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Project Portfolio Management for a Support Function

- Neglected challenges inhibiting effective PPM

Master of Science Thesis
in the Management and Economics of Innovation Programme

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Abstract

Resources are always limited within an organization and should be utilized in the best possible way. In multi-project environments, it is not always easy to know which projects to allocate resources in order to achieve an “optimal” portfolio. Project Portfolio Management (PPM) provides a process which assists decision makers with the selection, evaluation and prioritization of project and project proposals.

The purpose with this master thesis is to explore underlying reasons for challenges connected to PPM within a support function. In this qualitative case study, seven hypotheses were investigated in order to help us answer our research questions.

Current literature regarding PPM is today primarily related to an external multi-project environment where projects are commenced for an end-customer in a market. Thus, there is a lack of literature assessing PPM for internal multi-project environments.

On a market, input regarding a projects’ success is readily available from an economic perspective derived from customers’ willingness to pay. For a support function, working with business development and performance improvement, this input should generally take longer time to be generated since the support function is further away from the end-customer and lacks the market mechanism.

The outcome of the case study showed that many of the organizational challenges connected to PPM correlate between an external and internal multi-project environment. But, our conclusion is that PPM, for an internal multi-project environment, should be more complex from an economic perspective. The difference in organizational setting provides complexity in terms of how to assess the business value of an undertaken project.

Key words: Project Portfolio Management, Internal PPM, External PPM, support function, market mechanism

List of Figures and Tables

1. Introduction

When companies grow and become more complex, the degree of specialization increases within the company (Gregory, et al., 2009). The division of labor thus generates different functions within the company with specialized responsibilities. This implies both a main function pursuing core activities, e.g. product development, but also support functions e.g. administration and IT (Mintzberg, et al., 1999).

One of the most important means which guides a company is strategy (Grant, 2010). A company adheres to what Mintzberg (2007) calls an intended strategy, which acts as a plan for the company's future activities. In a dynamic environment, situations occur that need to be handled, and thus emergent strategies arise which affects the intended strategy to result in a realized strategy (Mintzberg, et al., 1999). The activities and projects undertaken illustrate, according to Cooper, et al. (2001), resource allocation decisions. A resource allocation decision is important since organizations have limited resources and should use their resources in an optimal way (Cooper, et al., 2001).

One common way of making sure that resources are allocated optimally within a multi-project environment is done by applying Project Portfolio Management (PPM). Resource allocation should thus fulfill the goals of effective PPM, i.e. a portfolio of projects which are strategically aligned, balanced and where each project adds value to the organization (Cooper, et al., 2001). In literature there are several similar definitions of PPM. Based on Cooper, et al. (2001), Gutiérrez (2012) use a similar definition which is the definition which will be used in this thesis:

"Project Portfolio Management is a dynamic decision process wherein a list of active development projects is constantly revised. In this process, new projects are evaluated, selected and prioritized; existing projects may be accelerated, killed or reprioritized, and resources are allocated and reallocated among the projects in the portfolio" (Gutiérrez, 2012, p. 6)

A PPM process provides a structured approach to resource allocation driven by the strategy (Archer & Ghasemzadeh, 1999; Cooper, et al., 2001). This process will not eliminate, but it may reduce, uncertainty regarding how to allocate resources optimally. Today, there exists no best practice regarding project portfolio management process (Dawidson, 2006). Nor is there a specific portfolio management model which will ensure that the right answer is provided regarding how to allocate resources (Cooper, et al., 2001). Furthermore, Dawidson (2006, p. 24) state that "*no single tool or method does better than the others in fulfilling project portfolio management goals"*. Instead project portfolio management must be adapted to the given company, its situation at hand and its prerequisites (Dawidson, 2006).

A support function share several challenges of effective PPM with a product development organization, e.g. managing scarce resources, effective project management and how to evaluate that the undertaken project was a success. (Elonen & Artto, 2003)

But, there are also some major differences between the two organizational types. The support function work with internal projects, i.e. projects aimed for organization itself, while the aim of a product development organization is to run external projects, i.e. projects aimed for an end-customer (Artto & Dietrich, 2007). Thus, from a value chain perspective, the support function is

further away from the end-customer of the final product than the product development organization is.

According to fundamental theories of economics, the market mechanism balances the supply and demand curves in a competitive market to intersect at a point of equilibrium, reaching economic efficiency[1]. The market mechanism therefore allocates resources efficiently. This implies that the benefits are greater than the costs and that both the buyer and the seller are satisfied. A critical aspect on the market, in order for the pricing mechanisms to function, is competition. For example, when there is an increase in demand, the market reaction renders an increase in price until a new point of equilibrium arises. (Gwartney, et al., 2006)

The support function does not act on a market with economic efficiency; since resources are allocated through centralized planning. Thus, this implies that: it does not fully control its own resources; cannot choose its customers; does not have the ability to adapt prices nor can it scale up or down the business to respond to changes in demand.

1.1. A Gap in Literature

Project portfolio management is a widely researched concept within product development (Archer & Ghasemzadeh, 1999; Cooper, et al., 2001; Bible & Bivins, 2011), but when applied on a support function, instead of product development organization, the concept is less addressed. This creates a blind spot when applying PPM for a support function.

Cooper et al. (2001) have mapped general challenges of effective PPM for a product development organization. Elonen & Artto (2003) chose to complement this external view with an internal view by commencing a study of two internal development portfolios of projects, in order to identify causes for problem areas of internal multi -project environments.

But, Elonen & Artto (2003) do not provide an in-depth explanation explicitly derived from the internal multi-project environment for the problem areas identified. Nor do they consider the organizational prerequisites as to why there could be challenges, or a difference in terms of challenges, faced between a support function and a main function.

The lack of literature regarding PPM applied for a support function makes the area an interesting one to address in order to continue to identify possible differences and bridge the theoretical gap on why challenges may differ. Throughout this thesis, we assess this theoretical gap with a case study on an internal multi-project environment and challenges related to this organization.

In this thesis the following hypothesis regarding inhibitors of effective PPM, derived from theory, will be assessed:

1. Communicating information is a costly activity and not prioritized
2. Each organization tend to focus on their specific strategic objectives which render conflicts of interest in how to balance the project portfolio
3. Strategic issues are not handled since focus is on execution

[1] ”implies an economic state in which every resource is optimally allocated to serve each person in the best way while minimizing waste and inefficiency” (Investopedia , 2013)

4. Project management metrics are not sufficient for measuring portfolio performance
5. Project classification is misused and therefore not trustable
6. Decision makers focus too much on the cost side of the project rather than valuing project benefits contra cost
7. An informal PPM process prevents effective PPM

These hypotheses will be theoretically elaborated on in Chapter 2 and further discussed in Chapter 5.

1.2. Purpose

The purpose with this master thesis is to explore underlying reasons for challenges connected to PPM within a support function.

1.2.1. Research Questions

In order to investigate common inhibitors for effective PPM within a support function, the following research questions will be assessed:

1) *What are the challenges that the case company experience in terms of PPM?*
2) *What challenges are related to the fact that the case company organization is a support function?*
3) *Why would PPM be more difficult within a support function than within a main function?*

1.2.2. Limitations

This thesis focuses on PPM for a support function, based on empirical research from one in-depth case study. Project management is a close interfacing process, but not in focus per se.

1.2.3. Thesis Outline

Below is an outline of the structure of the master thesis. The thesis disposition includes short captions on the content of each chapter.

Chapter 1 - Introduction
•The scene of this thesis is set by presenting the gap in literature, purpose, and research questions which this thesis will answer.
Chapter 2 - Literature Review
•The theoretical aspects of the thesis is presented by introducing some general concepts which will set the arena for the more in-depth review of PPM which follows.
Chapter 3 - Methodology
•The methodology for the research is presented, which guides the reader through the procedure along which the study has been performed.
Chapter 4 - Empirical Findings
•A description of the case company is presented, as well as the empirical findings regarding the hypotheses.
Chapter 5 - Discussion
•Each hypotheses is discussed, followed by a concluding discussion.
Chapter 6 - Conclusions
•The research questions are answered one by one and the extracted conclusions of the thesis is presented.

2. Literature Review

Below follows a review of relevant literature, but before entering the core of this section, i.e. PPM, the arena for PPM must be set. Thus, we begin by introducing the organizational setting by using a value chain approach and discussing the role of different organizational constituents. Then, a top down approach will follow, ranging from strategy to PPM. Moreover, general activities within a PPM process will be covered and challenges of effective PPM will be assessed.

2.1. Organizational context and the value chain

An organization can be described in different ways; Mintzberg et al. (1999, pp. 333-334), argue that there are generally six basic constituents, or functions, of an organization illustrated in Figure 1:

- The *operating core* – the people within an organization who perform the basic activities which results in products and services rendered.
- The *strategic apex* – the managers who oversee the organization.
- The *middle line* – the persons forming the chain of command from the strategic apex to the operating core.
- The *techno-structure* – the people who perform administrative tasks aimed to plan the work of others, but outside the chain of command.
- The *support staff* – the people who perform various internal services, e.g. mail, IT etc.
- The *ideology* – which in turn constitute the culture of an organization and makes the organization unique.

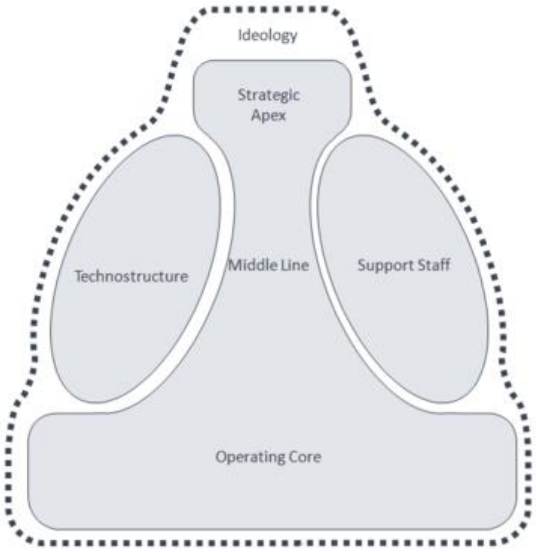

Figure 1 - Mintzberg's six basic constituents of the organization (ManagementMania, 2013)

Figure 1 shows how these constituents can be interrelated to form an organization. The strategic apex, middle line, and operating core constituents are drawn together since they form an uninterrupted chain of command, from top to bottom. This organizational entity will constitute the main function in this thesis. The formal authority sequence which is described in the center does not apply for the techno-structure or support staff which is placed outside of the operating core. This implies that these two constituents influence the operating core merely indirectly. The ideology constituent can be located in the outskirts of Figure 1 as a shaded area. The size and form of the

organizational constituents vary depending on the specific organization and its prerequisites. (Mintzberg, et al., 1999)

Even though Mintzberg's organizational constituents provide a good framework, it fails to assess a company's activities or processes which is of interest for this thesis. Thus, Porter's value chain approach is more appropriate for this thesis since it puts the support functions in an activity context which is more tangible. This other way of illustrating the constituents of an organization is done from an activity-based view of a firm. Porter (1985) has introduced the value chain concept in Figure 2 which puts the organizational activities in perspective and argues that what make an organization create value to customers are the individual activities within a company. Value is equivalent with what a buyer is willing to pay for a good, and profit is the difference between the value and the costs of the activities needed to produce the good (Porter, 1985).

