently increase the investment risk. The growth of the market associates with the external analysis opportunities and threats.

The most important theoretical fundamental of BCG portfolio matrix is using freely available liquid funds, stated as free cashflow (FCF) as a target criteria. The relative market share determines the amount of cash available and the growth of the market reveals the maintenance capex which is the amount of cash consumed. Together they determine the FCF as it forms from cashflow decreased by maintenance capex.

BCG matrix can be used to analyse the company's "portfolio of activities in great detail and to plan the allocation of investments to the most productive areas of business" (Kotler et al. 2010, 41).

Figure 9. BCG matrix. (Strategic Management Insight 2015.)

The Figure nine illustrates the BCG portfolio matrix and the division to cash cows, stars, question marks and dogs. The profitable cash cows have a high relative market share, which ensures a continuous cash flow as long as company is able to keep the market position. The position could be held with maintenance investments. Stars have also high relative market share but they operate in a rapidly growing market which requires more investing on. However the stars have high potential to become cash cows and are worth to be invested in. The organization should react the most urgently to question marks as they consume more than they generate, because they operate in a market with relatively low market share. Dogs are the investments that have a low market share and they do not either consume or generate much but still require organizational resources. The organization should decide whether to divest them, sell them away or terminate them. (Kotler et al. 2010, 41.)

3.4 Portfolio management metrics

The portfolio management maturity is a scale, where an organization may benchmark themselves in comparison to other organizations and thus decide if they wish to improve their performance in order to gain advance for example with marketing value or efficiency in operations. It is important to define metrics that qualify the targeted results. The metrics are indicators that reveal what has been achieved and when the goal has been reached. Usually cost, schedule, resource allocation, benefit realization, project relationships and interdependencies are common features that are being managed and measured.

PMI (2013, 85) provides examples of portfolio performance metrics. Qualitative metrics could be:

- “Degree of strategic management, degree to which portfolio and organizational risks have been adequately managed by undertaking the portfolio components, recognition of legal and regulatory compliance, sustainability and corporate responsibility”

Examples of quantitative metrics:

- “Increases in revenue attributable to the portfolio, decreases in cost attributable to portfolio, change in the net present value (NPV) of portfolio, return on investment (ROI) of the portfolio, internal rate of return (IRR) of the portfolio, percentage by which cycle times are reduced due to the portfolio”

Metrics are important for determining what has been achieved and when it has been achieved in accepted quality. For an organization that have no fully formulated business processes according the ISO certification and quality management, the process would be engineering of business processes for the first-time. Business process reengineering (BPR) means the entire redesign of the existing business processes.

> "It consequently becomes easier to manage the business from a results-based perspective given that the entire business process is conducted through key performance indicators (KPIs) that are exclusively geared toward the end product, rather than through a department's own indicators, which are seldom customer oriented" (Kotler et al. 2010, 83).

By mapping and controlling the business processes with common KPIs, an organization gain advantage by linking together variable units, departments and business locations.

According to Krebs (2008, 67) agile portfolio management requires accurate measurement, but in his opinion projects should not put additional effort on creating new metrics but instead use the available data for reporting purposes. He highlights the agility in both portfolio management and project development, and puts the emphasis on reusability of the produced reporting data. Krebs introduces three cornerstones of agile project reporting, that should be used as key metrics creating an interface between agile portfolio and projects under it. He states (2008, 68) that project progressing reveals well the current state of the project. Comparison between the estimation and the actual work or value accomplished provides information of how much value has been created that far and gives foresight to how much is expected until the requirements are fulfilled. The methods that are most commonly used for agile project progress estimating. Project requirements are documented as units called story points or use-case points and the progress is being measured according to points completed. Other commonly used estimating methods are expert estimations and bottom-up method, in which the project work elements and their value are tied to project work breakdown structure.

Quality is needed as a supportive metric, as project progressing does not reveal the entire truth. If the project quality is not on acceptable level, resolving of defects may involve unexpected work during the project and consequently have impact on costs and schedule. The third cornerstone in agile project management Krebs (2008, 85) brings up is team morale which affects the long-term performance of a project team. The individual and team morale can be influenced for example by overtime working and the increase in stress level.

The status data reporting for portfolio manager, PMO or executives should be periodical and retain the same key metrics. In addition to the numeral metrics a brief written status reports provides the details of the current status of the project and value achieved. Krebs (2008, 88) lists up other issues as additions to a status report, such as current situation versus estimated schedule, key issues, requirements completed, risks, change control and other information that does not fit into other categories. All the information on the report should benefit the portfolio manager as the purpose of the report is to provide precise and up to date information of which conclusions can be made for the benefit of the organization.

Organizations have vision, mission and goal initiatives that are translated via portfolios to programs and further to projects. As the projects are organization investments, they are expected to produce cash flow and profit. For measuring the profitability of the project, return on investment can be used as an indicator. A profitable portfolio should be long-term, financially balanced and include reliable metrics.

Business goals however do not always translate directly into project initiatives. Business goals may be qualitative or quantitative. Krebs (2008, 93) gives an example of strengthening the brand of a company as a qualitative goal. It can be broke down into quantitative projects, of which one may target at increasing the sales by a certain percentage by developing a new web sales channel. The project itself cannot directly deliver strength to the brand, but may subsequently generate more sales. However the increase in sales may be result of discounted prices that have been given for marketing visibility, and therefore the increased sales have not been gaining profit for the organization. In the end, the return on investment would be positive if the sales would lead to profit that would exceed the investment made in the project.

3.5 Maturity improvement process

Improvement of portfolio management maturity is a process. It has been divided to four stages that determine the activities that should be accomplished in order to reach a higher level of maturity. The steps take into account the current state, target level, implementation and continual improvement.

Figure ten demonstrates the project portfolio management maturity improvement with a curve that reaches for highest level during a four year time span.

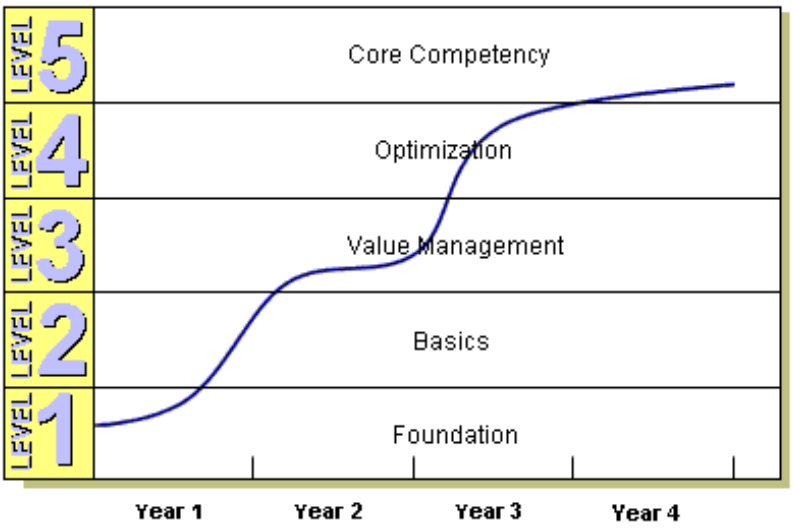


Figure 10. Step changes can be made, but achieving high levels of maturity typically takes years.(Lee Merkhofer Consulting 2015.)

Lee Merkhofer Consulting suggests that “significant short-term performance gains can be achieved, but making step changes requires understanding current weaknesses and the commitment of effort and resources.” (Lee Merkhofer Consulting 2015). A project portfolio management research was mentioned by Lee Merkhofer Consulting, in which had revealed that there were 71% level five organization that have had project portfolio management processes in place more than five years. 43% of level 1 organizations have had the same processes in place less than six months. The longer the processes are in use and the organization puts effort in capability improvement, more likely it is for the organization to reach higher levels of maturity.

3.5.1 PAP - Project Allocation Percentage

For identifying how important project portfolio management (PPM) is for an organization, the value of project type of work can be estimated with Project Allocation Percentage (PAP). According to Matti Haukka, (Haukka 2013, 6), organizations that deliver products or services to external customers are well aware of the value. When project type of work considers internal portfolio of projects, the value usually is not considered.

> “First, the value can be measured by estimating the significance of strategic change, the need of developing new products and processes etc. Practically the value of projects can be measured by dividing all working processes to project work and non-project work and estimating the amount of resource allocation to both processes” (Haukka 2013, 6).

PAP describes the relative resource allocation, in a certain part of organization. The part of organization can be only a single business unit or function. By recognizing the amount

of resources allocated to project work, the shared resources can be managed better between different projects and avoid resource over commitment. In Project Institute Finland's model, the division of resource allocation is between resources allocated to recurring processes and the resources allocated to actual project work. This work is related to project or program processes.

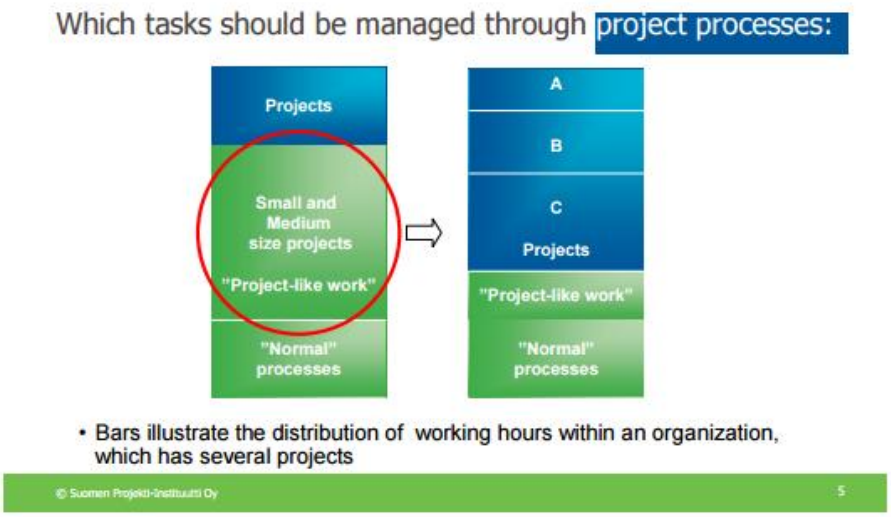


Figure 11. Distribution of work. (Haukka. 2013, 7.)

Figure eleven demonstrates the usual distribution of work and the division of tasks that should be managed through project processes. According to Matti Haukka (Haukka 2013, 7), very common situation is described on the left diagram, in which only large projects are being managed through project processes. Small and medium sized projects are not being given any management efforts. The right column presents a situation, in which the management effort is being divided according to project complexity classification. Project portfolio management should take into account all projects.

Project Institute highlights the importance of resource management as a key function of PPM. In their model, the targeted PPM maturity level can be discovered by estimating the PAP. The maturity levels defined by Project Institute Finland are discussed in more detail in chapter 3.2.7.The PAP number also has a purpose to awaken management to understand the need of project portfolio management. Targeted maturity level for an organization in relation to PAP (Haukka 2013, 9):

- Level 1: Awareness of ongoing projects = PAP 0-15%
- Level 2: The status and balance of project portfolio is known = PAP 10-25%
- Level 3: Resource management across all projects and other work = PAP 20-40%
- Level 4: Projects are prioritized in a systematic way = PAP 30-50%

- Level 5: Program and project orientated organization = PAP 45-100%

Matti Haukka (Haukka 2013, 11) discusses in his article the justification for project portfolio management. In his opinion, organizations that manage only a few projects at a time, would not benefit much of PPM. Instead, organizations that have 50% or more of the resources working in projects, the management and governance should be project-oriented. The benefits are shown especially in risk mitigation. The maturity improvement should occur as an implementing process, focusing on changes in project culture, time allocated to management, defining the success criteria and reward model for project work as well as overall project culture and competence development throughout the entire organization.

