Project Portfolio Management in Practice

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Abstract. This research investigates the approaches that organizations apply to implement project portfolio management (PPM). We have compared theory and practice to find out how organizations can benefit from PPM. The study finds that PPM consists of three tasks: (1) screening, selecting, prioritizing and allocating resources to project proposals, (2) monitoring and reprioritizing running projects, and (3) tracking and managing the realized benefits of projects. We have found a number of opportunities for improvement, since most investigated organizations do not adopt all three tasks. We have found that of the three approaches mentioned in the theory, our respondents use only two. Devoting more attention to the actual outcomes of projects can help organizations to improve their screening and selection process, as well as to take corrective action when intended outcomes are not attained.

Keywords: Enterprise transformation, project portfolio management, business cases, benefits mangement.

1 Introduction

Consider America Online, Inc. (AOL), a U.S. based Internet company. According to Dougherty [1]), AOL grew strongly during the 1990s and its management team in the early 2000s realized their project-based processes were too informal to support further growth. AOL wanted to ensure that its projects reflected strategy and business objectives. They wanted to select high-value projects and find the right mix and balance of projects. AOL also intended to improve accountability through quick and binding decision-making. By 2004, AOL had installed portfolio management teams across its business lines that gave it far more control over its projects and project portfolio. The result was a reduction in the yearly demand of project man-hours from around 200,000 to about 120,000 as well as an increase in return on investment (ROI) of the project portfolio as a whole. So, how did AOL realize a 40% reduction in man-hours while simultaneously improving its portfolio ROI? Essentially, they have asked and answered two questions: what projects should we take on and what projects should we drop?

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Project portfolio management answers these questions by making an inventory of current and proposed projects and by developing criteria that enable a ranking and comparison of these projects. It is an iterative process that must continually keep track of the project portfolio to ensure fit with business objectives. Taking into account the entire portfolio of projects and interdependencies between projects allows organizations to optimize the contribution of all projects taken together to the overall welfare and success of the organization, as demonstrated by the example case of AOL [2].

Project portfolio management is essential in enterprise transformation, as it enables organizations to manage the transformation in a controlled and justified manner. Typically, enterprise transformations are conducted through a series of projects, programs and activities. Planning and managing these is complicated, and allows for mechanisms that take into account interdependencies, (financial) benefits and control structures.

Research on portfolio management started in finance. Markowitz [3] was among the first to construct a model for securities portfolio selection (dubbed modern portfolio theory). He presented the idea of an 'efficient frontier': an optimal balance of expected returns and variance of returns. Halfway through the 1990s, researchers and practitioners became more interested in portfolio theory geared towards projects [4]. Project portfolio management is defined as "the managerial activities that relate to (1) the initial screening, selection and prioritization of project proposals, (2) the concurrent reprioritization of projects in the portfolio, and (3) the allocation and reallocation of resources to projects according to priority" [5].

Existing literature has pointed out that project portfolio management is important to several business disciplines. McFarlan for instance, argued that companies should create a risk profile of their entire portfolio of Information Technology (IT) projects to maintain a desirable aggregate risk level [6]. According to McFarlan, firms should balance innovative yet riskier projects for future competitive advantage, as well as more conservative projects that support present-day operations. In a New Product Development (NPD) environment, Cooper, Edgett, & Kleinschmidt state that project portfolio management is important as a means to operationalize business strategy (i.e. the products, markets, and technologies that the business wants to focus on) [7]. These decisions direct the business for about five years into the future and products introduced in the past five years generate approximately 32% of companies' current sales. Project portfolio management would help to improve success rates by better aligning projects with the organization's strategy and balancing the portfolio of projects in terms of type and risk. This enables firms to maintain a number of projects in their portfolios that can be resourced effectively, but that is still sufficient to ensure an adequate flow of projects and product introductions [8].

In addition, Archer and Ghasemzadeh [9], Cooper, Edgett, & Kleinschmidt [10] and Blichfeldt and Eskerod [5] argue that project portfolio management is a key resource allocation and balancing activity in many organizations, because the pool of available resources for carrying out projects is generally not sufficient to support the entire pool of projects available for selection. Organizations therefore need to make choices regarding which projects to start, to keep, and which ones to terminate.

The literature demonstrates both financial and non-financial benefits for organizations that apply project portfolio management, such as higher value projects and fewer project delays respectively. However, Jeffery and Leliveld [11] and De Reyck et al. [4]

argue that the benefits of project portfolio management differ between organizations, depending upon the extent to which all project portfolio management practices are in place (a concept known as project portfolio management maturity). Moreover, as Blichfeldt and Eskerod demonstrate, a host of smaller projects are generally carried out 'under the radar' [5]. That is, small projects may not be subject to project portfolio management even in organizations that do have a mature project portfolio management process in place. Hence, firms may experience difficulties in achieving the potential benefits of project portfolio management.

The research described in this paper investigates the approaches that organizations apply to perform project portfolio management. It aims to find out what benefits organizations reap from their project portfolio management implementations, what pitfalls they may encounter and how to avoid these.

We have structured this paper as follows. After the introduction, chapter two provides an overview of project portfolio management, based on a literature study. Chapter three describes our research approach. Chapter four provides the results from fifteen interviews conducted for this research. Chapter five compares the theory on project portfolio management with the practices that surfaced during the interviews, leading to conclusions and further research.

2 Project Portfolio Management

This chapter provides an overview of project portfolio management. Oftentimes, there are more ideas and projects available for selection and execution than the available resources allow for [5, 12,13]. This calls for some form of framework on the basis of which firms can decide whether or not to carry out or terminate projects. Project portfolio management provides such a framework and considers the entire portfolio of projects that a company is engaged in [4]. Archer and Ghasemzadeh base their definition of a project portfolio on the description of projects given by Archibald [14]. A project portfolio would be "a group of projects that are carried out under the sponsorship and/or management of a particular organization" [12].