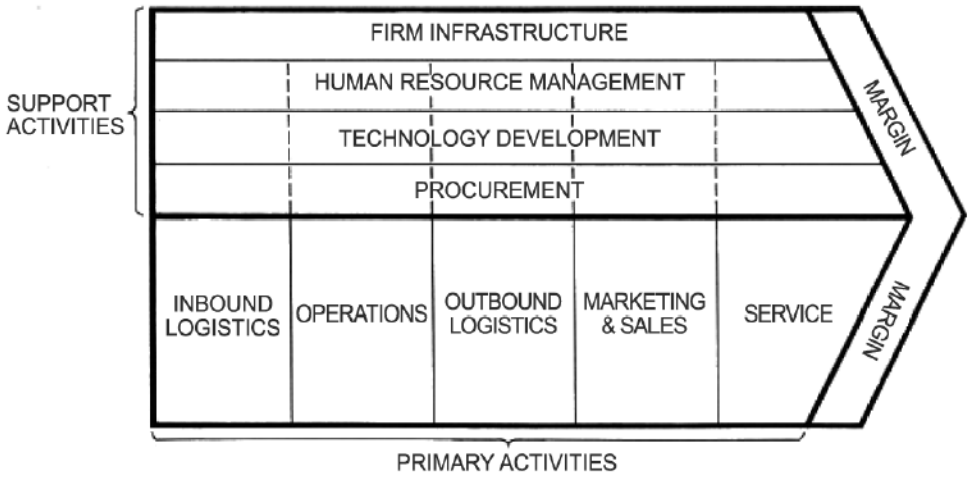

Figure 2 - "The generic value chain model", Porter (1985), picture retrieved from (Svensson, 2003, p. 390)

An organization can thus be a composition of many different sub-organizations, each with its specific purpose as depicted in Figure 2. The primary and support activities presented by Porter (1985) are examples of activities which are the responsibility of different such sub-organizations.

A company's competitive advantage; which according to Porter (1985) either is differentiation or cost leadership, is built upon these activities, rather than on the functions responsible for the activities. According to Porter (1985), an activity can be synonymous to a process within a company. By using Porter's (1985) value chain concept, the strategically important activities leading to competitive advantage can be identified. This implies identifying how these activities contribute to the costs of the organization, but also by identifying prominent activities and how they are commenced which results in differentiation as an effect. (Porter, 1985)

The competitive advantage can be illustrated in a more tangible way from a performance perspective (Porter, 1996). Porter (1996) states that a company's performance is based upon, both operational effectiveness, and strategic positioning. Operational effectiveness implies doing similar activities as your competitor in a better way while strategic positioning revolves around doing different activities or activities in different ways compared to your competitor (Porter, 1996).

2.1.1. The role of a support function

For this thesis, support functions of particular interest are process support functions and Information Technology (IT) support functions since they serve the main function, handling product development, directly. They are support functions with strong interconnections which can be highly intertwined. In order to illustrate the role and importance of the different support functions, a brief background to the scope and function of these organizations is provided.

Magoulas & Pessi (1998, p. 23) defines a process as "*a collection of activities which uses one or different inputs in order to create value for the customer*". A process is normally supported in many ways by Information Systems and Information Technology (IS/IT). When new process development or IS/IT development is undertaken, this may call for adaption of the current processes or IS/IT solutions.

During recent years, the role of IT and how you integrate systems has gained importance and thus investments in IT have increased (Hugoson & Pessi, 2011). IS/IT has thus become more important for companies to be successful and requires active IT-management in order to constantly improve a company's information environment. IT-management is according to Magoulas & Pessi (1998) improvement of an information environment via design and utilization of IS/IT and strategic IT management is the long term approach of developing an information environment by using IS/IT. IS/IT enables organization to become more integrated, both intra-organizational, but also with e.g. customers and suppliers (Magoulas & Pessi, 1998). Furthermore, IS/IT implies a way to use information within the company more effectively when available information can be accessed by the person who needs it, whenever the person needs it (Magoulas & Pessi, 1998). For a product development organization, this could imply e.g. Product Data Management (PDM) which considers all the tools and data related to the product development process (Hallin & Zimmerman, 2001).

As companies have become more complex and technically advanced, and IS/IT has become more central and important for work activities within a company, the expectations and demands on the IS/IT support function; commonly referred to as the IT-organization in industry, has increased. Thus, the IS/IT support function has a two folded responsibility, to perform maintenance of the existing legacy systems, but also to conduct new development activities. Generally, it is common that maintenance gets allocated a majority, up to 80%, of the total IT-budget. New development, on the other hand, revolves on developing e.g. new IT-solutions and applications for the organization which in turn may affect future maintenance budgets. (Magoulas & Pessi, 1998)

IT is one major enabler of process innovation where the need for connecting different information systems of the processes is driven by an increased processualization focus within organizations. Common areas of discussion which arise due to process development are connected to architecture and infrastructure. Architecture in this sense corresponds to an organizational behavior which can be illustrated by the relationship between e.g. humans and artifacts which constitute the content of the architecture. (Magoulas & Pessi, 1998)

Information system architecture is according to Magoulas & Pessi (1998, p. 5) defined as a way to "*represent the sum of all information-related flows, structures, functions and so on, both manual and automated, which are in place and/or required to support the relationships between the entities that make up "The Business"".*

2.2. Strategy

A company's mission constitutes the overall purpose of the firm and why it exists, and a company's vision corresponds to a company's wanted future position (Grant, 2010). What guides each business unit or sub-organization within a company is the strategy which is derived from the vision and goals of the company (Mintzberg, et al., 1999; Bible & Bivins, 2011).

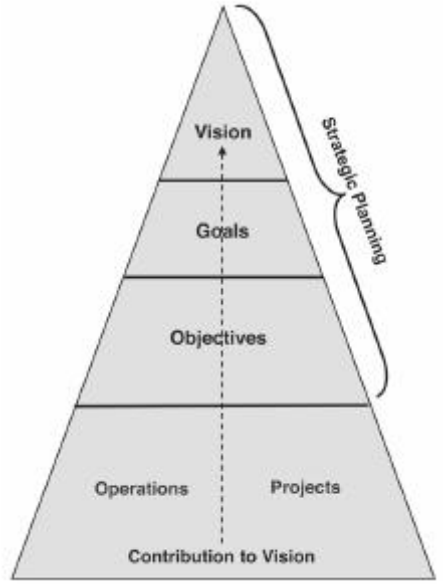

Figure 3 - Illustration of the relationship between strategy and action (Bible & Bivins, 2011, p. 6)

Strategy is a widely researched concept within literature. Bible and Bivins (2011) put strategy and resource allocation in context within Figure 3 by illustrating how projects and operations, i.e. resource allocation, contribute to the vision of a company. A view similar to the statement made by Cooper, et al. (2001) that it is the resource allocation that initiates strategy fulfillment, something which correspond to Porter's (1987, p. xviii) statement: "*activities… make strategy operational*".

Bible and Bivins (2011), denote the development of a company's vision, goals, and objectives as strategic planning (Figure 3). In our assessment, Bible and Bivins (2011) use a too simplistic view of the strategy process delimited to a plan for a future state of a company.

Setting strategy in a time perspective, Mintzberg (2007) use two ways of looking at strategy, either as a formulated or ongoing plan to a future state, e.g. "our strategy *is"*, or in retrospective as a pattern of actions in the past, e.g. "our realized strategy *was"* which is illustrated in Figure 4. The point is that there can be a difference between a strategy and the strategy which is actually realized, and it is important to understand this discrepancy.

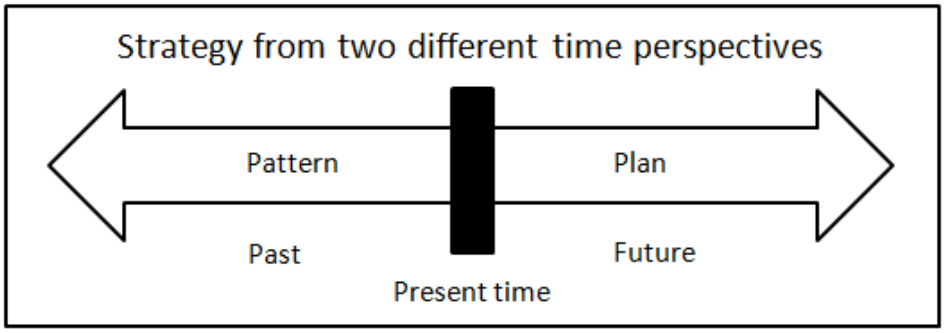

Figure 4 - Strategy from two different time perspectives, inspired by Mintzberg et al. (1999)

According to Mintzberg et al. (1999, p. 13), the dominating view of a strategy is strategy as a plan, i.e. an *"intended course of action, a guideline … to deal with a situation*". In turn, the definition of strategy as a pattern of actions, made by Mintzberg et al. (1999, p. 14), is a "*consistency in behavior, whether or not intended".*

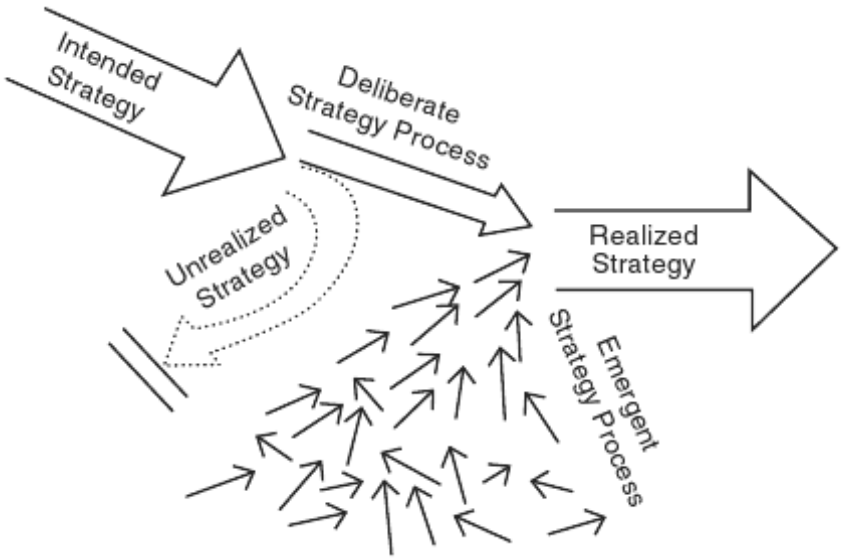

Figure 5 - "Forms of strategy" (Mintzberg, 2007, p. 6)

In Figure 5, the plan and pattern definitions described above are put into context. The starting point of the strategy process shown in Figure 5 is the plan which is equivalent to the "intended strategy". Strategy as a pattern is illustrated by the "realized strategy", a pattern which is constituted by the consistency in the resulted actions which were taken. (Mintzberg, et al., 1999; Mintzberg, 2007)

We now return to the discrepancy between the plan and the pattern, i.e. the intended strategy may not always be completely realized. Figure 5 explains this discrepancy between the plan and the pattern by introducing the "deliberate strategy process", the "emergent strategy process" and the "unrealized strategy". (Mintzberg, et al., 1999; Mintzberg, 2007)

The deliberate strategy process can be translated into, albeit somewhat simplified, the realization of an intended strategy, i.e. intended actions. The emergent strategy process can be seen as other unintended actions, albeit coherent actions, which in turn are not derived from the intended strategy but, still emerge. The unintended actions can for example be a result of organizational learning, i.e. a

person within an organization taking an action because it makes sense for him/her. (Mintzberg, et al., 1999; Mintzberg, 2007)

Furthermore, the "unrealized strategy" is a part of the intended strategy which is not realized. This implies that the outcome of the deliberate strategy process and the emergent strategy process constitutes the realized strategy. (Mintzberg, et al., 1999; Mintzberg, 2007)

But, how do ongoing projects, which were instigated as an attempt to fulfill an older version of a company's intended strategy, relate to this model; projects which simply are not finished yet? If we return to Figure 3, i.e. the illustration made by Bible & Bivins (2011), of how projects contribute to the fulfillment of a strategy, we identify a time lag within an organization between the formulation of strategy and the projects commenced in an organization which shall fulfill the strategy.