3.5.2 PPM checklist

Rajegopal, McGuin and Waller (2007, 229) introduce a brief project portfolio management (PPM) checklist for establishment and health check of PPM framework. The list consist of themes, which determine and evaluate the used processes, mechanisms and methodologies as well as how well they are understood and implemented in an organization. The themes of the key questions are:

- Alignment of business strategy and project goals
- Portfolio mix
- Project prioritization and selection process
- Project initiation and approval processes
- Roles and responsibilities
- The framework
- Estimation processes
- Resource pool and availability
- Project status
- Go/kill/hold/fix decision
- Key project and organizational interfaces

The questions aim at determining strategic alignment and process knowledge by revealing how well project teams are structured, are team members and project managers aware of their own roles and responsibilities in executing strategic goals, how teams make project estimations and how the resource needs are identified and planned. The mechanisms and criteria that are used for project selection, prioritization, scheduling, measurement and tracking are examined. The questions also enquire for mechanisms on portfolio level for determining the status of all projects, defining interdependencies with other projects, pro-

grams or other organizational processes and when project criteria should be evaluated in order to cancel a project. (Rajegopal et al. 2007, 229.)

3.5.3 Steps for improvement

An approach to maturity improvement process is described by Andy Murray (2015), defining steps with four questions:

1. Where are you today?
2. Where do you want to be?
3. How will you get there?
4. How will you know?

According to Murray (2015) the first question “Where are you today?” aims at understanding in which key process areas the organization currently performance well and what needs to be improved. The next question “Where do you want to be?” aims at defining the target level that suits best to the organization’s project and program type of activities. At this point it should be estimated how important the project type work is for the organization.

The third question “How will you get there?” should be answered by defining valid Key Process Areas (KPAs) that can determine what has been achieved. Each KPA should have an owner. KPAs should be road mapped and prioritized, initiatives for improvement should be collected and reviewed. An organization can answer the last question “How will you know?” by demonstrating the performance improvement. The purpose of improving maturity is to improve organizational capability, and it should be measured by collecting metrics. Key Performance Indicators (KPIs) demonstrate when the targeted goal has been achieved. KPIs demonstrate the ROI for capability investment – the value may be marketing value of achieved PPM level or the value may be the knowhow for how to reach another higher level of maturity.

PMI proposes four steps for portfolio process implementation and improvement (2013, 23):

1. Assess the current state of the portfolio management process
2. Define the portfolio management vision and plan
3. Implement the portfolio management processes
4. Improve the portfolio management processes

1. Assess the current state of the portfolio management process

PMI's proposal for the current state assessment would examine the existing processes and defining which processes are needed by the organization. It also takes into account the enablers and obstacles and their potential impact on process improvement in organizational or cultural context. The assessment aims at formalizing the portfolio management function. Some of the portfolio management related assessment activities proposed by PMI are listed below:

- Evaluating existing portfolio management knowledge (risk, performance, strategic management etc.)
- Evaluating how existing processes support the strategic objectives (portfolio management processes such as identification, alignment and prioritization of projects)
- Assessing portfolio management governance structure and evaluate capability of required competent resources
- Evaluating the current portfolio components' alignment with strategy and resource allocation versus resource requirements
- Performing a stakeholder analysis
- Reviewing the reporting processes

As on outcome of assessment, the portfolio managers could receive valuable information of communication requirements and hindrances that needs to be addressed, commitment from executive level and consideration of organization's vision reflected to portfolio management. (PMI 2013, 23.)

2. Define the portfolio management vision and plan

Portfolio management vision should reflect the organizational vision and value and clarify them to portfolio management plan stakeholders. The plan provides guidelines of how the processes and governance structure should be implemented in practice on portfolio management level. The plan should define efforts needed for portfolio management process establishment such as (PMI 2013, 24):

- Change implementation plan for changing organizational behavior. The plan should define how portfolio management team should apply leadership and management practices for implementing a change.
- Continuous development plan for improving portfolio management processes.

3. Implement the portfolio management processes

The third step is the organization wide implementation of processes, which requires effort from executive level and portfolio managers. The change of business processes requires long-term planning taking into account organization behavior, therefore the implementation should be well planned and started with definitions (PMI 2013, 24):

- Definition for roles and responsibilities
- Communication of the plan for the stakeholders
- Definition and implementation of processes along with training for employees and stakeholders.

4. Improve the portfolio management processes

The plan for improving processes provides objectives and metrics how to evaluate and measure improvement. The plan is a guideline for measurement and prioritization of efforts. Predefined metrics validate the achieved results as well as reveals the current level of performance. Documentation of process improvement and tracking changes also assist with improving current processes in a controllable manner. Portfolio management process improvement should take into account if there are interdependencies from other parallel processes for example project management processes should be aligned in order to receive reliable performance information supporting prioritization decision-making on portfolio management level. (PMI 2013, 25.)

4 Analysis of empirical research

The thesis aims at developing a method for measuring the current level of portfolio management maturity for PPS product line. A systematic measurement method, which refers to predefined criteria from project, program and portfolio maturity models, enables creation of an overall figure of organization's current capabilities and needs for improvement.

4.1 Specialist interviews

The interviews were recorded and notes of the interviews were written along the interviews. The language used in interviews was Finnish. The interview questions and notes of the completed interviews are an attachment of the thesis. The recordings are not being published. Interviews were conducted both with an individual and in a small group with the interviewees. The duration of the interviews varied from 60 to 90 minutes. The interviews gave practical information how the level of portfolio management maturity could be measured and specified but also gave hindsight which frameworks and standards are used in organizational project portfolio management. The key findings collected from the interviews are summarized in the chapter 4.2.

The interviewees represented persons that are or have been working with project portfolio related duties.

- Program Manager
    - Professional ICT program manager with experience and knowledge of leading large scale international programs. Program Management Office lead experience with a program portfolio size of 250 people. Gives lectures and speeches at project professional events.
- Program Manager
    - Professional project and program manager, business management consultant. Specialized in taking over and recovering strategic business development programs facing crisis or major difficulties.
- COO, Business Director
    - Business and operative management professional, experienced business unit and team leader, certified project manager.
- Director Business Development
    - Business director with variable business and operative management experience. Competence from roles of project manager, operational director, business unit director to vice president.

- Business Executive & Senior Advisor
    - Experience from various business executive positions, sales, marketing and strategic partnership professional, senior business development advisor.

The collected findings from the interviews are based on the gained knowledge and practical experience of the persons interviewed. The interviews have pointed out areas of development in portfolio management practices and exposed areas where portfolio management has been proved to be successful. Based on the interview discoveries the theoretical framework of the thesis have been iteratively reviewed and the factors affecting portfolio management maturity has been considered. The thesis have thus received additional value from practical perspective, with the intention of creating a portfolio management maturity level measuring method.

4.2 Summary of interviews

Leadership and top management commitment

The personal capabilities of a good leader were brought up during several interviews. A good leader must be:

- Approachable that employees should not be afraid to tell about concerns.
- A good leader is showing interest. For example technology can be utilized for displaying interest towards organization and staff, Yammer mentioned as one tool. Innovations, development ideas, problems are encouraged to be brought up and top management should use a corporation wide tool as one of the communication channels, because in practice it reaches the entire staff.

Some respondents brought up the importance on managing employee satisfaction as part of portfolio level activities, while other respondents did not feel that their own satisfaction at the organization had much importance for their performance at work responsibilities. Employee satisfaction was not clearly linked with leadership or management, but was acknowledged to have influence on entire organization's performance and was believed to be reflected in financial and quality measures as profitability losses and project schedule overruns.

Competence development and knowledge management

Competence development was seen as an internal investment. However, respondents did not recall that there was a measurement criteria for competence development that would qualify the return on this investment. Competence of the staff was seen as valuable asset

that would bring competitive advantage in the market and should be continuously improved.

For managing a portfolio, the capabilities of organization's resources must be known. When there are new projects in pipeline, portfolio level must know what kind of resources are needed and when as well as what are the competencies of current resources and when will they be available.

The realization of the goals reveals how well the company can take advantage of know-how and knowledge management as a management tool.

Resource management

Organizational resources are seen as a valuable asset. Small and mid-sized organizations cannot afford to have resources remained un-used, therefore the allocation is being reviewed on portfolio level on regular basis. Actual hours versus allocation is seen as a reliable and adequate measurement for resource management. One of the respondents mentioned that the changes in resource demand and supply are being forecasted six months in advance and the organization put continuous effort for reacting to changes before they have significant financial impact.

On a detailed level of resources management are competencies, whether the organization has certain kind of expertise. The most productive projects should be prioritized with expert resources, because according to a respondent, all business is based on the fact that the projects make profit.

Strategic management and alignment

Strategic portfolio plan was mentioned in an interview. The plan defines the initiatives for example for improvement of organization visibility. The visibility could be for example marketing visibility, technical competence visibility and visibility in social media campaigns.

The usage of strategic portfolio plan aligns the strategy with organizations' external and internal functions:

- Some projects could be selected based on strategic importance that is reflecting extended business thinking. For example, a project can be accepted to be finished with a zero margin if it is delivering a foothold in the Russian market. However, there should be a profound scenario for how the new market foothold can be obtained.

- Business and IT cooperation was often found ineffective and questioned by a respondent, which claimed that sometimes companies order work before they have applied funding for a project. In the respondent's opinion the IT project financing should not be IT department's budget issue, instead there should only be business cases that apply for business investment money separately from IT annual budget.

Sequential dimension and accurate timing for project implementation was brought up in an interview. It should be planned how the project will be interleaved, as postponing a certain project to next year does not necessarily pay off and create the currently expected benefits. Often good separate business cases pass thought, but mistakenly will be launched at the same time, when there are neither resources of finance for them.

Portfolio mix, selection and prioritization

A respondent claimed that portfolio management is a business management tool, which purpose is to ensure that the development work is aligned with strategy.

Portfolio Management is designed to ensure the realization of the expected business benefits of the selected projects.

- The respondent highlighted the importance of skilled management, which should have the courage, skills and ability of making use of the project results and harness them for achieving higher-level objectives. Portfolio optimization makes the selection which projects are being launched.

Appropriate portfolio mix is essential in order to secure market share when there are competitors that may develop advanced products.

- According to a respondent, a portfolio must have cash cows, which build financing for the future. If all organization's projects are only cash cows, there is a risk that competitors will create renewed products that replace the old ones. There should be development projects ongoing meanwhile a profitable product creates the current cash flow.

Cash flow should be adequate in relation to the investment capacity. Part of portfolio mix is also a conscious decisions whether an organization wants to cooperate with everyone, or do we they want to be profiled for example in a certain geographical area. Strategic dimension and demand management were mentioned during an interview, meaning an ability to pick the right projects based on documented selection criteria that organization is capable to deliver.

Valid measurement criteria

All of the interviewees mentioned a data quality as factor that is always under investigation. There should be on-time, up-to-date available data that ensures efficient portfolio level management and supports strategic decision making.

Usual problems and impact encountered with data quality were:

- Unsymmetrical data between closed opportunities and order backlog → An opportunity has been closed but the project is not visible in any other dashboard → Cannot be measured, managed and does not provide data needed by project and business or portfolio managers.

The impact of data quality could be seen in:

- Resourcing →forecasting and estimation accuracy
- Cash-flow. Frequent cash-flow is important for a small company. Costs such as salaries must be paid each month even though projects would not create cash-flow.
- Costs that project work is generating must be estimated in advance when negotiating contracts.

