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IMPROVING PROJECT PORTFOLIO DECISION MAKING IN THEORY AND PRACTICE

Research Paper

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Abstract

Project Portfolio Management (PPM) is “a dynamic decision process wherein a list of active development projects is constantly revised. In this process, new projects are evaluated, selected and prioritised; existing projects may be accelerated, killed or reprioritised, and resources are allocated and reallocated among the projects in the portfolio” (Gutierrez & Magnusson, 2014). PPM is perceived to be a means to implement strategy through projects and programs. This study focuses on ICT projects. Current PPM research is focused on project selection, prioritization, and portfolio balancing in few research areas and there are major limitations to the approaches used in practice. There is clearly a need for more empirical PPM research. The following main research question was employed: How can an information intensive organization improve decision making for project selection within its project portfolio management process? A second problem is that there seems to be no agreement on what constitutes PPM. This is a second aim of the study. Three data collection methods were used to answer both questions. As a result, it can be stated that PPM is still in its infancy. Based on the study, seven recommendations are made for improving PPM decision making.

Keywords: Project portfolio management, IT Governance, business IT alignment, decision-making.

1 INTRODUCTION

Many ICT projects contend with disappointing results and costs incurred. The same results are also noticeable in many governmental ICT projects. Many failed ICT projects in government recently led to an investigation by the Commission Elias - named after the chair Ton Elias (Zantingh, 2014). However, it is whether the abovementioned problems themselves are only of recent nature. Organizations typically do not boast about their failing projects. Obviously, organizations, both public and commercial, try to implement their ICT projects successfully. Since it often does not work, it must be concluded that IT governance is not yet sufficiently developed within many organizations (Hardy, 2006; Posthumus et al., 2010). IT Governance is clearly the responsibility of the board and top management, not IT Management, although the name may suggest otherwise (Brand & Boonen, 2008; Hardy, 2006; Raghupathi, 2007; Van Grembergen et al., 2004). It has simply put four goals (Brand and Boonen, 2008), i.e. promoting business IT alignment, maximizing business benefits, spending ICT resources responsibly and managing risk properly. The attention of the Commission Elias seems primarily motivated by financial motives and focuses strongly on perhaps this element. The other three goals of IT Governance, however, deserve at least as much attention for holistic reasons.

In this research paper, the focus will be on the development of ICT facilities. As a result, the operation and maintenance phase is conveniently disregarded. Project Portfolio Management (PPM) functions as an important tool to guide the development of such ICT facilities in the right direction. Therefore, it is seen as an important part of IT Governance. PPM is defined as “[...] a dynamic decision process wherein a list of active development projects is constantly revised. In this process, new projects are evaluated, selected and prioritised; existing projects may be accelerated, killed or reprioritised, and resources are allocated and reallocated among the projects in the portfolio” (Gutierrez and Magnusson, 2014). Various authors claim that strategic alignment, value maximization, and a balanced portfolio are the objectives of PPM (see, e.g. Heising, 2012; Kester et al., 2009; Killen et al., 2006).

Weill and Woodham (2002) indicate that IT Governance applies the same principles as those applied to Financial Governance. PPM techniques originate from the financial domain (De Reyck et al., 2005; Markowitz, 1952; Sanchez et al., 2008). Markowitz (1952) originated the concept of portfolio management. Decades later, McFarlan (1981) brought it to the arena of Management Information Systems. Over the years, many insights and best practices were developed. The importance of good PPM practices is evidently endorsed by many organizations and some organizations have taken serious steps to make it a part of their strategic decision-making. Much has been written about PPM. Academics do that already for more than 45 years (Lamratanakul et al., 2008). Nevertheless, PPM still is an immature concept within many organizations. PPM literature has many resemblances with management literature before Mintzberg presented his empirical research on management practices (see, e.g. Mintzberg, 1989). It offers mostly rational models and theories, i.e. how PPM should be managed, instead of how it is managed in practice. Unfortunately, these models do not offer solutions to practical problems (Kornfeld and Kara, 2011). There is clearly a need for more empirical PPM research (Martinsuo, 2013). Jeffery and Leliveld (2004) report that 98% of surveyed or interviewed Fortune 1000 company Chief Information Officers are aware of PPM, but only 17% are realizing its full potential. The enormous social costs of failing ICT projects require more openness and transparency. The economic environment in which organizations are facing cutthroat competition, the crisis forces organizations and governments to cut costs, while simultaneously need for innovation is greater than ever, make that effective IT governance is vital.

In this research paper, the results of recently conducted empirical research into the practice of PPM are outlined. Based on the results a model is offered to help organizations analyse and develop the PPM process further. Additionally, recommendations are made for improving PPM decision making.