As a basis for our research, we use the definition provided in [5], stating that *"project portfolio management entails the managerial activities that relate to (1) Screening, selecting and prioritizing of project proposals, (2) Reprioritizing of running projects and (3) Allocating and reallocating resources to projects based on their respective priority."*

The first task would comprise screening, selecting and prioritizing of project proposals based on for instance uncertainty/risk estimations, financial parameters, and resource requirements [12]. The second task would entail reprioritizing running projects based on project status data [2]. Finally, the third task of project portfolio management would encompass that organizations take into account resource constraints and adjust their project portfolio according to the earlier established priorities [13].

In [15] it is argued that projects are only successful if they deliver benefits to the user or owner of the project result. Information on the outcomes of a project would be required to assess whether benefits have indeed been delivered to the project's user or owner. Hence, it is argued here that a fourth task is relevant in addition to the three tasks mentioned above. Practice shows, that tasks 1 and 3, though different in nature,

are often combined into one. Therefore, our investigations into project portfolio management has the following tasks in scope: (1) screening, selecting, prioritizing and allocating resources to project proposals, (2) monitoring and reprioritizing running projects, and (3) tracking and managing the realized benefits of projects. The subsequent sections discuss the three tasks of project portfolio management in more detail.

2.1 Screening, Selection, Prioritizing and Allocating Resources

2.1.1 Screening

Screening involves the evaluation of project proposals before projects are selected and added to the project portfolio. Several methods for screening exist. The business strategy method entails that organizations use their strategy to assess which projects to include in their portfolio. These organizations generally distinguish strategic envelopes or strategic buckets to which projects are assigned.

Levine [2] argues that risk should be incorporated into financial project assessments and proposes that risk be incorporated in the form of a discount factor. Archer and Ghasemzadeh [13] and McFarlan [6] focus on the overall portfolio risk level and state that high and low-risk projects should be balanced in the portfolio. This balance would help to prevent that an organization leaves gaps in the market for competitors to fill and it would help to ensure continuance of day-to-day operations. A risk balance in the portfolio of projects would achieve the before mentioned by fostering innovative yet riskier projects that can help build competitive advantage in the future, while at the same time incorporating low-risk projects that support and enhance present-day operations.

The most common method for screening project proposals is the financial method. Relying predominantly on quantitative measures such as financial metrics may result in sub optimal decisions, since crucial qualitative aspects may be overlooked [16] and too much confidence could be placed in the ability of the firm to forecast financial data. Financial screening encompasses some form of profitability or return metric, such as Net Present Value (NPV), Internal Rate of Return (IRR), Return on Investment (ROI), or payback period [4, 11, 13, 16, 17]. Any one of these methods has the potential to be used effectively, yet all have their advantages and disadvantages. Payback period for instance, is a relatively straightforward and easy to explain method, yet it does not take into account any cash flows beyond the payback period [16]. Hence, comparing projects of different duration is complicated. Another example, ROI would be more useful as a performance indicator than as a project evaluation metric, because it does not take into account the time value of money. In order to forecast future cash flows, companies can rely on market research, for instance in the form of consumer panels and focus groups [13].

2.1.2 Selecting Projects and Setting Priorities

Archer & Ghasemzadeh [13] and Cooper et al. [17] state that selection and prioritizing models should be applied consistently so that projects can be equitably compared regardless of the particular model that is used.

Firms may for instance use bubble diagram modeling to select projects and set priorities. Here, projects are plotted on a map using some form of bubbles or balloons. Projects are categorized and resources allocated depending upon what zone or

quadrant on the map the projects are assigned to. The axes that are used to create the map can differ and can be for instance risk versus reward, or cost versus timing. Another approach is the scoring model method, in which (potential) projects are evaluated on the basis of a number of ratings or scores that may or may not be weighted to form an overall score for the project. Scoring models are generally used as a ranking or prioritization tool, as opposed to using project scores for go/kill-decisions.

In [18], linear programming is proposed as a model for selecting projects and setting priorities. The model can be used to arrive at a portfolio that is optimized for a certain predefined objective. When this objective is a financial metric such as NPV, the model can optimize for the objective directly. If the objective would be a qualitative measure such as strategic alignment, a quantitative score would first have to be derived. Limited resources should be included in the model as a constraint, as well as other prerequisites such as regulatory compliance projects and running projects that the firm does not wish to interrupt.

Finally, checklists combine criteria by evaluating projects on the basis of a number of yes/no questions. This method is arguably the most straightforward: a project must achieve a designated number of yes-answers in order to be accepted into or remain in the portfolio of active projects. In contrast to the scoring model method, the checklist method tends to be used for making go/kill-decisions rather than setting priorities.

2.1.3 Allocation of Resources

If an enterprise's constrained resources are not allocated effectively, project delays may result because projects have to be put on hold when there are insufficient resources to fund them [2] This phenomenon is referred to as pipeline gridlock: projects keep being added to the list of running projects without taking into consideration resource availability and they are consequently held up as a result of insufficient resources to fund an infinite number of projects. Resources can be allocated by determining the resources available to carry out projects and subsequently assigning those resources to proposed projects according to their relative priority. A first step is to determine what resources are available and whether they suffice to complete currently running projects. Subsequently, firms should take into account proposed new projects and consider whether the available resources allow for starting these projects. This analysis of capacity and demand will demonstrate possible resource shortages. When shortages become apparent, either more resources should be allocated or certain projects should be terminated or reprioritized [13].