Key Performance Indicators (KPIs) are used in project level, but in portfolio level the measurement criteria is usually financial only. Project margins are aligned with the organization target margins. Employee performance is measured with personal goals that have other measurement criteria. For example learning new IT technology and knowledge sharing among the colleagues is expected, Sales activities may have different targets and measurement criteria. Some of the respondents found a discrepancy:

- Sales versus delivery. Increase in sales is not equal to increase in turnover. Sales phase estimations may differ significantly from actual. Also the projects could have been sold with minimal margin expectancy. Targeted sales KPIs may be achieved, but at the cost of delivery KPIs.
- KPIs should be comparable between different portfolio components, which are usually projects. The data provided may not be reliable and misleads to make unfavourable decisions.

Organizations may be managed in a very formal and structured manner, but it can differ from how the work in being accomplished in practise. There were problems arisen:

- Alignment from organization strategy does not reach the bottom line on operative and project execution level.

- The KPIs defined for project management are not aligned with program management and further with portfolio management.
- The KPIs are not compatible with each other. For example sales indicators cannot be reflected with the delivery. If the KPI requires more sales, the sales can be increased by dropping prices and the KPI numbers look better. However, the actions may arise problems with delivery as there are too many projects that have not been resources nor scheduled to match with the increased sales. So to say, the storage is empty. Problems arise easily if the inequality is not known and detected.
- KPI construction is problematic, but quality professionals were told to be better with identifying inequalities in data quality. However, it was seen troublesome and time consuming for one person to implement a change in an organization.

There cannot be a reliable measurement of the benefit for the organization if the sales pipeline and closed opportunities differ heavily from the delivered value. The benefit realization and monitoring was mentioned as a top management task. Sometimes, the benefit may be placed in longer time period.

An interesting point of view was presented in an interview. It was suggested that sometimes measuring begins to lead the operations to the wrong direction. An example of sales bonuses versus delivery capability was given. In a company where sales bonuses that would be dependent on a number of sales, could lead to a rapid change in sales figures, which would not take into account the company's capability to deliver what has been sold.

- In portfolio management it should always be known what happens to projects timely and financially.
- A respondent proposed, that every meter should have a balancing counter meter, sort of like double entry bookkeeping.
- Measurement should not provide numbers only, but rather give direction, because the meters are rarely perfect.

Part of measurement is to calculate the return on investment, but according to a respondent, creating a valid measurement criteria base on facts instead of gut feeling is hard. Calculating ROI for one million euros investment is difficult. The time scale for ROI could be several years, but a calculation for value generation for the next year would visualize some trends.

Harmonized methods

In order to receive quality data to guide portfolio level decision making, the organization must have harmonized working methods which ensure that for example hours are reporting in a similar way.

Communication

Communication is most likely never adequate and fail at some extent. Reference to Osmo A. Wiio's statement about communication was presented during an interview; "Communication always fails - except by accident (Wiio. 2016.)". Communication plans exist but they are not created to meet the needs of the organization or meet the advanced technology. Also communication often drowns in the used communication channels. Used solution to the problem has been repetition in different channels, however it is challenging to ensure that the content will remain the same and does not modify along the repetition process.

According to the interview respondent's opinion, corporate communication does not reach all of the employees, which was assumed to be lack of employee proactivity. The proactivity was supposed to be a common factor because approximately half of the employees were able to find the essential information and the rest were often giving feedback that they are not being informed on topics that they find important.

Communication is related to resource management. One respondent claimed that customer organization's incapability to manage resources leads to communication problems. As the customer organization does not allocate resources for their projects, the supplier has no one to communicate with about urgent and important issues.

Measuring maturity

Interviewees provided hints for studying portfolio management maturity from a theoretical point of view. CMMI and SAFe were frameworks that were suggested. Keeping mind on strategic alignment and portfolio optimization were thought to be essential as one respondent stated that "to a certain degree the operations can run on their own level, but at some frequency the layers must be synchronized.

To measure the maturity a questionnaire was suggested to be an effective tool. A number of questions would be presented to interviewees and the results would be collected in a report, which would reveal the current stage of maturity and give a viewpoint for which areas could be improved. Would be then another matter if the company has process professional top management and discipline to accomplish things in a profitable manner.

Benefit of a measuring method would be that the maturity could be measured quickly and provide some high level suggestions for improvements, but fixing things should be planned case by case.

5 Synthesis

As a result of the thesis, there were various theoretical contribution created. Portfolio management in this thesis is referring to an organization that have project type of work. Thus there is no distinction between terms project portfolio management and portfolio management. Figure 12 describes the theoretical input delivered within the synthesis.

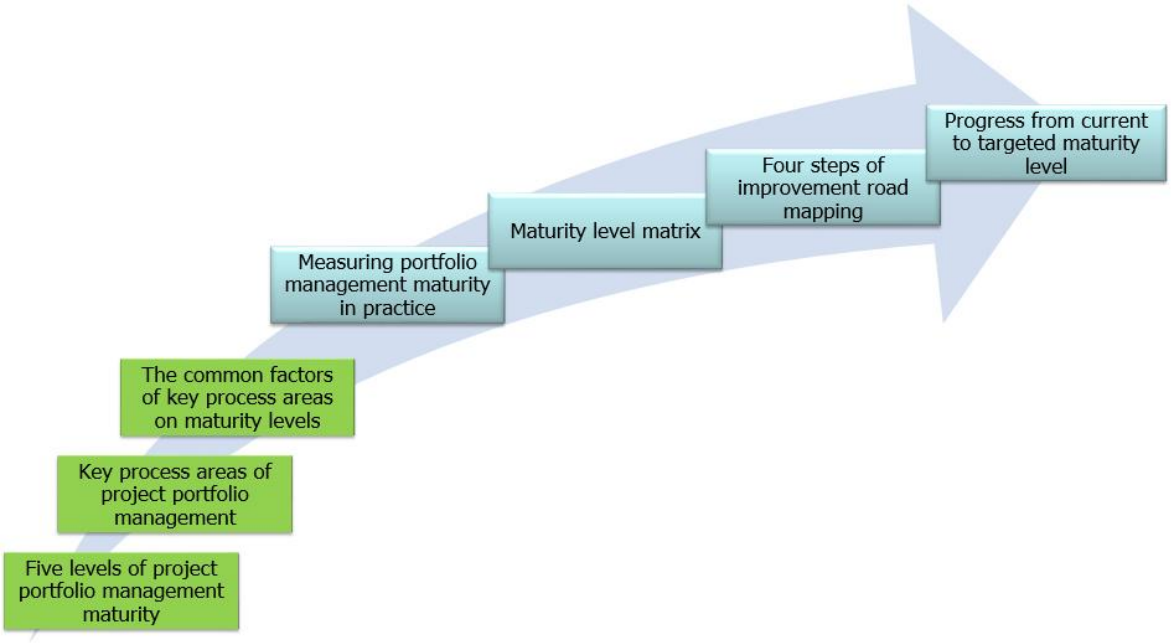


Figure 12. Thesis results.

The five levels of project portfolio management maturity has been defined in the synthesis. Key process areas illustrate how capable the organization is at implementing project portfolio management. Reviewing the organizations capability with common factors in each key process area, reflects current performance level of the organization.

The level of performance in each key process area can be discovered by measuring portfolio management maturity in practice and a given value determines the level of maturity. Therefore the organization may gain different level of maturity in each key process area in the Maturity level matrix and may prioritize the capabilities which need to be improved.

An organization can utilize four steps of improvement road mapping for determining which Key process areas are essential to be improved and demonstrating what initiatives have been achieved. The success of achieved KPAs can be measured with determined Key Performance Indicators (KPIs) that demonstrate when the target level has been achieved. KPIs may also demonstrate the return on capability investment. The thesis provides high level guidelines how to progress from current level to targeted maturity level.

5.1 Five levels of project portfolio management maturity

A model for five levels of portfolio management maturity is presented in figure 13. The current maturity level can be measured with common measurable process areas for each level by specifying how well the organization is performing in a certain area.

Figure 13. Five levels of portfolio management maturity.

The five levels of project portfolio management maturity are adapted from Gartner program and portfolio maturity model and Lee Merkhofer Consulting's five levels of project portfolio management maturity model. They presented different maturity levels systematically, defined relevant processed areas and their common features that can be examined when specifying the maturity level. The models also provided suggestions for improvements.

Five levels have been chosen to determine the created maturity model in this study. All of the researched maturity models determined five different maturity levels. Five levels of hierarchy of knowledge described in chapter 3.3.5, support the five level classification of as well. Reflected with hierarchy of knowledge, maturity levels are after all, transferring information into knowledge and further to organization wide wisdom. Five different levels provided adequate amount of comparative factors that clearly distinguish levels from each other and helps the measurement of maturity.

The purpose of the portfolio management maturity model is to:

- benchmark organization's portfolio management capabilities
- determine where organization is currently performing well
- define which areas organization could perform better in order gain value for the capability improvement

An organization may have capabilities in each maturity level, depending on the process area. Therefore it is not necessary to place the organization on a single maturity level. Instead it is more beneficial to investigate organization's performance on different portfolio management areas and determine what should be improved in each area, in order to

carry the organization to higher level in areas which bring the most value to the organization.

The progress to higher levels of maturity requires effort and commitment from organization and its resources. Some capabilities can be improvement in short-term basis, but reaching a higher maturity is a long-term process.

5.2 Key process areas of portfolio management maturity

The common key process areas for each maturity level define how capable the organization is deploying portfolio management. By reviewing the organizations performance in each key process area, the maturity level can be specified.

The researched maturity models referred to process areas that are similar to Project Management Institute's standard for portfolio management, which has been selected to form the baseline for the key process areas on maturity levels. The standard for portfolio management provides quidelines for process oriented management in which different kind of documented processes are linked with each other through interdependecies. As an example, a change in organization's resource allocation method must be communicated further to accurate stakeholders. Communication management is therefore linked with Performance and resource management, as communication management defines the communication plan, channels for communication and takes into account the role of stakeholders which should be informed.

The researched portfolio management maturity models considered various process areas, but offered alternative approach for PMI's theoretical framework. The maturity models originated from authentic portfolio management processes, in which ways of working have been invented, tested and standardized. The maturity model approaches have been repeatably applied in organizations and reproduced to advanced new models.

The most common origin to portfolio maturity models has been Capability Maturity Model (CMM), that introduced linkage between quality of work and development processes. It also presented identification of maturity of processes in an organization. However the models refined from CMM, appeared to be more sophisticated. SAFe is an excellent framework to utilize, when ensuring that agile development work remains aligned to the strategy. However SAFe should not function as a single guideline for portfolio management, as the framework's the main function on portfolio level place at investment decisions and value stream funding. Portfolio management is more than that and there should

be a comprehensive capability to manage various process areas, financial issues included.

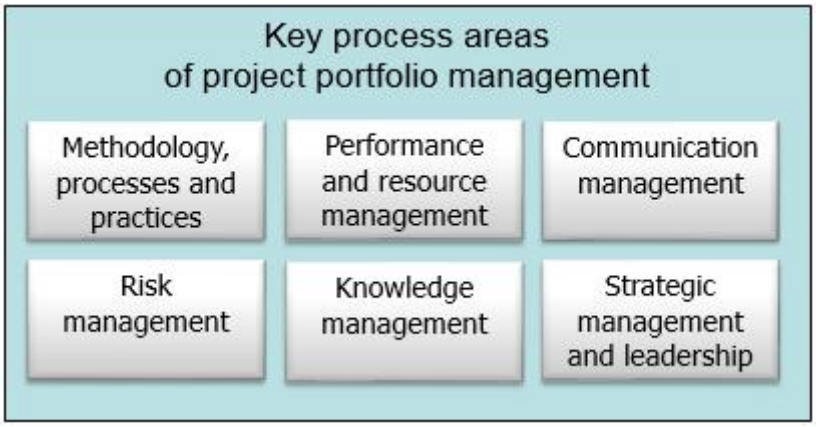


Figure 14. Key process areas of project portfolio management.