2 METHODOLOGY

The main research question was answered by an exploratory qualitative study using a qualitative interpretivist approach (Orlikowsky and Baroudi, 1991). The explorative nature enables finding what is going on, without restricting possible perspectives. Due to the major limitations of literature on offering empirical results (Martinsuo, 2013) and an adequate solution for the project selection problem (Kornfeld and Kara, 2011), it was common sense to use the Grounded Theory (GT) research strategy. GT is “particularly helpful for research to predict and explain behavior, the emphasis being upon developing and building theory” (Saunders et al., 2009). Three data collection methods were used. First, a preliminary qualitative survey was conducted to explore the worthiness of the study and to generate some preliminary data, e.g. do organizations know about the concepts that the literature describes. The survey enabled insight in relevancy of the research subject, and awareness and progress of PPM in practice. Second, conversations with two experienced portfolio management consultants were conducted for idea generation, to discuss survey data and perceived issues in practice. A second aim was to crosscheck the relevancy of the research question and preliminary interview questions. The conversations generated some insights and ideas from practitioners who advise and implement PPM within various information intensive organizations. Both methods helped to identify common PPM problems, e.g. lacking ownership and management commitment, project overload, lacking project termination, misaligning projects and strategy. Subsequently, eleven in-depth face-to-face interviews were conducted within six non-profit and five commercial organizations. Moreover, an extensive literature review with multiple search iterations was conducted based on a variety of peer reviewed academic journal articles containing quantitative and qualitative PPM and related research. In line, practice oriented PPM presentations, books and whitepapers were used to explore promising ideas and issues from practice. Summaries were made of all reviewed articles. Additionally, a concept matrix was created for this study (Webster and Watson, 2002) on which all reviewed articles were mapped. The PPM phases defined by Jonas (2010) were initially used for concept formulation. The concept matrix was gradually updated to reflect all relevant concepts.

2.1 Research questions

Information intensive organizations were generally interested and considered PPM as relevant. However, due to various reasons, they had difficulties with PPM decision making. This was suggested by survey results, e.g. some organizations were found implementing or revising PPM. Therefore, the following main research question was formulated:

How can an information intensive organization improve decision making for project selection within its project portfolio management process?

Academic literature varies on what components constitute PPM. Managing project portfolios effectively encompasses many aspects, i.e. at least more than only selecting and prioritizing projects. Various authors present divergent views (see, e.g. Archer and Ghasemzadeh, 1999; Englund and Graham, 1999). Therefore, the following sub research question was formulated:

What processes constitute the PPM process?

2.2 Research validity

The same researcher conducted all interviews. The interviewer explained the type of research, the nature of the interview, the expected duration, and its format (Doody and Noonan, 2013). Permission was asked to record the interview. Questions asked included, among others, topics concerning:

- PPM structure and components;
- involvedness of top management;
- problems interviewees face with managing project portfolios;
- specialized roles within PPM;
- amount of projects that are selected and run simultaneously;
- amount of terminated projects (process and reasons); and
- whether there is a clear process for project termination, and so on.

Org.	Int.	Sector	Employees	Budget	Role of the interviewee
A	#1	ICT cooperation services	100	€10.000.000	Programme manager
B	#2	Professional educational institution	3.300	€1.500.000	Portfolio manager
C	#3	Professional educational institution	2.500	€3.500.000	Programme manager
D	#4	Railway maintenance services	4.000	€369.000.000	Head of Portfolio management
E	#5	Financial and insurance services	22.000	€150.000.000	Head of portfolio management
F	#6	Information services	1.800	€6.500.000	Portfolio secretary
G	#7	Mail transport and distribution services	32.000	€25.000.000	Head of project department
H	#8	Professional educational services	2.200	€5.600.000	Lead architect
I	#9	Property management services	400	unavailable	Portfolio analyst
J	#10	Aviation, cargo and maintenance services	95.000	€70.000.000	Portfolio manager
K	#11	Pensions, mortgages, financial, insurance and assets	24.000	€90.000.000	Project Portfolio Manager

Table 1. Overview of interviewed organizations

A mix of qualitative open and closed questions was used throughout the interviews. This enabled a flexible exploration without leading the interviewee in a certain direction (Doody and Noonan, 2013). To clear up misunderstandings, a probing technique was used. This also enabled an open character to explore data and allowed interviewees to speak freely. Summaries were created after the interview and then sent to interviewees for member checking. Collected data were catalogued and analysed to a certain extent after an interview, i.e. interesting findings were used as input for subsequent interviews. After the final interview, the collected data were juxtaposed and analysed thoroughly to find emergent PPM patterns. These patterns were subsequently compared with those found in academic literature to build an integrative model. To clear issues, to generate more data and to help make sense of the collected data, follow-up calls were conducted. Some interviewees additionally shared project proposals, business cases, project selection criteria, and review criteria, which enriched the interview data. Three

interviewees would only collaborate if data would be anonymized. Therefore, the organizations are named Organization A to K. Their corresponding interviews are classified as I#1 to I#11, see Table 1 for an overview of the organizations and interviewees.

3 CONCEPTUAL FRAMEWORK

This study elaborates on the process view of Jonas (2010), which suggests a chronological sequence of four phases derived from the project portfolio managerial tasks. The portfolio is structured. Then, resources are managed. Subsequently, the portfolio is steered. Eventually, an organization learns by regular reviews. However, there are three concerns with this phased perspective. First, Jonas perceives the four phases as chronological. The interviewed organizations do not manage their portfolios according to this chronological thinking. Therefore, this study does not perceive the PPM process in that manner. The phases are rather dynamic and occur concurrently. A second concern is that Jonas seems to suggest tasks associated with static project selection. Ghapanchi et al. (2012) differentiate between static and dynamic project selection. The first involves the selection of only new project proposals. The latter involves managing running projects and new proposals concurrently. It involves more complex decision-making as project termination and deletion decisions need consideration as well, e.g. to select a new project proposal, one or more running projects might be terminated. Additionally, project selection occurs throughout the year, not only once a year. Therefore, this study focuses on dynamic project selection as all interviewed organizations worked according this structure. A third concern is that Jonas groups many concepts under the “portfolio structuring” phase, suggesting a narrow description of PPM. This study disentangled and rearranged them in a more coherent preference based on the concept matrix created for the literature review. More importantly, contextual concepts are added.