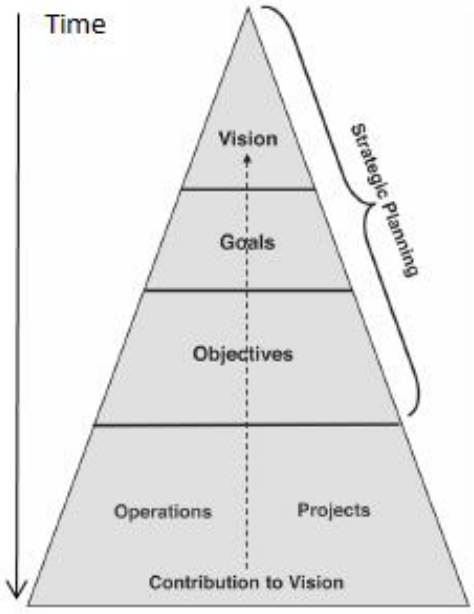

Figure 6 - Illustration of the relationship between strategy and action considering the temporal dimension (Adapted from Bible & Bivins, 2011, p. 6)

The intended strategy is a directive, usually a text, from management which is cascaded within the organization. It is common that an intended strategy is updated within a given time-interval. If we consider the implementation of a strategy within an organization, these activities generally take time, with a temporal issue of resource allocation as a consequence as illustrated in Figure 6. Hence, ongoing implementation could differ from what should be done according to the new intended strategy. Mintzberg et al. (1999), state that the realization of an intended strategy is difficult to accomplish. This difficulty could partly be because the environment where a company dwells tends to alter and affect the organization, which in turn could promote the emergent strategy process. But, we argue that there is another major cause behind this, namely the projects or operations derived from an old intended strategy, i.e. the legacy, which probably would have an effect on a company's realized strategy. In turn, this would imply that a new intended strategy never could be perfectly fulfilled. Unless, the organization is brand new without any legacy issues to assess, or when a new intended strategy takes the old intended strategy into consideration. This leads to our argument that somehow, a *new* intended strategy relate to the *old* intended strategy.

We illustrate this by introducing two different views of expressed intended strategies; the “ignorant” view and the “including” view. The ignorant view represents an articulated strategy text which ignores the old intended strategy and the ongoing projects derived from that strategy text. The including view, on the other hand, is a strategy text which could take the old intended strategy text, and thus the ongoing projects within an organization, in consideration when articulating a new intended strategy text.

Management’s approach to the formulation of the strategy text as either an ignorant or an including view has consequences for the organization. If it is an including view, the strategy text guides the organization when making resource allocation decisions about, and in relation to, the legacy to a wider extent than when using the ignorant view. Thus, the ignorant view allows more freedom for middle management in their decision processes, but it also shifts the responsibility for the legacy to this level. Our point is that the legacy, or simply business as usual not mentioned in an intended strategy text, probably is not bad or wrong, and should thus be governed regardless of which view management use for a new intended strategy text.

These views are, to our knowledge, not considered in Figure 5. But, if strategy fulfillment implies resource allocation (Cooper, et al., 2001), it is important to recognize the implications of the ignorant and the including view. Otherwise, the organization’s ability to make effective resource allocation could be hampered, but also, it may fail to provide an adequate understanding as to why an intended strategy was not fulfilled. Moreover, one could discuss whether a strategy should be easy to fulfill or not. If the strategy is realized, could that strategy be considered insufficient? Maybe, a strategy should challenge the organization by articulating stretch-goals? This leads to the philosophical question whether a realized intended strategy really was an optimal strategy?

Porter (1987) sets the intended strategy in an organizational context, by identifying two different types of strategies; the corporate strategy, and the business unit strategy. Corporate strategy is according to Porter (1987, p. 43) “*what makes the corporate whole add up to more than the sum of its business unit parts*” and considers two relevant questions; what business should we be in and how to manage the different business units in a diversified company. Hence, a corporate strategy is often partly a legacy derived from the history of the company and earlier strategies, but should be seen as dynamic and adaptable to a changing environment. A business unit strategy on the other hand concerns how to create competitive advantage, i.e. a competitive strategy, for that business unit. (Porter, 1987)

Both the corporate strategy and the business unit strategy are usually communicated via statements in terms of plans, i.e. intended strategies.

2.3. Project Portfolio Management

In this section, an understanding of Project Portfolio Management is facilitated via a bottom up approach starting with the introduction of the constituents of PPM and interrelated concepts.

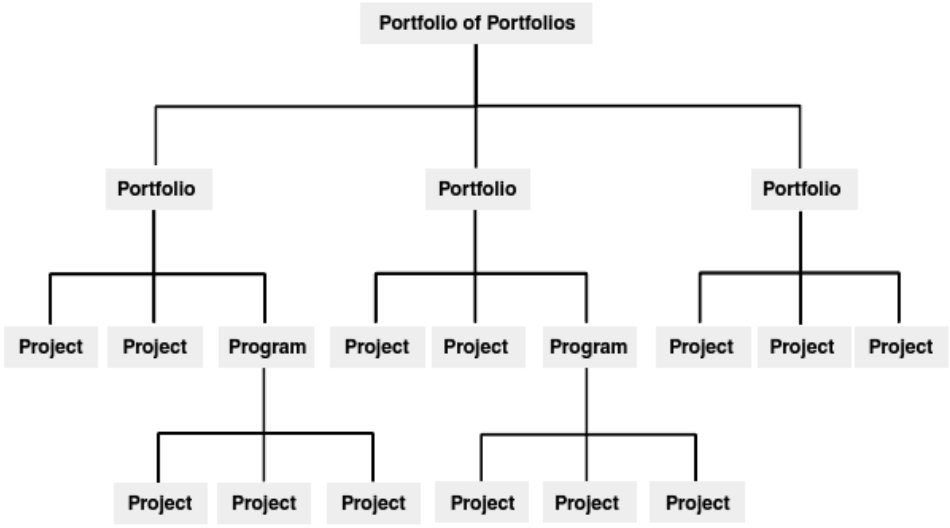

Figure 7 - "Sample structure for PPM in organizations with multiple portfolios" (Bible & Bivins, 2011, p. 302)

Figure 7 illustrates the relationship between portfolios, programs, and projects by setting them in a hierarchical order. Portfolios can include programs and projects, whereas programs can include projects only. Programs are generally a group of similar projects, or projects which are linked in order to achieve a specific purpose. Thus, projects are the building blocks of portfolios and programs. (Elonen & Artto, 2003; PMI, 2013)

2.3.1. Projects

A project can be defined in different ways by different organizations. Maylor (2010) discuss some of the definitions made by leading project management associations throughout the world and identifies a pattern of similar features regarding the definition of a project:

1. Aspects of uniqueness – the exact project has never been done before, albeit similar activities might have been commenced by someone else earlier.
2. Temporary – the project should have a defined beginning and end, be allocated a limited set of resources, both in terms of head count and financial resources.
3. Focused – the project has a particular mission or goal to fulfill.

This is in line with the world's largest professional association of project management; the Project Management Institute's definition from 2004 of a project: "*A project is a temporary endeavor undertaken to create a unique product, service or result"* (Maylor, 2010, p. 5)

Organizations having multiple projects ongoing simultaneously are often considered as acting in multi-project environments, and Zika-Viktorsson, et al. (2006) states that these kinds of multi-project undertaking organizations can be referred to as project based organizations (Payne, 1995; Engwall & Jerbrant, 2003).

The multiple-projects run by an organization are often organized in a project portfolio. Archer & Ghasemzadeh (2007, p. 94) defines a project portfolio as "*a group of projects to be carried out under the sponsorship of a particular organization".* Payne (1995), states that in terms of value, up to 90% of all projects undertaken are commenced in a multi-project environment.

Even if projects are different within a portfolio, they still draw at least some resources from the same resource pool, something which can be a challenge for many organizations since it has a direct effect on an individual projects progression (Payne, 1995; Eskerod, 1996; Engwall & Jerbrant, 2003). This battle of resources also affects other projects within the portfolio and causes turbulence in this internal portfolio environment (Eskerod, 1996; Zika-Viktorsson, et al., 2006).

Engwall and Jerbrant (2003), state that a multi-project organization is a highly political organization with continuous competition for project priority and available resources. This correlates with Eskerod's (1996) description of a multi-project environment as a game where Darwin's "survival of the fittest"-theory is applicable since individuals have the possibility to affect the outcome of the game. The key issue of multi-project organizations is according to Engwall & Jerbrant (2003, p. 407) the "*resource allocation syndrome*". This implies a difficulty of allocating and re-allocating scarce resources which affects a portfolio, independent on the type of projects within the portfolio. The result of this syndrome was a short-term problem solving environment where focus is on reactive behavior (Engwall & Jerbrant, 2003).

The reasons behind the resource allocation syndrome could be a combination of multiple issues. According to Engwall and Jerbrant (2003) plausible reasons were e.g. failing project scheduling, over commitment and opportunistic project management behavior. Failing project scheduling lead to an "*after-the-fact-prioritization*" instead of "*a priori planning"* of the projects in the portfolio (Engwall & Jerbrant, 2003, p. 407) while over commitment implied more projects than available resources needed. Opportunistic behavior regarding project management in order to secure resources could also be a reason hampering resource allocation. (Engwall & Jerbrant, 2003).

Moreover, the resource allocation syndrome could also be coupled to the legacy issue presented in the strategy chapter by offering a complementary view of this issue. Recall that resource allocation and utilization implies strategy fulfillment. When projects draw resources from the same resource pool, the resource allocation syndrome would probably be related to the legacy of an organization's old intended strategies. Thus, when the project managers fight for resources in accordance with Eskerod's view (1996), if the project is connected to old intended strategies, they impede the realization of the new intended strategy. This adds a different perspective to the strategy issue presented in the strategy chapter.