The key process areas are listed in the figure 14. They represent the most influencing capability areas of portfolio management:

- Methodology, processes and practices define the operative framework of portfolio management. It describes the degree of standardized processes and how well they are supporting organizational strategic objectives.
- Performance and resource management are the key management functions as portfolio management is responsible for prioritizing projects and managin resource requirements both proactively and reactively.
- Communication management is essential as portfolio management is performing as an intermediate level contact point between executive and operative level. Portfolio management must take into account different stakeholders and provide adequate, accurate and timely information to ensure that organizational strategic initiatives are creating value to the business.
- Risk management requires proactivity and capability to foresee risk propabilities as well as prepare risk mitigation plan.
- Knowledge management facilitates continual improvement and supports learning organization by ensuring that lessons learned are collected, documented and utilized for improving performance.
- The theoretical framework study and empirical research revealed that leadership has a remarkable role for how portfolio management practices are implemented and accepted in an organization. Leadership have been brought up in maturity models as well, but the interviews gave out actual examples why leadership has an important role with successful portfolio management. Therefore leadership has

been taken to the key process areas, but is an interdependent part of strategic management. Portfolio management must be able to translate organizational vision and mission into manageable strategic initiatives, such as project type of work and lead the work of resources in a manner that it fullful the expected benefits.

5.3 The common factors of key process areas on maturity levels

For each maturity level and key process area there are a collection of common factors, which have been adapted from the researched maturity models. Capability Maturity Model (CMM), IPMA Delta Module O and Office of Government Commerce's P3M3 models describe very similar features, but alike Project Institute Finland's maturity model, they are very simplified and focused more on project management processes instead of portfolio level practises. In Project Institute Finland's model project portfolio planning and management are presented as an administrative function, which purpose is to collect data. Their approach is similar to PMI's triangle model, with the exception that PMI considers strategic planning to be part of managing a portfolio. Project Institute Finland's maturity model is limited on resource management, while in comparison other maturity models find resource management as one of the processed areas in maturity improvement. The common factors presented in this chapter, describe the collective features of capabilities needed for successful portfolio management. The degree of usage of standardized processes and organization wide capabilities define the level of maturity.

The common factors for each key process area on particular maturity level are described in more detail in the tables listed below. The tables consist of maturity levels that each can be defined with key process areas. An organization may utilize the model for benchmarking, by inspecting its current capabilities in different key process areas.

Methodology, processes and practises	
5. Capability innovation	• management processes are continuously used in all project, program and PMO activities • change management maximize benefits • technology is facilitating strategic planning • quality data used for continual improvement

4. Adjusting integration	• standardized and documented processes and tools aligned with organizational strategy • logical and systematic business processes • quantitative analyzing methods in use
3. Value assessment	• standardized and documented processes used for measuring project benefits • portfolio and project metrics and tools in place • impacts of changes evaluated and managed • tools and technology do not support quantitative analysis
2. Developing fundamentals	• standardized, repeatable processes on project level • PMO, some supportive functions and basic PM tools established • portfolio management responsibilities established • regular project data collection integrated on portfolio level– data quality not adequate for value management
1. Responsive basics	• no regular portfolio management processes in use • basic PM tools used by single persons (e.g. MS excel)– data not available on portfolio level • changes are not being managed nor tracked and lead to project cost/durationn overruns on project management level

Table 1. Methodology, processes and practices.

Performance and resource management	
5. Capability innovation	• value adding decision-making in line with strategic objectives for funding and resource allocation • resource and capacity requirements proactively managed organization wide • roles and responsibilities fulfill their expected outcome • resource management is integrated with HR along with competence requirements
4. Adjusting integration	• resources and performance proactively managed and controlled • resource pools utilized globally for allocation from multiple locations • resource and capacity allocations versus actual outturns are being monitored • value model supports decision-making

	• value and benefit creation is being monitored
3. Value assessment	• roles and responsibilities clearly documented • career paths established • performance is being monitored, forecasted, audited • capability for resource planning
2. Developing fundamentals	• resource requirements not proactively managed • resource allocation monitored on portfolio level • no project forecasting and and regular performance management
1. Responsive basics	• some project type of work • some financial monitoring → cost tracking at project level by project manager • no real-time and up-to-date data available • roles and responsibilities are not defined • no control over resource allocation - shared resources over-committed among projects

Table 2. Performance and resource management.

Communication management	
5. Capability innovation	• effective and proactive stakeholder cooperation • regular reporting practices generating data for portfolio level decision-making • portfolio level communication to correct interest group of e.g. in project selection and prioritization
4. Adjusting integration	• efficient and timely stakeholder communication • cooperation between internal and external stakeholders
3. Value assessment	• project dependencies recognized, communicated and managed • efficient communication from project to portfolio level • support is available for PMs when requested
2. Developing fundamentals	• program level management used for managing project interdependencies • business and IT relationship unsteady, lack of communication leads to overlapping projects benefits and resourcing conflicts

1. Responsive basics	• project interdependencies are not recognized and communicated • Information is shared locally and ad-hoc

Table 3. Communication and relationship management

Risk management	
5. Capability innovation	• risks fully managed • risks mitigated in order to ensure value creation for business initiatives
4. Adjusting integration	• risks identified, evaluated, prioritized and managed based on standardized practices • risks have owners • organization's tolerance for risk assessed
3. Value assessment	• risks are being identified and managed • risks are tracked based on standardized practices
2. Developing fundamentals	• risks identified and evaluated in all projects but not followed up and managed • no portfolio level risk mitigation
1. Responsive basics	• risks identified in some projects but not followed up and managed • risks are not managed on portfolio level

Table 4. Risk Management.

Knowledge management	
5. Capability innovation	• organization wide mature competence in portfolio management aims at high quality performance on operations and markets • continuous improvement as a process in use • learned lessons are collected and used for knowledge and skill improvement • training programs established • innovations are encouraged

4. Adjusting integration	• knowledge share is organization wide • knowledge management process and tool in use, enabling organization wide knowledge share, templates and advice available in the tool • individual competence development, regular training and support
3. Value assessment	• knowledge and understanding of portfolio management transferred to project level • individual performance improvement, training
2. Developing fundamentals	• knowledge sharing partially – not organization wide • some formal channels for knowledge share
1. Responsive basics	• learned lessons are not collected or shared • knowledge share is local

Table 5. Knowledge management

Strategic management and leadership	
5. Capability innovation	• project portfolio management defines the ways of working • competent portfolio managers understanding influence of management processes • proactive planning and forecasting targeted at business sustainability • business initiatives value estimated and tracked in order to ensure return on investment
4. Adjusting integration	• portfolio usage optimized • valid and measurable model for value estimation, resource allocation, project prioritization • top management commitment • consistent, quality data used for proactive decision-making
3. Value assessment	• proactive decision-making based on quality data • business cases analyzed and approved on portfolio level • ability to choose right mixture of value adding projects that create return on investment • project prioritization according to benefit-to-cost ratio

2. Developing fundamentals	• single projects are aligned with strategy • projects collected in portfolio database • project prioritization forced by resource over-commitments • business cases analyzed for some projects • business value not profoundly defined - overlapping business benefits in projects • data used for scheduling ongoing operations – not for planning
1. Responsive basics	• strategy is not aliged with projects • modest business case analysis for projects • lack of detailed business benefits presentation • no selection criteria →selection of projects decided case by case • budgetary estimates made for few projects • no visibility on portfolio level – separate project funding and steering

Table 6. Leadership and strategic management

The common factors in key process areas generalize, what are the typical capabilities and how organization perform on each maturity level.

5.4 Measuring portfolio management maturity level in practise

A measuring method for portfolio management maturity level has been created for PPS services as a confidential part of the thesis. The method consists of a multiple choice questionnaire, in which the questions intend at defining the current degree of organization's capability on a certain portfolio management key process area.

The questionnaire can be utilized for example in the form on a webpropol survey, enabling a quantitative approach for examining organization's portfolio management maturity assessment. A wider mixture of respondents from an organization provides a good perspective how employees in different roles and positions find portfolio management realization in their organization. The questionnaire also reveals the respondent's familiarity of portfolio level management to some extent. For a larger sampling of respondents, a weighted average from results places the organization to a certain current maturity level.

The key process areas follow the synthesis of the thesis and the questions in a questionnaire are related to the six areas:

- Methodology, practises, processes and practices
- Performance and resource management

- Communication management
- Risk management
- Knowledge management
- Strategic management and leadership

The five portfolio management maturity levels have been described as an outcome of the theoretical framework of the study. The measurement method assists with classifying which level the target organization currently positions oneself. The method helps also with identifying the targeted level of maturity that fits to organization's business purposes, taking into account organizational capabilities that could be enhanced and improving effective use of portfolio management practises.

The method focuses on common areas of portfolio management methodology and processes, current project management practices and project controlling, PMO function, resource allocation methods, financial and performance quality monitoring along with data collection and analytics, strategic management and leadership, communication management, risk management, change management, knowledge management and continuous improvement.

The questionnaire results represents an overall depiction of organization's level of capability and understanding of portfolio management, current practices, hindrances and areas of development as well as helps constructing an approach for improving portfolio management competency.

5.5 Maturity Level Matrix

Organization's capabilities may differ between key process areas. Therefore an organization's maturity level may vary depending on process area. Table seven demonstrates a maturity level matrix, in which the maturity levels are presented on top horizontal row and evaluated key process areas on vertical axis. An average maturity number describes the organization's overall portfolio management capability.

Maturity Level Matrix	1. Responsive basics	2. Developing fundamentals	3. Value assessment	4. Adjusting integration	5. Capability innovation
Methodology, processes and practices			3		
Performance and resource management			3		
Communication management		2			
Risk management	1				
Knowledge management		2			
Strategic management and leadership			3		
Average Maturity Level 2					

Table 7. Maturity Level Matrix.

In table seven, an organization has been specified to have portfolio management maturity level three in three key process areas. The organization has established standardized processes that are in common use. Portfolio metrics are set and regular data collection supports strategic portfolio level decision-making by providing top quality data. The organizational resources and capacities are monitored and managed on portfolio level. Resource requirements are planned and managed. Business cases are analyzed and approved on portfolio level in order to create value for business. However value creation is not being tracked and return on investment cannot be ensured at third maturity level. The organization has been specified at level one in risk management. An organization may identify risks, but does not have management process to support evaluation of risk impact and probability against the organization's tolerance.

Maturity level two has been identified for communication and relationship management as well as for knowledge management and continuous improvement. Organization at this level does not gain advantage for knowledge share, as it occurs locally instead of organization wide and lessons learned cannot be utilized repeatedly. Project interdependencies have been recognized and they are being managed at program level, but not on portfolio level. The portfolio level cannot thus react proactively for realized risks that for example resource over-commitment of shared resources has created for projects. At level two business and IT do not recognize themselves as trusted partners. IT does not function at

its best as a business enables and business does not have overall understanding of IT's current capability to deliver services.

The Average Maturity Level tells where the organization is in overall maturity level analysis. Even though the organization has capabilities on level three, improving some key process areas could bring advantage to process efficiency and enhance business value creation. The more important than looking at the average value, is to focus on the areas that scored the least, but also improving the higher level areas can be useful, as long as keeping in mind which key process areas are the most important and useful to the organization.