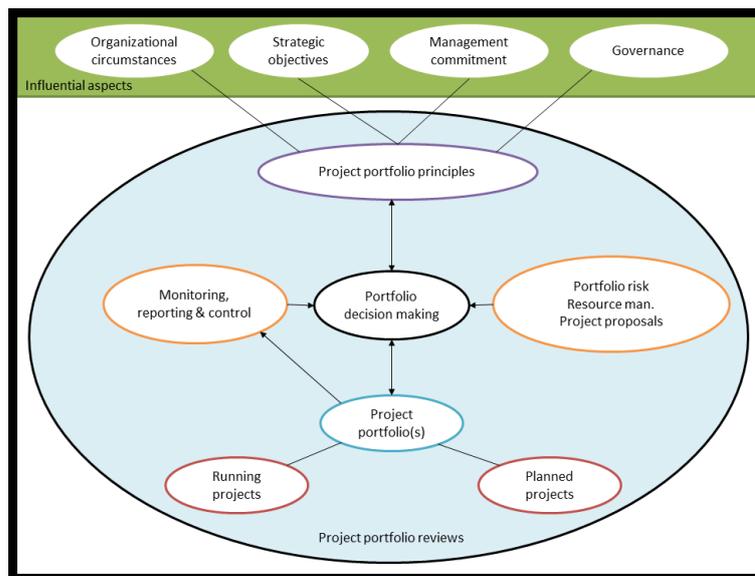


Figure 1. Conceptual model

To answer the sub research question, it can be stated that the PPM process, depicted in Figure 1, consists of seven key concepts. Influential aspects are the external factors of PPM. They have a major influence on the PPM process and therefore need consideration. The aspects are governance, management commitment, organizational circumstances (such as organizational culture and maturity) and strategic objectives. The six other concepts are the internal aspects of PPM. Portfolio Principles structure the portfolio. This includes matters such as process ownership, make-or-buy strategies, investment budgets, success factors, performance indicators, size and duration of projects, PPM goals, frequency of project selection, communication and information processes, the type of projects managed, what selection criteria utilized, strategic buckets, and so forth. These principles can come from various sources inside and outside the organization, e.g. legislation, regulation, enterprise architecture and in-

formation management policies. Portfolio reports, project proposals, portfolio risks and resources function as input mechanisms for portfolio decision making. Project selection, project termination and project (proposal) deletion decisions function as output mechanisms of portfolio decision making. These mechanisms affect running or planned projects within the project portfolio. Outcomes of conducting periodic project portfolio reviews are organizational learning and gaining insight into portfolio exploitation. Management may consider this process as feedback on their actions. This approach makes the process of formulating and implementing strategy conclusive.

4 LITERATURE REVIEW

4.1 Influential aspects

Governance

IT governance is all about creating transparency, defining responsibilities and roles, managing risk and resources, and monitoring management behaviour. Webb et al. (2006) define IT governance as “*the strategic alignment of IT with the business such that maximum business value is achieved through the development and maintenance of effective IT control and accountability, performance management and risk management*” (Webb et al., 2006). Similarly, Posthumus et al. (2010) perceive the focus areas to be, strategic alignment; value delivery; risk management; resource management; and performance measurement. Müller et al. (2008) suggest four possible ways for governance implementation through project, program and portfolio management. Organizations might (1) group multiple projects isolated from each other (multiproject organization); (2) group projects by objectives (program driven organization); (3) group projects by resources (portfolio driven organization); or (4) combine all three approaches (hybrid organization). Hybrid organizations that combine techniques from program and portfolio management were found to be significantly more successful than organizations that do not.

Strategic objectives

Strategic alignment is one of the goals of PPM and IT governance in general. Therefore, strategic objectives have an impact on PPM. On the one hand, an organization formulates strategic objectives. On the other, it needs to implement them. PPM serves as a means to implement strategy through projects and programs. It has, opposed to projects, an infinite lifespan and needs continuous improvement. It is rather an organizational process than a management or implementation technique. Organizational processes are critical building blocks to strategic planning and organizational structure (Kohlbacher and Gruenwald, 2011). These unique processes are difficult to imitate by the competition and can be a source of consistently strategic advantage.

Organizational circumstances

Organizational circumstances are unique per organization, e.g. culture, complexity of the environment, maturity, change and risk appetite, and have impact on PPM implementation and exploitation (Archer and Ghasemzadeh, 2004). They need consideration as well. Some authors suggest that PPM demands a cultural shift in thinking and that it is a shared business responsibility (Archer and Ghasemzadeh, 2004; Chiang and Nunez, 2012; Christiansen and Varnes, 2008; Posthumus et al., 2010).