2.2 Monitoring and Reprioritizing Running Projects

Once projects are selected, they need to be monitored individually on the project level, and taken together at the portfolio level [2, 13]. Monitoring is important because the environments in which projects operate are not static and projects do not necessarily always run according to plan [11]. The assumptions that were made when the project was started may lose their validity over time, whether expected or not, which may require reprioritizing of projects in the portfolio. Thus, projects need to be periodically assessed in terms of their status and performance [2] Companies that do not reassess their portfolio of projects on a regular basis disregard possibilities that they may have to reprioritize. That is, they forgo possibilities to abandon unpromising projects and to expand investments in successful projects [4]. The current section

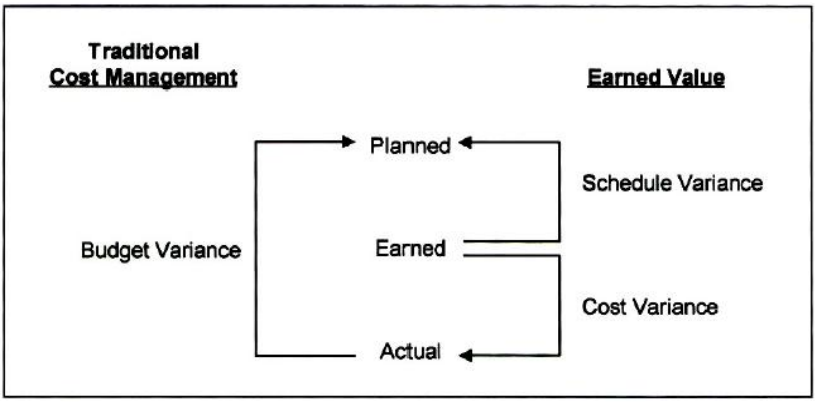

Fig. 1. Traditional cost management vs. EVA [19])

elaborates on three approaches to monitoring projects: earned value analysis, the Stage-Gate process, and the bounding box approach.

Earned value analysis (EVA) is one way to keep track of running projects. Earned value analysis essentially answers the question 'what did I receive for what I spent?'. The difference between traditional forms of cost management and earned value analysis is that the former only compares 'actual cost' with 'planned cost', whereas earned value analysis also incorporates the variable of 'earned value' [19]. As figure 1 shows, earned value analysis disaggregates budget variance into schedule variance and cost variance. It thereby provides insight into the origins of the variance.

Although earned value analysis may provide better insights than traditional forms of cost management, Lukas [20] argues that earned value analysis only works when the organization has reached certain maturity in project management. Earned value analysis requires specific information such as documented project requirements and cost collection systems.

Secondly, organizations may opt for the Stage-Gate process to monitor their running projects, in which projects are divided into phases (each called stages) and decision points (called gates).

The Stage-Gate method breaks down the project process into key activities and decisions as shown in figure 2 [21]. Each stage consists of one or a number of parallel activities that lead up to a subsequent gate. The gates consist of a number of deliverables that decision makers need to make an informed decision for continuance or termination of the project [13]. Gates thus function as a go/kill checkpoint, based on the results of the activities performed in the preceding stage. Figure 2 describes a typical Stage-Gate process for a technological innovation.

A simpler method to monitor and reprioritize running projects is the bounding box approach. This approach can also be used when projects do not fit with the phased Stage-Gate process, for instance when projects are characterized by overlaps between project phases. The bounding box approach entails that the organization sets certain critical parameters (called boundaries) within which the project team itself is authorized to make decisions. Only when exceptions occur will the project portfolio function assess the project and determine whether it should be continued or terminated.

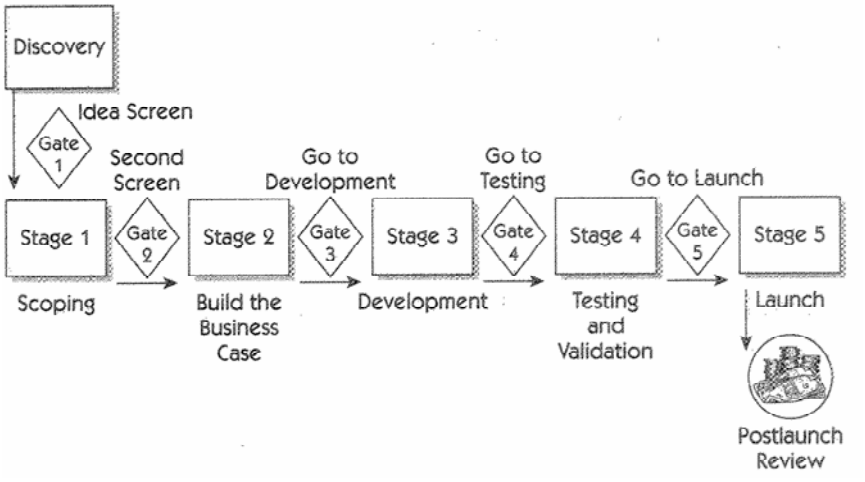

Fig. 2. An overview of the Stage-Gate process [21]

Earned value analysis, the Stage-Gate process, and the bounding box approach are monitoring tools that focus on individual projects and do not consider the entire portfolio of projects. Reviews of the entire project portfolio are needed in addition to the methods that have been discussed in this section so far. The methods that firms apply to screen, select and prioritize project can be used to reprioritize running projects as well [13].

2.3 Benefits Tracking

One would expect firms to learn from their mistakes and success stories to improve their project selection practices. Although Blichfeldt and Eskerod [5] do not mention this issue, other researchers do incorporate benefits tracking as part of project portfolio management in their models [4, 11].

The advantage of tracking the outcomes of projects after completion is that investments in successful strategic buckets can be expanded. Conversely, unsuccessful strategic buckets might require a changed approach or can be scrapped altogether [11]. Without a process to measure the actual benefits of projects however, how would an organization know which ones are successful and which ones are not? Information regarding the success of projects thus becomes a crucial input for the first three tasks of project portfolio management identified in [5]. This feedback concept may be called 'outcome tracking' or 'benefits tracking' and appears to be a necessary component for optimizing the tasks of screening, selecting, prioritizing and reprioritizing, and allocating resources to projects. Without benefits tracking, organizations do not know whether their project investments have been worth the effort or whether they yield a positive return at all. Companies might have trouble implementing benefits tracking because they never set objectives or standards to compare outcomes against. Furthermore, the scope of projects can change over time, rendering the initial standards or objectives invalid and requiring an updated set of standards/objectives [4].