Project Categorization and Classification

Even though the terms tend to correlate, we make a distinction between project categorization and classification in this thesis. Categorization of projects can be done in multiple ways and on different levels; Bible & Bivins (2011) discuss general approaches of categorization by segment, geography, or type of project. Furthermore, they also mention project categorization by the goals of the projects e.g. cost reduction or new product development. (Bible & Bivins, 2011)

Artto & Dietrich (2007) discuss a high-level approach of intra- versus extra-organizational categorization of projects, i.e. internal and external projects. External projects are projects which are

aimed for the ultimate customer, i.e. a customer in the market. These projects could e.g. be the development of a product. Internal projects are projects which are commenced for an intra-organizational customer; these projects can e.g. be maintenance, problem solving, utility, organizational-, or operational development oriented. This view of internal versus external projects contextualize if a project deliverable has a direct, or indirect effect on the ultimate customer. (Artto & Dietrich, 2007)

Cooper et al. (2001) apply another dimension; the project classification, by dividing projects into must-do and should-do projects. Must-do projects are often projects derived from a legal need or projects which are of utmost necessity to the organization. The essential projects could be e.g. projects which are strategy fulfilling, imperative for the business to remain, or simply projects which are considered good and already are underway. Should-do projects are all other projects which are attractive for the company and would be done if the resource pool was large enough. (Cooper, et al., 2001)

2.3.2. Project Management

Project management is all about the processes and practices for "doing things right" (Bible & Bivins, 2011, p. 1). Doing things right is important in order to fulfill the customer's need and is usually constrained by cost, time and quality (Bible & Bivins, 2011).

The Project Management Institute (2013, p. 3) (PMI) defines Project Management as "*the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements".*

A common way for organizing product development projects is by using a Stage-Gate process (Cooper, et al., 2001). This process is divided into stages, or phases, separated by gates where a project has to fulfill certain goals in order to proceed to the next phase. The Stage-Gate process provides a structured way to assess a projects progression. (Cooper, 1990; Cooper, et al., 2001; Maylor, 2010)

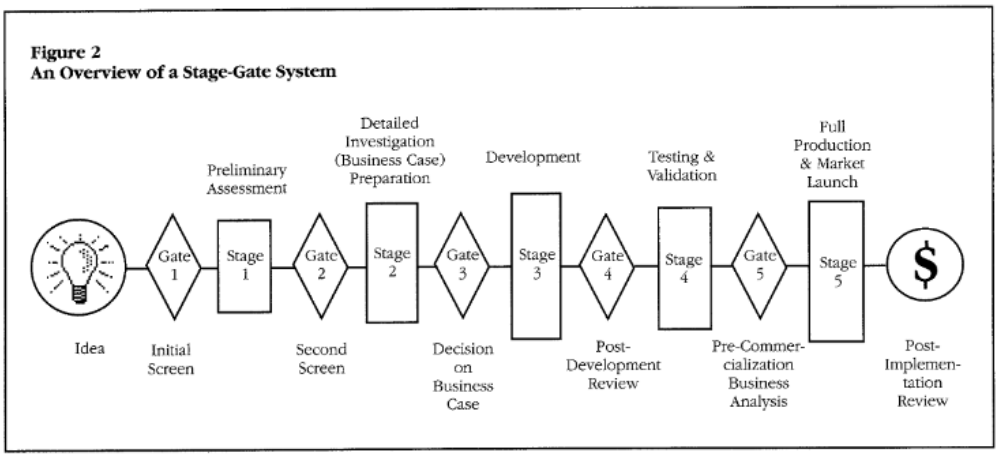

Figure 8 - "An overview of a Stage-Gate System" (Cooper, 1990, p. 46)

Project management and project portfolio management are interrelated in many ways by different interfaces. For example, the governance of the Stage-gate process is often a part of the PPM process. Even though project management ensures that a project is on track, it is wise to have an aggregated view of the projects progression to prevent and mitigate resource problems. (Bible & Bivins, 2011)

Project Management and Organizational Political Behavior

A common view on political behavior within organizations is of negative character. This would imply that it should be avoided and prevented to the largest extent possible. Pinto (1998), on the other hand, stress that politics is a natural part of an organization since it is a useful tool to successfully implement projects. This implies that politics can be used to manage conflicts within an organization. There are three modes of power which a project manager can apply to influence the organization to achieve a successful project: authority, status, and influence. In this thesis, the usage of influence is of interest since project managers' behavior influence affects the selection of projects in the portfolio. Influence is a more informal way of affecting the organization by cutting deals, negotiating, and making tradeoffs in order to achieve project success. (Pinto, 1998)

Furthermore, Pinto (1998, pp. 67-71) presents six propositions, which in a logical order explains the natural view of organizational politics:

1. *"Most important decisions in organizations involve the allocation of scarce resources."* Scarce resources and its allocation is therefore the fundamental basis to why organizational politics within decision making occur.
2. *"The decision process often involves bargaining, negotiating, and jockeying for position."* This statement implies that, even if we strive for a logical rezoning in the decision making process, decisions are more often based on criteria of bargaining and negotiation.
3. *"Organizations are coalitions composed of a variety of self-interested groups."* This statement implies that every sub-unit within the organization tries to optimize their own benefits, at the expense of others as well as the organization as a whole.
4. *"Groups differ in terms of goals, values, attitudes, time frames, etc."* This statement relates to the concept of organizational differentiation, which explains that each functional group within an organization develops their own values, attitudes and goals, which act as a foundation for priorities and decisions. This also implies that different sub-units can have different conflicting goals, where one sub-unit may have to sacrifice theirs to benefit someone else's.
5. *"Because of scarce resources and enduring differences, conflict is central to organizational life."* This implies that one should not try to avoid conflicts but rather embrace its presence within organizations and use it constructively.
6. *"Because conflict is inevitable, the use of power and politics becomes a mechanism for resolving conflict situations."* The last statement implies that political behavior can be used as a tool to manage situations of conflict in a beneficial way.

We believe that these organizational behavior political aspects stated above, which originally are stated for project management, should also be relevant for PPM.

2.3.3. Project Portfolio Management

Portfolio management considers the processes and methods used to "do the right things" (Bible & Bivins, 2011, p. 1). There are many similarities between portfolio management and the closely related terms program management, and multi-project management (Elonen & Artto, 2003), but in this thesis, we focus on project portfolio management.

Definition of PPM

There are several definitions within literature of PPM which are complementary and overlapping.

Cooper, et al. (2001, p. 3) state that:

> "*Portfolio management for new products is a dynamic decision process wherein the list of active new products and R&D projects is constantly revised. In this process, new projects are evaluated, selected, and prioritized. Existing projects may be accelerated, killed, or deprioritized and resources are allocated and reallocated to the active projects. The portfolio decision process is characterized by uncertain and changing information, dynamic opportunities, multiple goals and strategic considerations, interdependence among projects, and multiple decision makers and locations."*

Albeit, Cooper et al. (2001) provide a good definition of PPM, we consider it to be too oriented towards product development. For this thesis, the definition made by Gutiérrez (2012) is considered more relevant since it broadens Cooper's perspective and objectively introduces PPM, regardless of which kind of development projects undertaken.

> *"Project Portfolio Management is a dynamic decision process wherein a list of active development projects is constantly revised. In this process, new projects are evaluated, selected and prioritized; existing projects may be accelerated, killed or reprioritized, and resources are allocated and reallocated among the projects in the portfolio"* (Gutiérrez, 2012, p. 6)

Goals of effective PPM

Many companies dwell in a dynamic and flexible environment which calls for continuous innovation in order to be competitive on the market. Hence, it is common to choose from a pool of possible product and process development proposals which can assist in assuring that the company's competitiveness is maintained in the future (Dawidson, 2006). The chosen proposals which are turned into projects then, together with the ongoing legacy of projects, constitute the portfolio of projects. This implies that PPM is about assuring that the right projects are commenced (Bible & Bivins, 2011, p. 1).

The goal of portfolio management is threefold according to Cooper, et al. (2001) :

- maximize the value of a portfolio
- balance the portfolio
- achieve strategic alignment of a portfolio

Maximizing the value of a portfolio implies that the resources are allocated to the portfolio content with the aim to fulfill a company objective. Balancing a portfolio can be done by assessing different parameters, e.g. balancing in terms of risk, time, technology or type of project. Achieving strategic alignment of a portfolio means that the portfolio content reflects, or is in line with, the company's business strategy which is the articulated way of reaching the desired future state of the company. (Cooper, et al., 2001)

According to Cooper, et al. (2001) it is complicated to fulfill all of the goals of PPM within a portfolio, furthermore the use of PPM method often has an effect of creating a hierarchy and informal

prioritization of the goals of portfolio management. Nevertheless, it is important to try to fulfill these PPM goals since it will help to reduce the decision makers' uncertainty regarding portfolio constellation, i.e. resource allocation.

Cooper, et al. (2001) state that ineffective portfolio management implies e.g. inefficient "go/kill" criteria and decisions based on feelings and politics without strategic criteria and objective facts to adhere to. In turn, the effects of ineffective portfolio management are many according to literature; e.g. difficulties to kill projects, or too many projects for the given resources which in turn implies that projects get delayed and quality suffers. (Cooper, et al., 2001)

2.3.4. PPM Tools, Methods and Business Cases

Dawidson (2006) states that, in PPM theory there is not yet one best way to organize for PPM, which implies the way to arrange PPM activities, usage of tools and methods, as well as organizational considerations. Dawidson (2006) continues by stating that the way to organize for project portfolio management is highly dependent on each company's specific situation. Cooper, et al. (2001) state that one problem with PPM is that people tend to perceive the concept; portfolio management, differently depending on their job and background.

In order to measure the portfolios ability to achieve its objectives, Sanchez & Robert (2010) present a method based on the critical success factor approach. This revolves around the portfolio Key Performance Indicators (KPIs) focusing on two aspects which are "*the contribution of projects to achievement of a portfolio's strategic objectives*" and "*the level of performance of each project at a given point in time*" (Sanchez & Robert, 2010, p. 66).

Figure 9 below, originally developed by Dawidson (2006), organize some PPM methods and tools in relation to Cooper, et al. (2001) three goals of effective PPM.