Top management commitment

To gain buy-in and to implement strategic objectives through PPM, top management support is critical. Various authors emphasize its key to PPM success (Arto and Dietrich, 2004; Cooper et al., 2001; Gomes et al., 2001; Jonas, 2010; Killen and Kjaer, 2012; LaBrosse, 2010; Unger et al., 2012). When lacking commitment, PPM will not deliver its full potential.

4.2 Project portfolio principles

PPM principles structure portfolios. Examples include process ownership, make-or-buy strategies, investment budget, success factors and key performance indicators, frequency of selection, and so on.

Process ownership and improvement

Literature is very scarce on PPM process improvement. Therefore, this study uses more general process improvement techniques as well. Kohlbacher and Gruenwald (2011) state that “*there is a remarkable lack of studies investigating the importance of the process owner and process performance measurement in organizations*”. They suggest three prerequisites for achieving high performance with any process. First, PPM needs organizational actor and stakeholder support to be successful. Second, regular measurement and review moments enable process improvement. The third prerequisite is that a process owner is necessary. The process owner ensures continuous process review and improvement. The owner has an end-to-end responsibility, competence and power to change the process. Kohlbacher and Gruenwald (2011) claim that when an organization lacks a process owner or process measurement; it is insufficient to achieve high performance. They argue that measuring process performance without a process owner leads to hardly any improvements. Similarly, having a process owner without measuring performance regularly will unlikely improve business performance.

Managing project overload

Managing project overload is necessary to ensure a constant delivery of projects. However, there is not much literature on this concept. Some authors perceive the right amount of projects as one of the biggest PPM challenges (Cooper and Edgett, 2003; Killen et al., 2006). PPM models and frameworks do not consider how to achieve a healthy amount of projects (see, e.g. Archer and Ghasemzadeh, 1999; Arto and Dietrich, 2004; Cooper et al., 1999, 2006; Englund and Graham, 1999; Gutjahr et al., 2008; Lamratanakul et al., 2008). Neither do they offer an adequate solution to selecting projects (Kornfeld and Kara, 2011). Resources can function as constraints to limit projects. Whether this is enough is unclear. There is no clear-cut answer in the literature. Other valuable advice is learning when to say no, and terminating projects to ensure a healthy portfolio (Kester et al., 2009).

4.3 Portfolio decision making

In the literature, there are two perspectives on decision-making. There is a distinction between what management should do versus what they actually do (Mintzberg, 1989). Rational or optimized decision making also known as standard choice theory informs the first perspective (Heiner, 1983). Many models are based on this theory, e.g. Archer and Ghasemzadeh 1999; Arto and Dietrich, 2004; Cooper et al., 1999, 2006; Gutjahr et al., 2008; Oh et al, 2007; Stantchev et al., 2009. This perspective focuses on what management should do and simplifies the messiness of everyday reality (Ciborra, 1997). Archer and Ghasemzadeh (2004) state that, “*some of these models also support sensitivity analysis, but most do not seem to be used extensively in practice. Probable reasons for disuse include the need to collect large amounts of input data, the inability of most such models to include risk considerations, and model complexity*”. Heiner (1983) argues that presence of a c-d gap regulates behaviour, not its absence. Therefore, bounded rationality informs the second perspective. A decision maker does not have all information or time to make the best decision; rather one chooses a best fit under circumstances. Reasons for this may be time constraints, lack of information, knowledge or skill, and so on. Christiansen and Varnes (2008) term this appropriate decision-making. Various authors adopt this view (see, e.g. Curutiu, 2008; Kester et al., 2009; Killen et al., 2012; Martinsuo, 2013).

Quality decision making tends to be important for an effective PPM strategy (Killen et al., 2006). There are four different levels of decisions (Müller et al., 2008). First, there is the unconscious or autopilot decision. Kahneman (2011) calls this system one thinking, e.g. solving a simple equation like two plus two. The second level consists of decisions made in reference to a few attributes. The third

level entails choosing between alternatives. The fourth kind involves complex problem solving to define decision alternatives. Kahneman (2011) calls this system two thinking. Bannister and Remenyi (2000) claim that “*when it comes to very complex decision-making, managers often rely on methods which do not fall within the traditional boundaries of so-called rational decision making*”. Therefore, rational PPM models might be usable for the first three levels of decision-making. The fourth level decisions are too complex for rationality alone. Employing a rational model for decision-making will not be sufficient in that case (Martinsuo, 2013; Unger et al., 2012).

There are three important decision categories in PPM, i.e. selection, termination and deletion decisions (Kester et al., 2009). Müller et al. (2008) recommend taking portfolio decisions in interdisciplinary teams. They suggest project selection based on strategic objectives, not on a manager’s personal preferences. It involves complex parts that form a complex whole, and it is more than managing individual projects (Artto and Dietrich, 2004; Killen and Kjaer, 2012; Rungi, 2010).

Project selection

Project selection entails a process to gather, evaluate, approve, and prioritize project proposals (Rungi, 2010; Stantchev et al., 2009; and Wen, 2010). According to Killen (2006), project selection is one of the biggest challenges within PPM. There are two types of projects within selection: active projects and new project proposals. Active projects consist of running and planned projects. Some authors suggest grouping projects in strategic buckets (see, e.g. Cooper and Edgett, 2006; Kester et al., 2009). This ensures alignment of projects to strategic objectives for traceability and communication purposes.

