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Project Management

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RESOURCE ALLOCATION BENEFITS

– developing project portfolio management process

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MASTER'S THESIS | ABSTRACT

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- developing project portfolio management process

The objective of this study is to identify development areas and propose improvements to the current project portfolio management process in the case company, which is a technology company in the machining industry.

This study examines in particular the resource allocation benefits in project portfolio management. The study is motivated by the case company's strategy and vision that drives the continuous development and excellence in processes.

The theoretical part of the study covers characteristics of the project portfolio management, its development phases and RAP-model that describes resource allocation process. The research data of the empirical part is collected from the internal documentation and the research interviews conducted in the case organization. The research methods consist of direct observation, documentation analysis and research interviews.

The key result in this study is that driving strategy with the means of project portfolio management requires suitable projects to be identified, selected and prioritized. Additionally, proper resource allocation is a prerequisite for functioning project portfolio management.

The findings in this case study are that resource allocation could benefit the project portfolio management by improving productivity, strategic planning, risk management, workload management and project team commitment. An action plan has been as the first step in the process of developing the project portfolio management at the case company. However, in order to integrate resource allocation in the project portfolio management process and capitalize the benefits also further development work is required in the case organization.

KEYWORDS:

project portfolio, project management, resource allocation, continuous development

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RESURSOINNIN EDUT

- projektisalkkujohtamisen prosessia kehittämässä

Tämän opinnäytetyön tavoitteena on tunnistaa kehittämiskohteita toimeksiantajayrityksen projektisalkkujohtamisen prosessissa ja esittää parannusehdotuksia niihin liittyen. Opinnäytetyön toimeksiantajana on konepajateollisuuden alalla toimiva teknologiayritys.

Opinnäytetyössä käsitellään erityisesti resursoinnin etuja projektisalkun johtamisessa. Innostus tutkimuksen tekemiseen tuli yrityksen strategiasta ja visiosta, joissa jatkuva kehittäminen ja toiminnan sujuvuus ovat selkeästi esillä.

Opinnäytetyön teoriaosuudessa käsitellään projektisalkkujohtamisen ominaispiirteitä, sen kehittämisen vaiheita sekä resursointiprosessia kuvaavaa RAP-mallia. Työn empiirisen osan tutkimusaineisto on kerätty kohdeorganisaation sisäisistä dokumenteista sekä tutkimushaastatteluista. Tutkimusmenetelminä ovat havainnointi, dokumentaatioanalyysi ja tutkimushaastattelut.

Työn keskeisimpänä tuloksena on, että strategian toteuttaminen projektisalkkujohtamisella edellyttää tarkoituksenmukaisten projektien tunnistamista, valintaa ja priorisointia. Lisäksi projektien asianmukainen resursointi on toimivan salkkujohtamisen perusedellytys.

Työn johtopäätöksenä on, että projektijohtaminen voi hyötyä resursoinnista tuottavuuden, strategisen suunnittelun, riskienhallinnan, työkuormanhallinnan ja projektiryhmän sitoutuneisuuden parantuessa. Toimeksiantajayrityksessä projektisalkun johtamisen prosessin kehittäminen on aloitettu toimintasuunnitelman laatimisesta. Resursoinnin sisällyttäminen projektisalkkujohtamisen prosessiin ja siitä saavutettavien etujen hyödyntäminen kohdeorganisaatiossa vaatii kuitenkin myös kehitystyön jatkamista.

ASIASANAT:

projektisalkku, projektijohtaminen, resursointi, jatkuva kehittäminen

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LIST OF ABBREVIATIONS

CEO	Chief Executive Officer
CSF	Critical Success Factor
EPMO	Enterprise Portfolio Management Office
IPMA	International Project Management Association
ISO	International Organization for Standardization
KPI	Key Performance Indicator
PMI	Project Management Institute
PMO	Portfolio Management Office
PPM	Project Portfolio Management
RAP	Resource Allocation Process

1 INTRODUCTION

Organizations seek ways to grow and develop to meet the business requirements. Change is often organized in projects. Projects become materialized through people and the work they do. The ultimate task for project management is getting things done.

Project portfolio management is a decision-making process that provides the discipline to manage large and complex organizations. The defined goal of project portfolio management is generally to maximize value for the organization against business objectives. This is accomplished with a balanced and strategically aligned portfolio.

This study was performed to respond the needs of the case organization in order to develop the ways to operate further. The case organization is interested in improving the operation of the current project portfolio management.

This thesis studies how resource allocation would benefit the project portfolio management.

1.1 Case Company and Organization

In brief the case company of this study is a provider of equipment and services for process industries. The company operates in over 50 countries, having 13,000 professionals worldwide. There are two financial reporting segments that operate globally with customers in different industries, all processing raw materials.

The vision of the case company is to be *the best choice for sustainable processing and flow of natural resources*. Company strategy is based on five fundamentals: customer centricity, service leadership, innovation, operational excellence, and people and leadership.

The vision and strategy are implemented in everyday work. Organization development is often created in projects and derive from the needs of business, operations, maintenance or external causes, for example legislation.

The case organization of this study is a production facility located in Finland, with over 800 employees working on the premises. Plant targets are outlined in a roadmap. Three key targets set in the roadmap 2018-2020 are related to the strategic fundamental of

operational excellence, meaning continuous development of processes, quality and safety. First, to have a competitive and cost-efficient supply chain with own production to ensure work in the future. Second, participate actively and selectively in product development projects. Third, have everyone in the organization to develop ways to operate.

1.2 Challenge

In the case organization there are simultaneously ongoing development projects that might fight over the same resources and attention of the factory management group. Therefore, project portfolio management is used as an operating tool for decision making.

Development of the project portfolio management process has been lacking attention, mainly due to limited time. The project portfolio manager has his operational duties and must choose what to concentrate on. Thus, the case organization considers the current development efforts being somewhat insufficient and wishes to achieve a more holistic project portfolio management process.

The focus is to improve the key activities of project portfolio management process in order to gain more efficient decision-making. In future resource allocation would be done in each project.

1.3 Objective and Research Questions

The objective of this study is (a) to define activities of the current project portfolio management, (b) propose improvements on the project portfolio management process.

The research question is formed as follows:

1. Why should resource allocation be integrated in the project portfolio management process?

The outcome of this study is a proposal for resource allocation that contributes to the existing project portfolio management processes.

1.4 Research Design

This study is composed of two phases, literature review and case study. Figure 1 summarizes the process and structure of the study. Each step is shown with the description of the outcome.

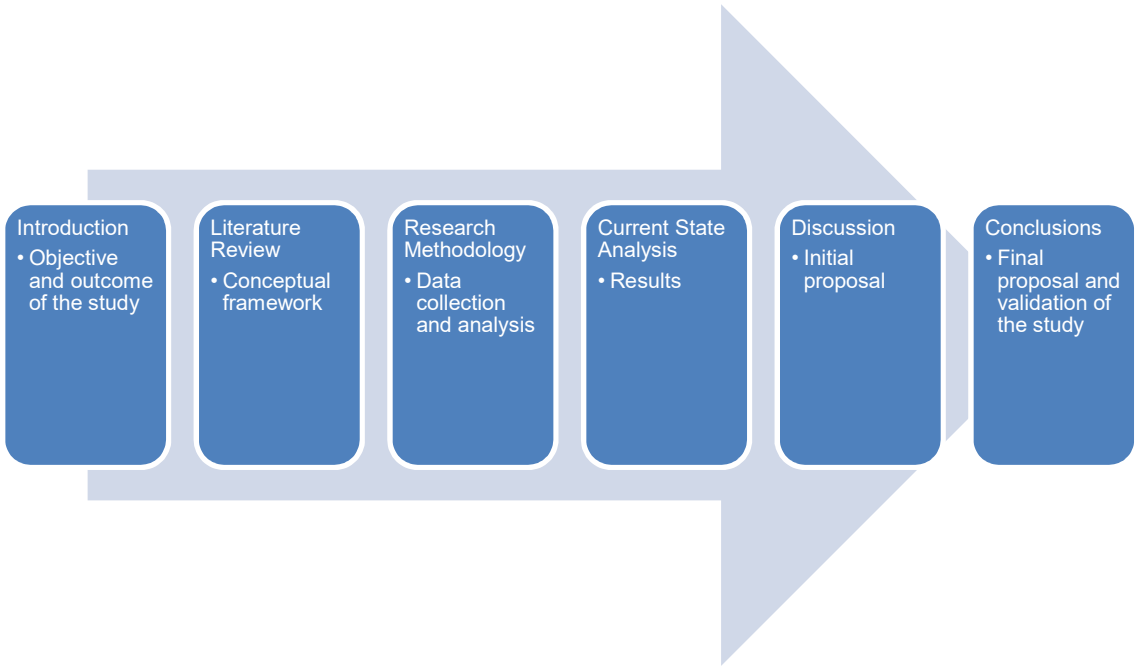


Figure 1. Thesis research design.

This thesis consists of six chapters, starting with introduction, where business challenge is introduced, and direction of the study defined. This is followed by literature review forming the conceptual framework. Next, research methodology is introduced, current state analysis is conducted, and results of the study presented. Finally, initial proposal is created and discussed, and conclusions and validation of the study are established.

2 LITERATURE REVIEW

The literature review consists of five approaches on the research topics. First, the key concepts and definitions are explained. The characteristics of project portfolio management are presented, and the resource allocation process model is introduced. After that, the process for developing project portfolio management is described. Finally, the outcome of this literature review is the conceptual framework that is used to conduct the empirical part of the study.

2.1 Key Concepts and Definitions

The definition of a project, programme and portfolio vary depending on the source. Differences are mainly in what is being highlighted. Selected definitions of project and portfolio by International Project Management Association (IPMA) are the following:

> *A project is a unique, temporary, multi-disciplinary and organised endeavour to realise agreed deliverables within predefined requirements and constraints.*
>
> *A portfolio is a set of projects and/or programmes, which are not necessarily related, brought together to provide optimum use of the organisation's resources and to achieve the organization's strategic goals while minimising portfolio risk.* (IPMA Individual Competence Baseline 4.0 2015, 27.)

A programme is often composed of related projects and other activities, having a clear vision of an end state (Butler 2018, 4).

The IPMA defines project portfolio management as:

> *A dynamic, decision-making process in which new projects and programmes are evaluated, selected, prioritised and balanced in the context of the existing projects and programmes within the portfolio. The goal of portfolio management is to align projects with strategy, to maintain a balance of various project types within the portfolio and to ensure that the portfolio fits with resource capability so that the organisation can sustain*

> *the maximum value from project investments.* (IPMA Individual Competence Baseline 4.0 2015, 282.)

The concept of portfolio is used in many fields e.g. in finance, strategy, marketing, education and politics. To understand the idea of project portfolio management it is essential to understand these different approaches, especially finance and strategy. In finance a portfolio is a collection of investments. Risk-limiting strategy generally means diversification of investments, to reduce the concentration of certain types of risks. The main objective of portfolio management is to maintain and increase monetary value of the portfolio. By means of portfolio management, the potential assets are analyzed and included in the portfolio regarding the objectives and risk strategy. In strategic management a portfolio is a collection of products, services or brands offered by a company. Analytical-rational tools are used to achieve good portfolio balance, where maximum profit with minimal risk are combined. Project portfolio management is derived from financial and strategic portfolio management, so the same issues are also true of project portfolio management. (Thiry 2014, 47-48.)

Management process is a business process, a logical chain of events, activities and decisions. Every business process has a customer and an owner. Management processes provide directions, rules and practices. The project portfolio management process can be described as an interfunctional management process that is within the organization, but across several functional boundaries. The maturity of the project portfolio management process cannot be higher than the programme or project management maturity. (Molitor 2018, 176-178.)

Distinction between project portfolio management and governance principles is that management principles address the question of how an organization delivers, whereas governance principles provide the structure to enable that to happen (Butler 2018, 155).

2.2 Characteristics of Project Portfolio Management

Project portfolio management practices and techniques are used to implement the strategy by defining the work and assigning resources. First, purpose, work and resources are discussed. Finally, roles and responsibilities that are needed to implement project portfolio management are introduced.