3 Approach

This chapter provides an overview of the methods used to conduct the research. The way the study is set up is discussed, as well as the data collection methods and the sample characteristics. Finally, the chapter discusses the methodology that was used for data-analysis.

3.1 Data Collection Method

Data for the literature overview are collected from secondary sources, such as academic and practitioners' journals, books, and published Websites. Primary data are subsequently collected through semi-structured interviews. The interviews are guided by a predefined topic list, but there is room for deviation and variation depending on the flow of the interview. The interviews are set up in a semi-structured way to ensure that meaningful responses can be elicited from the respondents depending on their knowledge and the organizational context. The interviews are held with respondents at client firms of Ernst & Young to discover what their project portfolio management practices are and how they – if at all – benefit from these practices. In a majority of interviews, two interviewers are present during the interview to enhance the flow of the conversation and to ensure that all applicable topics are covered. A drawback of this approach is the sometimes erratic course of the interviews. To ensure that non-verbal cues can enrich the data, the interviews are conducted on-site and face-to-face where possible. The interviews are conducted by phone in a minority of instances, where an on-site appointment was not possible. The interviews are audio recorded with the respondents' permission and subsequently transcribed.

3.2 Sample

Fifteen respondents with knowledge of project portfolio management within their respective organizations were identified for the empirical study. The aim has been to find organizations that are aware of project portfolio management so that they can provide insights on how project portfolio management can be beneficial. Saunders et al. [22] refer to this type of sampling as 'purposive sampling', meaning that the judgment of the researcher was used to select respondents who would enable answering the research questions. Advantageous about the purposive sampling strategy is that people knowledgeable in the field of project portfolio management could be identified efficiently. The sample consists of fifteen respondents, representing thirteen companies.

3.3 Data-Analysis Procedure

The transcript data have been categorized using the interview topic list. The data display consists of all topics and all literal responses extracted from the transcripts that pertain to the topic in question. Subsequently, similar responses have been sought within categories and these were counted and grouped. This analysis forms the basis of chapter four, as displayed in graphs 1-9.

3.4 Survey

On top of the 15 real-life cases, we have validated the results with an online survey among 650 respondents. The results of this survey are currently analyzed and will be addressed in a future paper. First results show no substantial deviation from the findings of the interviews.

4 Findings

This chapter starts by characterizing the project types that respondents consider in their project portfolio management and it subsequently elaborates on the four core tasks of project portfolio management. We conclude by discussing the respondents' view on the critical success factors for project portfolio management, their view on the advantages of and pitfalls for project portfolio management, and the improvement areas that interviewees have identified within their respective organizations.

4.1 Project Types

Eight of fifteen respondents reported that their role in project portfolio management is limited to projects that involve IT. One respondent was concerned with a portfolio of new product development (NPD) projects. A group of four respondents reported that their project portfolios consider projects of all types. Finally, two respondents indicate that their project portfolios contain mainly infrastructure projects.

Respondents who focus on IT provide two reasons for this emphasis. First, five respondents state that virtually any project involves IT to some extent, because business processes generally depend on a certain IT-infrastructure. Making changes in the organization hence quickly leads to changes in the underlying IT-infrastructure. Second, two respondents state that employees outside the IT discipline are unfamiliar with keeping track of time spent on projects for reporting purposes and that these records are needed for assessing the status of projects. Unfamiliarity with timekeeping would therefore increase complexity of introducing project portfolio management for non-IT projects.

4.2 Project Screening and Selection

4.2.1 Financial and Strategic Screening

The topic of financial metrics has been discussed with twelve respondents, all of whom report that their firms rely on multiple financial metrics for project screening. Within the plethora of financial metrics, the most common metric reported by the respondents was the net present value (NPV) measure, which is reported by eight respondents. The pay back period (PBP) method comes in second at seven mentionings. Return on investment (ROI) was reported by five respondents; internal rate of return (IRR) by four, and the absolute cost of the project has been mentioned by two respondents as a financial measure for screening and selecting projects and for determining their relative priorities.

Although three respondents said they regard the ease of use of the payback period method as beneficial, most respondents did not provide a substantive rationale for the choice of particular financial metrics. Another three respondents indicated they do not see differences between various financial metrics and two respondents indicated they do not know why their firm opts for particular financial metrics.

Furthermore, ten respondents reported that they consider alignment with company strategy when screening project proposals. In seven cases strategic alignment was used as part of a set of multiple criteria for screening, selection, and prioritizing. Two approaches to considering strategic alignment can be discerned. The first approach is to determine strategic objectives and to determine what actions are needed to achieve these objectives. Projects are then derived from each of or combinations of these actions. The second approach is to allow employees to propose projects as the need for change arises. These proposals are then screened to verify whether the proposed changes fit with strategic objectives.

4.2.2 Risk Analysis in Screening

Eleven of fourteen respondents reported that their companies consistently apply a risk metric to screen projects. Risk metrics that respondents mentioned vary and include feasibility, complexity, and market dominance. Furthermore, three respondents reported that their companies link project risks and returns to each other. As opposed to considering risk as a separate item, these three firms link the degree of certainty with which a project can be completed successfully to other elements of the project score. More specifically, one interviewee reported that his company makes risk adjustments to the *overall* project score, meaning that projects for which the expected risks are high receive a lower score. The two others in this group adjust their *financial metrics* according to the anticipated project risks. For example, cost expectations for a project may be doubled if the technology risk is considered to be high due to the introduction of a new type of technology.

4.2.3 Selection and Prioritizing

Two respondents indicated that they use the scoring model method, where each project proposal receives a score based on multiple criteria and projects are prioritized according to their relative scores. Twelve others reported that they do consider multiple criteria for selection, but that they do not combine these criteria into a selection model. Selection and prioritizing criteria that are used for both approaches are financial metrics, the feasibility of the project, the extent to which the proposed project is in line with the company's strategy to ensure projects contribute to achieving strategic objectives, and compliance with government laws and regulations to prevent fines and other governmental reprimands. Some criteria may be industry specific and hence not applicable to organizations in general. Examples in this category include customer safety and environmental impact.