Project termination

Project termination tends to be perceived difficult within organizations (Christiansen and Varnes, 2008; Kester et al., 2009; Unger et al., 2012). Some authors recognize project termination as key to successful PPM and ensuring strategic fit (see, e.g. Unger et al., 2012). Reasons for perceived difficulties can be “*defense by design*” (Argyris, 1993), “*a sign of failure, or loss of face*” (Choo 2005), “*we’re almost there*” argumentation (Cooper and Edgett, 2003), “*entrapment, or too-much-invested-to-quit syndrome, sunk cost effect, or escalation of commitment*” (Unger et al., 2012). Indeed, one needs a strong personality to pull out the proverbial plug. Cooper and Edgett (2006) claim that management makes mistakes by making irrevocable “go” decisions early on in projects. This is a paradox as there is much uncertainty to commit in a preliminary phase. Therefore, they suggest an incremental approach to make termination later on easier.

Project (proposal) deletion

In the literature, there is little research on project deletion. However, some authors suggest product deletion as part of new product development (NPD) portfolios (see, e.g. Kester et al., 2009), i.e. termination or end of life of a product. It is possible to make the same decisions in other types of portfolio. Therefore, the term project (proposal) deletion is preferred. Project deletion entails two types of deletion. Firstly, uninterested proposals may stay on the long list. Therefore, they may be deleted. A clear response to the project proposer offers clarity and a clean proposal list. Secondly, deleting planned projects with low priority might occur as well. A planned project is a selected one that has not initiated yet, e.g. due to low priority. The difference between project deletion and termination is that it involves a more difficult decision when resources are actually spent.

4.4 Portfolio risk management

Risk management is an underexposed concept when it comes to portfolios (Sanchez et al., 2008). The standard for portfolio management (Project Management Institute, 2008) defines portfolio risk as “*An uncertain event, set of events or conditions that, if they occur, have one or more effects, either positive*

or negative, on at least one strategic business objective of the portfolio". It starts with creating one vocabulary, defining performance criteria, defining a process and defining guidance on the integration within decision-making processes and structures (Purdy, 2010). According to the Management of Risk framework (M_o_R), risk is managed on four levels, i.e. strategic, program, project and operational risk (Office of Government Commerce, 2010). Portfolio risk is managed at the strategic level. M_o_R emphasizes to triangulate risk management on the other three levels as well to protect the organization from failure. Risk management is not an activity that only occurs before project initiation. By structurally managing risk, the organization raises PPM success (Archer and Ghasemzadeh, 2004).

Project interdependencies

Project interdependencies inform termination, deletion and selection decisions, e.g. one project termination may lead to multiple terminations due to interdependencies. PPM consists of many single projects that may have multiple interdependencies with each other. Interdependencies are typical portfolio risks, e.g. a group of interdependent projects may together deliver capabilities, or multiple projects may depend on the outcome of a single enabling project. Examples of project interdependencies include shared resource, learning, market or benefits dependencies (Killen and Kjaer, 2012).

4.5 Resource management

Resource management entails the management of financial, human and other resources. It is an intertwined concept, e.g. a project that is running out of budget may need resources from other projects. Jonas (2010) perceives this activity as a phase in his suggested approach to PPM. However, in this study it is an activity that needs consideration during any portfolio decision, not only after portfolio structuring. Generally, there is agreement that resource allocation is challenging, especially when an organization has many varying projects that demand varying specialists (Hendriks et al., 1999).

4.6 Portfolio monitoring, reporting and control

Portfolio monitoring and reporting generate management information for decision making, i.e. to control the portfolio. Organizations monitor and control projects until the next project portfolio meeting. Due to this activity, running or planned portfolio projects can be reprioritized, paused, deleted or terminated, e.g. due to lack of resources or other issues.

4.7 Project portfolio reviews

The key to advance the PPM process is continuous improvement. Organizational learning is a key strategic capability to compete in modern markets (Santos-Vijande et al., 2012). Periodic portfolio reviews enable the ability to learn and improve PPM (Müller et al., 2008).

5 RESULTS, ANALYSIS AND DISCUSSION

In this section, the research results will be highlighted, analysed and discussed. The presentation of this section is structured according to the focus areas of IT Governance. The reasoning behind this is that IT Governance directs the development of ICT facilities.

5.1 Strategic alignment

PPM consists of making decisions on varying cross-functional project proposals. One of its goals is to achieve strategic alignment. Involvement of various disciplines is necessary, as this is a prerequisite for high alignment (Chan and Horner Reich, 2007). All interviewees stated that PPM is a shared collaboration between various organizational actors and structures. The Portfolio Board generally consists of IT and business representatives. Furthermore, they stated that they analyse project proposals on strategic objectives. However, it begs to differ whether organizations manage only projects that con-

tribute to strategic objectives within PPM. Some literature and interview findings suggest the contrary. Young et al. (2012) found that organizations invested 100 billion dollars in projects without evidence of improvement in strategic goals. Similarly, an interviewee stated that, “We try to align projects to strategy but are not mature enough to do it accordingly” (I#2). Another interviewee stated that, “50% of its portfolio budget is invested in business continuity, while the idea is to invest in more strategic objectives. The organization tries to change this into a strategic portfolio. The team thinks that the feed of project proposals should therefore come from annual information plans and information strategy. Current thinking and cultural aspects hold this step back” (I#6). Yet another interviewee stated that, “From project proposals the organization tries to translate project results to strategy. To change the current thinking is difficult, because new power relations may arise which managers tend not to appreciate. This strategic thinking is needed to be successful in portfolio management” (I#4).