2.2.1 Purpose

The purpose in project portfolio management is explained as achieving known goals of the organization (Walenta 2018, 34). The general understanding among researchers nowadays is that strategy, strategic thinking and properly considered anticipation of the future remain important. It is expected that an organization with a defined strategy is more successful than one without. However, the times are unpredictable and will not be made any more predictable only through precise planning. Organizations need flexibility to think in shorter investment cycles and act accordingly. Without successful implementation, strategy will never become a reality. Project portfolio management must offer solid processes, tools and competences to implement the strategy efficiently. (Sedlmayer 2018, 9.)

Two principal approaches to strategy also determine how to set up project portfolio management (Sedlmayer 2018, 10). The emergent approach (Mintzberg 1978, 947), a bottom-up process, builds on innovation. Focus is on emerging ideas and including them in the strategy. The rationalist approach (e.g. Drucker 1985), a top-down process, derives initiatives from the strategy. To apply this process the management needs to have a clear picture of the strategy and how it can be implemented through projects and programmes.

The emergent project portfolio approach uses a well-defined process to collectively manage current and proposed projects. To achieve operational and financial targets of the organization the project portfolio management objectives are to determine the optimal resource mix for delivery and to schedule activities. To ensure that all projects are in line with the organizational strategy, while honoring constraints imposed by the customers or external real-world factors, project portfolio management usually applies a gate approach where potential project ideas are compared against selected key characteristics. This is done to reach a decision whether to launch the project. Evaluation enables various reports to be generated, and support decision-making. As it is uncommon to have enough resources to deliver all ideas at the same time, project prioritization is needed. This cyclic process generates a project pipeline, with the stages of exploration, scoping, initial feasibility studies, definition and execution. The focus on emergent approach is on balancing the project portfolio, but a link to the strategy is commonly superficial. Disadvantages of this process include lack of assurance about

feasibility, leading to many strategies not being implemented. Also, business ideas are often queued rather than being either delivered or eliminated. (Sedlmayer 2018, 10-11.)

The rationalist project portfolio approach is an integrated approach seeking to derive projects naturally and directly from the strategy. Although, a strategy may contain elements that can be implemented without projects, most strategic statements indicate the need for changes, which implies the use of project methods and structures. After strategy definition and before the final approval, it should be checked whether the strategy is feasible. The strategy must be elaborated to reach a clarity how to implement it and whereby projects and programmes can directly be derived from it. With the feasibility check the management could predict the likelihood of the strategy to be implemented. At this stage, it is not necessary to have exact project plans in place, but a clear picture about the solution and its impact on current business, the way to get there (e.g. rough timeline, core milestones), key resources including management capabilities to steer the implementation process and financial implication (financing and cost). (Sedlmayer 2018, 12-13.)

There is no universal, optimum approach to implementing a strategy. A sound project portfolio management process leads to strategic alignment yet is not enough for success. Strategic alignment means that all elements of business support fulfilment of its long-term purpose. (Sedlmayer 2018, 14.)

The research reveals that, on average 95 per cent of the employees are unaware of, or do not understand their organization's strategy (Kaplan & Norton 2005, 72). Thus, many employees struggle to understand how their actions or behaviors can help to achieve strategic goals and create value for their organization (Floegel & Metoui 2018, 271). If employees are to contribute to the strategy, effective communication about strategy, targets and initiatives is vital (Kaplan & Norton 2005, 83).

Strategic control systems are established to monitor strategic progress and ensure the implementation of strategic plans. The control system process allows senior management to determine whether a business unit is performing satisfactorily. (Goold & Quinn 1990, 43.)

A strategic control process is focused on the achievement of future goals and benefits, instead of the evaluation of past performance. The essential elements of a strategic control process are articulation of the strategic outcomes, description of the strategic activities and resources needed in pursuit of the required outcomes, definition of a

method to track progress made (usually by monitoring performance measures and associated target values) and identification of an effective intervention mechanism, allowing observers to change, correct or adjust activities. (Sedlmayer 2018, 14.)

Strategic goals provide a more balanced, long-term motivation for managers than purely short-term profits. However, implementing strategic control system might be complex, involving assessment of whether the goals and strategies remain valid. Evidently, many senior managers prefer to rely on their judgement and general knowledge on business in order to decide whether and when to modify goals and strategies. (Goold & Quinn 1990, 50- 52.)

However, before measuring the portfolio performance, the baseline must be defined and set up. The baseline creates the ground for measuring the benefits and the value to strategic objectives. A common approach when establishing a baseline is to consider such operational dimensions as scope, budget and schedule. Defining a non-operational performance baseline can be more challenging yet important. The non-operational baseline components are customer impact, team impact, organizational success and future preparation. For instance, it is well known that employee engagement has a direct impact on the success of projects. (Floegel & Metoui 2018, 273-274.)

Organizations need actions at strategic level to set meaningful critical success factors (CSF) and key performance indicators (KPI) which will be used to asses project portfolio on a regular basis. Also, each KPI should be linked to a CSF and should provide data useful in improving performance and efficiency (Thiry 2014, 52-57.)

Basically, two types of CSFs are defined (Thiry 2014, 52):

1. Generic CSFs: capabilities that should always be present, such as effective communication, top management support or user involvement. Generally, they are set from above and can be used as a framework for project portfolio management. Project portfolio success is not guaranteed by their presence but may be jeopardized by their absence.
2. Specific CSFs: actions required to achieve a specific strategy in its determined context or circumstances. They have a direct correlation to the success of the portfolio. Specific CSFs are linked to needs and expectations of stakeholders and should be presented in measurable terms.

Key performance indicators can provide direction in making appropriate decisions to control the project portfolio effectively. Thus, project portfolio managers use KPIs to evaluate how their portfolios are performing. However, a badly designed KPI can confuse the decision needed, leading to incorrect actions. The indicators are usually represented visually, e.g. using charts or other graphic. (Dixon 2018, 215.)

There should be different KPIs for a project portfolio performance at the beginning where new ideas are added into the portfolio, in the middle where the projects and programmes are delivered and at the end where the benefits of the projects can be obtained. KPIs at the beginning could include several ideas transferred into projects and programmes, backlog of ideas and available budget indicator. RAG indicators (red, amber or green) are typically used to show the status of the ongoing projects. Projects with green status are to be delivered on time, projects with amber status could have problems related to risks, project dependencies or resources delaying the delivery and projects with red status have issues with the delivery and could need intervention. KPIs at the end of a performance allow the organization to realize what benefits have been received and plan future projects. These indicators give an overall view of the project portfolio performance and if any issues need to be investigated. (Dixon 2018, 216-222.)

Results should be set and measured at organizational level for overall project portfolio, at benefits level for programmes and at deliverable level for projects (Thiry 2014, 57).

2.2.2 Work

The core characteristic work in project portfolio management includes categorizing, selecting and prioritizing the work at hand (Walenta 2018, 32).

Identifying and categorizing

If an opportunity is relevant, meaning there is a need to spend resources to evaluate this, it must become part of the project portfolio. To find the opportunities and to support long-term success it is usual to implement a structured process and create an environment for innovation in which to find and develop opportunities. (Kämpfert & Schwarz 2018, 249.)

Examples for the opportunity-finding process include (Kämpfert & Schwarz 2018, 249-250):

- The voice of customers: good relationships and regular communication with customers give the opportunity to find out what they expect in the future. The idea is to find ways to help or support the customer's development plans;
- Analysis from benchmarking: to find out the strength of a competitor, a benchmarking programme can be conducted. The benchmarking process can introduce ideas to improve the organization's own product and business model, and to create opportunities;
- Legal regulations: change in business-related legislation brings a chance (or the need) to create new opportunities. A project is usually set up to achieve this change;
- Input from suppliers: supplier may have an innovative solution on the market that enables to improve or create a new product;
- Process and technologies: improvement of production or product can be possible due to new production processes and technologies on the market;
- Solutions from other industries: other industries may have similar problems to yours and it might be useful to find out about their solution principles;
- Expert input: experts will probably find many opportunities by discussing a topic. Also, creative tools can be used to support the team flow and to achieve greater efficiency and effectiveness.

Through categorization, every business may assess feasibility of project and programme opportunities (Walenta 2018, 31).

It is not only the decision criteria that are relevant to a successful project portfolio, but knowing where the dependencies between different components lie, and which projects or programmes are mandatory, before a selection process can be started (Kämpfert & Schwarz 2018, 251).

Sometimes the best practice to manage interdependencies is to combine related projects into a programme. (Kämpfert & Schwarz 2018, 253.)

Risk-reward relationship is commonly recognized and according to the financial portfolio theory, high rewards are usually associated with higher risks, which might also be the case for projects when they can be interpreted as investments (Haberstroh 2018, 317-318).

Risk management at the project portfolio level can have a positive influence on the success of the project portfolio. While there are concepts, methods and tools available for risk management at the portfolio level, implementing risk management practices are difficult. Thus, more development is needed to reach a higher maturity level. (Haberstroh 2018, 322).

Selecting

The criteria for selecting project portfolio components should be defined so that they are useful for measuring the fulfilment of strategic objectives, and that the portfolio components can be evaluated and prioritized based on the strategic objectives. Typically, an organization will have many project portfolio components, therefore several different types of project portfolios are used. It would be quite difficult to compare, for example, investment, research or IT projects in one integrated project management portfolio. (Kämpfert & Schwarz 2018, 251-252.)

Decision making and project selection approval is typically done by an established project portfolio steering group, composed of the key stakeholders. When deciding which projects to implement, an organization can choose to treat all projects at the same level and use scoring matrix to select projects. Alternatively, projects can be divided into categories with an advance decision to allocate a determined percentage of their annual resources to each project type. (Thiry 2014, 54.)

Prioritizing

Prioritizing the project portfolio components should result in the best-balanced outcome to maximize the overall portfolio benefit. A balanced mix of project portfolio components should be selected so that the strategic objectives are best fulfilled. This means that the selected components may well contribute to further strategic objectives even if direct support is not evident. (Kämpfert & Schwarz 2018, 253.)

A typical project portfolio selection and prioritization process is rather iterative and will go through all steps and perspectives more than once. The balance of components will vary whenever new components are integrated, the weighing of existing components is changed, some components are removed, or components are completed. Where smaller organizations might appear to be flexible and dynamic in handling transformation, some bigger organizations can exhibit higher resistance and inflexibility to crucial changes in their project portfolio components. In such cases organizations could benefit from

reviewing the prioritized portfolio components and checking them in terms of the capacity and capability for handling them. (Kämpfert & Schwarz 2018, 255.)

2.2.3 Resources

Project portfolio resources could be defined as all resources required to deliver the change initiatives that compose the project portfolio of the organization (Summerfield 2018, 326). Resources generally include funds, staff with certain capabilities, contractors, partners, materials, management oversight and so on. The available resources should be assigned to work in a manner that enables the purpose to be achieved in an optimal way. (Walenta 2018, 32.)

Although people are a vital resource, are other resources critical, because they are often more finite and less flexible to deploy than people (Summerfield 2018, 325).

Project portfolio management has the following components (Summerfield 2018, 326):

- Creating an understanding of the resources required for the proposed project portfolio by means of estimates and forecasts;
- Assessing the resources that are or can be made available inside and outside of the organization;
- Understanding the resources that are available to fulfil the project portfolio requirements;
- Taking required actions in order to manage the gap between supply and demand and ensure that the planned project portfolio is effectively resourced.

Resource allocation is one objective of project portfolio management. Resources are shared and allocated to projects and programmes across the organization. The project portfolio management team examines the project and programme proposals and their resource requirements. Resource allocation is divided in two processes of resource availability assessment and resource assignment. (Thiry 2014, 55.)

Resource availability assessment requires the comparison of supply and demand. Demand concerns, not only the resources required by all the programmes and projects that are part of the project portfolio, but any proposals that have been approved for implementation. Supply concerns the available resources in terms of number, capacity, competence and capabilities. This obviously concerns human resources, but also

financial resources. The supply must always be greater or equal to the demand. However, if there is a great surplus of available resources over the resources required, the organizations should review its selection processes to enable more projects or programmes to be implemented. (Thiry 2014, 55-56.)