5.6 Proposal for portfolio management maturity improvement

This proposal aims at providing high level guidelines for **what**, **when** and **how** a higher level of portfolio management maturity can be achieved. The guidelines are adapted from Project Management Institute and Andy Murray, which both provided similar approaches for mapping the improvement process. The guidelines support the progress of moving from lower to an advanced maturity level.

5.6.1 Four steps of improvement road mapping

Four steps are proposed for road mapping in order to improve the project portfolio management maturity from a lower level to an advanced level. The steps consist of definition for current maturity level, setting target for advanced level, implementation of improvement roadmap and continual improvement after achieving the targeted level. Measurement by collecting metrics is important in order to demonstrate the value of the effort.

Project Institute Finland's (Haukka. 2013, 7.) project allocation percentage (PAP) applies to this study for evaluating the importance of project portfolio management in an organization. PAP reveals the relative percentage of organizational resources allocated in project, program and portfolio management work. The bigger the number, the more important it is for organization to put effort on management improvement on portfolio level as project type of work is always more challenging and prone to risks. The portfolio management maturity level classification defined by Project Institute Finland is modest compared to several other models, but PAP estimation is applicable for determining the percentage that offers guideline for defining the targeted maturity.

Figure 15. Four steps of improving portfolio management maturity level. (Adapted from Murray, A. 2015 & Project Management Institute 2013.)

Figure 15 describes the four steps and implementation of the steps is described in more detail in the table eight below.

Current level analysis	• Define where the organization's project portfolio management processes (e.g. identification, prioritization) are at that moment on the scale of five levels of maturity* and how well do the processes support strategic objectives. • Understand in which key process areas the organization currently performance well and what needs to be improved. • Evaluate existing portfolio management knowledge and identify needs for improvement (risk, performance, strategic management etc.) • Evaluate governance structure how well it fit to effective decision-making • Review current portfolio management roles and responsibilities • Evaluate current portfolio components' alignment with strategy and reflect them to resource requirements • Implement a stakeholder analysis and reviewing the reporting procedures *A method for specification of current maturity level has been created in this thesis for PPS product line. The method has been described on high level on chapter 5.3.
Definition of target level	• On the second step the organization set a target which level they want to be. • The target level: o Suit best to the organization's needs according to the extent of project and program type of activities. o Reachable in terms of capability of the organization to accept the needed changes. • The target level should demonstrate the importance of project

	and program type of activities for the organization's performance. o The highest level does not necessarily fit to purpose to everyone. o A smaller organization that has little project type of activities might not gain value for implementation of all processes on level five. • Project Allocation Percentage (PAP) describes the relative value of project work for organization. Based on the percentage, the management can determine the demand for maturity improvement. PAP value can be measured by making the division of working processes between project work and non-project work and estimate the resource allocation for both. (Haukka. 2013, 6.) The percentage is a recommendation for target level. o PAP 0-15% → Level 1 o PAP 10-25% → Level 2 o PAP 20-40% → Level 3 o PAP 30-50% → Level 4 o PAP 45-100% → Level 5
Improvement implementation	• For verification that the target has been achieved, the implemented improvements should be measurable. • The organization determines improved Key Process Areas (KPAs), which reveal what has been achieved. o Each KPA must have an owner. o KPAs are road mapped, they are prioritized and initiatives for improvement are being collected and reviewed.
Continuous improvement	• The fourth step aims at continual improvement and increasing capability of the organization • The improvement of organization's performance should be measured by collecting metrics. • Key Performance Indicators (KPIs) reveal when the target has been achieved o KPIs demonstrate the return on investment (ROI) for maturity level improvement process as a capability investment. o The value of the capability investment may be for exam-

	ple marketing value of achieved maturity level, when the organization is benchmarking it with other companies' maturity level. The value could also be in the form of knowhow of what is needed for reaching higher level of maturity.

Table 8. Improvement step descriptions.

The steps may be repeated when defining what should be achieved for reaching another higher level of portfolio management maturity.

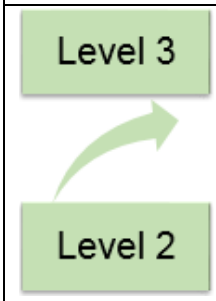
5.6.2 Progress from current to targeted maturity level

Equally important as defining the measurement criteria for improvement is to create an implementation plan for **how** to achieve the targeted results. To move to an advanced level, an organization should focus on improvement on the key process areas described in chapter 5.2. The table nine below describes focus areas that an organization could concentrate on when moving from lower level to a higher one.

Suggestions for maturity improvement progress	
	**Methodology, processes and practices** • When reaching the level five, the organization has established repeatable processes. The focus is on continuous innovation, that ensures that processes fit to purpose also when the organizational environment changes. **Performance and resource management** • On level five the organization has efficient resource management, has KPIs that are measurable and provide up to date data for strategic planning and portfolio management purposes. • The focus is on ensuring continuity of quality data, efficient forecasting of resource and capability future requirements and maximizing the utility rate of resources and capabilities. • Continuous interaction with human resources would assist with fulfilling competence requirements. **Communication management** • Communication management is focused on efficiency on stakeholder communication, but continuity effort should be put on regular report-

	ing practices. Reporting should support decision-making. **Risk management** • Risks are fully managed and evaluated. At level five risk mitigation should be continuous and organization wide. **Knowledge management** • Knowledge management emphasizes continuous improvement at skills and capabilities in order to maintain the maturity that match with the strategically important competence requirements. **Strategic management and leadership** • The organization is capable for strategic planning at forecasting future trends and make decisions in advance that benefits the business in long term. • At a changed situation the top management should define **what** is going to change in organization and **when** the change is being implemented. • Strategic planning should take into account predictability and probability of business affecting changes and have ability to react to rapidly. Organizations leadership plays to the strategic role of **how** the change is being alignment throughout the organization.
	**Methodology, processes and practices** • At level four, the organization should ensure continuous use of established management processes at all project, program, PMO and portfolio management type of activities. • Technology should support efficient use of standardized practices. • Change management should concentrate at maximizing business benefits. **Performance and resource management** • Organization wide resource pools used for allocating resources and maximizing utility rate, integration with human resources would ensure competence development. • Performance and allocation monitoring and controlling on portfolio level would ensure cost-benefit ratio. **Communication management** • Improving the level four communication should be focused on effective and proactive stakeholder communication that is timely right. • The cooperation between internal and external stakeholders should be encouraged and managed. Also correct interest groups should be

	identified, especially when projects related decision are made and should be communicated further. **Risk management** • Risks are monitored and evaluated at level four, but for reaching the level five an organization should focus on risk mitigation by identifying suitable responses to risk, implement these responses, gain assertion about effectiveness, embedding and reviewing the process. **Knowledge management** • There are established processes, channels and tools, and organization wide knowledge share is efficient. The gained knowledge should be harnessed to training programs. **Strategic management and leadership** • At level four an organization should take advantage of already competent and committed top management, and bring the organization to level five by driving sustainable strategic planning. Measurement models support the analysis of current practices and capabilities, therefore the effort should be put on forecasting the future, and how strategic objectives apply with upcoming market trends.
	**Methodology, processes and practices** • Standardized portfolio management tools and processes should be aligned with strategy. For example collected data should support decision making and quantitative analysing method should be used. **Performance and resource management** • At level 3 the organization has reached the maturity of applied portfolio management processes and practices. By moving up to fourth level, the organization may take advantage of the established processes and start contributing value and benefits to business by evaluation and reaction to the becoming resource requirements. **Communication management** • At level three project interdependencies are managed and communication flows between portfolio and project level. For reaching level four, the organization should have stakeholder analysis and identify which stakeholders should be contacted and when. **Risk management** • Risks are already identified and tracked, but organization would gain value for improving risk management with risk prioritization and evaluating risk tolerance.

	Knowledge management • At level three the portfolio management understanding has been shared with project level, but should be further made aware in entire organization. • Individual competence development should be supported by establishing knowledge management processes, tools and templates. **Strategic management and leadership** • Advancing from level three to level four, strategic management should start to utilize the generated quality data at value measurement.
	**Methodology, processes and practices** • Validating standardized portfolio level process for selecting, evaluating and prioritizing projects would take organization to higher level of maturity. • Project benefit measuring should be documented and standardized. **Performance and resource management** • At level two the organization should establish advanced tools for enhanced data collection as well as improving reliable project budgeting and cost accounting • Resource management should be improved by reacting proactively to resource needs and avoid over-commitment. **Communication management** • If organization wish to proceed to level three, the portfolio level management practices should be recognised at level two. Portfolio practices would enable alignment with strategy by communicating the strategic objectives to project level, and would for example create regular communication flow between IT and business, establishing trusted partnership. • Project and program type of management activities would be supported by open communication defining objectives as well as providing guidance. **Risk management** • At level two, the organization should improve tracking of risks. • Establishing standardized practices would benefit the organization managing risk on portfolio level. **Knowledge management** • At level two there are some channels provided for knowledge share.

	The channels and tools should be made easily available organization wide. • Also attention should be given to the format of knowledge, which should be easily accessible and would support individual learning. • Portfolio thinking should be made transparent to project management level. **Strategic management and leadership** • Moving to higher maturity level from level two, an organization should put effort on collecting the projects under a portfolio. • Business case analysis should be done to each project, and value should be defined. • Collected data should be used for strategic planning.
	**Methodology, processes and practices** • Organization's focus should be on project management level process improvement. The improvements should aim at standardizing project management activities in order to have consistent, repeatable processes for project scheduling, resource allocation. **Performance and resource management** • Costs should be tracked at the project level, and project proposals should be supported by clear statements of the need and presumed project benefits. • In order to facilitate project decisionmaking, projects should be consistently defined to include all of the efforts necessary to secure the benefits that motivate the work, with project work broken into activities and tasks as necessary to faciliate planning. • An organization may find the need for improvement from an external factor such as market change that leads to a change in demand. **Communication management** • On lowest level of maturity an organization has not understanding of project interdependencies, which may lead to resource and schedule over-commitments. Program management understanding would enable effective communication between interlinked or overlapping projects. **Risk management** • For aiming higher maturity level, an organization should define a framework, identify the risks, identify probable risk owners and evaluate the risks.

	Knowledge management • An organization would have potential for advanced maturity by encouraging open communication and provide channels for knowledge share. **Strategic management and leadership** • From the basic responsive level of maturity, an organization could rise by establishing basic portfolio management disciplines such as defined method for business case analysis. • Budgetary estimated should be done for each projects and funding should be applied after business case acceptance. • Selection criteria should be documented, in order to choose projects that are aligned with strategy and will create value for business.

Table 9. Suggestions for maturity improvement progress.

Alike skills and capabilities, the highest level of maturity is not a permanent state. Organization and business climate changes, for example new technology requirements and changes in competitive field require adaptation to a changed situation. The processes and metrics may need to be re-engineered to fit better with the needs of the business.

6 Conclusion

Conclusions of the research are discussed in this chapter. Research was conducted for Tieto Practical Project Steering (PPS) services. Thesis aimed at identifying what factors affect portfolio management maturity, creating measurement method for PPS and providing development suggestions for maturity improvement.

Usefulness and working life relevance

PPS services is the primary beneficiary of the thesis. The focus was on PPS service's possibility to use the method for receiving quantified versatile responses from customer organizations. By using the method, the responses would be mutually comparable and generate value of current maturity level on each key process area.

Organizations that would be evaluated with the measurement method, could have advantage from the study as secondary beneficiaries. By measuring the level of portfolio management maturity, and organization could benchmark own maturity level, define areas that could be developed and plan improvement activities.

The theoretical framework compared different maturity models and reflected them with standardized practices and factors affecting portfolio management. The research highlighted the benefits of mature portfolio management practises to entire organization, as portfolio management is not an isolated function but interdependent with strategic level and project level.