5.2 Performance management

The interview results made clear that half of the interviewed organizations lack a formal PPM process owner. This implies that there is no champion for improving the process and measuring performance. Moreover, PPM performance is not sufficiently measured in these organizations. As suggested by Kohlbacher and Gruenwald (2011), a process owner is necessary next to regular performance measurement and active stakeholder support to achieve high performance. Additionally, regular performance management enables transparency. According to Weill and Ross (2004), “transparent mechanisms promote desirable IT behaviours and individual accountability”. Some interviewed organizations are not transparent in their decision-making. Stakeholders and other interested parties must take action themselves, to determine whether a project is selected. Transparency reduces political decision-making, enables status tracking, and enhances stakeholder support. It allows shortfalls in PPM maturity to become more transparent to top management. In one organization, it is even customary to initiate projects outside of PPM. PPM in some cases receives a notification of an initiated project, in others not at all. This organization had serious issues with top management commitment. The interviewee stated that, “Internal power relations hold progress of portfolio management. Although the directors think it is important, they do not act responsibly and do not champion the recent developments” (I#9). This results in a slow PPM implementation. Consequently, top management commitment is required.

Recommendation 1	Create transparency for stakeholders and other interested parties!
Recommendation 2	Implement a process to improve the PPM process and appoint a PPM process owner that is responsible for process measurement and improvement!

5.3 Portfolio risk management

Most interviewed organizations manage individual project risk. However, the majority does not manage portfolio risk. This is visible in the lack of risk management roles within virtually all interviewed organizations. Organization E has a specialized role for risk management. Nonetheless, the interviewee stated that, “this and other specialized roles like resource management are not fully matured within the organization. Some roles are under continuous improvement and there is certain awareness that all these roles are important for the process” (I#5). Typical examples of portfolio risk involve initiating too many simultaneous projects, not terminating weak performing projects, only considering cost aspects of initiatives, having many projects that do not add value, having many large, complex and long cycle projects, and having many interdependencies between projects. These issues were found in the majority of the interviewed organizations. Overall, they can have a devastating impact on a large portion of projects as these risks can come from inside or outside the portfolio. Issues might occur on portfolio level without the knowledge of a project manager or executive. Therefore, they need to be managed at the portfolio level.

Recommendation 3	Implement portfolio risk management and appoint a responsible portfolio risk manager!
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Managing project overload

Limiting simultaneous running projects is perceived as difficult within most interviewed organizations. It is recommended as many interviewed organizations suffer from project overload. The most found limiting factor for simultaneous projects tends to be annual budget, available human resources, or a combination of both. The problem is that there is often no insight in the availability of human resources, that estimates are quite off, and that money is difficult to spend because of slow decision-making processes. Management might feel that adding a few projects might not be a problem. However, not limiting simultaneous running projects gradually leads to project overload. An organization might find itself doing too many projects and delivering little results. This culminates in many projects that do not add value or do not contribute to strategic objectives. Other issues might be that many projects are not delivered within reasonable constraints and that employees suffer from change fatigue.

Organizations should first analyse the problem. Like Organization D did a few years ago. It mastered the craft of limiting simultaneous running projects by assigning Project Equivalents (PEQS) next to budget and human resource constraints (I#4). PEQS consist of six criteria, they are complexity, dependencies, size, organizational impact, critical resources that are highly specialized and choices within a project. These criteria define needed steering capacity. Management establishes the amount of PEQS on basis of steering capacity that a project needs. The total PEQS (limit) are calculated annually on basis of the total available steering capacity the organization has, i.e. all hours management can work on steering projects. A portfolio receives a maximum amount of PEQS for simultaneous running projects. When the portfolio reaches its maximum, no more projects can initiate, unless one is finished, terminated, or put on hold. This enhances the chance to deliver projects within constraints.

Recommendation 4	Limit project selection and simultaneous running projects as well!
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Project termination

Most interviewed organizations do not have a formal process for project termination at the project portfolio level. The project portfolio managers lack mandate. They rather advise steering committees to terminate projects when relevant. Furthermore, they perceive termination as a project management activity, as they utilize best practices from the utilized project management method, i.e. steering committees decide whether to terminate a project. How often projects are terminated varies not much between the interviewed organizations. In one organization, project termination is very rare and rather theoretical (I#10). Most organizations terminate projects only in exceptional cases. Few tend to terminate projects more often. Rather interesting is a comment of an interviewee about officially terminated projects. "Sometimes they start shortly after termination disguised as another project" (I#4). One organization has a clear defined termination process built-in its stage gate (I#1). When termination is considered, the decision is taken at stage gates. It provides documentation through operational excellence for this purpose. An interviewee thought that, "procedures for terminating projects could be improved as steps to terminate projects are not very clear" (I#3). This might explain why some projects linger on while officially terminated. The suggested incremental approach of Cooper and Edgett (2006) was found in Organization K. By utilizing its stage gate, a project receives a "go" decision for a month. When it does not deliver according to plan, PPM puts it on hold until it approves a new plan. Otherwise, the project can be terminated. The interviewee simply articulated that "a project that initiates may be finished as it is a choice to execute projects, it is not a given in most cases" (I#11). This organization terminates quite some projects on an annual basis.