Resource assignment means that of project and programme managers define the key resources required and available for each project or programme. This iterative process should be continually updated, and projects and programmes reprioritized if necessary. (Thiry 2014, 56.) Resource assignment to project portfolio tasks should reflect the portfolio priorities with a focus on the deployment of resources on the most strategically important issues. A clear and accurate understanding of the resource requirements of all categories is needed to deliver the project portfolio goals and benefits successfully, and to assess the relative merits of different initiatives. (Summerfield 2018, 327.)

Before the budget for a project execution has been approved, a chosen portfolio of projects is merely an intent. Therefore, to produce good results project portfolio management and finance processes require synchronization. Besides resource allocation, another influencing factor is the ownership of the budget. If the organizational budget can be divided an independent sub-portfolio for this entity can be established. Change initiatives are often held centrally and kept separate from the operational budget, which can enable effective project portfolio management, but undermine project managers' individual autonomy. To avoid this an option is to leave the budget in the operational units but run a project portfolio management process centrally with company-wide governance. (Molitor 2018, 177.)

The role of the resource manager is often included in an enterprise portfolio management office (EPMO). Where the role of portfolio resource manager does not exist, much of the resource management activities may fall to the project portfolio manager. Close collaboration with many functions (e.g. human resources management, line management for people, assets management for plant, buildings, machinery) is typically needed, wherever the specific responsibilities sit. (Summerfield 2018, 329-330.)

Key success factors for effective project portfolio resource management include (Summerfield 2018, 333):

- Developing and maintaining the project portfolio resource management framework, reflecting best practice and the needs of the organization;

- Ensuring that the leadership is committing to the provision of the resources required to deliver the outcomes and benefits, if new initiatives are included in the project portfolio;
- Educating the project portfolio management community in the organizational approach to resource management;
- Keeping the balance of supply and demand for defined resources under review and managing the risks and issues that emerge.

2.2.4 Roles and Responsibilities

In order to implement successful project portfolio management several roles need to be established and the responsibilities defined. The principal roles are:

- Project portfolio governance body;
- Project portfolio sponsor;
- Project portfolio manager;
- Project programme managers;
- Project managers;
- Portfolio management office (PMO) (Farahmandlou 2018, 169).

The project portfolio governance body is typically represented by business executives or business managers having the authority to make strategic portfolio decisions. The responsibilities include providing guidance for supervising and controlling the portfolio, making decisions on investments, defining the key performance targets and defining priorities for the project portfolio. (Farahmandlou 2018, 169.)

The portfolio sponsor role is normally represented by a business manager or functional manager within the organization, with the purpose of acting as an interface between the project portfolio governance body and the portfolio components. The main responsibilities include facilitating the required changes, resolving escalations, ensuring the fulfilment of the portfolio goals and benefits as well as strategic alignment of the goals. (Farahmandlou 2018, 170.)

The portfolio manager aims to optimize the results from project investments across a portfolio. This is done by improving the alignment of projects with the strategy and

ensuring that resources are made available in sufficient quantity and necessary quality. The main responsibilities are:

- Supporting processes of selection, prioritization, balance and termination of project portfolio components to ensure alignment with the strategic goals;
- Screening and analyzing the project portfolio and making corrective recommendations to optimize the portfolio alignment with the evolving goals and changing business conditions;
- Conducting portfolio assessments and providing regular portfolio performance reports to stakeholders;
- Identifying risks and issues at the portfolio level that could have an impact for portfolio performance;
- Supporting the decision-making process by timely and consistent performance reporting of portfolio components;
- Selecting programmes or projects with high-risk exposure for review by senior management;
- Evaluating critical risks and issues, and escalating further to the portfolio governance body;
- Providing relevant information to the programme and project managers to support the lessons learned, and process and facilitate learning among other portfolio components. (Farahmandlou 2018, 170.)

Programme managers interface with the portfolio manager, the portfolio governance body and the portfolio sponsor. To manage the programme, so that the intended benefits are achieved, includes ensuring that the risks and issues are under control. Regular monitoring and reporting of the critical risks, issues and programme performance must be established and the results made available to the portfolio manager. (Farahmandlou 2018, 171.)

Project managers serve as the interface between the portfolio manager and programme manager to manage the project deliveries. The main contribution of the project manager is the assessment, reporting and escalation of critical risks and issues to the portfolio manager and programme manager, together with the management of dependencies of the project. (Farahmandlou 2018, 171.)

The portfolio management office reports to the top management and is established to manage the following for projects and programmes: investment process, strategic

alignment, prioritization and selection, progress tracking and monitoring, and optimization and benefits realization. Portfolio offices provide information and support enabling decision-making for all business change within an organization and for projects undertaken by the organization externally. (Arnaz-Pemberton 2018, 184.)

2.3 Resource Allocation Process Model

The resource allocation process (RAP) introduced by Joseph Bower in 1970 and extended by Robert Burgelman 1983, has proven to be among the most enduring contributions to the field of business strategy (Peteraf 2005, 439).

The model was developed to describe the allocation of capital. However, the model can be used to analyze the allocation of other critical resources, including operating funds, human resources, key people, and information. (Bower 2005, 37).

Before examining the RAP model further, the characteristics of resource allocation are presented in the Table 1.

Table 1. Characteristics of resource allocation (adapted from Bower, Joseph L. et al. 2005, 9).

Structure	**Process**
Knowledge is dispersed across levels and units	Processes are dispersed across levels and units
Power to make commitments is dispersed across levels and units	Activities of all sorts proceed simultaneously
Roles are narrowly defined and inevitably in conflict	Processes are iterative

Dispersion of knowledge means that managers with different perspectives contribute to the same decision-making process. In many cases knowledge is subtle and complex enough not to be exchanged or analyzed easily, making reconciliation of contested knowledge a social exercise, based on trust and mutual understanding. (Bower, Joseph L. et al. 2005, 9-10.)

Dispersion of power to make commitments refers to the fact that a careful top management might not choose to contravene positions taken by key executives closer to the ground, even if power to allocate resources is formally centralized. (Bower, Joseph L. et al. 2005, 10.)

Each manager considers different facts, usually those most relevant to success in one's own operating role. From individual perspectives, despite conflicts, each might be right. (Bower, Joseph L. et al. 2005, 10.)

The process of resource allocation is simultaneous across levels and iterative over time. The notion of a centrally managed strategic process depends on control that rarely exists. Facts are always being created at operating levels that enhance or undermine corporate initiatives. Decision making evolves over time as events play out. Once new options or critical inputs emerge, the situation needs to be revisited, making the crafting of strategy a continuous iterative process. (Bower, Joseph L. et al. 2005, 10-11.)

The processes that lead to strategic outcomes are remarkably stable even in changing environments. (Bower & Gilbert 2005, 439.)

In conclusion the structure and process of resource allocation have important implications for strategy (Bower, Joseph L. et al. 2005, 12-14):

- The allocation of resources and execution of process shapes strategic outcomes. When wishing to manage strategic outcomes, managers need to manage resource allocation process and the forces that shape it.
- Operating managers can play a significant role in shaping strategic outcomes, because all those involved in resource allocation will influence the strategy. The importance of commitments at lower level in the organization is repeatedly revealed in studies.
- The structure of resource allocation shapes strategy. This statement is true, because the reality of strategy is the result of resource allocation, and because resource allocation is influenced by structural context.
- There is almost always true uncertainty about which decisions will have strategic consequences. Management participation in a stream of decisions provides multiple opportunities to calibrate judgement and build, test, and deepen trust.

The three processes of the RAP model represent the answers to three questions: the way content is defined, the way impetus for commitment is developed, and the way

structural context shapes the first two (Bower 2005, 33). The original RAP model in the table 2. is presented next.

Table 2. The original RAP model (Bower 2005, 34).

	Definition of Content	**Impetus for Commitment**	**Structural Context**
Corporate	Corporate mission, financial goals and objectives, aggregate policies; may include technical and economic strategy	Commitment of funds and other resources	Designs formal organization, measures of business and managerial performance, incentives, and the work environment
General Manager in the Middle	Integrates corporate and business unit thinking, translates	Sponsors projects and plans that fit, slows or rejects those that don't; competes for resources	Interprets and adopts to business-unit needs
Operating	Business-unit/functional activity and policies. Proposes business-unit strategy, new investments	Champions proposals for new business, new capability, new capacity	The rules of the game

Definition of a content is the process by which the basic technical and economic characteristics of a proposed investment are determined (Bower 2005, 28).

Impetus for commitment is the willingness of a general manager in the middle to sponsor a project, the force that moves a project towards funding (Bower 2005, 30).

Structural context of the organization is what determines the content developed by specialists and the decision to provide impetus for projects by general managers in the middle (Bower 2005, 32).

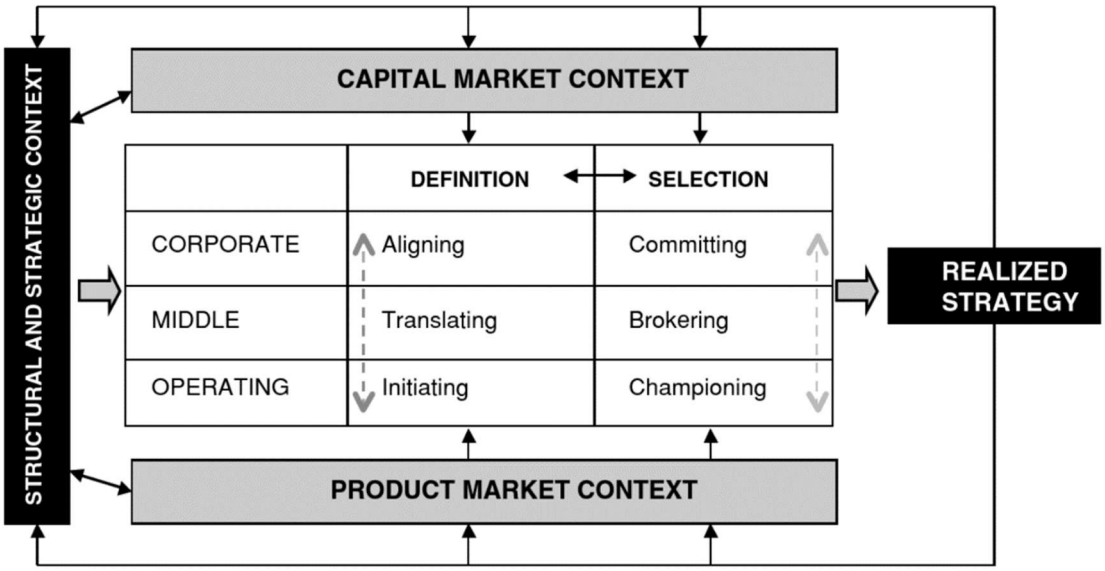
However, structural and strategic contexts are not the only forces that direct the bottom-up dynamics of resource allocation (Bower and Gilbert 2005, 440). The sources of influence can be internal or external and are described in Table 3 below.

Table 3. Forces that shape bottom-up process (Bower and Gilbert 2005, 441).

Internal forces	**External forces**
Structural context	Customers
Strategic context	Capital Markets
Cognitive frames	

Internal forces of structural and strategic context and cognitive frames, as well as external forces of customers and capital frames, can produce a strong conservative bias on the types of projects that are selected in the organization. Many of these forces that shape the bottom-up process can be managed if they are understood. (Bower and Gilbert 2005, 439-441).

The revised model of resource allocation in Picture 1 has four main revisions. First, the set of forces that influence definition and selection as separate from the processes they shape are formally identified. Second, forces beyond structural and strategic context have been included. Third, formal inclusion of firm-level outcome: the resource allocation process leads to the realized strategy of the organization. Finally, the new model acknowledges important interactions from which the feedback loop from realized strategy is the most visible one. (Bower & Gilbert 2005, 444-445.)



Picture 1. A revised model of resource allocation (Bower, Gilbert 2005, 444).