Qualitative interviews provided practical relevance to compilation of theoretical framework and synthesis. The collected data was recorded, but only notes were published. Findings were summarized and utilized for synthesis. The iterative process allowed agility for research process, as the gathered theory could be tested by reflecting theoretical framework with the interview findings. It was proved that the collected theory corresponded with the practice that interviewees brought up. Interviewees suggested additional research areas within the thesis topic as well as opened up their knowledge of benefit measurement practices, which are interlinked with portfolio management measuring methods.

Research results

The end result, maturity measurement method, was created and met the needs of the PPS services. As by-products of the thesis, there were other theoretical and practical contribution created:

- The concept of the maturity evaluation
    - Maturity level classification
    - Key process area definition
    - Common factors description
    - Maturity matrix
- Steps for maturity improvement
- Maturity level improvement proposals

Research questions were replied comprehensively in the research. The created theoretic substance was rationally explained.

What factors affect project portfolio management maturity?

- Thesis identified different factors and ended up with key process areas that were based on maturity model descriptions, PMI's standards, other theoretical sources and interview findings. The key process areas described the central elements of portfolio management practices, which are needed for ensuring strategic alignment. Key process areas were presented and discussed in chapter 5.2.
- In more detail, the common factors of each key process area were described in the synthesis in chapter 5.3.

What are the maturity levels of project portfolio management that are meaningful in practice?

- Several frameworks were studied, compared and features selected in order to compile a theoretical substance that collaborates best with the created portfolio management maturity measuring method. Five levels of maturity were commonly accepted model in maturity frameworks, therefore the five level model was suitable for this research. There were remarkable differences in maturity models, especially how they defined the organizational capabilities in each level. The created maturity level classification presented in chapter 5.1 combined different elements from various sources, in order to have a consistent structure where measured capabilities can be positioned.
- The practical components of maturity levels were presented in chapter 5.3, in which the common factors of key process areas were described. The common factors were pointed out level by level.

How portfolio management maturity can be measured?

- A measuring method for portfolio management maturity was created and attached in the thesis as separate confidential attachments. The attachment three formulated a

questionnaire that could be used for customer purposes. The attachment four provided measurement criteria and attachment five an example of calculation of weighted average for multiple respondent survey. The method was reviewed, evaluated and accepted by the beneficiary of the thesis, PPS services, which had a strong interest at utilizing the questionnaire as a webpropol survey in practice.

- During the compilation of the measurement method, the thesis sponsor from PPS services proposed that the method would fulfil its purpose best if it was in a form of a questionnaire survey that could be sent out to an unlimited number of respondents. The method was further developed during the research, to match with the maturity level classification and key process areas.
- The measurement method generates a weighted average value for each key process area. Together the maturity levels and key process areas form a maturity matrix described in chapter 5.5. The weighted average values can be placed in the matrix, which demonstrates an overall picture of current portfolio management capabilities in an organization. An average maturity level in the bottom of the matrix tells a general level of maturity, nonetheless it has been highlighted that the importance is on improving the exact capabilities that are important to the organization in project type of work and portfolio level management.

How the current level of portfolio management maturity can be improved?

- Steps for improvement were listed in chapter 5.6.1. The steps were adapted from two theoretical source. They help an organization to plan the process from evaluation of current maturity level, to defining targeted level, implementing the planned changes and maintaining the continuous improvement in its gained capabilities.
- High level improvement suggestions were provided in chapter 5.6.2. However the final improvement plan should be evaluated case by case, and ponder which development actions bring the most value to a certain organization. Therefore there is no simple common plan that would suit to every organization when reaching a higher portfolio management maturity level.

An organization may have documented standardized practices, but the more important is that the common ways of working are deployed and understood throughout the organization. By implementing efficient portfolio management processes, improving strategic alignment and maintaining organization wide communication, the employees working related to project type of activities would have better understanding how prosperous project delivery is linked to organization’s measures of success.

The overall advantage of improving portfolio management is to maintain and develop processes, which enhance efficiency and cost savings in operations and business benefit creation. Mature portfolio management aligns strategic objectives to the actual program and project work and ensures the realization of expected business benefits.

As a conclusion can be disclosed that portfolio management maturity is interdependent with strategic alignment throughout the organization and organization's capability at executing strategic objectives. The portfolio management maturity levels define the degree of how sophisticated the established processes are and how well they are implemented and acknowledged in the organization.

Validity and reliability of the research

The thesis avoided to provide suggestions for maturity improvement, which would be based on theoretical sources only. Variable theoretical sources were exceedingly alike and repeated similar improvement suggestions. Instead the aim was to bring perspective besides of the theory, what has already been done and what is efficient in practise. The interview findings were used as a verification method and supportive secondary source, providing valuable in-depth knowledge. Even though the number of interviewees was small, the gained data was adequate to support the research.

This thesis does not take a stand to the practical applicability of the measurement method or suggestions for improvement, as there was no test case study within the scope of the thesis. The reliability of the research is based on the validity of commonly recognised standards and maturity models, which form the base for the synthesis of the thesis. Nevertheless, this research has fulfilled what has been agreed to be in the scope of the thesis. Thesis has been completed by applying research methodologies that ensure the validity and reliability of the results.

Development ideas for further research

Topics have been brought up during the interviews and discussions with thesis supervisor and sponsor. The theoretical framework has elevated ideas for potential opportunities that new technology could offer for strategic planning and portfolio management purposes. Most of the development topics are related to financing, but that is evident, alike one of the interview respondents stated that the reason for project type of work is only for producing more money for the business.

Big data opportunities in strategic planning and portfolio management:

- Real-time dashboard visibility from versatile data sources would create the advantage of big data utilization. Efficient analysis of on-time data combinations would benefit organization with for example market change and financial forecasting possibilities.
- Thus portfolio management possibilities to plan resource and competence requirements would enhance.
- Also the realization of business benefits and return on investment from project investment decision to project completion and further to production use could be easier to track, when the variable data could be combined and realigned.
- Several researches are investigating the big data possibilities, but a theoretical pre-study could draft potential data combination structures and reflect them to theories of market fluctuation, political environmental changes or even to global climate warming. For example a big data research could combine data and analyse the effect of oil price changes in relation to emission control and oil refining product manufacturing costs and taxation in a certain geographical area. The data combining would already fulfil the strategic planning objective and portfolio management would come in when end products are produced. Big data possibilities are endless.

IT budgeting versus business case funding:

- An idea presented by one the interviewees was refreshing to usual “we are running out of annual budget” thinking. According to the interviewee, development projects should not be dependable on IT department’s annual budget adequacy, but instead the funding for beneficial business cases would be applied straight from the business.
- Development ideas that would have strong potential to create value for business would not rely on IT budget. When the funding would be granted, portfolio management level prioritizes, resources and schedules the business initiative to a project, which completion at right time would create the expected benefit the business.
- A separate development funding would therefore enhance positive business development, as often bonus targets are linked with IT budget undercutting, which leads to pattern that instead of doing productive projects, underperforming is rewarded.
- A research could study strategic alignment from financial funding point of view, the internal funding structures and complex rewarding systems.

Value chain mapping of return on investment in project type of work:

- A future research could examine the project benefits realization. The success of portfolio management can be measured in numeral metrics, but is it possible to measure how successfully the executive level is able to lead the organization to the desired direction?
- Is it possible to measure the entire value chain?
- It would be financially useful to have metrics that could measure and track the value chain for from strategic initiative, to accepted business case via portfolio component to launched project.
- The value chain mapping should reach the realized project result, which would be taken into production use and in the end how much does it generates value, for example turnover of marketing visibility.

The topics raised up indirectly during the interviews, when leadership and top management decision making was questioned, especially the ability to make profitable investment decisions that rely on the organization's capability to deliver the expected results in given cost, quality and schedule.

In addition to financial metrics, it would be interesting to have data of how much impact leadership practices and portfolio management capability have on return on investment. Is the organization mature enough to communicate the change effectively throughout the organization and mature enough to collectively understand the aligned strategic initiative and capable for delivering the results according to the changing requirements? If organization is able to deliver the expected benefits, how are the benefits measured and validated that they have fulfilled the expected value for the organization? Portfolio management is a practise for completing selected strategic initiatives, but as important would be linking the realized business benefits as data in a knowledge database, in order to gain advantage for continuous improvement and shared best practices.

7 Discussion

The thesis subject had a clear connection to practical working life. The topic broadened personal understanding of project organization's decision making processes and alignment between project type of work and corporate strategy, which very often is unclear at operative level. The thesis process has been inspiring as the subject has offered new information, but been closely related to own work experience. The thesis progressed as planned but took more time than expected, mainly because the scope appeared to be much broader than estimated.

The chosen research methods proved to be efficient and fit to purpose, and concluded at creating the solution to the research problem. The interviews were arranged as one-to-one meetings and group interviews. A group interview appeared to be efficient method for data collection, as the interviewees compared their own opinions and experiences together. The discussion was versatile and easily jumped slightly sidetracked, but raising up issues that were valuable to study further. Comparing the qualitative results with each other and reflecting the results against the theoretical framework, the results provided conclusions how a maturity measurement method could be compiled and would fit to purpose. The constructive research allowed agility, as the results of interviews could be iteratively evaluated against the theoretical framework as well as the theoretical framework could be reviewed in order to create a valid and practical end result of the study; maturity measuring method.

The utmost benefit of specialist interviews were the development ideas pondered during the interviews. The ideas varied from suggestions for further theoretical sources to be researched within the scope of the thesis, practical knowledge of value chain mapping practices, as well as viewpoints how portfolio management maturity could be measured. Ideas for further research, which were outside the scope of the thesis, were conducted from the interviews and personal learning process during the research.

The thesis project has increased personal theoretical knowledge about organizational strategic planning and portfolio management practises. Portfolio management and maturity models were being studied profoundly during the thesis project, and objective comparison was done among different maturity models. The terminology had often been encountered during previous work experience, but was easily placed at right context after studying the theoretical sources.

Personal motivation towards the thesis topic was high. Primarily goal was to increase own IT management knowledge and find new competence areas, which could extend personal competitive advantage in future labour market. Secondary goal was to have thesis finalized as a high quality university level research, and receive a graduation diploma for the master degree programme at Information Systems Management.

Thesis process started during spring 2015, when attending a leadership training provided by PPS. It came out that there could be potential thesis subjects related to PPS product line when contacting the leader of PPS services, Tanja Räikkönen. In a few months the topic draft was conducted, an agreement of thesis research signed with Tanja as a sponsor role of the thesis, and kick-off meeting arranged with the thesis advisor, Jouni Soitinaho from Haaga-Helia University of Applied Sciences.

During the thesis process, there were several review sessions with thesis sponsor and advisor, in which the direction of thesis was reviewed, research questions were fined down and the validity and form of the results discussed. The review sessions that took place both virtually and one-to-one discussions, encouraged significantly own motivation and focus for the thesis at the times when it seemed to be temporarily lost. Feedback was asked and given during the process, also from other sources at Tieto Corporation that have experience in scientific processes and practical portfolio management. Feedback was extremely valuable, since it gave external point of view to the study and assisted with being objective towards the research.

The scope of the thesis appeared to be wide, but narrowing it down would have had negative impact on the compilation of synthesis by drawing out many factors affecting portfolio management. In the end, the extensive research of theoretical framework was required in order to develop a suitable solution to research problem. The original planned schedule prolonged, but did not affect the quality of the thesis. In general the thesis process advanced own professional and interpersonal skills in utilizing variable theoretical and practical sources as well as increased understanding of strategic business and portfolio management in project organizations.