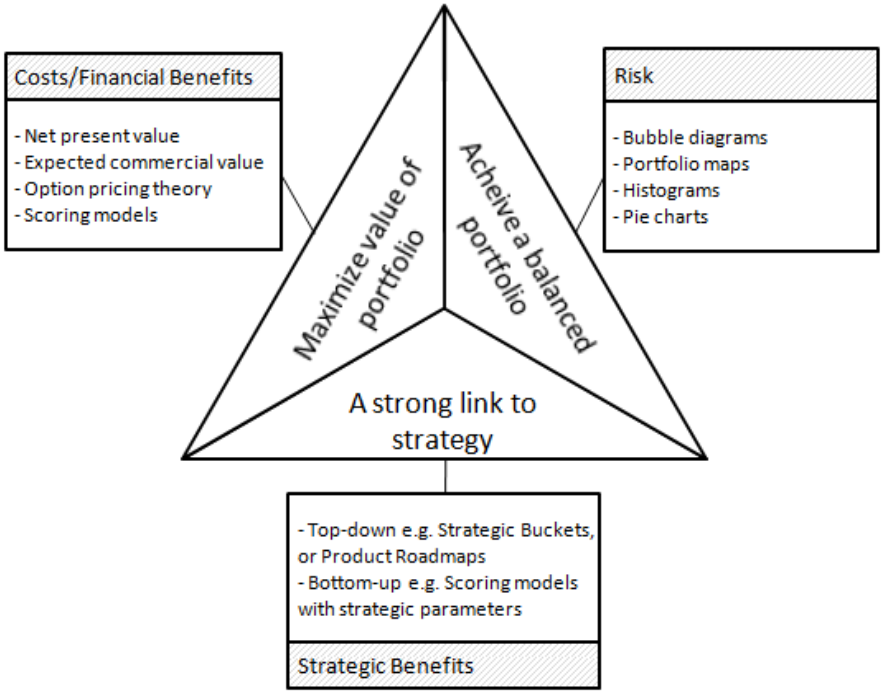

Figure 9 - Model describing PPM tools and methods, how they can be applied to support the three goals of PPM presented by Cooper, et al. (2001) as well as the relation to a business case. (Adapted from Dawidson, 2006, p. 21)

According to Dawidson (2006), methods applicable to evaluate the maximized value of a portfolio, generally consider financial aspects for each project individually. To evaluate the achieved balance of a portfolio, a number of methods based on visualization tools are suggested, which give a comprehensive view of portfolio balance. Methods related to the third goal, i.e. a strong link to strategy, imply to evaluate the strategic alignment of a portfolio, either top-down by e.g. strategic buckets and product roadmaps, or bottom-up based on individual project attractiveness. Research shows that the best performing companies on average use 2-4 tools to support their PPM process. (Dawidson, 2006)

Maylor (2010), states that a project's business case should include an estimate of costs, benefits and risks. Furthermore he states that benefits are not only financial, so therefore we chose to sub-divide benefits in financial and strategic benefits. The non-financial benefits, i.e. strategic benefits, are according to Maylor (2010) more difficult to estimate than the financial benefits.

If we apply Maylor's (2010) three dimensions of a business case on Cooper's three goals of PPM we can, if somewhat simplified, get an overview of how they relate to each other. The financial benefits and costs, relate to the methods applied to achieve a maximized value of a portfolio. Strategic benefits relate to the goal of a strong link to strategy, and risk is the main aspect to achieve a balanced portfolio. By constructing a business case for each investment opportunity, the decision makers can compare the investment opportunities and make decisions supported by data (Maylor, 2010).

2.4. Project Portfolio Management Process

It is often hard to know which proposals to choose, but one way to reduce the perceived uncertainty regarding this matter, from the decision makers' perspective, is to use a project portfolio management process. This PPM process is often a combination of tools, techniques and methods supporting a selection, prioritization and evaluation of the portfolio (Dawidson, 2006)

Below follows a presentation of the main activities in the PPM process, combining the essential aspects from the frameworks by Archer & Ghasemzadeh (1999) illustrated in Figure 10, and Bible & Bivins (2011) illustrated in Figure 11. Common for the two frameworks is that the PPM process is divided into different phases.

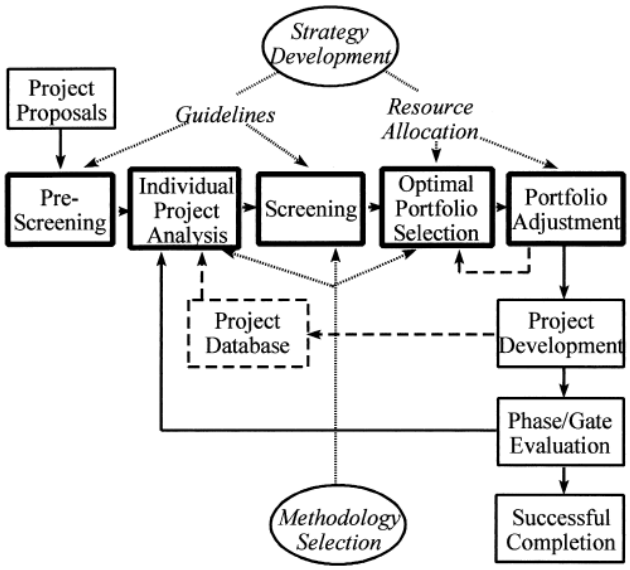

Figure 10 - "Framework for Project Portfolio Selection" (Archer & Ghasemzadeh, 1999, p. 211)

Archer & Ghasemzadeh (1999) divide the PPM process into three stages: Pre-process activities, Selection process, and Post-process stage.

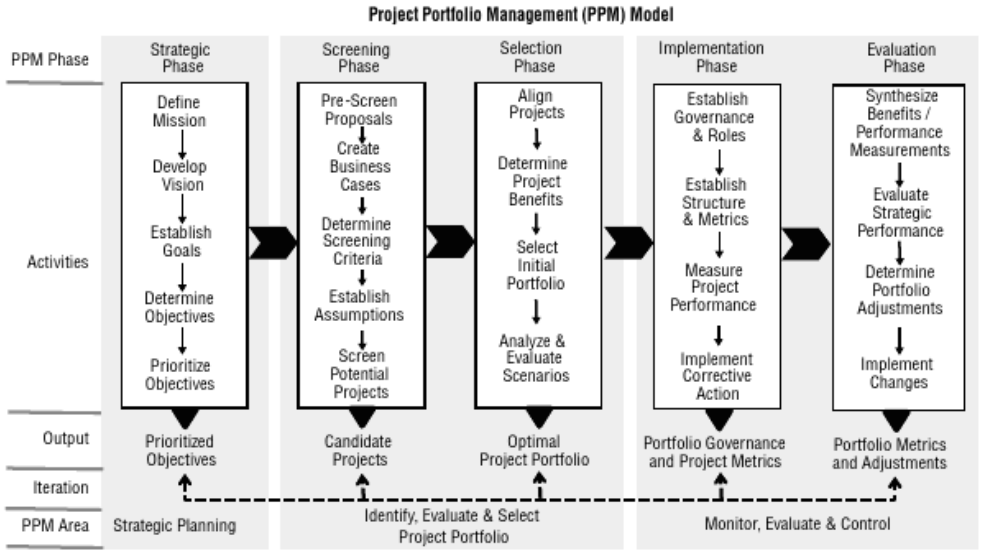

Figure 11 - "PPM process overview" (Bible & Bivins, 2011, p. 4)

Bible & Bivins (2011) divide the process into three PPM areas: Strategic planning, Identify, evaluate and select project portfolio, and Monitor, evaluate and control. The phases in the two different frameworks show similarities. To find a common term for the phases of the two frameworks we use in this thesis, the following: Strategic phase, Tactical phase, and Operational phase, which Table 1 summarize.

Table 1 - Coherence between the frameworks and their PPM process phases

	Archer & Ghasemzadeh (1999)	Bible & Bivins (2011)
Strategic phase	Pre-process activities	Strategic planning
Tactical phase	Selection process	Identify, evaluate and select project portfolio
Operational phase	Post-process stage	Monitor, evaluate and control

Before we present the main activities in each phase, we chose to introduce some more general PPM aspects which are generic for all three phases or not specific for any phase.

Governance structure for PPM

Bible & Bivins (2011) presents a simplified structure for portfolio management, which is illustrated in Figure 12. It is stressed that the governance structure is highly depending on the organizational context in which decisions are determined as well as the level of the maturity of the PPM process (Bible & Bivins, 2011). Furthermore, it is important to have a well-functioning and established governance structure since it acts as a frame for authority and decision-making.

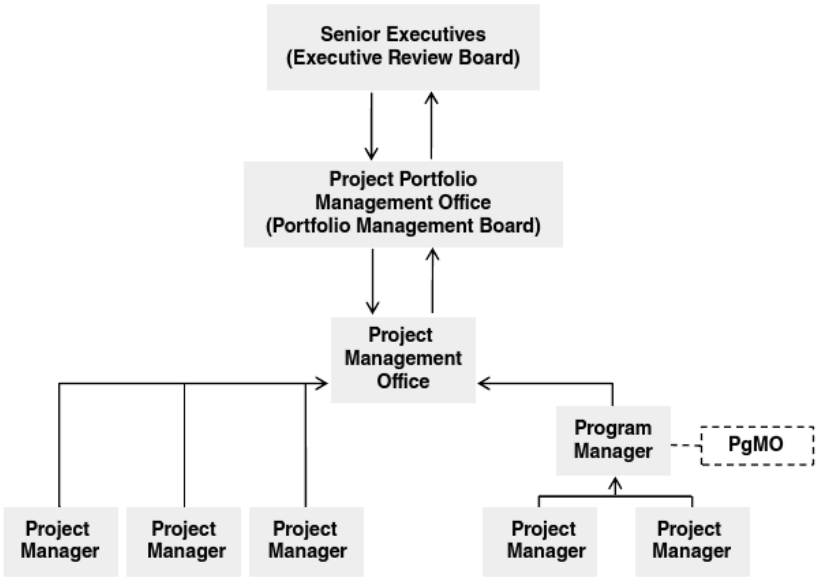

Figure 12 - "Sample portfolio management structure" (Bible & Bivins, 2011, p. 301)

Starting from the top, the senior executives in the Executive Review Board are responsible for the strategic aspects in terms of determining the mission, vision, objectives and goals of the organization i.e. they are involved in managing the portfolio at a high level. The project portfolio management office i.e. the Portfolio Management Board, which in some organizations also can be the Project Management Office, is the group of people who mainly manages the selection, implementation and evaluation of the portfolio, i.e. most of the portfolio activities. Therefore it is desired that the people within this group are competent and experienced both of the corporate culture and operations as

well as strategic plan, as they function as a bridge between strategy and tactics. Within the Project Management Office lies also the responsibility to allocate resources across projects and programs, as well as the reporting of their performance. A portfolio is constituted by programs and projects with similar goals or other common aspects which makes them suitable for grouping. The portfolio managers responsibilities differ compared to the project/program manager in the sense that the portfolio manager is responsible for the overall portfolio performance. A portfolio manager needs a more holistic perspective than a project manager. The project manager and the program manager are responsible for one or several project respective programs at an operative level, i.e. costs and performance of each project/program. (Bible & Bivins, 2011)

Emergence of project proposals

Cooper et al. (2001) have identified three types of project proposal origins; top-down, bottom-up and the combined top-down/bottom-up approach. Bible & Bivins (2011) communicate a similar set of origins with one exception, the third approach, which they call the collaborative method. Furthermore, Bible & Bivins (2011) stress that, no matter the origin, all project proposals should follow the same process, be described in the same template and evaluated by the same decision making group.

The top-down approach implies that one or several senior executives identifies and suggests an important project proposal for the organization. This person probably has a better holistic perspective in terms of strategy and is therefore able to identify opportunities that are important (Bible & Bivins, 2011). Cooper, et al. (2001) suggests that the top-down approach comprises two general approaches which both have in common that new ideas, proposals and projects are derived from the firm's vision, goals and strategy. The Product Roadmap, which is one of the two, assesses which projects should be done in order to fulfill the strategy and their orderly sequence in time. The second one, The Strategic Bucket Model focuses more on resource allocation by assessing how to invest. Thus, Cooper, et al. (2001), state that from the strategy, an allocation of resources is commenced in two different ways; via buckets or to projects, which can be used individually or together.