Project management frameworks, such as Prince2, provide a procedure for terminating projects (Office of Government Commerce, 2009). It suggests that a steering committee needs to terminate a project when necessary. In some cases this may be problematic, such as the outlined reasons provided in the Literature review. A solution for these cases might be to implement a mandated project termination procedure at PPM level. Some authors believe that organizations should implement a "Murder Board"

(see, e.g. Breese, 2012; Jenner, 2009). Others suggest a similar approach by utilizing a Stage Gate with sharp teeth (Cooper and Edgett, 2006). The bottom line is an objective need to analyse a set of projects with the aim to continue, terminate, or to improve them. This group should consist of people who are able to ask critical questions regularly and are detached from project content. Organizational circumstances and a lack of management commitment, however, can slow down an effective output of such an approach. Jenner (2009) therefore proposes that organizations need to create a culture in which project termination is perceived as success, e.g. reward employees to terminate projects. Above all, awareness and a shift of current thinking are needed.

Recommendation 5	Implement a project termination procedure at PPM level!
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On balanced portfolios

The academic literature considers a balanced portfolio as necessary. According to Meskendahl (2010), it is even a factor for portfolio success. Few interviewees perceive it as a factor for portfolio decision-making. Nevertheless, they did not perceive it as a PPM goal. The majority selects a group of projects based on individual project characteristics, and not per se on the best portfolio mix. The literature and practice differ much on this point. Many contextual aspects, such as uncertainty, limited cognitive capability, organizational circumstances, politics and power are not considered in the literature. This gap generates room for discussion on whether it really is a PPM goal. A balanced portfolio is like a balanced diet. It is a means to achieve a goal, i.e. to have a healthy life. Therefore, an unbalanced portfolio is rather a risk that needs to be managed. For instance, an interviewee stated that, “it is theoretically possible to have three very large, high risk projects in the portfolio” (I #10). This might not be a balanced portfolio and may not deliver value to the organization. It might not even contribute to multiple strategic objectives. Therefore, it might be a risk. Another perspective is that a balanced portfolio adds value to the organization and multiple stakeholders and develops multiple organizational aspects. It therefore enhances stakeholder support, and might have positive impact on portfolio success.

5.4 Value delivery

There are some disturbing conclusions when comparing the definition of Posthumus et al. (2010) with interview findings. Almost all interviewed organizations answered that projects cannot start without a business case. They stated furthermore that proposals are primarily analysed on strategic objectives and business benefits value compared to cost and risk. An involved controller typically manages cost expenditures. Few of them review planned against actual achieved strategic objectives. Planned versus actual responses to risk and generated benefits are shockingly seldom reviewed. This creates room for believing that a business case is just a prerequisite to start a project in most interviewed organizations. What follows varies per organization. Some interviewees answered that they require business cases to be updated when necessary, but not all interviewees responded to this follow-up question. Few interviewees stated that they report periodically on short-term benefits realized during project execution. Only one interviewee reports periodically on realized long-term benefits (I#7).

A reasonable explanation for this behavior might be that most managers tend to believe that implementing IT will generate benefits, for instance “Organizations rush to purchase IT silver bullets in the form of customized business solutions, enterprise application packages and other ready-to-wear IT solutions in the naive belief that they come neatly packaged and stamped benefits inside. Again, the idea is that all you have to do is plug in the technology and, magically, the benefits will flow” (Fujitsu Consulting, 2007). Tiernan and Peppard (2004) claim that, “the majority of business managers thinks that by implementing IT, it will bring benefits. This is a reason why so many projects fail”. They furthermore claim that “this thinking is reflected in the practice of creating elaborate plans to implement the technology while the achievement of business benefits - the reason presumably why the investment is being made in the first place - receives little or no planning”. This behavior is observed in many of the interviewed organizations. Most of them are very careful before a project may initiate. They tend

to neglect other PPM concepts, e.g. portfolio reviews, risk management and benefits management. Gomes and Romao (2014) claim that, "It is unlikely that the benefits previously identified automatically arise from the introduction of a new technology. It's getting to be rigorously planned and managed". Benefits need to be managed from planning to realization, i.e. some benefits are delivered years after project dissolution. An interviewee provided an interesting perspective "benefits are not managed actively after project delivery due to organizational maturity. First, an organization needs to focus on delivering projects right. When this is mastered, then organizations will start looking at benefits" (I#11). Other views on lacking a benefits management process (Gomes and Romao, 2014) might be:

- "Lack of experience or knowledge of the business. Focus on results, rather than on benefits";
- "Lack of focus on people who will enjoy the benefits";
- "Emotional commitment to continuing the project and therefore is not open to changes that could threaten the viability of the project";
- "Lack of tools to help ensure that the benefits will be delivered".