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Appendices / Attachments

Appendix 1. Interview themes and questions

The interviews were done in iterative cycles, in which the first interviews had few predefined high level themes, but the interviewees were not restricted to follow the themes. Instead free communication flow was encouraged, while the interviewer avoided to interfere too much.

The first themes were not presented to the interviewees, but were utilized unnoticeably to keep the focus on portfolio management. The themes lifted up questions of portfolio management as a term, portfolio management processes, maturity assessment methodology and interviewees' personal experience of portfolio management practices in organizations they had been consulting or working.

After the first interviews a list of questions was formed to form a framework to becoming interviews. The questions were based on the original themes, but also focused into existing portfolio management practices.

Interview questions in English:

1. Are you familiar with the concept of portfolio management?
    a. What do you think it consists of?
2. How is the portfolio management implemented in your own work?
3. Has the companies where you have worked on used standardized methods for portfolio management?
4. What do you feel are the most important areas of portfolio management?
    a. Which areas are the ones which should be improved and in what way?
5. How has the level portfolio management been measured?
    a. (used processes, resource allocation versus the actual occupancy)
6. Is the realization of the targeted benefits followed? In which way?
    a. (e.g.return on investment)
7. How are decisions made by management are reflected in practice?
    a. What kind of strategic decision have been made?
    b. e.g. selection of certain customer companies? In which way?
8. Extra question: Would you like to mention an example of good portfolio management based on your own experience?

Suomenkieliset kysymykset:

1. Onko portfoliojohtaminen tuttu käsitteenä?
    a. Mitä se mielestä pitää sisällään?
2. Millä tavalla portfolio johtaminen toteutuu omassa työssäsi?
3. Onko yrityksissä, joissa olet työskennellyt käytetty standardoituja menetelmiä portfoliojohtamisessa?
4. Mitkä ovat mielestäsi tärkeimpiä portfoliojohtamisen alueita?
    a. Mitkä alueet ovat niitä joita pitäisi parantaa ja millä tavalla?
5. Millä tavalla portfolio johtamisen tasoa on mittaroitu?
    a. (käytetyt prosessit, resurssien allokointi versus todellinen käyttöaste)
6. Onko tavoiteltujen hyötyjen toteutumista seurattu? Millä tavalla?
    a. (esimerkiksi return on investment)
7. Kuinka johdon tekemät päätökset heijastuvat mielestäsi organisaatiossa käytännön tekemiseen?
    a. Millaisia strategisia päätöksiä on tehty?
    b. esim. valikoitu tiettyjä asiakasyrityksiä? Millä tavalla?
8. Extra kysymys: Haluaisitko mainita kokemuksesi perusteella esimerkin hyvästä johtajuudesta tai portfolio hallinnasta?

Appendix 2. Notes of interviews

Interview 10 September 2015

- I personally do not find a big difference, whether a project is implemented by a customer or by a supplier. The project is in itself a business. For the buyer, the project is not part of the business, but the benefits are as an outcome of the project. Then it is essential to look at which are those projects that will maximize the benefits.

Resource management

- Often the drawback is the resource pipeline, from the supplier side. Very often the bottleneck for projects is that the customer is not used for usage of resources. Then we do not have anyone to whom to communicate with and with whom to talk. Project pipeline involves also the resource pipeline. That whether we have the resources available. It must be known what resources are available, their competence, how they are allocated, and when they will be needed.

- When you have an allocation for project, the reporting of hours should monitor the actual accomplished effort. Often full-day entries are reported, even if it does not actually have anything to do with the actual workload.

Financial management

- It should be thought carefully what the portfolio consists of. For example, when the resource management and the controlling it by using a pipeline. Perhaps the biggest thing is, how much there seems to be investment money, when there is a productive project that has a business case in the background. If there is no investment money, then how can you implement a project? In my opinion there should not be budgets at all, but business cases instead for project type of work.

- When the IT department has a budget, and the budget is running out, then nothing can be done. Or even sillier that something will be ordered even though here is no confirmed budget for it. Implementation should take place so that you apply financing for your project, then either you get the money or not, but it is not matter of IT-department's annual budget. And someone who is sitting on the treasury chest, believes in the project and tells the seller that this project should be done. Business and IT do not work together effectively.

Measurement

- The most difficult thing for a program is definitely is to define what you get and how do you get it. Portfolio management must be based on measured facts. Instead of looking at recent figures, but the trends of for example, for the return on investment margin. If you invested a million, how much it generated in the next year. But how can you count that? It is a difficult part, if the evaluation is made based on gut feelings, feeling that this was a good project. It's just someone's opinion. Creating a valid measurement criteria for that is really hard.

- Then what can be measured, is a more specific way to analyze organization's portfolio management maturity. The analysis can be numerical or the company can be asked if they use a systematic project income measurement system. Then you look at the statistics and consider how many of the respondents said yes. If you are collectively asking this in practice, it is very likely that small part of respondents says yes. Respondents could be asked what happens after the project's production intake, and who makes the measurement of return on investment.

- It is very good, if the business benefits can be achieved. It is often difficult to distinguish what is exactly is benefit for the business in a particular project. Sometimes, the benefit may be placed in longer time period. In research type work, the results of basic research work could be realized ten years from now when someone comes up with an application based on it. But what did the basic research work then generated? The same applies to companies which favor ERP systems, which do not necessarily produce anything. Then the system will be utilized in the business calculations and the benefit can be realized. The benefit may hit multiple parts of the business. While all the other things would be okay, measurement may also damage the operations. If the metrics are the least bit wrong, operational directing go to the wrong direction.

Strategic management

- One important thing which is associated with many things is the limitation of resources and competencies and project's accurate timing. In the world there are restrictions, so there need to be a plan for how the project is interleaved. The sequential dimension is important. For example, if this project cannot be started this year, the next year no longer pays off. It should be controlled in some way, what it is the beneficial timeline to implement the project. In addition that is it worth to be implemented and when we have the possibility to implement it. Especially if there is no such of kind skills and knowledge and there will be a lot of good ideas for projects, often they all will be launched at the same time when they pass through as business cases and are very

good as separate ideas, but there are neither resources of finance for them. Business benefits are the reason, why these projects are made

Interview 28 September 2015

- In my opinion, portfolio management is a business management tool. It must ensure that the development is in line with the strategy. Someone has decided targets, vision, direction and schedule view. Portfolio Management is designed to ensure that the business benefits and the expected impacts of the selected projects are realized. Therefore the purpose of a project is to produce instruments that can be harnessed if you have the courage, skill and ability of making use of them to achieve higher-level objectives. Optimization takes place at the portfolio level, where the projects are being launched.

- I jumped into a development program at a stage, where there has been several management drawbacks. The program has progressed and hours were used without any actual deliveries produced. Steering was inadequate because no one questioned that no evidence had been presented to be completed. Project controlling and management was seriously troubled. The project should have been finished in two months, but there was basically nothing ready.

Valid Key Performance Indicators

- The problems were on both upper and lower project steering level. Often a project manager has an administrative role that keeps tools in order and takes care of the needs of the project team. It had not be seen that the project manager should be in the leading role. Of course the first thing on a portfolio level is that key performance indicators (KPIs) must be in order. How can you be confident what the KP is telling you? That is, if the KP requires more sales, of course we can sell by dropping the price and give KP a heap. However, we do not get anything delivered, there is always too little time to schedule the sold projects.

- Now we need to compare the two KP. Can we sell and deliver this. Fine, if both looks good. If sales show a plus and delivery is badly negative, it is unlikely that the project bring business benefit for organization as schedule and costs may vary. In one project hour reporting did not look good. It was decided that everything should report 100%. Two weeks went by and all was well, but it did not make any sense. Thus KPI target was filled, but it did not matter because it did not correspond to reality. Each meter will begin to guide the operation, until it feels that it begins to control too much. Every meter should therefore have a counter meter that balances things. A bit like double entry bookkeeping. This idea is based on my own experience, it has no scientific basis, but verification for it would be useful.

- Measuring begins to lead the operations sometimes too much and we go way too far in the wrong direction. One example are the sales bonuses. For example in a company in which sales figures are wanted to be increased rapidly by the end of the year, as sales bonuses are only dependent on a number of sales, excluding the company's capability to deliver what has been sold. When you start to measure something, you should know what is being measured. In portfolio management is it important to know that happens to projects timely and financially. The measurement should not provide numbers only, but rather give direction, because the meters are rarely perfect.

- It is essential to know and understand to know whether to trust the KPIs. If you ask what are they based on and the respond is to the hours worked, you should immediately question whether it can be trusted. However, if you got a list on issues that have been done which customer has accepted, then you can certainly rely that these things have been realized.

- Projects and programs come to an end, but the portfolio management is eternal. The projects should be obtained if the business benefits has been achieved. Measuring the benefits can last for years. If there is a strategic objective that the margin percentage should be increased, all projects and programs will report the right KPI per cent, which is useless. If linearly things seems to go badly, it should be explored why and what is being done wrong.

Strategic portfolio level management

- The detailed level it is a matter of resources, competences, whether we have a certain kind of expertise. Resources must be put to the most productive projects, because all business is based on the fact that projects are profitable. There may be some so to speak, projects of strategic importance, but then it is based on an extended business thinking. For example, now we can make this project with a zero margin and we will get a foothold in the Russian market. There should be a really good scenario for how the new foothold in the market can be obtained.

- There should be portfolio level business cases and decision making. For example if the maintenance of a single product cost so much that it is worth the get rid of it and even give another product to the customer with no charge. These things should be portfolio level thinking and seeing the portfolio in one entity. KPIs should be comparable from one project to another. For example, in another project the project management is included in costs, but not in another. Then the figures are not comparable with

each other. It creates problems easily if the inequality is not known and detected. KPI construction is problematic, quality people are better with identifying equalities, but how can one person implement the change in the organization? It will take quite a long time.

Portfolio mix, selection and prioritization

- The portfolio must have cash cows, those who build finance for the future. If all projects are only cash cows, then you got is a risk that already next year will bring renewed products from competitors and you will left out of markets. If you have a product that makes profit right now, you should keep starting projects that develop something new. Waterfall model is used often in development projects, but it is known that agile methods are becoming more popular. Therefore agile project management should be practices, although the first attempts would go a little wrong. There are also projects that consciously and controllably run down some products whose life cycle is at the end. In my opinion in a portfolio there should be 20% development, 80% cash cows and 20% of sunset projects.

- Important is portfolio structure, the percentage of certain type of projects clearly visualize entity.

- There should be a rhythm, where one part produces investment money for new development. Cash flow must be adequate in relation to the investment capacity. There should be conscious decisions in the selection of projects. Do we want to cooperate with everyone, or do we want to be profiled. For example, one company does not want to be global but rather Nordic. Strategic dimension is important on portfolio level, having the ability to pick the right projects. For example, in demand management there are 20 projects of which five must be selected according to some parameters. What is the criteria for Demand Management, that is, on what basis the selection is being done? If they are not documented, the selection criteria is zero. If the criteria are listed, it can be ensured that the organization has the necessary resources available when the project starts.

- How would you argument is someone says that we have a portfolio management processes in order? For example, resource management. When a new project comes you can ask how much resources we have and what competences we have available in December. It jumps to a question which is extremely difficult to answer. And it should not be a difficult question. The answer determines it is worth to go on to a certain project, because it is not worth to take if we have no possibilities to carry it out. Then, for

example, the sales should say that we do not join this bid at all. It is, of course, miserable when the so-called warehouse is empty and nothing can be sold. One should not sell what cannot be delivered.

- In demand management the choice is made, which projects will be selected. A brutal selection can be made, when you find a good deal and a great deal. It may be noted that we do not go in at all to that good deal because we want to choose the great deal. How do you make a choice if you have no meters to guide you, or visibility of for the capabilities of the organization? If we are looking at two great deals, and we win both of them, but we do not have the resources to do them, then we are in trouble. This involves resource pipeline management, it relates to our capability to implement.