Definition is needed for basic problem-solving. Often in the beginning of projects or plans there is a gap between where the business is positioned and where its leadership believes it needs to be. A plan must be initiated by exploring the technical, financial, and market characteristics. Next, the plan is translated to other levels of the organization. Finally, the plan or project must be adjusted to align with the corporate strategy, or that strategy evolves to fit with the plan. Each phase of a definition process can occur at any management level. (Bower, Gilbert 2005, 445-446).

Also, a selection process occurs at all levels of the organization. Three steps appear quite stable. Someone must be willing to announce and promote an idea. The idea must get support from the general managers, who assess the prospects of proposed investments. The process of committing large sums or key resources requires at least formal corporate approval whether the commitment is already a reality. In many cases operating managers have held significant power over the selection process. This is sometimes done by denying operating time and attention to new projects. In this sense, strategy realization can be determined by the selection process deep in the operating levels of the company. (Bower, Gilbert 2005, 447-448).

The ability to manage ongoing operations with competitive vigor while driving innovation that undermines those same operations is rare. Solving the selection challenge does not restrain recurring problems in the definition process, especially as the resource allocation

process iterates over time. However, corporate managers can use the selection process to drive definition outcomes less obvious. Intervention can be used to drive changes in the bottom-up process. But whether reframing context or directly intervening in the definition and selection process, the change requires active management. (Bower, Gilbert 2005, 448-452).

2.4 Developing Project Portfolio Management

Several signs could indicate that the project portfolio management requires improvement and that the strategy is not fully realized:

- Many former strategic objectives projects are still active;
- Some projects are active, but stopped somewhere and neglected;
- Most projects are late compared to their baseline due dates;
- Resources are overbooked and overworked;
- Readiness to start new projects based on new strategic objectives is limited;
- New ideas are not assessed and aligned to the strategy;
- Most strategic objectives are missed or not aimed (Floegel & Metoui 2018, 272).

Many maturity models have been developed in the domains of project, programme and portfolio management. The results of a maturity assessment help the top management to make decisions about the needed development. (Wagner 2018, 361.)

Three internationally recognized models exist that assess the organization's maturity in managing projects, programmes and portfolios:

- International Project Management Association's (IPMA's) maturity assessment model IPMA Delta;
- Project Management Institute's (PMI's) Organizational Project Management Maturity Model OPM3;
- P3M3 Portfolio, Programme and Project Management Maturity Model from AXELOS. (Wagner 2018, 363.)

The overview process for developing project portfolio management in an organization is summarized in Figure 2.

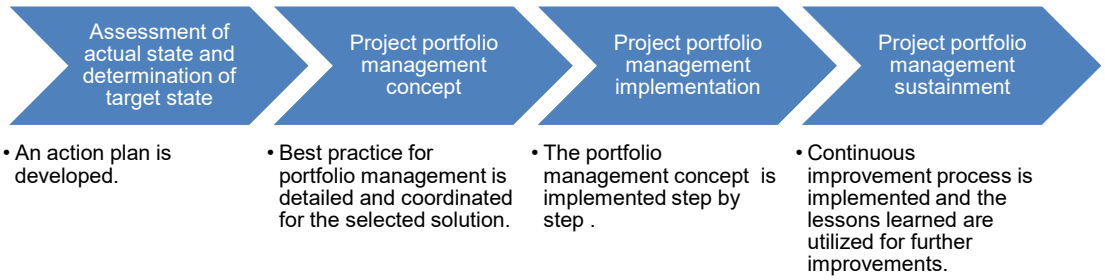


Figure 2. Overview of the phases and activities for developing project portfolio management (adapted from Tiba Managementberatung GmbH, Wagner 2018, 365).

Next, the phases and activities are discussed in detail.

Assessment of Actual State and Determination of Target State

The assessment stage is where the actual state of project portfolio management will be analyzed by internal or external assessors using the chosen maturity model. After assessment, the target state can be established regarding the project portfolio management. The outcome of this stage is an action plan. (Wagner 2018, 365.)

In practice the assessment can include checking available documents, interviewing project portfolio management stakeholders or observing the practice of project portfolio management (Wagner 2018, 366).

As an example, IPMA Organisational Competence Baseline defines seven questions that IPMA Delta uses for the assessment of the project portfolio management (Wagner 2018, 365).

- Does the organization define the role of a project portfolio and its contribution to achieve both the organization's and the project, programme and portfolio's missions, visions and strategies;
- Does the organization provide a standard for portfolio management (e.g. processes, methods and tools;
- Does the organization ensure that selection and prioritization of the projects and programmes in a portfolio is aligned with the organization's overall mission, vision and strategy;
- Does the organization ensure the balancing and prioritization of all projects and programmes in a portfolio, taking account of the available resources;

- Does the organization have a process for consolidating the progress reports of projects and programmes at the portfolio level and reviewing them on a regular basis;
- Is the portfolio management standard accessible to, understood and applied by all staff and managers;
- Do all users of the portfolio management standard provide feedback and suggestions for continuous improvement? (IPMA Organisational Competence Baseline 1.1 2016, 82-83.)

Project Portfolio Management Concept

The concept stage elaborates on future solution scenarios, considering the findings on the assessment of actual state and determination of target state. Concepts including, but not limited to organization, people, processes and methodology, and tools need to be developed based on the chosen approach and perhaps by making use of best practice standards. (Wagner 2018, 366.)

There are many extensive standards for project and programme management, including national and international, generic and sector-specific, process-oriented and competence-based. Project portfolio management is quite a new approach gaining more recognition since the early 2000s. Therefore, only a few best practice standards are available for project portfolio management. (Wagner 2018, 63.)

Project portfolio management is all about people and the work they do. Human competence is at the core of competence-oriented standards. Competence-oriented standards do not describe detailed activities for all process steps of project portfolio management and are typically not intended to be used as process models or methodology. Competence development through training and other ways can provide relevant best practices. (Wagner 2018, 63-64.)

For clarity, the prominent international standards by the international project management association (IPMA), the International Organization for Standardization (ISO), the Project Management Institute (PMI) are introduced next.

The IPMA Individual Competence Baseline Version 4.0 for Project, Programme and Portfolio Management is a standard for individual competence in project, programme and portfolio management. The goal with this standard is to enrich and improve the

individual's competence in project, programme and portfolio management and to provide an inventory of competences. (IPMA Individual Competence Baseline 4.0 2015, 11.)

The IPMA Project Excellence Baseline Version 1.0 for Achieving Excellence in Projects and Programmes is a standard designed to promote excellence in managing projects and programmes. The IPMA PEB baseline is derived from Total Quality Management (TQM) and related models. The main purpose with the standard is to describe the concept of excellence in managing projects and programmes. (IPMA Project Excellence Baseline 1.0 2016, 5.)

The IPMA Organisational Competence Baseline Version 1.1. for Developing Competence in Managing by Projects standard defines the foundations of the concept of organizational competence in managing projects. The standard offers a holistic approach for organizations to strengthen their management of projects, programmes and portfolios. (IPMA Organisational Competence Baseline 1.1 2016, 19.)

The ISO 21500 Guidance on Project Management is a process-oriented standard that provides guidance on concepts and processes of project management (ISO 21500 2012, 46).

The ISO 21504 Project, Programme and Portfolio Management – Guidance on Portfolio Management provides guidance on the principles of project and programme portfolio management (ISO 21504 2015, 4).

The ISO 21505 Project, Programme and Portfolio Management – Guidance on Governance is a standard developed for the governance of projects, programmes and project portfolios (ISO 21505 2017, vi).

The Guide to the Project Management Body of Knowledge (PMBOK Guide) by PMI describes work as being accomplished by processes (Wagner 2018, 68).

The Standard for Portfolio Management is also a process-oriented standard, where all processes are outlined with their inputs, tools and techniques, as well as the outputs. (Wagner 2018, 68-71.)

International standards are typically very generic as they are intended to fit all project portfolios and organizations, therefore the standards should be used as a guidance for developing situation-specific solutions (Wagner 2018, 71-72).

Stakeholders should be included in developing the project portfolio management concept or otherwise the results may not be accepted during the implementation. Agile methods can be used for achieving quick wins and by involving the users at the early stage. Top management should also be involved to receive feedback how the concept fits their expectations as well as to the overall vision, mission and strategy. Several choices should be given to top management, together with economic effects and implications for achieving the organization's strategic objectives. (Wagner 2018, 366.)

Project Portfolio Management Implementation

Typically, the implementation is started with a pilot application in one area of responsibility and resulting in evaluation whether the concepts work and how people adopt newly designed solutions. Several rounds of development might be required to adjust things that did not work. (Wagner 2018, 367.)

Activities of the project portfolio manager should serve the goal of providing appropriate information to stakeholders timely and integrating the data across the project portfolio components. To ensure that project deliverables are adopted, it is important that project management is obliged to demonstrate to the organization the benefits realized as a result of the project completion. (Floegel & Metoui 2018, 277-279.)

Newly designed project portfolio management may need to be introduced to people, thus the implementation process should include communications, training and coaching. Ensuring stakeholder engagement is important, thus valuable information can be received by asking feedback. Implementation should be supported by change management activities to deal with possible changes in culture, leadership behaviour or even with conflicts and crises. (Wagner 2018, 367.)

Change management focuses on the acceptance of a new process or solution. A detailed description of the desired state is needed for people to understand why the change is necessary and what is in it for them. (Horlebein 2018, 336.)

Project Portfolio Management Sustainment

Regular feedback loops, systematic utilization of lessons learned, performance evaluation against predefined KPIs and continuation of coaching and training will help to achieve a sustainable solution for project portfolio management (Wagner 2018, 267).

In principle improvement and learning cycle follows a four-step management method, where acronym PDCA stands for plan, do, check and act (Figure 3). This approach leads to a process of continuous improvement. (IPMA project excellence baseline 1.0 2016, 45.)

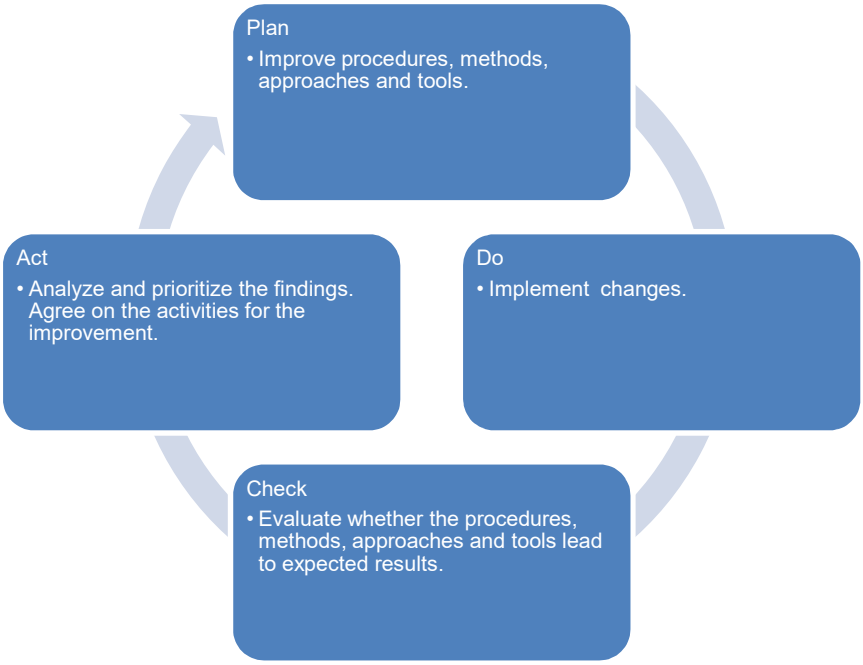


Figure 3. PDCA cycle of continuous improvement (adapted from IPMA project excellence baseline 1.0 2016, 45).

In order to run project portfolios appropriate to their organization's guidelines, project portfolio managers need to have perspective competencies that address the contexts of the project portfolio, people and practice competences that address personal and social topics and portfolio competences that address the specific practice competences for managing portfolios. (IPMA Individual Competence Baseline Version 4.0 2015, 283.)

Specifically, education and training of the project portfolio managers are a key factor for effective project portfolio management. Also, continuous progress requires a clear ownership. (Floegel & Metoui 2018, 275-276.)