The bottom-up method for assessing project proposals, according to Bible & Bivins (2011), implies that ideas for new project opportunities originate from lower levels within the organization. Cooper et al. (2001), on the other hand, state that these ideas basically can originate from anywhere within an organization. It is agreed that the proposals need to be screened by a higher level of management who can understand the strategic aspects in order to ensure that the best ones are selected and turned in to projects (Cooper, et al., 2001; Bible & Bivins, 2011). Hence, this approach focuses on project selection by incorporating strategic criteria into the project selection tools, and strategic alignment is achieved through screening, prioritization and continuous evaluation (Cooper, et al., 2001).

The top-down, bottom-up approach, by Cooper et.al (2001), implies a combination of top-down in terms of resource allocation and bottom-up in terms of scoring models to identify new proposals. The collaborative method is according to Bible & Bivins (2011) enabled by the establishment of work groups of people from different parts of the organization, who collaborate together to identify new project opportunities.

2.4.1. Strategic Phase

The activities, that Archer & Ghasemzadeh (1999) stresses in the pre-process stage are related to strategy development and methodology selection, see Figure 10. The strategy development mainly implies to determine the strategic focus, and to set the constraining resource frame for the portfolio. The strategic focus and portfolio budget should take a holistic perspective and should therefore be determined on a higher managerial level (Archer & Ghasemzadeh, 1999). According Bible & Bivins (2011) the strategic phase involves setting the foundation for the PPM process in terms of defining the mission, vision, goals and objectives for the organization.

Once the portfolios strategic focus and guidelines are established, adjustments are required on a regular basis (Archer & Ghasemzadeh, 1999). Bible & Bivins (2011) state that, the strategic plan should stretch for approximately five years ahead, and then be reviewed and updated. The strategic plan implies a roadmap with a set of activities over a given time period, which aims to attain the strategy. Since the selected portfolio should represent the strategic objectives of the firm, it is crucial that the portfolio guidelines are unambiguous in order to avoid confusion in the selection process (Archer & Ghasemzadeh, 1999). Thus it is important that the strategic plan is communicated throughout the organization, especially in multinational corporations, in order to achieve success (Bible & Bivins, 2011).

For large corporations strategic planning requires attention at several levels within the company. Initially it is conducted at corporate level which then acts as guidance for another round of strategic planning at more tactical level in each sub-division within the organization. Furthermore it is stated that, the better the portfolio management understand the result of the strategic plan in terms of goals and objectives, the better they can perform in the PPM process. (Bible & Bivins, 2011)

Regarding the selection of structure and methodology for PPM, this is stated as a onetime activity (Archer & Ghasemzadeh, 1999; Bible & Bivins, 2011). Archer & Ghasemzadeh (1999) stress that models should be relatively simple and in turn to avoid too complex models that require significant amount of data. This implies to choose methodologies which the users understand, and to divide the selection process in clearly stated steps in a logical order (Archer & Ghasemzadeh, 1999).

The last step in the strategic phase involves a prioritization of the objectives in relation to each other. This step is stated to be a prerequisite for effective PPM as it gives guidance when budget cuts appear (Bible & Bivins, 2011).

2.4.2. Tactical Phase

The portfolio selection process framework, provided by Archer & Ghasemzadeh (1999), consists of five main activities: pre-screening, individual project analysis, screening, optimal portfolio selection, and portfolio adjustment. Bible & Bivins (2011) framework divides this phase in two major blocks with activities related to screening and selection. Below follow a description of the most important aspects of the screening and selection activities.

Pre-screening

The pre-screening aims to do a first feasibility evaluation of the project proposals and to eliminate those that seem less promising. What is important to consider is that all the projects proposals have a clear strategic connection and contribute to the strategic objectives. (Archer & Ghasemzadeh, 1999; Bible & Bivins, 2011)

In terms of roles and responsibilities, Bible & Bivins (2011) suggest that the Portfolio Management Board should establish the process for gathering project proposals within the organizations as well as stating the pre-screening criteria for pre-screening evaluation. These pre-screening criteria should be wisely stated, i.e. unambiguous, making it simple to eliminate project proposals (Archer & Ghasemzadeh, 1999).

Archer & Ghasemzadeh (1999) suggest that a project owner or sponsor should be identified early during the pre-screening phase, with the responsibility to provide further information about the project. Furthermore it is important to avoid overload of data (Archer & Ghasemzadeh, 1999), so Bible & Bivins (2011) therefore stress that it important to specify clearly what information is needed, emphasizing on a condensation of the main aspects of the project.

Archer & Ghasemzadeh (1999) also state that must-do projects should be identified in this phase, i.e. projects that are critical for the organization's ability to fulfill its purpose.

Screening

Archer & Ghasemzadeh (1999) state that the main activity in this stage is to determine criteria, in terms of a common set of parameters, and evaluate each individual project proposal accordingly. Bible & Bivins (2011) use a similar approach where the creation of business cases, determination of screening criteria and establishment of assumptions are important activities. The screening involves several parts of the organization, both the sponsor of the project, the decision makers in the Portfolio Management Board as well as higher management and project management (Bible & Bivins, 2011).

The screening also includes reviewing the currently ongoing projects in the portfolio. Archer & Ghasemzadeh (1999) suggest that ongoing projects which have reached some major milestones or gates should be reviewed simultaneously as the project proposals. Bible & Bivins (2011) stress the difficulties of terminating ongoing projects, even if they bring little value to organizational objectives. It appears to be rather easy to terminate poorly performing projects at an early stage, but projects close to completion are more difficult to kill (Bible & Bivins, 2011).

The main argument of the screening is to exclude projects that do not appear to be aligned to the criteria in order to minimize the number of project proposals in the selection stage. Archer & Ghasemzadeh (1999) stresses the importance to keep a balance in the level of judgment in order to avoid exclusion of projects with potential and future value for the organization.

Portfolio selection

At this stage in the process, the project proposals have been limited to a manageable number. This does not imply that the selection of projects to include in the portfolio is easy, it is now time to determine which of the projects that adds most value to the organizational objectives (Bible & Bivins, 2011). Archer & Ghasemzadeh (1999) state that all the projects that have been preceded to the selection phase, are to be evaluated in terms of interaction and interdependencies. The point is to determine if and how projects compete for the same resources and when in time the projects require certain resources (Archer & Ghasemzadeh, 1999).

According to Bible & Bivins (2011), each project should connect to one or more organizational objectives, which can be displayed in e.g. an alignment matrix. This activity is important since it can expose conflicting objectives or criteria (Archer & Ghasemzadeh, 1999).

Furthermore, it should also be measured how much the project contributes to each objective, which can be done by various methods (Bible & Bivins, 2011). The tools and methods for measuring the project's contribution to portfolio objectives may vary depending on the portfolio's character (Archer & Ghasemzadeh, 1999). If the portfolio contains a great number of projects it can be wise to use a scoring model where the projects are given a weighted score after a set of criteria, which makes decision situation less complex. If the number of projects is limited, a pair-wise comparison is possible where projects are evaluated two by two (Archer & Ghasemzadeh, 1999). These activities, then result in a prioritized list of project proposals.

To determine the optimal portfolio, the prioritized projects are to be utilized to maximize benefit with the restriction of the organizational constraints in terms of resources (Bible & Bivins, 2011). It is stressed by Bible & Bivins (2011) that budget and resources should be secured for the projects that are undertaken by the portfolio, in order to limit the risk of projects not being on time. The optimal portfolio is found on the efficient frontier in accordance with Markowitz's Modern Portfolio Theory which displays a trade-off between portfolio value and cost (Bible & Bivins, 2011).

Portfolio adjustment and additional considerations

Archer & Ghasemzadeh (1999), state that it is important to achieve balance within a portfolio. This implies to have projects with different risk, size and time span, and to optimize the portfolio from an overall perspective. In order to achieve such optimization it is important for the decision makers to have accurate information and avoid overload of unnecessary data which would make the evaluation too complex (Archer & Ghasemzadeh, 1999).

Bible & Bivins (2011) state that portfolio adjustments are the responsibility of the Portfolio Management Board and the Executive Review Board (Recall Figure 12). These decisions revolve around changes in the portfolio in terms of adding and terminating projects. Portfolio adjustments can be needed due to poorly performing projects which are required to be killed, or if the strategic plan changes for some reason (Bible & Bivins, 2011).

Decision makers should be aware of the resource constraints within the organization, in order to avoid poor project performance due to a poorly planned resource allocation (Bible & Bivins, 2011). Furthermore another type of balance should be kept in mind, i.e. balance between competing interests and maintain a good distribution among organizational objectives. Conflicts can be mitigated within the organization by clearly established portfolio constraints, which are determined by the Portfolio Management Board. Constraints also help to maintain a continuous distribution of resources over time (Bible & Bivins, 2011).

Bible & Bivins (2011) emphasize the role of politics and internal culture of the organization as an important aspect to consider when selecting the portfolio. This is important as the Portfolio Management Board has to be aware of the impact that politics have, and how it affects the organization and the people within. When a PPM process is implemented, or becomes more formalized, it renders an organizational change. In order to get the new PPM process accepted within the organization, an extensive work is therefore required in terms of detailed tactical planning, and communication throughout all levels of the organization. Furthermore, to achieve success in change management, the support from top management is important. It is also required to review the changes in systems, and how the measurements and rewards are affected. These actions have to be managed in order to overrule powerful voices of influential people, who can be a source of conflict.

Thus, an important role that the PPM process has is to manage and balance the different political agendas that exist within an organization. (Bible & Bivins, 2011)

2.4.3. Operational Phase

The operational phase revolves around monitoring, evaluating and controlling the project portfolio. According to Bible & Bivins (2011) the monitoring of portfolio performance is a central aspect in order to verify that the portfolio is on the right track. This requires that the right information is collected and communicated as well as that metrics, performance indicators and targets are established.

Roles, responsibilities and information flow

Once the project portfolio is up and running, Bible & Bivins (2011) continue to explain the different roles and reporting responsibilities of the different actors in the PPM governance structure. The Executive Review Board is mainly responsible for stating and reviewing the strategic plan as well as prioritizing objectives. They should also set the major constraints in terms of resources constraints and balance of the portfolio, and act as a gate keeper for approval of major portfolio decisions. The Portfolio Management Board has the main operational role in managing the portfolio, but also to support the Executive Review Board in the prioritization of objectives. Responsibilities include to screen, prioritize and analyze project alternatives and to further select and recommend a portfolio. They should also drive change management of the portfolio and to calculate and estimate portfolio risk and benefits. Project managers have the main responsibility to lead the project team. (Bible & Bivins, 2011)

In terms of information flow and reporting structure, Bible & Bivins (2011) describe two main paths of information; top-down which communicates changes in strategy and priorities, and bottom up which communicate performance of activities. The Executive Review Board is therefore responsible to communicate to the Portfolio Management Board, changes in the strategic plan and re-prioritization in objectives, e.g. when a new strategic cycle starts. The Portfolio Review Board on the other hand is responsible to report portfolio performance and suggest portfolio changes for approval to the Executive Review Board. Downwards in the hierarchy, the Portfolio Review Board is responsible to communicate portfolio adjustments in terms of addition of new projects as well as termination of ongoing projects. The project managers are thus responsible to report the performance of each project in terms of schedule, cost, risk, and quality etc. (Bible & Bivins, 2011)

Bible & Bivins (2011) stress the importance of having a project portfolio management plan, which implies setting up a document with a game plan of who is responsible for delivering what and when in the portfolio. Furthermore it is stated that the plan should include milestones, such as cycles for strategic review. The portfolio management plan document acts as guidance for portfolio decisions, making it clear and consistent. Bible & Bivins (2011) also stress the use of Information Management Systems to facilitate the PPM process. However, De Reyck et al. (2005) indicate that the value of an investment in PPM software is larger when the PPM process is relatively mature.