4.3 Monitoring Current Projects

All respondents indicated that they have a centralized idea of what projects are currently running and what the status of those projects is. Three respondents reported that their organizations use the Stage-Gate process to monitor running projects. Five

respondents stated that their firms use a form of the bounding box approach, where the project team is authorized to make its own decisions within certain boundaries. Only exceptions that are outside these boundaries are reported to bodies that are higher in the organizational hierarchy, such as an investment board or portfolio board. Seven respondents reported that their firms use a fully centralized approach to project control. Here, all projects report to a body that is higher in the organizational hierarchy than the project team itself on a regular basis.

As discussed in chapter two, escalation of commitment occurs when current projects are not adequately monitored, resulting in unwarranted continuation of unpromising projects. Two respondents explicitly indicated they had not experienced escalation of commitment as a real issue. They argued that proper project screening and selection practices largely prevent the occurrence of unpromising projects altogether by ensuring that only promising projects are carried out. Furthermore, adequate monitoring would avert derailment of projects.

4.4 Internal Constraints and Allocating Resources

Fourteen of fifteen respondents were able to provide information about their respective companies' approach to constraints that are internal to the company and that influence the allocation of resources to projects. Two types of constraints surfaced during the interviews: scarce resources and sequential dependencies between projects. Ten respondents reported that they only consider resource availability. A total of four respondents indicated that internal constraints need to be more carefully considered in future. Another two respondents indicated that they actively consider whether projects do not interfere with each other, in terms of both resources and sequential dependencies. One of these respondents reported that certain meetings are dedicated to consider project interdependencies and the other respondent indicated that company wide requirements are collected early in the project portfolio management cycle. The latter respondent said that creators of a project proposal are asked to consult all stakeholders within the company to verify whether the proposed project may influence running projects or existing IT platforms (the firm applied project portfolio management to its portfolio of IT projects).

In total, thirteen respondents reported that resource constraints are taken into account at some point in the project portfolio management process. The types of resources that surfaced during the interviews are financial resources and human resources. Eleven of thirteen respondents indicated that they take into account both financial and human resources in their project planning to enable cost control and to ensure that projects can be adequately staffed.

4.5 Benefits Tracking

Nine respondents reported that the benefits of completed projects are not tracked at all or that project benefits are tracked on an ad-hoc basis in incidental cases. One interviewee reported that the concept of benefits tracking is not applicable to all projects because certain projects are imposed upon the organization. Only one respondent reported that the organizational body that is responsible for project portfolio management consistently tracks the benefits of completed projects. His firm measures the

actual outcomes of projects three months after they have been closed and, when deemed necessary, a year after their closure. The respondent explains these so-called 'post calculations':

"We mainly look at the benefits because there are projects that introduce a certain new service to the market for which we really want to know what their return is and whether it was worth the effort. There are also projects that for instance replace a certain system, maintenance on projects or licenses for ERP systems, etc. Those projects don't return anything and so it does not make sense to do post calculations. In those cases we do of course check whether they have remained within budget."

Another two respondents indicated that they have recently engaged in benefits tracking and that the benefits of the projects that are currently running will be tracked once closed. Finally, two respondents reported that their respective organizations do track the benefits of closed projects, but that this responsibility is delegated to other parts of the organization. As a consequence, there is no feedback mechanism from the actual outcomes of projects back to the criteria that are used for projects screening, selection, and prioritizing. For instance, if some organizational subunits consistently perform better than others, this difference in performance would not be reflected by the allocation of resources across subunits.

Why have most organizations in the sample not engaged in benefits tracking so far? Five respondents indicated that it is complicated to attribute benefits to the right causes. The actual benefits of a project, such as a cost reduction or increased revenues, may be caused by factors other than the particular project. The attribution problem may be enhanced when benefits are due to take effect and thus measured a considerable period of time after the project is closed. A potential solution that has been proposed is to incorporate the anticipated benefits of a project into the first upcoming budgeting cycle so that the project and its anticipated effect are as close as possible to each other in terms of time.

4.6 Critical Success Factors

Central to the success of any project portfolio management implementation would be the commitment of top management, according to seven of fifteen respondents. This commitment would be necessary to ensure that all organizational bodies and individuals that are affected by the project portfolio management framework are either convinced of or forced to commit to its cause.

Five respondents reported that one critical success factor is the realization that project portfolio management requires a pragmatic approach to be successful. Interviewees indicated that the project portfolio management process should be formalized and rigid to the extent that the organization carries out projects that are started and monitored on the basis of predefined and objective criteria. However they also stated that the process should be flexible enough to allow for speedy decision-making. Respondents indicated that organizations should therefore be critical of the amount of regulations and templates they impose on project managers and sponsors and that this administrative burden should be kept to a minimum.

Five respondents stated that another critical success factor is transparency regarding the grounds on which decisions are made, and regarding the status of running projects. Transparency on these issues would facilitate learning about the organization's strengths and weaknesses in project management, in addition to creating awareness for the importance project portfolio management and increasing acceptance for project portfolio management within the organization.

Finally, two respondents advised to keep the project portfolio management function small. One of these respondents referred to the number of tasks of the project portfolio management function and urged to start off with a limited and hence easier to handle number of tasks. The second of these respondents referred to the number of employees within the project portfolio management function. The respondent argued that keeping the function small leads to more networking and communication within the organization because time pressure would force employees to look for innovative ways to handle their workload.

4.7 Project Portfolio Management Advantages and Pitfalls

4.7.1 Advantages of Project Portfolio Management

Respondents stated that the project portfolio management process enabled them to make the right decisions for the right reasons. Project portfolio management provided them with means to prevent opportunism in starting projects. Project portfolio management would help to ensure that project proposals are assessed based on objective criteria so that only useful projects are started. The project portfolio management process apparently forces firms to answer questions such as 'does this project have a solid business case?', 'do we have budget to carry out this project?', 'does it fit our planning?' and 'do we have sufficient human resources available?'