Academic and practice-oriented literature presents many frameworks, methods and models for benefits management that the interviewed organizations do not use. A typical issue might be where to vest responsibility for benefits management. The Managing Successful Programmes (MSP) method suggests that program management generates capabilities through projects. Business Change Managers (BCMs) are responsible for realizing benefits by embedding those capabilities in the line organization (Office of Government Commerce, 2011). For this purpose they create a Benefits Realization Plan. To enhance successful triangulation, the same techniques may be applied to PPM. It is found that organizations that successfully triangulate techniques from program and portfolio management are significantly more successful than organizations that do not (see, e.g. Müller et al., 2008). Other suggestions include appointing a benefit to each owner and locking in expected benefits in departmental budgets as suggested by Menke (2013). One interviewee stated that they follow this practice much to the disliking of many department heads within the organization (I#11).

Recommendation 6	Implement benefits management and appoint a responsible benefits manager!
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5.5 Resource management

Organizations generally have trouble with resource supply and demand. Most interviewees stated that initial estimates are hardly on point and that they have no insight in available resources. Moreover, they stated that project delivery within constraints varies from 10 to 80 percent. This means that reserved portfolio budget is never enough for all planned projects. Ullman and Levine (2009) therefore suggest that a portfolio should be established based on worst-case estimates. Most organizations do estimate with some slack in mind, but this seems to be insufficient. To manage resources effectively, insight is needed in expected and available resources. Additionally, project proposals should contain accurate estimates. Organizations should be reviewing estimated and actual resource usage periodically. The more diversity in projects and needed specialists, the more critical project termination and managing project overload become. To make matters worse, line activities may have impact on portfolio projects in matrix organizations. Two interviewees stated that rogue projects are sometimes disguised as line activities. These activities can lead to big issues, e.g. secretly guzzle resources that cannot be assigned to portfolio projects, increased risk, spaghetti architecture, increased cost, redundancy, and so on. There is no simple suggestion to reduce rogue projects, e.g. Organization G assigns a project id to each official project (I#7). Employees must register time against a project id when working on projects. This measure might ban some rogue projects. However, projects that only need human resources are less likely to be banned. Therefore, it is better to analyse the root cause than to fight fire afterwards, unless cultural aspects do not allow this.

Recommendation 7	Implement resource management at PPM level and assign resources from within PPM. Centralized resource allocation clears the way for project managers to deliver
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	results. In many of the interviewed organizations project managers were wasting time on getting resources assigned instead of working on delivery due to decentralization.
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6 CONCLUSION

Based on the research, it can be concluded that many organizations can still improve PPM. After 45 years of PPM research, the concept is still in its infancy. Many practical problems are not described in the literature. When they are, they usually lack a workable solution. Another problem is that of cut and paste research. It is time to raise PPM into maturity. Some interviews with portfolio managers reveal that PPM is not a full-time activity within their organizations. This is also noticeable in the underrepresentation of roles within PPM, such as benefits, risk, stakeholder, performance and resource management. Often, PPM is carried out on the side. One would think that PPM, that involves large amounts of capital, would have more dedicated employees than one project portfolio manager. Management starts somewhere and lets the process run its course with hardly any performance measurement. Because of this lack of feedback, organizations learn little and hardly improve the process. When comparing the research results with the IT Governance goals, there is a disturbing conclusion. In fact, three goals are underexposed in the majority of the interviewed organizations, i.e. maximizing benefits, spending ICT resources responsibly and managing risk properly.

To conclude this research paper the main research question is answered. How can an information intensive organization improve decision-making for project selection within its project portfolio management process? Portfolio decision making is not different from decision-making for any other organizational concept. Conducting periodic reviews is considered to improve decision-making. This enables learning to improve the PPM process as a whole. The focus areas of IT Governance (see, e.g. Posthumus et al., 2010; Webb et al., 2006) are recommended concepts to review periodically. This translates to comparing expected and actual benefits; expected and actual risk responses; estimated and actual resource usage; and expected and achieved strategic objectives. If applicable, PPM sub concepts may be reviewed as well, e.g. selection criteria and amount of simultaneous running projects.

6.1 Research limitations

This study generated some insights in PPM practice. However, there were some research limitations. Interviews were conducted with only one interviewee per organization. Some organizations had multiple portfolio management offices, e.g. Organization E and J. More interviews could generate richer data quality per organization. This includes interviews with other PPM specialized roles.

6.2 Future work

Some open questions need further research. The influence of timekeeping on the quality of resource management is unclear. That an organization keeps time spent on line activities does not guarantee that portfolio human resource allocation improves. For instance, Organization A requires time keeping spent on line activities. However, they have major issues with human resource allocation for projects (I#1). By contrast, Organization G and K have no issues with this aspect and plan resources quite easily. It might be that finding a balance between too detailed and too little timekeeping, as suggested by Organization I, is important but not sufficient. They have timekeeping issues due to a lack of employee commitment (I#9). Organizational circumstances typically influence PPM enormously. Further research could entail searching for other important aspects and an optimal balance.

Two interviewees mentioned that the collaboration between PPM, information management, and enterprise architecture was not yet optimal within their organizations (I#4 and I#7). It might have impact on business agility and ICT infrastructure flexibility. The interviewees stated that issues arise between the practical focus of PPM and the conceptual focus of enterprise architecture. The research could entail how this triptych affects business agility and ICT infrastructure flexibility.

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