Effectiveness in project portfolio management means realization of the intended strategic objectives and benefits, optimal use of the resources, transparency regarding the project portfolio activities and the status of all projects and support of the decision-making process of senior executives (Wagner 2018, 367-368).

2.5 Conceptual Framework

This chapter summarizes and discusses the literature review findings. The conceptual framework (Figure 4) illustrates cyclical progression that results in project portfolio and requires project portfolio management throughout the process.

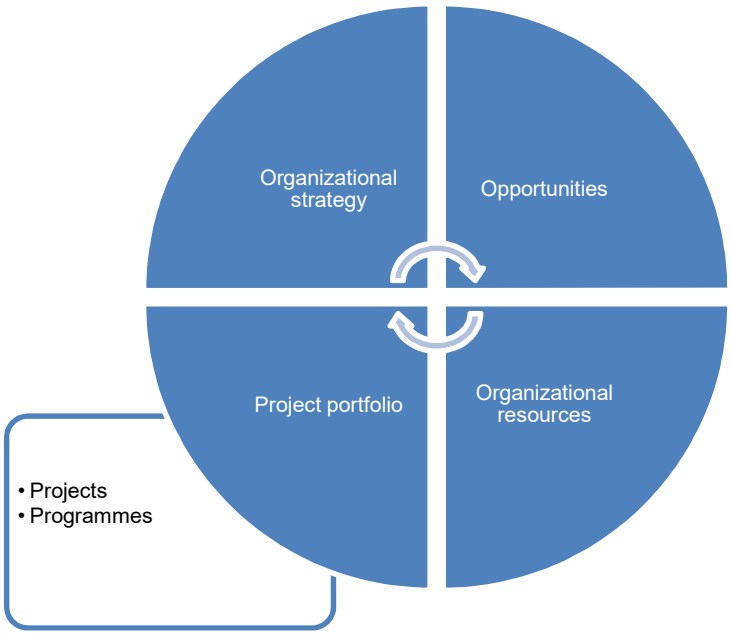


Figure 4. Dimensions of project portfolio management process.

First, every project, programme and project portfolio should start to satisfy established strategic objectives (Sedlmayer 2018, 9). Approach to strategy, whether emergent (Mintzberg 1978) or rationalist (Drucker 1985), determines how to set up project portfolio management. However, there is no universal approach to implementing a strategy. A sound project portfolio management process leads to strategic alignment, where all elements of business support fulfilment of its long-term purpose. (Sedlmayer 2018, 14). Strategic control system process allows senior management to monitor strategic progress and determine whether a business unit is performing satisfactorily (Goold & Quinn 1990, 43).

Second, to find the opportunities and to support long-term success a structured process is usually implemented (Kämpfert & Schwarz 2018, 249). Selection criteria for project portfolio components should be defined so that they are useful for measuring the fulfilment of strategic objectives, and that the portfolio components can be evaluated and

prioritized based on the strategic objectives. In addition, it is important to understand where the dependencies between different components lie, and which projects or programmes are mandatory. (Kämpfert & Schwarz 2018, 251-252.)

Third, project portfolio resources can be defined as all resources required to deliver the project portfolio components (Summerfield 2018, 326). Resources are shared and allocated to projects and programmes across the organization through resource allocation, which is one objective of project portfolio management (Thiry 2014, 55). A chosen portfolio of projects is merely an intent, before the budget for project execution has been approved (Molitor 2018, 177). Two broad conclusions can be drawn from the studies of the resource allocation process. The processes that lead to strategic outcomes are stable even when environments shift, and many of these forces that shape the bottom-up process can be managed if they are understood. (Bower and Gilbert 2005, 439.)

Finally, project portfolio managers use key performance indicators to evaluate how their portfolios are performing, because KPIs can provide direction to make appropriate decisions to control the project portfolio effectively (Dixon 2018, 215.) Commonly operational dimensions as scope, budget and schedule are measured. However, defining a non-operational performance baseline can be more challenging yet important. The non-operational baseline components are customer impact, team impact, organizational success and future preparation. (Floegel & Metoui 2018, 273-274.)

3 RESEARCH METHODOLOGY

This chapter represents the research methodology and material that was used to carry out this study. First, the research approach is introduced. Second, the data collection and analysis is explained. Third, validity and reliability plan is proposed.

3.1 Research Approach

Hirsjärvi et al. (2009, 137-138) write that the research should always have a purpose. The objectives of a research are usually to identify, explain, describe or predict phenomena. A research can include more than one purpose or objective.

The appropriate methods for the given study depend on the nature of the process being examined, as well as the interest of the researcher (Woodside 2010, 15).

The research strategy derives generally from the research scheme or the research problems. The research strategy refers to unique choice of research methods used to implement the plan. (Hirsjärvi et al. 2009, 132.)

According to Yin (2009, 2), case studies are the preferred method when “how” or “why” questions are being posed, the researcher has little control over the events, and the focus is on a contemporary phenomenon within a real-life context.

The case study is a traditional research strategy providing a detailed and intensive data. Usually a case study is about a person, a group of people or a unit, where the researcher examines processes in the natural settings to increase understanding of them. The case study combines data collected with multiple methods e.g. observation, research interviews and documentation analysis. (Hirsjärvi et al. 2009, 134-135.)

The opportunity for direct observations exists as a case study should take place in the natural setting. The observations can range from formal to casual data collection activities. Less formally, direct observations might be made throughout a field visit, including occasions, e.g. research interviews, during which other evidence is being collected. Direct observations cover events in real time and context. (Yin 2009, 102-109.)

The research interview is one of the most important sources of case study information. One type of case study interview is a focused interview. Duration of these interviews is

typically short, an hour, for example. The interview may follow a certain set of questions but remain open-ended and conversational. (Yin 2009, 107.)

Documentation as a source of evidence is relevant to many case study topics. Documents have an overall value for several reasons. They are stable and can be reviewed repeatedly and are not created as a result of a case study. Thus, they can be considered as unobtrusive. Documents are exact and helpful in verifying the correct spellings, references and details. (Yin 2009, 101-103.)

3.2 Data Collection and Analysis

This study combines data collected with multiple methods. Observation is used to form an overall understanding of the case organization. Documentation and tools are analyzed to map the current processes and practices that define the project portfolio management. Finally, with the data collected from the research interviews an extensive picture of the current state of the project portfolio management process is comprised. All data is used as an input for the proposal building.

The objectives of the data collection are:

a) to understand the current state of the project portfolio management process,

b) identify challenges in the current process,

c) find solutions to develop the process.

Data 1 consists of the observations done in the discussion with the project portfolio manager. During this stage initial data was collected to create an overview of the project portfolio management processes, what it means in practice, and what tools are used in the case organization. Data is compiled and documented into fieldnotes (Appendix 1).

Data 2 is composed of all the material used for documentation analysis. All tools and templates presented here were accessed through the case organization’s SharePoint, which is a web-based platform. Documents were collected and categorized on SharePoint site named Helsinki Plant worksite. This is an easy access platform for anyone working in the organization. The focus in the analysis is on how the tools and templates support the implementation of project portfolio management.

Table 4. Internal documentation.

	Name of the document	**Description**
Data 2a	Helsinki Plant Roadmap 2018-2020	Strategic objectives of the case organization during 2018-2020.
Data 2b	Steering Group Guidance Material	Guidance material for steering group members and project managers. Includes process chart of the Helsinki plant project and portfolio management process.
Data 2c	Project Portfolio_Helsinki Plant	Project portfolio tool in excel format.
Data 2d	Template_Project Proposal	Template for project proposal.
Data 2e	Template_Project Plan Presentation	Template for presenting project plan.
Data 2f	Template_Steering Group Presentation	Template for project follow-up to be presented at the steering group meetings.
Data 2g	Project Final Report	Template for project final report.

Data 3 consists of the research interviews, which are the primary data source of this study. The research interviews were conducted face-to-face, recorded and transcripted into text for further analysis. Language used in the research interviews was Finnish and necessary translations for this study were done by the author. A set of research questions (Appendix 2) were used to conduct the research interviews.

Table 5. Research interviews.

	Job title	**Date**	**Duration**
Data 3a	Production Planning Manager, Helsinki Plant	13.2.2019	30 min
Data 3b	Business Controller, Helsinki Plant	14.2.2019	20 min
Data 3c	Value Stream Manager (ATO & stock), Helsinki Plant	21.2.2019	30 min
Data 3d	Development Manager, Helsinki Plant	26.2.2019	60 min
Data 3e	Senior Value Stream Manager (special & heavy), Helsinki Plant	27.2.2019	25 min
Data 3f	Director, Helsinki Plant	5.3.2019	45 min

Production planning manager is nominated as a project portfolio manager and is responsible for the implementation and development of the project portfolio. A project portfolio manager proposes new projects to the factory management group.

Director, production planning manager, business controller, value stream manager (ATO & stock), and senior value stream manager (special & heavy) are all part of the the factory management group of Helsinki plant. The factory management group decides which projects are selected into the project portfolio, prioritized or closed.

Development manager leads the Helsinki plant lean process and method development organization. The lean process and method development team has 14 people working in development projects. Two of them are full-time project managers. This team executes most of the development projects at the Helsinki plant. Development manager is not part of the factory management group and reports to senior value stream manager (special & heavy).

All research interviewees (Table 5) work at the Helsinki plant and have or have had several roles in the project portfolio management process. Many had experience in working as a project manager or as a steering group member in factory development projects.

Besides business controller all research interviewees are in a supervisory position projects and have experience in resource allocation. Their subordinates work in factory development projects on a regular basis.

3.3 Validity and Reliability Plan

The main purpose of the research design is to help to avoid the situation in which the evidence does not address the initial research questions (Yin 2009, 27).

Because a research design is supposed to represent a logical set of statements, the quality of any given design can be judged according to certain logical tests. Four common tests are construct validity, internal validity, external validity and reliability. (Yin 2009, 40.)

Construct validity is especially challenging in case study research. It means identifying correct operational measures for the concepts being studied. Case study tactics are to

use multiple sources of evidence, establish chain of evidence and have key informants to review draft case study report. (Yin 2009, 41)

Internal validity is mainly a concern for explanatory case studies, seeking to establish a causal relationship, whereby certain conditions are believed to lead to other conditions. The second concern over internal validity concerns the problem of making inferences, basically every time an event cannot be directly observed. (Yin 2009, 43).

External validity deals with the problem of knowing whether the findings in a study offer a basis for generalization. Survey research relies on statistical generalization, whereas case studies rely on analytical generalization. However, the generalization is not automatic, and a theory must be tested by replicating. This replication logic is the same that underlies the use of experiments. (Yin 2009, 43-44).

Reliability can be achieved by demonstrating that the operations of a study can be repeated, with the same results. The goal of reliability is to minimize errors and biases in a study. Two specific tactics to overcome shortcomings are the use of a case study protocol to deal with the documentation and the development of a case study database. (Yin 2009, 40-45).

Imperative of accuracy applies to all phases of the research in order to adjust reliability on qualitative research. Circumstances of data collection should be presented clearly and truthfully. (Hirsjärvi et al. 2009, 232.)

4 CURRENT STATE ANALYSIS

This chapter introduces the tools and the templates in use, current state of the case organization's project portfolio management process, and the resource allocation practices. Finally, the development areas in the current project portfolio management process are presented.

4.1 Project Portfolio Management Tool and Templates

The main findings in the project portfolio management tool and the related templates are presented in the following.

Project Portfolio Tool

Currently, the project portfolio runs in Excel. It is administrated by the project portfolio manager, who updates the data and presents the file in a monthly factory management group meeting. The file contains four labeled sheets: initiative evaluation, Helsinki plant portfolio, resource pool, and summary.

The initiative evaluation sheet has three focus areas: direction, benefits, and investment. Each area contains several score points with a given estimation scale. Each initiative evaluation results into a total score that should help to decide whether the project should be started or not.

Information outside the score table is the process owner, project manager, project start/finish date, project lead time (calendar days), effective project manhours (7,5 h/man-day), possible in-house resources performing concrete tasks and critical path. The concepts of process owner, project manager and critical path are explained in detail.

Process owner is the person, who is responsible for the process and its resources and who, after the project, uses the results for driving his/her process.