Project portfolio management would also enable both control over and reduction of costs by stopping projects that are not likely to generate positive returns and by not starting unpromising ones to begin with. Furthermore, centrally tracking active projects and project proposals appears to enable organizations to prevent budget overruns on the project portfolio as a whole. One respondent was particularly explicit about the cost saving benefits of project portfolio management in the short term. He argued that stopping redundant projects and thereby saving money is a quick win of project portfolio management:

"When we started with [project portfolio management] towards the end of 2007 we had 400+ running projects and now (…) that's close to 100. (…) As soon as you start inventorying what you have across your entire group you'll encounter easy wins. (…) Project costs to start with."

Project portfolio management would also enable managing the overall value of their project portfolio. Project portfolio management would help to achieve strategic objectives and to keep track of whether intended project benefits are eventually achieved. In addition, firms now know what projects are running and what the status of these projects is as a result of their project portfolio management practices. One respondent summarized the above and said that the advantages of project portfolio management are:

"A general idea of what's running, what's coming and what the status of everything is. Plus, not completely unimportant is to link that to what [the project] costs, whether we actually want that and what we aim to achieve with [the project]."

Synergies between projects can more easily be identified because project portfolio management would prescribe centrally tracking all projects, thereby enabling the identification similarities and overlap and subsequently enabling corrective action. Finally, one respondent said that project portfolio management helped to achieve a balanced project portfolio in terms of discretionary versus obligatory projects.

4.7.2 Pitfalls for Project Portfolio Management

Respondents indicated that a perception of bureaucracy that spurs uncooperative behavior at lower management levels is a pitfall for project portfolio management. The resulting resistance on the part of employees may undermine the objective of project portfolio management to achieve strategic objectives, because ultimately people have to make projects happen. If these people resist the methodology they may be less effective at carrying out the project. Hence, the process of achieving strategic objectives and moving forward may be stifled. Resistance may also be caused by decreased freedom (noted by three respondents) for employees and increased transparency (noted by two respondents) about the reasons for starting a project and the status of running projects.

Furthermore, the project portfolio management function may impose the filing of forms, usage of document templates, and may simply require more administrative operations than would be necessary from the project manager's or projects sponsor's point of view. One respondent provided an illustrative example:

"Do you know how that goes? 'I have received your files, but you should have handed them in on Wednesday for next week's executive meeting and that's cramped already. And we have things that are so important right now… your turn will be next time.' That sets you back another two weeks. And then you've just missed the [for instance budgeting] cycle that is once a month… if you're out of luck you'll be delayed for a couple months."

Although the respondents mentioned the pitfalls discussed here, the first response of four respondents was that they did not see any pitfalls. The advantages of project portfolio management appear to strongly outweigh the pitfalls for these respondents.

One pitfall for project portfolio management described in chapter 2 is the phenomenon that a host of smaller projects that operate under management's radar might undermine the effectiveness of the project portfolio management process. Eight respondents reported that their firm uses a cut-off budget below which project proposals are handled differently. Six respondents explained their alternative methods towards smaller projects. Five of these entailed delegation of the responsibility to lower level management. The sixth respondent indicated that smaller projects are discussed in roundtable meetings where business and IT representatives are present to discuss what needs to be done.

Several project size cut-offs are mentioned ranging from 50.000 euros (two respondents) via 100.000 euros (two respondents) and 200.000 euros (one respondent) to 2M euros (one respondent). Another two respondents indicated that their respective firms do use a project size cut-off but they did not know the exact amount.

4.8 Improvement Areas

Seven respondents indicated that project benefits are not consistently tracked and view benefits tracking as an improvement area for their respective organizations. Two of these respondents stated that the rationale behind their desire to implement benefits tracking is to learn from past mistakes in an attempt to improve future performance. The following quote illustrates this rationale for benefits tracking:

"Business cases are prepared, the project is carried out, everyone is happy, customers are using their new services… And then no one actually looks back whether it went better or worse compared to the business case. That's where you miss out on the learning curve."

One respondent who views benefits tracking as an improvement area highlighted that benefits tracking is not a prerequisite for successful projects. The respondent explained that projects might be successful, but that benefits tracking enables the organization to identify and assess mistakes. This knowledge can then be used to prevent the same mistakes in future or to replicate successful practices improve future practices, thereby improving future performance.

Six respondents reported that project portfolio management within their respective organizations should be done more efficiently and involve less bureaucracy. These respondents wanted to increase decision-making speed by for instance reducing the bureaucratic burden imposed on project teams and through better software support.

Three respondents indicated that they would like more insight in the portfolio of projects in general. That is, they value a more integrated, holistic idea of what the overall status of the project portfolio is and better mechanisms for identifying possible performance deficiencies. This would make it easier for them to take corrective action when and where needed.

5 Conclusions, Discussion and Further Research

This chapter discusses the similarities and differences between the theory on project portfolio management and the results found in the interviews. The first three sections below each discuss and conclude on one of the research questions. The answer to the problem statement is formulated in the recommendations section. Finally, some suggestions for future research are outlined.

5.1 Comparing Research Outcomes with Existing Literature

5.1.1 Screening, Selecting and Prioritizing Project Proposals

All interviewees indicated that they apply a selection of the financial methods proposed in literature to screen project proposals. However, literature also states that each of the financial methods has its advantages and disadvantages, and that their

effectiveness depends on the way they are put to use; for instance whether they are used as criteria for project screening or as performance indicators once the project is carried out. This suggests that a conscious choice of financial methods is in order. Nevertheless, the interview data indicate that choices made with regard to financial methods are largely not consciously made.

Literature found that the best performing project portfolios are governed by multiple methods for screening, selecting and prioritizing project proposals. Only a limited number of interviewees indeed apply multiple methods for screening, selection and prioritizing. Even though a combination of screening methods is often applied, these methods are rarely combined into selection and prioritizing models. Only a few of the respondents combine their screening methods into a model that considers the relative importance of the methods.