Evaluating portfolio performance

Bible & Bivins (2011), state that portfolio performance can be evaluated by combining the performance of each project within the portfolio. Common KPIs for project management are to measure the cost of the project, its performance in relation to schedule, and quality. Project management metrics are a part of evaluating the portfolios' performance, but it does not measure

the performance related to strategic objectives, nor does it indicate portfolio balance. Therefore it is important to assess the benefits in both project management as well as portfolio management. In order to achieve this Bible & Bivins (2011) suggest the project portfolio dashboard which is a tool enabling the assessment of portfolio benefits and to get a comprehensive view of the portfolio. The tool uses a visual aid approach to assess performance top-down, by arranging the project within the portfolio in a hierarchy in accordance to the strategic objectives they support and to state their priority and performance. (Bible & Bivins, 2011)

2.5. Challenges of Effective Project Portfolio Management

There are many challenges and issues which is a part of the everyday PPM process. Cooper et al. (2001) have identified a set of challenges and issues for reaching effective PPM. We have categorized these challenges and issues under three different areas (Table 2), to make an illustrative case of the general pains within PPM:

Table 2 - Challenges and issues for reaching effective PPM (Cooper, et al., 2001)

Resource related challenges and issues:	i.	Too many projects in relation to the available resources within an organization and resource allocation problems.
	ii.	Should resource commitments be flexible, or firm?
	iii.	Balance issues of projects derived from unclear strategies imply that projects which are smaller, shorter and more defined tend to get resource allocation instead of projects with a longer duration
Portfolio Management Process related challenges and issues:	iv.	Too many projects are on hold since no one wants to kill good projects
	v.	Construction of a rank-ordered or prioritized list is needed since all decided go-projects have different payoff, priority or importance.
	vi.	Management sees portfolio reviews differently; either as a monitoring session without any selection activities or as a selection meeting where gate meetings are reduced to status reports.
	vii.	It is difficult to assess if a project should enter early or later in a portfolio management process, it is generally harder to rank projects against each other when very immature projects are included within this ranking.
	viii.	Getting hold of information about projects could be difficult within an organization, so how should this information be gathered, stored, and communicated?
Model and Method related challenges and issues:	ix.	Project selection methods compare projects against a minimum value, e.g. positive NPV, which does not render a prioritization of the projects.
	x.	Portfolio models could facilitate data from which management could commence a prioritized portfolio of projects. But, how involved should management be in interpreting the displayed information when the models have the capability to deliver a standardized prioritization list and function as decision models?
	xi.	Financial analysis methods use highly unreliable data to support decisions which affect how "good" a portfolio really is.
	xii.	Garbage In – Garbage Out, if the models use bad or uncertain data, how accurate can they be?

In the book, "*Portfolio management for new products*" by Cooper, et al. (2001), our opinion is that it can be difficult to understand exactly how these challenges are derived from the empirical research. That is why we chose to complement this view with another set of identified problems made by Elonen & Artto (2003).

These problem areas, associated with managing internal development projects, are derived from case studies within internal multi-project environments. Elonen & Artto (2003, p. 400) presents: "*Inadequate project level activities; Lacking resources, competencies and methods; Lacking commitment, unclear roles and responsibilities; Inadequate portfolio level activities; Inadequate information management; Inadequate management of project-oriented organization.*"

Worth noting is that many of these internal multi-project problem areas are somewhat similar to the challenges presented by Cooper, et al. (2001) which gives an indication that some challenges and issues connected to PPM can be generalized, no matter the portfolio context.

However, even though it appears to be an overlay between challenges, issues and problems between external and internal PPM, we find it interesting to assess the economic perspective which distinguish the two forms of PPM.

A market economic driven PPM process, i.e. external PPM, should identify deficiencies, related to the portfolio content, faster than done within internal PPM. This would imply that it should be more difficult to resolve some of the identified problems by Cooper, et al. (2001) and Elonen & Artto (2003) within an internal PPM process.

Furthermore, it should be more difficult to develop KPIs related to an internal PPM process from which to select portfolio content. If Cooper et al. (2001), have the benefit of assessing market performance, the internal PPM process has to ensure that the projects undertaken for the internal customer have an effect on market performance, which should be more complex since it is further away from the end-customer.

It is possible to interpret the findings compiled by Elonen & Artto (2003), from empirical research mainly constituted by asking people which problems they experience, as if it is a different set of problems presented for an internal multi-project environment. But, the people who practice PPM identify the same general problems. Thus, we believe that PPM in itself is so difficult to handle that it disguises the problems derived from the plan economic model.

2.6. Hypothetical inhibitors of PPM

In this part of the thesis a number of hypotheses will be presented discussing what could be potential inhibitors of effective PPM in general. These hypotheses were derived from reasoning regarding the theoretical aspects above and aims to comprise most of the activities within the PPM process.

2.6.1. Communicating information is a costly activity and not prioritized

An essential part of the PPM decision making process is to have the right information at the right time, and to avoid data overload (Archer & Ghasemzadeh, 1999). To compile and communicate information within large organizations is resource demanding and time consuming (Bible & Bivins, 2011).

It is therefore possible that a gap arises between the information holder and the information user. This phenomenon is in particular evident in a support function as its activities depend on the main functions information and plans. The main function can also be restrictive in the sharing of plans and information as it ties up the activity agenda towards the support function and complicates changes of resource commitment. An inhibitor for effective PPM could therefore be the lack of time and

resources to communicate necessary information, but also unwillingness to communicate necessary information as it ties the planner to promises of future actions.

2.6.2. Each organization tend to focus on their specific strategic objectives which render conflicts of interest in how to balance the project portfolio

Strategy is the foundation for effective PPM and should therefore be diffused throughout the organization and act as guidance for selection of projects (Archer & Ghasemzadeh, 1999; Bible & Bivins, 2011).

In theory, for a support function, this can imply that it must focus on its own organizational strategy derived from corporate strategy, as well as other business unit's strategies which they support. Hence, different organizations may focus on the strategic objective which relates the most to its respective activities. This can therefore give rise to conflicting objectives and conflicting interests within the project portfolio.

2.6.3. Strategic issues are not handled since focus is on execution

An organizations capacity is limited and it is common that the balance between the number of projects which are undertaken and the resources required for these projects is skewed which leads to an overloaded portfolio (Payne, 1995). If too many projects runs at the same time under a strict resource constraint this may result in insufficient time for strategic considerations (Cooper, et al., 2001).

The project managers and portfolio managers are buried in work and keep full focus on short term execution of current projects instead of allocating resources more tactical and prioritize strategically.

2.6.4. Project management metrics are not sufficient for measuring portfolio performance

What gets measured gets done! In order to get a portfolio balanced and improve strategic alignment, there must be KPIs measuring these activities (Sanchez & Robert, 2010). Project management is a part of portfolio management, but it is not comprehensive in terms of evaluating the full state of a portfolio (Bible & Bivins, 2011).

In order to improve portfolio performance it is important to measure the project portfolio as a whole, and not only the projects within. It is not sufficient to apply project management metrics on a portfolio, it requires specific portfolio metrics.

2.6.5. Project classification is misused and therefore not trustable

There are two classes of projects; must-do projects, and should-do projects (Cooper, et al., 2001). The must-do projects are mandatory in the sense that if they are not realized, the business cannot fulfill its purpose (Archer & Ghasemzadeh, 1999). A project should be classified early in accordance to those classifications, while it still is at the proposal stage (Bible & Bivins, 2011).

When people have ideas for project proposals within the organization, the possibility to get them realized into projects increase if the proposals get a must-do classification. Therefore, there is a risk that the categorization methodology gets diluted and not trustable.

2.6.6. Decision makers focus too much on the cost side of the project rather than valuing project benefits contra cost

Relying too heavily on financial methods implies a risk, especially in early new development, as the data is too unreliable (Cooper, et al., 2001). Since the business case is commonly oriented towards financial issues, the prevailing input for project instigation is insufficient for effective PPM.

Thus, decision makers base their decisions too heavily on project costs, instead of the strategic benefits of the project combined with costs.

2.6.7. An informal PPM process prevents effective PPM

The purpose of a PPM process is to manage prioritization, selection and evaluation of projects within a multi-project environment constrained by scarce resources (Bible & Bivins, 2011). Such a process could be more or less mature, i.e. implemented, structured and formalized within the organization.

Furthermore, in order to achieve organizational change and a more formalized process, i.e. a documented, standardized and used process, followed and governed within the organization, several actions are required to decrease the influence of "the rule of the loudest voice" (Bible & Bivins, 2011).

The competition for resources renders politics in terms of lobbyism and nepotism within the organization in order for project initiators to get the project realized. Therefore there is a resistance within the organization to formalize the PPM process as this eliminates the opportunity for ad hoc project realization.

3. Methodology

This section will provide the methods for how we pursued our research in order to answer our research questions.

3.1. Research Strategy

Bryman & Bell (2011) present two general types of research strategy; qualitative research and quantitative research.

We have in this thesis mainly chosen a qualitative research approach, for a number of reasons. The main advantages of this approach are: it makes it possible to interpret the environment through the eyes of the interviewees', it is in general rich in detail, and it allows for quick follow up questions and flexibility. Bryman & Bell (2011) highlight some common critique towards qualitative research e.g. that it is too subjective, difficult to replicate, problem of generalization, and that it lacks transparency. We have taken the strengths and weaknesses in to consideration throughout this thesis, and avoided pitfalls to the extent possible.

In this thesis we apply a mix of the inductive and deductive research process, illustrated in Figure 13 and Figure 14 respectively. Since this research area, according to us, is not sufficiently addressed in academia to analyze with quantitative models, it motivates the choice of a qualitative research strategy. But the reason for using hypotheses, which traditionally is a part of the deductive research process in a quantitative approach, is because the research area offers such a richness of causal reasoning. Therefore we believe that the hypotheses can bring clarity to the report and make it easier for the reader to follow. Furthermore, the research area is complex, so even though we generate hypotheses, we still need to apply a qualitative approach to understand their impact on the phenomenon.