Project manager is the person who manages the project and is responsible of fulfilling the schedule, budget and targets.

Critical path refers to those identified projects/initiatives that must be completed in certain sequential order.

The main and lower level focus areas of initiative evaluation are presented in Table 6 below.

Table 6. Initiative evaluation focus areas in project portfolio.

Direction Related	Benefits Related	Investment Related
- Strategic importance - Aligned with vision and next target state	- Business impact - Impact to customer satisfaction - Impact to internal efficiency - Impact to employee & staff satisfaction	- Cost to get work done including full-time equivalent (involvement in a project) - Probability to success (risk) implementation, changes - Execution capability (competent resources)

The latest updates on the initiative evaluation sheet are from 2013. It can be concluded that the initiative evaluation has not been done for the current projects in the project portfolio at all or in this tool. However, the focus points are still relevant and major changes are not needed to utilize this tool in the future.

All projects that are selected into the project portfolio are listed under Helsinki plant portfolio sheet. This is the main view of the project portfolio. Projects can be in definition, implementation or closing phases. The project portfolio sheet contains basic information such as project name, process owner, project manager and project phase (depending on the framework in use). Other fields cover the topics of project status (based on the KPIs of scope, cost and schedule), portfolio management issues, other risks and issues, planned and actual investments, and financial benefits. All information can be seen at a glance. Most of the data is illustrated either in text or numbers. Only status of scope, cost and schedule is indicated by color.

The data that is updated throughout the project and presented at the factory management group is presented in Table 7 below.

Table 7. Helsinki plant portfolio data.

Status	• Scope • Cost • Schedule
Portfolio Management Issues	• Resource conflict? • Schedule change requested? • Plant management group contribution needed?
Risk/Issue/Schedule Description	
Investments [euros]	• Planned • Actual
Financial Benefits [euros]	euros/year

The resource pool sheet is in the definition phase and contains very little information. The idea is to show a workload of each project manager in percentage. However, this sheet is not in use now. In order to make a good use of this feature, the sheet should be developed further.

The summary sheet provides selected information on all projects in the project portfolio. Estimated manhours show how many people are working in the projects full-time. Estimated lead times are shown in days and the sum of calendar years, when the projects are put on a timeline consecutively. The number of projects with critical path is mentioned. The section project management and ownership present both numbers of projects with named project managers and project owners. Also, the number of project managers and project owners in the need for competence training is shown.

In conclusion, the Helsinki plant portfolio sheet is in use whereas other sheets remain unutilized. Project portfolio management could profit from all features available. Especially, the development of resource allocation tool should be considered. The current draft is integrated in the Helsinki plant portfolio. However, any working solution, integrated or separate, would be an upgrade.

Templates

All development projects handled in the project portfolio are required to use standard project management templates. These standardized documents are created to guide the project managers and ensure that the needed information is available for stakeholders. The document templates in use are a project proposal, a project plan presentation, a steering group presentation and a final report.

The project proposal is a document that a project manager fills in and presents to the project portfolio manager. The key information fields are presented in Table 8.

Table 8. Project proposal.

Proposal information	• Proposed by • Proposal date • Knowledge owner
Project details	• Project name • Target process • Project manager • Project start date • Project completion date
Project alignment	• Strategic importance • Aligned with vision and next target state
Business case	
Project objectives	SMART principle: specific-measurable-achievable-realistic-time bound
Project costs [euros]	• Investments • Materials • Consulting
Project return [euros]	Financial benefits
Project benefits	

Strategic importance must be scored in the project proposal. The same scale as on the project portfolio initiative evaluation sheet is in use; no link to strategic areas, partly supporting some strategic areas, supports fully one or more strategic areas.

It is visible that resource allocation on the project proposal template concentrates on finance. The only human resource information that must be mentioned are a knowledge owner and a project manager. Typically, a project requires more human resources, thus should be allocated early on to avoid workload overlap.

The project plan presentation is a template that the project manager presents to the factory management group after a project has been selected into the project portfolio. It can be presented to other interest groups as well. The content of the presentation is:

- Business case
- Project organization
- Project metrics
- Project scope
- Project risk assessment
- Project decomposition and schedule
- Project budget
- Project control plan (meeting plan, communication plan)
- Appendices & support material

This template is more detailed and complement to the project proposal. The resource allocation of the people implementing the project is on view for the first time. The information of the project core team, project steering group and other important stakeholders should be available. The support material contains the risk checklist with the basic questions such as: Does this project compete with other projects for resources and priority?

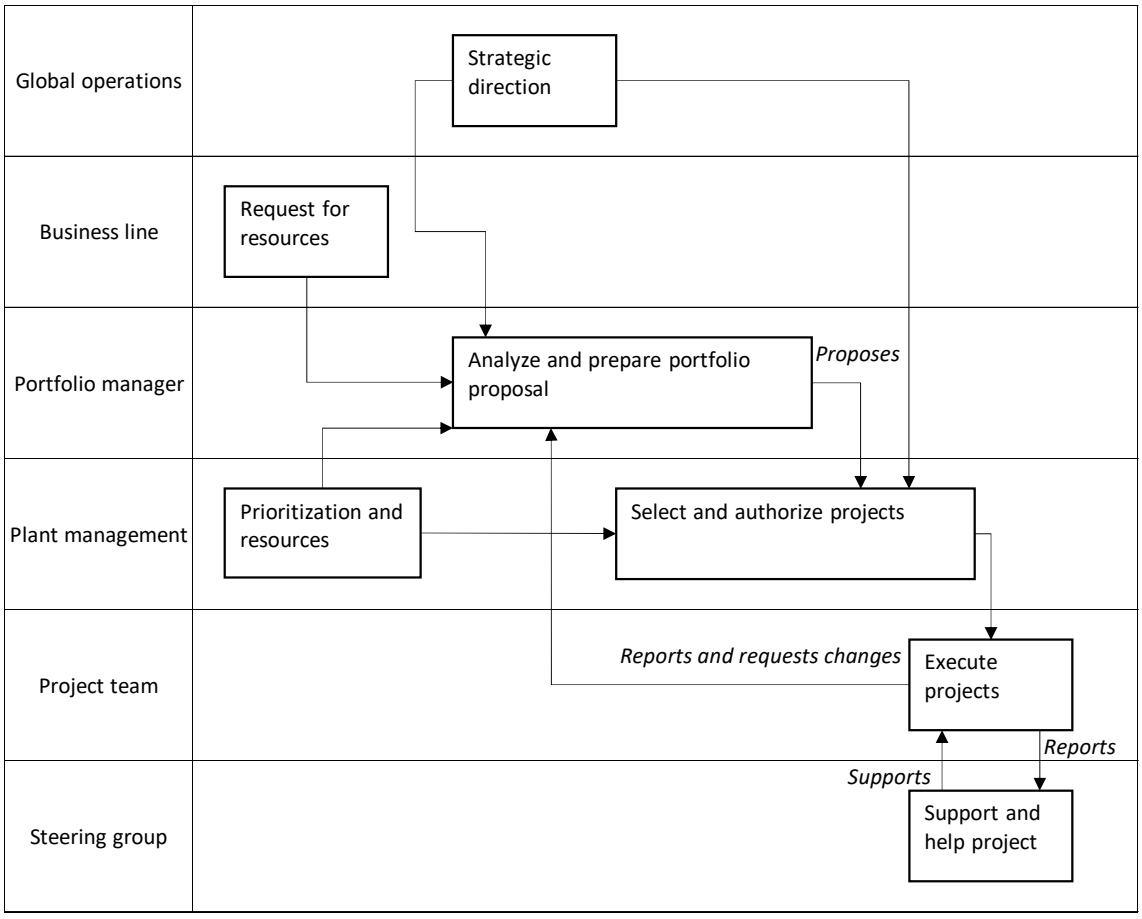
The steering group presentation template is filled by the project manager before a steering group meeting. The summary of a project's basic information is collected on one slide i.e. a project charter. However, the presentation concentrates on showing information of a project status. KPI status is defined for scope, cost and schedule. Any issues, risks or changes to charter should be mentioned. The decisions needed actions and next project milestones should be discussed and documented.

The project final report is required for all projects in the project portfolio. It is prepared by the project manager at the closing stage of a project. The final report contains e.g. the following information:

- Business case
- Project team and schedule
- Achievements and business impact (problem statement, project objectives, strategic linkage, and benefits estimate)
- Recommendations
- Lessons learned

4.2 Project Portfolio Management Process

Project portfolio management process is visualized in Picture 2 below.



Picture 2. Case organization's project portfolio management process.

The process levels of a global operations, a business line, a portfolio manager, a plant management, a project team, and a steering group are introduced next.

Global Operations

The strategic direction is set at the global operations level. Specific and concrete targets for the case organization are presented in a roadmap for Helsinki plant, which is made every three years.

When a target state defined in the strategy requires development, work is often done in projects. This can mean, for example starting a new product production that requires machine investments at the factory.

Business Line

Without resources there is no project. Work is needed to pursue the targets. All human resources for projects are requested from business line. Business line can be any organization where a person is working in.

Work is typically turned into a project, when a smaller scale development actions are not enough and cooperation between organizations is needed.

> *When resources from other organizations, or time, money, and layout changes are needed. When it is a big deal. It cannot be executed by one unit only, but everyone must be aware of the change, if it affects the whole value stream. Then it is a project level. Or the investment value is over 20 to 30 Keur*.
>
> Senior Value Stream Manager (special & heavy), Helsinki Plant

Portfolio Manager

The project portfolio manager identifies new projects and runs the initiative evaluation (Table 6). Based on this evaluation a project portfolio manager prepares a proposal for a factory management group.

New opportunities derive from two main sources, daily management and strategy. Typically, development projects are proposed after a practical problem is recognized. Additionally, there is a process for initiatives that may result in proposing a development project.

However, it is recognized that there could be more project components on reserve.

> *There could be a pile, twenty projects in line. - - We do not have such a list.*
>
> Director, Helsinki Plant

Plant Management

The factory management group gathers once a month for a project portfolio review to select, prioritize, and close the projects in the project portfolio.

Currently projects are selected based on the project proposals and discussions in the factory management group.

> *Naturally some projects have been dismissed. Many projects. If it is found that there are no resources to execute.*
>
> Director, Helsinki Plant

No tools for resource management are in use. It is discussed in the factory management group how many active projects can be included in the project portfolio.

> *From five to six projects is the maximum that I see can be executed at the same time. Otherwise resources will run out. Then I tell that some (projects) need to be closed before new ones can be started.*
>
> Director, Helsinki Plant

According to most of the research interviewees the project prioritization is done when needed. However, prioritization is rare.

> *Prioritization is done when needed. Now there are so few projects in the portfolio, and resources clearly assigned that there is no overlapping.*
>
> Value Stream Manager (ATO & stock), Helsinki Plant

Project Team

Each project has a nominated project manager, project team, and steering group that gathers as agreed to evaluate ongoing project status based on the key performance indicators of scope, cost and schedule, together with possible open issues.

A project team executes the projects and reports to the project portfolio manager and steering group. The project team also creates change requests to the project manager if there are any deviations in the project scope.

Based on the internal documentation and research interviews, the roles and responsibilities in the project portfolio management process are not extensively documented.

> *I do not think those are available, because I have not seen them.*
>
> Production Planning Manager, Helsinki Plant

Steering Group

The role of the steering group is to support the project team in executing the project. There are experiences that this is not always the approach.

> *It should be considered that besides making demands, also conditions should be created.*
>
> Senior Value Stream Manager (special & heavy), Helsinki Plant

At some point there has been a habit to go through a process chart before the first steering group meeting. The idea was to recall the process, roles and responsibilities among everyone involved in the project.

4.3 Resource Allocation

While having a functioning project portfolio management process, there is little focus on resource allocation. Based on research interviews, no common tools for resource allocation exist. However, there should be means for assessing, assigning and monitoring human resources working on development projects. A competence survey matrix is available in some teams, but resource assessment is typically done with a gut feeling. Instead of optimizing resources, the number of ongoing projects is kept low to avoid a situation where a project delivery fails due to lack of resources.