5.1.2 Monitoring and Reprioritizing Running Projects

With regard to the three approaches to monitor running projects proposed in literature, none of the interviewees reported the application of earned value analysis. A third of them did report the application of the bounding box approach. This could be an indication that firms would rather opt for a simpler approach, since the bounding box approach requires less mature project management practices. Perhaps the project management practices in the organizations that the interviewees work for do not have the information systems (e.g. documented project requirements and cost collection systems) in place to enable earned value analysis. All interviewees do report that they have a process to monitor the status of running projects. Hence, they do not run the risk of disregarding possibilities to abandon unpromising projects and to expand their investment in successful projects [4]. Organizations may opt for any of the available project control mechanisms, as long as they consistently apply them to all projects. This ensures that projects are comparable and that firms can make informed decisions for continuing, terminating, or correcting projects.

5.1.3 Benefits Tracking and Management

Most interviewees reported that their respective companies do not track realized project outcomes. This finding is consistent with earlier studies, even though benefits tracking is important and has substantial potential advantages as discussed in chapter two. One of the problems associated with benefits tracking is the complexity of attributing benefits to individual projects. The solution proposed earlier is to feed forward project outcomes into budgeting cycles. This way, benefits are automatically taken into account at the aggregate level. Then, corrective action can be taken when needed. For instance, if the overall return on investment for projects is low, an organization might want to change the criteria on the basis of which it accepts projects. Another possible solution would be to assess the feasibility of benefits in project proposals in such a way that there is less clutter that could moderate or mediate the relationship between project efforts and realized benefits. Finally, if a project is closed and benefits tracking indicates the anticipated benefits have not been achieved, the organization could commence a new project in an attempt to achieve the intended benefits still. Actively following up on planned but non-realized benefits is referred to here as benefits management.

5.2 Project Portfolio Management Advantages and Pitfalls

5.2.1 Advantages Associated with Project Portfolio Management

The most noted advantages found during the interviews are 'making the right decisions for the right reasons,' 'enabling cost control and reduction,' and 'managing the overall value of the project portfolio.' These advantages correspond to the value creation advantage identified in the literature [1, 2, 4, 11], where selecting the most promising projects and cost savings can create value for the organization. In addition, the advantage of project portfolio management noted by one interviewee is 'the ability to balance the portfolio' and this topic also recurs in the literature discussion on value creation.

The second advantage identified in the literature is the ability to manage uncertainty and risk [6, 13, 23]. The interviewees did not mention this advantage as such. Existing literature explains the ability to manage uncertainty and risk as an example of a learning organization and perhaps this requires a maturity level that the organizations that the respondents work for have not yet reached. As discussed in the sections on benefits tracking, organizational learning is a concept that respondents are aware of but it is also a concept that has not fully come to fruition yet.

The ability of organizations to terminate undue projects [2, 24, 25], is not mentioned as an advantage by the interviewees. Rather, respondents point at the ability of project portfolio management to enable selecting and monitoring projects on objective grounds as a beneficial factor that decreases occurrence of unpromising and derailed projects.

5.2.2 Pitfalls Associated with Project Portfolio Management

The first pitfall for project portfolio management is generating sufficient buy-in from all organizational levels [11, 26, 27]. Although assembling adequate buy-in from all organizational levels was not reported as a pitfall for project portfolio management by the interviewees, the buy-in from top management is the most frequently mentioned critical success factor. Moreover, a perception of bureaucracy is the most noted pitfall for project portfolio management by the interviewees. This perception may originate from a lack of buy-in, since employees may see the project portfolio management function as taking away their flexibility, freedom, and independence. Organizations should make sure that their employees understand the reasons for the implementation of project portfolio management and they should demonstrate how project portfolio management can be helpful rather than detrimental to them. Firms can for instance demonstrate how project portfolio management can solve some of the issues that employees experience in their daily project-related work.

A second pitfall are the difficulties to find the time and information required for project portfolio management [8, 26, 28]. Several interviewees also contended that the additional time that it takes to start projects because of project portfolio management is a pitfall for the process. Speeding up the process of approving project proposals by, for instance, increasing the frequency project proposal review meetings may alleviate this challenge.

Furthermore, in [29] it is stated that it is often difficult to make accurate estimations of the outcomes of project parameters and that firms should therefore not rely too heavily on quantitative selection criteria. Notably, none of the interviewees have

reported the limited ability to estimate project outcomes as a pitfall for the project portfolio management process. This may be due to the fact that the literature highlights the challenge of estimating project outcomes in the context of purely quantitative methods for project selection such as linear programming. None of the respondents indicated that they used linear programming for project selection, or that they rely merely on quantitative methods. It therefore appears that respondents alleviate the challenge of accurately estimating project outcomes by relying on multiple methods for project selection.

Regarding the issue of un-enacted projects, it is interesting to observe that none of the respondents reported that they regard smaller projects as a problem. In other words, none of the respondents support Blichfeldt and Eskerod's notion that the value of project portfolio management is endangered by un-enacted projects [5]. It appears that the companies the respondents work for have come up with solutions to the un-enacted projects pitfall: three respondents reported that they have a separate budget for smaller projects, which enables them to control the costs of these initiatives. Four respondents indicated that there are guidelines and criteria for small projects to enable monitoring and control of smaller initiatives.

5.3 Conclusions

To benefit from project portfolio management, organizations should consistently consider multiple methods for screening, selection and prioritizing that are widely supported by key stakeholders. The organization in its entirety should be made aware of the function and benefits of project portfolio management, for instance by demonstrating how project portfolio management can resolve project-related issues that employees encounter. Creating widespread awareness and support within the organization is important for the proper functioning of project portfolio management.

Secondly, it is essential to find a balance between qualitative and quantitative methods for screening, selection, prioritizing and resource allocation, because over-reliance on quantitative methods entails the risk of overestimating the organization's ability to accurately approximate project outcomes. The majority of firms in the sample can improve by combining financial and business strategy screening methods into a scoring model that takes into account the relative weights of the methods and by considering bubble diagrams. Furthermore, most respondents did not provide a substantive rationale for the choice of particular financial metrics. Firms should make deliberate choices in this regard, because the effectiveness of each of the financial metrics depends on the way they are applied.