Harmonized methods

- When we are aware of the KPIs and how they are calculated and in addition to that we have common human sense. Then you also need to have harmonized working methods to ensure quality data, therefore everyone for example reports hours and accomplishments in similar way.

Leadership

- If we take the leadership dimension in question. For example, a situation in which a project manager reports to portfolio manager bad news that there should be 50% completed but there is only 30%. Portfolio manager gets mad and verbally attacks the project manager. Then fear management model may spread to the entire organization. Then we can come to a situation that portfolio manager's leading style affects also the lower levels. Until at some point the reality is revealed. Poor leadership causes people to act according to learned patterns. Proper research has been done, that the organization is used to report issues to the upper level a little bit better than they actually are. It has been found that the sales forecasts are changing always to be a little better at the higher levels, who reports forward. Poor methods can be scaled across the organization.

Measuring maturity

- For measuring maturity level, a questionnaire is good. You can check out whether these things are in order. For measuring the current level, it may be useful to analyze the portfolio structure. What is the percentage distribution of cash cows etc. Whenever asked whether that resource issues are in condition, the answer is always affirmative.

- A good starting point is to examine the various maturity models such as CMMI. On top there is strategic management, then portfolio management etc. To a certain degree the operations can run on their own level, but at some time the layers must be synchronized. According to SAFe the results are frequently reviewed. Portfolio management is a permanent part of it, and we have to think all the time the overall optimization. If you have 5-10 points, which can check whether things okay, it would give a viewpoint for which areas could be improved. If 30 people are interviewed, and tools to provide a report. The final report can show that you are in this stage of maturity, and then you can go through what practices can be improved. It is another matter whether the company has the discipline to accomplish things, in order to improve the operations. There can be leaders that are process of professionals and those who focus on other things. The benefit is that maturity could be measured quickly with the measuring method. It would tell whether there is a rush to do something, or on longer term, something should be improved.

- Suggestions for improvements some things can be at the higher levels, but fixing things can be in indicators of KPI structures and should be done case by case.

Knowledge management and alignment

- Feedback is important. Alignment must therefore be maintained, so that a company can have a successful business, as the realization of the goals tells you how well the company can take advantage of know-how and knowledge management as a management tool. Right things happen, at an appropriate frequency.

- In a hierarchy the business creates the strategy, such as growth target. It should also be reflected at the portfolio level, whether this means growth in turnover. For example, in the portfolio new customers will be rather chosen, which carries out new projects. It is strategic decision and afterwards it will be monitored whether that happened that net sales increased.

Interview 9 December 2015

1. **Are you familiar with the concept of portfolio management?**
   a. **What do you think it consists of?**

- Portfolio means the entire product offering of an organization e.g. Amer Sports
- Management methods
- Portfolio as a concept: procedures, management through processes
- Leading, follow up, support functions and deploying a model in practice
    - Deployment of organizational strategy into support functions
- What is the purpose of the company and to which customers
- Portfolio management refers to the process oriented activities such as projects, programs and development activities.

2. **How is the portfolio management implemented in your own work?**

- Yearly targets/objectives
- Middle management is given different objectives on a higher level
    - The objectives are being specified to detailed lower level targets for example to targets of specified teams
    - Range of the measurement in the organization?
        - The indicators should be extended from top to the lowest level. The criteria and measurement can vary for example quantitative measurement
        - In IT world an organization must remain perched on the development, training staff is a way to stay on top
    - Internal training
        - necessary internal investment
        - Enables operative function of customer organization, when the delivering IT organization have the required technical knowledge and skills on for example SOME-technology
        - Is there a possibility to measure return on investment on the investment spent on internal training?
            - Yes. ROI can be measured in categories. Technology training spent would be e.g. 0,5% of net sales
            - personal goals, knowledge share

- Project portfolio, continual services
    - focus, time management
    - Notification on portfolio level for projects that need special attention
    - Projects are being followed on weekly basis through financial measurement, numbers, monthly reports, scrum-ebit weekly actual results
    - Visibility for the customer is important as well as forecasting
- Organization wanted to challenge bigger companies.
- The company CEO is a lean expert, an exemplary leader, the organization takes responsibility, employees are being trusted, the company has a number of senior professionals with an average of 14 years of work experience, lean principles are shown in all activities, management commitment is sincere and legitimate
- The attitude of management illustrating good leadership

3. Has the companies where you have worked on used standardized methods for portfolio management?

- Respondents are not familiar with standardized methods
- Portfolio management indicated on the metrics, which are used for managing the company
- In general, there are project management methods used in project deliveries

4. What do you feel are the most important areas of portfolio management?

a. Which areas are the ones which should be improved and in what way?

- The purpose of a company is the maximize the investment for the owners
    - quality, two-way communication
- metrics
- 6/12month themes, which are not managed as projects e.g. training. These themes should however be projectized.
    - theme can also be related to company values, e.g. PR work
    - communication, values, pride (internal and external)
    - Communication should be carried out as a project
    - Team manager's budget: does not necessarily need to be measured in euros. Based on trust, that budget is being used in a way that is beneficial for the company.

    - 107 recruitments during the year 2015. The level on knowledge improved. The growth target for the international net sales is 10%.
    - Public relations
        - Measurement: Some measurements such as number of media lifts. Big Data could be valuable with measurement.
        - number of sales
- Scaled Agile Framework (SAFe)

5. **How has the level portfolio management been measured?**
    a. **(used processes, resource allocation versus the actual occupancy)**

- There is no particular service management team. Technical lead is playing the role of a service manager.
- Partner teams, subcontractors
- Customer satisfaction during and after the project.
- Control: financial, repeatable for improving customer ships, reacting to resource requirements by recruitments 6months in advance, 107 persons recruited during 2015
- In smaller companies the general director is closer to the employees, which may have impact on the efficiency of resource allocation and realization of allocation. However, the size of organization should not have impact on the efficiency.

6. **Is the realization of the targeted benefits followed? In which way?**
    a. **(e.g.return on investment)**

- At least 20% growth every year. 10% ebit is adequate. It could be negative for several years.
- Personnel commitment is important, because variance in employee satisfaction would definitely show in company's project deliveries. Personnel and customer satisfaction measurement. Customer satisfaction measures the quality.
- Soft values and effect on business.
- Development on used processes and repeatability of the processes.
- Business plan can be utilized to keep track of the profitability of the investments.

7. **How are decisions made by management reflected in practice?**
    a. **What kind of strategic decision have been made?**
    b. **e.g. selection of certain customer companies? In which way?**

- Decisions are immediately reflected on the organization. Therefore immediate release of top management decisions are important.
    - Communication plan utilized for releasing news, top management commitments
    - division of responsibilities with communication
- Strategic objective
    - If there is no communication, there is no progress of wanted actions. Communication raises awareness.

8. **Extra question: Would you like to mention an example of good portfolio management based on your own experience?**

- Jarmo Lönnfors (Satama Interactive Inc) is a good example of good leadership.
- Jarmo managed to give clear objectives what a company which to achieve..
- There were clear 5 paragraph programs each year on portfolio level.
    - Commitment to company was shown.
    - Every 2 weeks there was a walkthrough for metrics/portfolio
    - Ones per month walkthrough with business teams
    - Action list was being checked through
- Jarmo dragged his black book with him and verified what has been agreed during the previous months. Issues were followed up and reviewed.

Interview 25 January 2016

1. **Are you familiar with the concept of portfolio management?**
   a. **What do you think it consists of?**

- Portfolio management is about compiling a financial overview
- Revenue and business forecasting and business management are part of portfolio management. Revenue must be divided in ERP-system.
- Sales forecasts (opportunities) are tightly related to business forecasting.
- Personal goals are also in a portfolio, but that portfolio is separate from business perspective.

2. **How is the portfolio management implemented in your own work?**

- Forecasting future trends.
- Project manager's work has been eased up as IT-tools have developed.
  - That has drawbacks; manual work has been decreased, and project managers' don't need to compile the project numeral themselves. Therefore they don't tend to follow the numeral data as often as earlier.
- Roles:
  - There is no clear role description.
  - Employees are encouraged to gain more competence.
  - For example a single person may have active role as a Project manager / tester / scrum master
- The quality of project manager work is being followed in monthly face-to-face meetings. There are internal and external targets.

3. **Has the companies where you have worked on used standardized methods for portfolio management?**

- No. Some ideas have formulated from learned standardized methods, but nothing has been deployed officially. The ways of working are based on personal experience and established ways of working in the organization. For example usage of development project portfolio, in which each project has been selected based on created business case.

4. **What do you feel are the most important areas of portfolio management?**
    a. **Which areas are the ones which should be improved and in what way?**

- Data Quality
    - on-time, up-to-date available data ensures efficient portfolio level management
- Usual problems:
    - Unsymmetrical data between closed opportunities and order back-log → An opportunity has been closed but the project is not visible in any other dashboard → Cannot be measured, managed and does not provide data needed by project and business (portfolio) managers
- Impact of data quality:
    - Resourcing
    - Cash-flow is important for a small company. Costs e.g. salaries must be paid each month even though projects would not create cash-flow
    - Costs must be estimated in advance when negotiating contracts

5. **How has the portfolio management level been measured?**
    a. **(used processes, resource allocation versus the actual occupancy)**

- Accuracy of forecasts (turnover)
- business case calculations
    - return on investment
    - qualitative measurement
        - customer satisfaction surveys
        - delivery executive team on strategic level is prioritizing and monitoring development programs
    - tangible measurement
        - e.g. cloud services → the amount of data variation is difficult to estimate in advance

6. **Is the realization of the targeted benefits followed? In which way?**
    a. **(e.g.return on investment)**

- KPI / KPA
- amount of overtime work

- billing rate
    - less than 100%
    - dependable of employee competence
- Competence development portfolio is used in company
    - reviewed in 2month sprints
    - agile deployment of portfolio activities
    - consist of competence development backlog, in which there topic cards from different themes
        - Cards have KPIs that reveal when measurement criteria have been realized
        - Each card has an owner, cards are selected and prioritized. Selection has impact on internal costs.
        - Cards and backlog are being followed as an entity and aims at reflecting the capability of doing IT development work.

7. **How are decisions made by management reflected in practice?**
    a. **What kind of strategic decision have been made?**
    b. **e.g. selection of certain customer companies? In which way?**

- Strategic portfolio plan
    - In a plan there are initiatives for example improvement of visibility
        - marketing visibility
        - technical competence visibility
        - social media campaings
- Communication plan
    - Communication is never adequate
        - Reference to Osmo A Wiio ”Viestintä yleensä epäonnistuu – paitsi sattumalta”.
    - Communication drowns in the used communication channels
        - Used solution to problem has been repetition in different channels, however it is challenging to pay attention to the content that it will remain the same and does not modify along the repetition process.

8. **Extra question: Would you like to mention an example of good/bad portfolio management based on your own experience?**

- Lack of leadership is more easily determined than efficient leadership.

    - Inefficient leadership style does not take into account variable viewpoints.
    - The competence and capabilities of the organization must be known.
    - There must be ability to recognize the most critical functions that create the organization and capability to understanding a large entity.
        - A change in an organization can happen only after the entity and dependencies are recognized. There must be sufficient knowledge of the organization as a whole before a business change can be implemented (and achieved successfully).
- A good leader must be:
    - Approachable. Employees should not be afraid to tell about concerns.
    - Show interest. For example technology can be utilized, Yammer as an example.
        - Innovations, development ideas, problems should be encouraged to be brought up.
        - The company has deployed Yammer efficiently for basically all its activities.