> *I am a bit conservative in that sense. Just because I want us to be able to deliver (projects). It is more important to me than being able to say that we*

> *have ten projects running. I rather have five projects finished than ten projects not finished.*
>
> Director, Helsinki Plant

Resource Assessment

Every project proposal should contain a budget estimate. Sometimes it is difficult to estimate how much a project will cost if there is no previous experience with similar projects.

> *In some development projects, for example Assembly Stream Fine Loading Project, we had no idea how much it wouldl cost. - - We hope to stay under few kilo euros, but what the cost will be, we still do not know for sure.*
>
> Production Planning Manager, Helsinki Plant

The Helsinki plant has a yearly determined investment budget. The investment budget is controlled regularly and is generally used in full. An investment often gains favorably to its cost. Each investment goes through an approval process, which requires a repayment calculation. An approval is needed also in those cases where a project scope is changed, and a project budget must be increased. When grounds for increase exist, extra budget is usually approved. The most expensive development projects are typically machinery investments that might cost a million euros or more. The implementation of such projects depends on the prevailing investment budget.

> *We cannot decide in the factory management group if we take this million-euro machine or not, because first I need to get an approval. It goes all the way to the CEO to get an approval. We can decide to propose it, but we cannot decide that it is going to happen.*
>
> Director, Helsinki Plant

However, there is a little financial follow-up for the actual costs of a project. Follow-up is limited to the procurement costs versus the investment budget.

> *There is little reporting on how much a project has cost. The salary costs of people are not calculated. Financial follow-up is poor.*
>
> Business Controller, Helsinki Plant

The Helsinki plant roadmap 2018-2020 sets the direction for the development projects needed. However, the investments of the development projects are not estimated altogether or earmarked due to a separate budget approval process. Thus, there is no clear strategic overall plan for implementing the targets in the roadmap.

> *Every project should have a cost estimate. - - Every fall, when we create a budget for the next year, we could consider that an executing roadmap, requires x euros investment budget.*
>
> Development Manager, Helsinki Plant

Human resource assessment is based on an open dialogue. The idea is to find representatives for the expertise on the topic and project stakeholders. There is no tool for workload assessment. The aim is to avoid a situation where a person has too many projects to handle. Also, daily operational tasks might be such that there is no real possibility to commit in a project. This might have a negative impact on personal wellbeing. Productivity can be affected, when the project is not executed on time due to lack of resources.

> *On the personal level a risk is work overloading. - - On the project delivery level, the challenge is not being able to manage workload within working hours. Or not being able to concentrate enough on an operational task.*
>
> Senior Value Stream Manager (special & heavy), Helsinki Plant

The need for other resources such as floor space at the factory is agreed on during the project proposal phase. People in the factory management group are in a deciding position for this sort of issues. Planning and risk evaluation are needed to avoid production interruption.

> *For example, Helsinki Plant Warehouse Automation Project did not go so well. - - New things were built and old taken down. - - However, it is rare to have a moment when production can be stopped. - - And how it turned out has probably brought caution for this year and in selection of projects to avoid interruption in the production.*
>
> Production Planning Manager, Helsinki Plant

In one of the research interviews it was brought up that production interruption is a possible risk that should be considered, especially before a bigger development project at the factory is implemented. A project might cause delays in production when machinery is temporarily out of use. Also, in cases where e.g. an assembler is working in a project without a substitute it will likely affect the output negatively.

Resource Assignment

First, a factory management group decides on a project owner and a steering group for a project. After that, a steering group names a project manager. Finally, a steering group and a project manager compose a project execution team.

The only people working full-time on development projects are those working at the Helsinki plant lean process and method development organization. At the moment there are two project managers, who will be assigned to maximum two projects at the time. For other project team members, resource assignment is not that transparent, and people might not commit themselves to projects.

> *For project team resources there is no follow-up. It can be that some projects fight for the same resources. People just decide if they participate or not.*
>
> Development Manager, Helsinki Plant

One practical way to make people commit their time is to arrange meetings.

> *People are mainly dedicated to their operational tasks and it is challenging to find time for development work. Sometimes it is necessary to encourage them to take a break from the operational tasks. Meetings work rather well, because participation is expected and the time there will be used for that (development work).*
>
> Value Stream Manager (ATO & stock), Helsinki Plant

Sometimes resources are assigned without supervisor's approval.

> *Someone just gathers a project team and suddenly a name appears in a project plan.*
>
> Value Stream Manager (ATO & stock), Helsinki Plant

A project manager does not always have to be a process owner. Not only substance knowledge is needed to lead a project successfully. Sometimes people are assigned as project managers to give them an opportunity to gain experience.

> *In my opinion it is has been a good trend. Professional growth is enabled by having an opportunity to raise people as project managers, for example based on development discussions.*
>
> Senior Value Stream Manager (special & heavy), Helsinki Plant

4.4 Development Areas in Project Portfolio Management

All research interviewees find that the current tools and templates provide enough information for decision making at steering group and plant management group levels. The advantages of the standardized tools and templates are that they are easy to follow, give a structure to meetings and have essential information available. In addition, project managers typically provide information that is transferred verbally if any details are needed. Therefore, the recognized challenges are mainly related to the use of tools and execution of the project management process.

Table 9. Development areas and suggestions collected from research interviews.

Purpose	Select projects that align with the organization's vision and strategy.
	Specify projects that are defined in the roadmap.
Work	Collect project proposal pool.
	Use initiative evaluation tool.
	Pay attention to quality of risk analysis.
	Prioritize projects.
	Financial follow-up on long-term savings.
Resources	Create tool for resource allocation.
	Ensure competence of the project managers.
Other	Move project portfolio manager's role under Helsinki plant lean process and method development team.
	Provide instructions on how to use the tools and templates.

Improvements suggested by the research interviewees can be split in categories of purpose, work, resources, and other.

Purpose

Projects should be selected carefully and based on how well they support the implementation of the strategy and vision. Strategic importance can be evaluated by using the initiative evaluation tool.

Active planning and project specification are needed in order to advance the targets set in the Helsinki plant roadmap.

Work

There is a wish to have a reserve on project proposals that could be taken further in the project portfolio management process as soon as the resources are available.

Initiative evaluation is recognized as a practical tool that has not been in use lately. However, it is seen that project portfolio manager should have an active role in analyzing project initiatives and providing information to the factory management group.

More attention should be paid to the quality of a risk analysis, which according to research interviews is the area most poorly presented in projects on an average. Proper risk management requires competence from a project manager and variation in skills exists.

Project prioritization should be more active to ensure that the scarce resources are in the optimal use and correct projects are part of the portfolio. The current approach is to run projects sequentially rather than to close unfinished projects or prioritize them.

There should be a closer follow-up on long-term savings, if it has been one of the objectives in a project.

Resources

A tool for resource allocation should be created or purchased. Better control and visibility are needed to manage workload and dependencies of those people working in development projects. At present there are no suggestions which tools could be used.

Availability of competent project managers should be ensured. Training is a suggested method to improve project management skills. It is seen that competent project management can deliver projects effectively.

Other

It is highlighted by two research interviewees that the development manager should take the role and responsibilities of a project portfolio manager. Grounds for this suggestion is that the Helsinki plant lean process and method development team executes many of the development projects, so it would be natural to integrate the project portfolio manager's role into that organization.

Instructions on how to use the tools and the templates should be created. Comments from the research interviews highlight that the quality of information depends strongly on the project manager's competence and possibly previous experience. Clear instructions could decrease the variation of the information quality, e.g. when writing down a business case.

5 DISCUSSION

This chapter is a synthesis of the theoretical framework and current state analysis. The study proposes an answer to the research question, *why should resource allocation be integrated in the project portfolio management process?*

The key viewpoints discussed next are productivity, strategic planning, risk management, workload management and project team commitment. A solution is proposed for every viewpoint. Finally, an action plan for the resource allocation implementation is presented.

5.1 Productivity

The key performance indicators measured at the case organization are the operational dimensions of cost, scope and schedule. However, without proper resources a project is not likely to finish on time or stay in budget.

Resource assessment helps to see the availability of people. Projects can be assigned to those, who are free at that time to execute.

Besides operational dimensions of scope, budget and schedule, the baseline for measuring the portfolio performance should contain the non-operational baseline components, such as customer impact, team impact, organizational success and future preparation.

5.2 Strategic Planning

The Helsinki plant has a yearly determined investment budget, which is typically used in full. However, the budget is not currently earmarked for any projects in advance. A process for budget approval is run every time when a new investment project is proposed or a scope of an existing project changes and requires extra investments.

The Helsinki plant roadmap highlights targets and direction for the development projects. For the time being it is not estimated how much implementation of those change

initiatives would cost yearly altogether. At this stage costs refer to investment budget only as salary costs are not allocated on projects.

At the case organization, ideas for new projects derive both from the strategy and daily management. There should be also a way to estimate costs of the projects that are selected into project portfolio from the daily management.

Leaving the investment budget in the operational units could increase project managers' individual autonomy. Still a project portfolio management process can be run centrally with company-wide governance.

5.3 Risk Management

Production interruption must be planned in order to avoid unnecessary delays and negative effect on output.

Proper risk analysis related to the resources is needed, especially when implementing a project at the factory that can possibly affect production.

The project manager responsibilities include assessing, reporting and escalating critical risks, issues and dependencies to the project portfolio manager. By keeping the balance of supply and demand for defined resources under review the risks can be managed instantly as the issues emerge.

The role and responsibilities should be described and available for everyone in the process. Information flow is necessary to have a shared reality of the expectations of each role.

5.4 Workload Management

Projects sometimes fight for the same people and without resource allocation there is no control over people's workload. Most people in the case organization have their operational tasks and time spent on a project is not systematically reserved or measured. This can lead to a scenario where a person cannot manage either operational work or project related tasks. Work overloading may cause stress or even burnout. Then the wellbeing of a person decreases, and sick leave might be needed for recovery.

Human resources should be assessed early on at the project proposal stage. A project should be started only after people are assigned to the project with supervisor's approval. A proper tool for resource allocation can provide visibility in the availability. However, this does not eliminate the need for communication between supervisors and employees.

5.5 Project Team Commitment

People sometimes do not commit to the projects they have been assigned to, especially when their workload is high.

However, employee engagement has a direct impact on the project success and reversely lack of commitment can have a negative impact.

Project management must assess and manage the risk and ensure that the project has all the needed resources available in sufficient quantity and necessary quality.

Also, it is important to ensure that the plant level management is committed to the provision of the resources required to deliver the outcomes and benefits.

5.6 Action Plan for Resource Allocation Implementation

The process for developing project portfolio management is introduced in Chapter 2.8. The process starts with the assessment of actual state and determination of the target state. The outcome of this step is an action plan.

The seven questions defined in IPMA Organisational Competence Baseline were chosen to assess the practice of project portfolio management (IPMA Organisational Competence Baseline 1.1 2016, 82-83). The assessment reflects the data collected from the internal documentation, the research interviews and the observation.

The case organization defines the role of the project portfolio and its contribution to achieve both the organization's and the project and portfolio's missions, visions and strategies. Development projects and a project portfolio are the selected means to meet the roadmap targets of the Helsinki plant. The targets in the roadmap derive from the missions, visions and strategy set by the top management at the corporate group level. The challenge is to follow the plan and promote the roadmap consistently. The human

resource is scarce, and a budget is not earmarked for the development projects in advance but must go through a separate approval process.

The case organization provides a standard for project portfolio management. The process for project portfolio management is well-defined. Tools and templates are in use and were found to support decision-making. However, execution according to a defined process and development of the process has been lacking attention. The suggestion is to bring assertiveness in analyzing and preparing project proposals, resources allocation and project prioritization as it could benefit the project portfolio management process.

The initiative evaluation tool is created to ensure that selection and prioritization of the projects and programmes in a portfolio is aligned with the organization's overall mission, vision and strategy. Scoring for strategic importance should be done, but it was found that the initiative evaluation tool has not been in active use for the past couple of years. The current project portfolio manager has not focused on this activity. Also, the factory management group has not required the information the initiative evaluation tool could provide. The suggestion is to start using the tool again and in a consistent manner. More time and attention is needed in running the role of the project portfolio manager. The role and responsibilities of the project portfolio manager could be moved under the Helsinki plant lean process and method development organization.