Organizations should track and manage project benefits because realizing those benefits is the primary objective investments in projects. Organizations can identify opportunities for improving their screening, selection, prioritizing and resource allocation processes through the application of benefits tracking and they can attempt to still realize project outcomes that were initially not achieved through benefits management. Finally, organizations need to ask themselves which project portfolio management elements add value and which ones do not. By eliminating elements that do not add value, the administrative burden required for project portfolio management is minimized in an attempt to increase decision-making speed and flexibility.

5.4 Suggestions for Future Research

A larger empirical study would be required to link project portfolio management practices to financial performance to quantify the value of project portfolio management. We have started this by conducting a survey among 650 respondents. Research across multiple industries and countries could verify whether the results found in this research apply to a wider range of businesses. Future research should preferably involve multiple interviews with each respondent and with multiple respondents within the same organization. This approach can shed light on possible differences in how project portfolio management is perceived by varying stakeholders within organizations. Finally, respondents hinted at the interactions between project management and project portfolio management. This topic has not been discussed in the literature before. A key question here would be how mature project management practices within an organization should be to implement project portfolio management successfully or the other way around.

References

1. Dougherty, R.: Section 9.3: Developing a project portfolio management Capability at America Online. In: Levine, H.A. (ed.) Project Portfolio Management - A Practical Guide to Selecting Projects, Managing Portfolios, and Maximizing Benefits. Jossey-Bass, San Francisco (2005)
2. Levine, H.A.: Project Portfolio Management - A Practical Guide to Selecting Projects, Managing Portfolios, and Maximizing Benefits. Jossey-Bass, San Francisco (2005)
3. Markowitz, H.: Portfolio Selection. Journal of Finance 7(1), 77–91 (1952)
4. De Reyck, B., Grushka-Cockayne, Y., Lockett, M., Calderini, S.R., Moura, M., Sloper, A.: The impact of project portfolio management on information technology projects. International Journal of Project Management 23, 524–537 (2005)
5. Blichfeldt, B.S., Eskerod, P.: Project portfolio management – There's more to it than what management enacts. International Journal of Project Management 26, 357–365 (2008)
6. McFarlan, F.W.: Portfolio approach to information systems. Harvard Business Review 59(5), 142–150 (1981)
7. Cooper, R.G., Edgett, S.J., Kleinschmidt, E.J.: New Product Portfolio Management: Practices and Performance. Journal of Product Innovation Management 16, 333–351 (1999)
8. Killen, C.P., Hunt, R.A., Kleinschmidt, E.J.: Project portfolio management for product innovation. International Journal of Quality and Reliability Management 25(1), 24–38 (2008)
9. Jeffery, M., Leliveld, I.: Best Practices in IT Portfolio Management. MIT Sloan Management Review 45(3), 41–49 (2004)
10. Archer, N.P., Ghasemzadeh, F.: An integrated framework for project portfolio selection. International Journal of Project Management 17(4), 207–216 (1999)
11. Cooper, R.G., Edgett, S.J., Kleinschmidt, E.J.: New Problems, New Solutions: Making Portfolio Management More Effective. Research Technology Management 43(2), 18–33 (2000)
12. Archibald, R.D.: Managing High-Technology Programs and Projects. Wiley, New York (1992)

13. Turner, J.R., Cochrane, R.A.: Goals-and-methods matrix: coping with ill defined goals and/or methods of achieving them. International Journal of Project Management 11(2), 93–102 (1993)
14. Remer, D.S., Stokdyk, S.B., Van Driel, M.: Survey of project evaluation techniques currently used in industry. International Journal of Production Economics 32, 103–115 (1999)
15. Cooper, R.G., Edgett, S.J., Kleinschmidt, E.J.: Portfolio management for new product development: results of an industry practices study. R&D Management 31(4), 361–380 (2001)
16. Chen, M.T.: The ABCs of Earned Value Application. AACE International Transactions (2008)
17. Lukas, J.A.: Earned Value Analysis - Why it Doesn't Work. AACE International Transactions (2008)
18. Cooper, R.G.: Section 7: project portfolio management applications: new product development. In: Levine, H.A. (ed.) Project Portfolio Management - A Practical Guide to Selecting Projects, Managing Portfolios, and Maximizing Benefits. Jossey-Bass, San Francisco (2005)
19. Saunders, M., Lewis, P., Thornhill, A.: Research Methods for Business Students. Pearson Education, Essex (2007)
20. Olsson, R.: Risk management in a multi-project environment: An approach to manage portfolio risks. International Journal of Quality and Reliability Management 25(1), 60–71 (2008)
21. Keil, M., Mann, J., Rai, A.: Why Software Projects Escalate: An Empirical Analysis and Test of Four Theoretical Models. MIS Quarterly 24(4), 631–664 (2000)
22. Harrison, P.D., Harrell, A.: Impact of Adverse Selection on Managers' Project Evaluation Decisions. The Academy of Management Journal 36(3), 635–643 (1993)
23. Datz, T.: How to Do It Right. CIO 16(14) (2003)
24. Cohen, C.B., Englund, R.L.: Section 5.1: Making the Case for Project Portfolio Management. In: Levine, H.A. (ed.) Project Portfolio Management - A Practical Guide to Selecting Projects, Managing Portfolios, and Maximizing Benefits. Jossey-Bass, San Francisco (2005)
25. Morcos, M.S.: Modelling resource allocation of R&D project portfolios using a multi-criteria decision-making methodology. International Journal of Quality and Reliability Management 25(1), 72–86 (2008)
26. Ghasemzadeh, F., Archer, N.P., Iyogun, P.: A Zero-One Model for Project Portfolio Selection and Scheduling. The Journal of the Operational Research Society 50(7), 745–755 (1999)