There are challenges in the case organization in balancing and prioritization of all projects in the portfolio. Instead of prioritizing the projects in the portfolio, the number of active projects is limited to ensure the availability of resources. Currently there is also no visibility if the resources are in optimal use. The project portfolio management could be developed in the direction of not limiting the number of projects in the project portfolio but ensuring resources through resource allocation and prioritization.

The case organization has a process for consolidating the progress reports of projects at the portfolio level. Review is done on a regular basis at the steering group meetings. Steering group supports the project team, and in case there are any issues to be highlighted, a project manager reports to the project portfolio manager. When needed, the project portfolio manager will present these issues at the factory management meeting.

The portfolio management standard is accessible to and applied by all staff. One thing that requires focus is the description of the roles and responsibilities. There is no evidence that they are documented. It is suggested to revive the habit of going through

a process chart before the first steering group meeting. This should help with recalling the process, roles and responsibilities among everyone involved in the project.

Continuous development is one of the key targets highlighted in the Helsinki plant roadmap 2018-2020 and improvement and learning cycle used at the case organization. However, there were no indications that all users of the project portfolio management standard would provide feedback and suggestions for continuous improvement.

A clear plan should be created to describe how the targets set in Helsinki plant roadmap will be achieved with the means of project portfolio management. The initiative evaluation tool should be used in all projects to ensure that the projects with the most strategic importance are executed. A tool for resource allocation should be created. All steps defined in the project portfolio management process should be followed systematically. Project prioritization should be used for balancing the resources and ensuring that the right projects are being executed in correct order. The roles and responsibilities should be written down to add clarity and common understanding among stakeholders. Regular trainings should be arranged to make sure that every stakeholder is aware of the process. Lastly, it should be encouraged and recorded that all users of the project portfolio management standard provide feedback and suggestions for continuous improvement.

To follow through the whole process of developing project portfolio management, it is necessary to choose a project portfolio management concept. Next, the project portfolio management concept should be implemented step by step. Finally, implementation of a continuous improvement process is needed to evaluate and develop performance further.

6 CONCLUSIONS

This chapter consists of summary, managerial implications for future development, evaluation of the research, and closing words.

6.1 Summary

The purpose of this study was to have an insight of the requirements of a holistic project portfolio management process and suggest improvements to the current process. Early on, it was recognized that the key activity of resource allocation was lacking transparency and consistency.

The study was composed of two phases, literature review and case study. The outcome of the literature review was a conceptual framework, which served as a theoretical backbone of the study. The case study combined data from different sources that were collected with the means of observation, documentation analysis, and research interviews. Scoping of the thesis was started by discussing with the project portfolio manager. Next, the current state analysis was continued by examining the tools and templates in use. Third, the more detailed data of the project portfolio management process and practice was collected with the means of research interviews. Fourth, the key results from the current stage analysis were further discussed. Finally, the action plan was created by considering both the key results and the theoretical framework.

6.2 Managerial Implications

This study presented the benefits of resource allocation in project portfolio management process. Resource allocation steps were described in the existing project portfolio management process chart. However, resource allocation was not transparent or executed in a consistent manner. This was seen as a challenge from the viewpoints of productivity, strategic planning, risk management, workload management, and project team commitment.

The action plan for developing resource allocation was presented in Chapter 5.6. It should be noted that the action plan is the first step in the process for developing project portfolio management process. The whole process is described Chapter 2.8.

The steps for developing resource allocation in project portfolio management process are listed in the following:

- Create a clear plan describing how the targets set in the Helsinki plant roadmap will be achieved with the means of project portfolio management.
- Use the initiative evaluation tool for all projects to ensure that projects with the most strategic importance are executed.
- Create a tool for resource allocation.
- Prioritize projects to balance the resources and ensure that correct projects are being executed in correct order.
- Write down the roles and responsibilities to add clarity and common understanding among stakeholders.
- Inform the process to every stakeholder through regular trainings.
- Create a process for continuous improvement.

6.3 Evaluation of the Research

First, outcome versus objective is presented and second, reliability and validity of the study discussed.

The objectives of this study were to define activities of the current project portfolio management, and propose improvements on the project portfolio management process. As the writer of this study, I consider both objectives achieved. The activities of the current project portfolio are presented in the current state analysis. Several development areas on the project portfolio management process were recognized and improvements proposed.

The results of this study were based on the data collected from internal documentation, research interviews and through observation. The research design is represented in Chapter 1.4. Material and methods are presented in Chapter 3.2. Research reliability refers to repeatability of measuring results (Hirsjärvi et al. 2009, 231). All stages of this study have been explained and data documented to conduct the study with rigor.

In my opinion, the findings represented the description of a phenomenon, which were the key activities in the project portfolio management process with a focus on resource allocation benefits.

Case study was a suitable method for measuring what it was intended to measure. It is an appropriate approach when “how” or “why” questions are being delivered, and the focus is on a contemporary phenomenon within a real-life context.

Methodological triangulation involves using more than one method to gather data and should lead to increased research validity (Hirsjärvi et al. 2009, 233). In this study the data was collected with multiple methods and from various sources. Documentation, research interviews and direct observation have their comparative strengths and weaknesses and are highly complementary.

It is to be noted that as Woodside (2010, 33) writes, the use of mixed-methods in a case study research usually contributes to increasing accuracy and complexity rather than generality in a study. However, the theories of resource allocation benefits were tested and replicated previously. The studies by Bower et al. concluded that the structure and process of resource allocation have important implications for strategy. In addition, even in changing environments the processes that lead to strategic outcomes are remarkably stable.

6.4 Closing Words

Resource is a prerequisite in any project. This study highlights the importance of resource allocation in a holistic project portfolio management process. The proposed action plan is the first step in developing resource allocation in the process. A process for project portfolio management development is multistage. It is necessary to continue the work in order to develop resource allocation in the project portfolio management process further. The case organization has a target of operational excellence, which translates into continuous development of processes, quality and safety. This study contributes to achieving this target by proposing improvements in the current project portfolio management process. The challenge left for the case organization is to sustain the development.

REFERENCES

Arnaz-Pemberton, Emma-Ruth. 2018. The enterprise portfolio management office. The handbook of project portfolio management, 184-192

Bower, Joseph & Gilbert, Clark. 2005. A revised model of the resource allocation process. From resource allocation to strategy, 439-455

Bower, Joseph. 2005. Modeling the resource allocation process. From resource allocation to strategy, 26-37

Bower, Joseph; Doz, Yves & Gilbert, Clark. 2005. Linking resource allocation to strategy. From resource allocation to strategy, 3-89

Butler, Steve. 2018. Basic concepts and definitions of portfolio management. The handbook of project portfolio management, 3-8

Butler, Steve. 2018. Portfolio governance. The handbook of project portfolio management, 155-166

Dixon, Stuart. 2018. Key performance indicators and their role in portfolio management. The handbook of project portfolio management, 215-223

Drucker, Peter F. 1985. Drucker on management: playing in the information-based 'orchestra'. Wall street journal.

Farahmandlou, Afshin. 2018. Portfolio management roles and responsibilities. The handbook of project portfolio management, 155-166

Floegel, Jörg & Metoui, Helene. 2018. Evaluating and reporting portfolio performance. The handbook of project portfolio management, 271-282

Goold, Michael & Quinn, John 1990. The paradox of strategic controls. Strategic management journal 11:1, 43-57

Haberstroh, Martin. 2018. Portfolio-level risk management. The handbook of project portfolio management, 314-324

Hirsjärvi, Sirkka; Remes, Pirkko & Sajavaara, Paula. 2009. Tutki ja kirjoita. 19. edition. Helsinki: Tammi. 464 p. ISBN 978-951-31-4836-2

Horlebein, Michael. 2018 Portfolio-level change management. The handbook of project portfolio management, 334-342

IPMA individual competence baseline version 4.0. 2015. International project management association.

IPMA organizational competence baseline version 1.1. 2016. International project management association.

IPMA project excellence baseline version 1.0. 2016. International project management association.

ISO 21500 guidance on project management. 2012. International organization for standardization.

ISO 21504 project, programme and portfolio management – guidance on portfolio management. 2015. International organization for standardization.

ISO 21505 project, programme and portfolio management – guidance on governance. 2017. International organization for standardization.

Kämpfert, Knut & Schwarz, Alexander. 2018. Identifying, selecting and prioritizing the portfolio components. The handbook of project portfolio management, 248-257

Kaplan, Robert & Norton, David 2005. The office of strategy management. Harvard business review 83:10, 72-80

Mintzberg, Henry. 1978. Patterns of strategy formation. Management science 24:9, 934-948

Molitor, Elvira. 2018. Alignment with structures, systems and processes. The handbook of project portfolio management, 173-183

Peteraf, Margaret. 2005. Research complementaries: a resource-based view of the resource allocation process model (and vice versa). From resource allocation to strategy, 409-426

Sedlmayer, Martin. 2018. Delivering organizational strategy with portfolio management. The handbook of project portfolio management, 9-18

Summerfield, Alan. 2018. Managing resources at portfolio level. The handbook of project portfolio management, 325-333

Thiry, Michel. 2014. Managing portfolios of projects. The handbook of project management, 47-70

Wagner, Reinhard. 2018. Assessing and developing the maturity of portfolio management. The handbook of project portfolio management, 361-369

Wagner, Reinhard. 2018. Best practice standards for portfolio management. The handbook of project portfolio management, 63-72

Walenta, Thomas. 2018. The relevance of portfolios and portfolio management in today's organizations. The handbook of project portfolio management, 31-41

Woodside, Arch G. 2010. Case study research: theory, methods and practice. United Kingdom: Emerald Group Publishing Limited. 454 p. ISBN 978-1-84950-922-0.

Yin, Robert K. 2009. Case study research: design and methods. 4. edition. United States of America: Sage publications Inc. 219 p. ISBN 978-1-4129-6099-1.

Data 1, Fieldnotes

Name of the informant	Informant A
Position in the case company	Production Planning Manager, Helsinki Plant, (Project Portfolio Manager)
Date of the interview	19.10.2018
Duration of the interview	60 minutes
Document name	Fieldnotes
1. Current state of the Helsinki Plant Project Portfolio	Helsinki Plant development work and projects follow company targets and those set on Helsinki Plant Roadmap 2018-2020. Project portfolio tool is an Excel template and accessible in Sharepoint for everyone in the case organization. Templates in use: • Helsinki Plant Roadmap 2018-2020 • Steering Group Guidance Material • Project Portfolio_Helsinki Plant • Template_Project Proposal • Template_Project Plan Presentation • Template_Steering Group Presentation • Project Final Report Average project is executed in 3-6 months. Factory management group meets once a month or when needed to review project portfolio.
2. Improvement areas	Project portfolio tool is simple to use, but not very visual. Dependencies are not visible. Templates are not designed for projects executed with agile frameworks. There are not tools for resource allocation.
3. Challenges	Project portfolio tool and templates are not updated or developed since created in 2013. Project portfolio manager has no time due other priorities.
4. What is to be achieved with this study?	Purpose of this study is to have an insight of what is required to have a holistic project portfolio management process and suggest improvements to the current process.

Research Questions

Background information:

What is your work position?

How long have you worked in your current position?

What is your role and responsibilities in the project portfolio management process?

Project portfolio management:

Are you familiar with the current PPM process description?

Are the roles and responsibilities for PPM clearly presented?

How are the new project opportunities identified?

How is it decided which projects to include in the project portfolio?

Are the projects in the project portfolio prioritized?

What data is collected and stored from implemented projects?

Are the must-use templates (project charter, project status, standard agenda) used in every project?

Do the tools and templates in use provide sufficient information for decision-making?

Are there other ongoing development projects at the Helsinki Plant that are not included in the project portfolio? Why are those projects not included in the project portfolio?

Resource allocation:

How is resource availability assessment done? People, budget, space, tools…

How are resources assigned to projects?

What tools are used for resource allocation?

What are the biggest risks in resource allocation in the current PPM process?

Development:

Are there improvements in progress concerning PPM?

What improvements would you suggest to the PPM process?