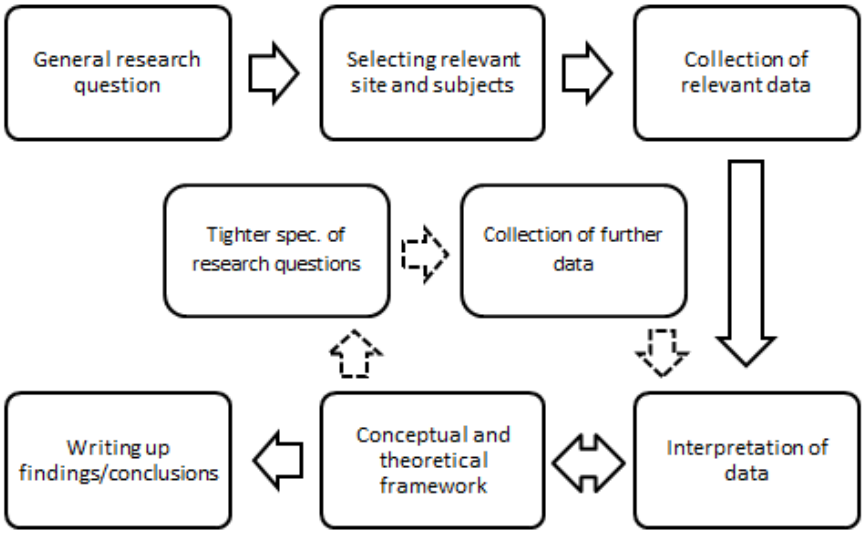

Figure 13 - Main steps of qualitative research (Bryman & Bell, 2011, p. 390)

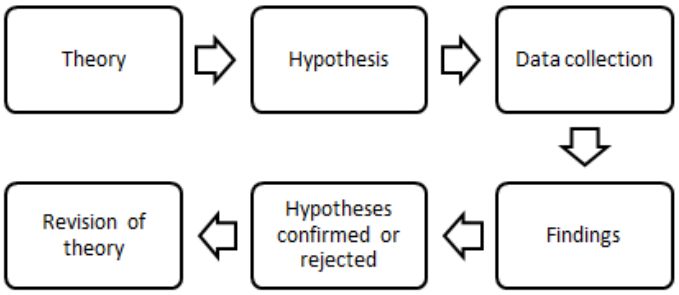

Figure 14 - The deductive research process (Bryman & Bell, 2011, p. 11)

3.2. Research Design

What characterizes a case study is a single organization, event, or location that is studied, which renders in-depth understanding of the case's complexity (Bryman & Bell, 2011). Case studies are associated with qualitative research, and its methods aim to render a deep and rich set of data. A common critique toward case studies are that it is bound to the unique features of the case per se, which limits its ability to generalize beyond the time and place of the case (Bryman & Bell, 2011). On the other hand, Dubois & Gadde (2002) state, that these problems should be regarded as an opportunity since; *"The interaction between a phenomenon and its context is best understood through in-depth case studies."* (Dubois & Gadde, 2002, p. 554). Another aspect, which Dubois & Gadde (2002) stress as a way to strengthen the case study, is to have a strong link to theory which motivates the rich literature chapter in this thesis.

3.2.1. Selection of Case Company

In order to answer the research questions we have commenced a case study at a case company, which is a large manufacturing firm acting globally. The case company has several advantages, but also some disadvantages, which have been considered throughout the study and will be assessed below.

In order to perform this study, some prerequisites had to be present. To start with, in order to investigate PPM within an organization it has to be organizations which act in a multi-project environment. The second aspect of importance was that the company had to be large enough, or that there is a support function present within the organization. These aspects together generate an internal multi-project environment. Since the case company had a support function, it fulfilled the prerequisites needed which implied a good match for us.

Furthermore, other benefits which made the case company particularly suitable for this study were several. The company is a large organization with multiple subdivisions in different phases or maturity stages of their PPM process. This enabled an easy access to benchmark other subdivision and their progress of PPM. Another benefit of the case company was that they have a large and important product development organization, where PPM was an established concept. This rendered a lower threshold for us in the initial exploratory phase. Furthermore the case company had an interest in PPM and was curious of the opportunities it could bring to the organization.

One aspect which rendered some difficulties for the study was that the case company still experienced the effects of the recent reorganization, and to a large extent still acts in transition of change and implementation. For the sake of the study this implied a very dynamic research environment where there occurred changes in processes and activities constantly, which rendered

difficulty to understanding some dependencies and causalities. On the other hand, from the case company's perspective it appeared as beneficial to review the opportunities of PPM at this stage of the reorganization as it enabled them to embrace its benefits.

3.2.2. Reliability and validity

According to Bryman & Bell (2011) the external reliability in qualitative studies are low, meaning that it is difficult to replicate the study, due to the fact that time goes on and the environment in the social setting changes. This is particularly important in our case study since the case company is in a transition phase of reorganizing the company. Therefore, it is most likely that a similar study in the future will give a different outcome regarding some aspects.

The possibility to generalize, i.e. show external validity, is stated to be weak in case studies since a case is not adaptable to other social settings (Bryman & Bell, 2011). This is most likely the case, to some extent, in our thesis as well. Although, it is reasonable to believe that other support functions, in similar settings i.e. within the manufacturing industry, face similar challenges and problems when it comes to PPM in support functions. This is also why we commenced a benchmarking activity with another subdivision within the case company group, to strengthen the case study's external validity.

3.3. Research Work Process

Dubois & Gadde (2002), state that in order to achieve the most of a case study the research process, and the activities within, should not be divided into separate phases. Instead they stress the importance of iteration between theory and empirical observations, since "*…theory cannot be understood without empirical observation and vice versa*" (Dubois & Gadde, 2002, p. 555). Throughout this research we have therefore seized on the iterative aspects of going back and forth between theoretical and empirical sources to achieve the full potential of this case study.

The character of work throughout this study has somewhat differed, as the learning and level of understanding has increased. The work progress can therefore be divided into three main parts: exploratory pre-study, main case study, and finalization. The parts have been mutually fluent, but can in a broad outline explain the sequence of events.

Table 3 - Summary of data collection

Primary Data Collection	Amount
Exploratory participant-as-observer	16
Semi-structured interviews	13
Observer-as-participant	6

3.3.1. Exploratory pre-study part

The exploratory pre-study, served as a way to get to know and understand the organization by commencing exploratory participant-as-observer meetings, 16 in total as stated in Table 3. It was also an opportunity for us to establish the research project within the organization among stakeholders, in order to make the semi-structured interviews more efficient. The sampling of the interviewees has been conducted by snowball sampling which is a type of convenience sampling (Bryman & Bell, 2011). Throughout this step, we asked after each meeting if the interviewee could recommend anyone else of interest for the study. Furthermore interviewees were also identified by studying internal documents; e.g. organizational charts.

During this part we instigated the initial round of literature studies, which resulted in the hypotheses which we have studied. Furthermore an extensive review was also commenced of secondary data in terms of both external and internal company documents as well as general mass media regarding the case company.

3.3.2. Main case study part

The main case study included most of the data collection i.e. commencing semi-structured interviews, and observer-as-participant. In addition to these interviews and observations, several shorter more informal discussions and conversations took place with people within the case company. Furthermore, e-mails and chats also provided valuable input. This allowed us to verify or elaborate on thoughts or questions, which appeared as the data collection went along. Alongside the empirical data collection the theoretical iteration has continued.

Semi-structured interviews

Most of the data in this thesis has been collected by semi-structured interviews, sampled via snowballing. The interviews have revolved around the hypotheses, but some general aspects have also been discussed. The questions have been addressed in varied order, depending on the direction of the interviewee's answer, in order to get a flow throughout the conversation.

The interviews have mainly been conducted in person, which has been beneficial, since the interviewee has had the opportunity to use a whiteboard to further explain context. But since a number of interviewees have been situated abroad some phone interviews, with possibility of screen sharing, have also been conducted. The interviews have been between 35-90 minutes in duration, in both Swedish and in English, and have in agreement with the interviewee been recorded to subsequently be able to go back and fill any gaps.

3.3.3. Finalization part

During the finalization, focus has been to analyze and complete this master thesis. This has implied further iteration of literature to confirm relevance and complement gaps. It has also implied some follow up conversations to verify and validate our main findings at the case company.

4. Empirical findings

In this chapter the empirical findings will be outlined. First a short introduction to the case company will be presented, setting the scene of the study in terms of the support function and the project portfolio. Furthermore the empirical findings regarding the hypothesis will be presented.

4.1. Description of Case Company

In order to maintain the firm in this study anonymous, the description of the case company only covers the essential aspects of its organization context.

The case company is a global actor within the manufacturing industry with about 100 thousand employees worldwide. The company is organized in different business units with different responsibility areas, and each business unit has support functions. The case company has recently undergone a major reorganization which has rendered a new governance structure and an increased process focus within the company.

4.1.1. The process support function

The main object of study in this thesis is the process support function for the product development business unit. This implies that the product development organization is the process support function's customer. There is also a corporate process support function which is responsible for the activities on a corporate level, which include governing all process support functions within each business unit. The process support function has approximately 250 employees and is divided into two different areas; maintenance and new development, where the latter is of focus for this thesis.

The process support function and its portfolios drive projects, which aim to make the product development processes more efficient and effective. This could imply to shorten lead times, increase productivity or standardize IT-systems etc. Therefore, IT-solutions are important as they support the product development processes. The role that the process support function has when it comes to IT is that it acts as a bridge between the IT-developer and the product development organization.

Within the support function, the total portfolio budget is constituted by two sets of currencies which are not mutually exchangeable; i.e. "money" and "business-hours". These currencies are also used on the project level. The money budget is mainly a sum of cash allocated for developing IT-systems whilst business-hours imply the time that people from the support and main organization spend in projects.

The money budget for the next coming year is mainly based on the previous year's figures and is set by the corporate function for process support, in a traditional economic planning manner. When a budget cut appears within the process support function, each portfolio is cut equally. Today, the new development organization is allocated one third of the money budget whilst the maintenance organization holds the remaining two thirds.

As for the business-hour budget, the process support function is dependent on business-hours from the product development organization in order to run its projects. This part of the budget is usually allocated via the product development organization based on the overall availability of hours within product development organization and the guidelines set for the product development organization's billable and non-billable hours. Billable hours are hours which are spent on product development projects, which ultimately are reflected into the price of the product. The product

development's non-billable hours, on the other hand, are not reflected in the price of the product. Non-billable hours are the type of business-hours which are allocated to the process support projects. The non-billable hour budget often correlates with last year's business-hour budget frame allocated to the process support function. Since resources also are scarce within product development, the projects which process support run, is often caught in the middle since product development first and foremost prioritize their own projects, i.e. projects with billable-hours.

Within new development of process support, the portfolios are divided into three phases, which we call; early phase, middle phase, late phase. These sub portfolios are highly different in character, which makes it difficult to find a common way of working with the portfolios. The different needs of the portfolios are depending on different size of portfolios in terms of the number of projects within.

When a new project proposal arises within the organization, it is managed through a standardized process. Everyone within the company can send in requests and propose changes. This has rendered a significant amount of project requests which are managed constantly.

Each project request, entering the project request process, is categorized to the portfolio which is affected or connected to the project request. When it comes to classification regarding priority of projects and proposals they are divided into two general classes established by the corporate process support function; must-do and others. The must-do class is further labeled with sub-categories in terms of legal, regulatory, technical etc. without an inter-mutual ranking. Once a project has been approved to run, it follows a stage gate model.

Case Portfolio - description, content, structure etc.

The case portfolio in this thesis is a project portfolio with responsibility for the middle phase of new development of processes. The portfolio constitutes approximately:

- 45 ongoing projects
- 50 project requests

The recent reorganization has resulted in a new governance structure which in turn has rendered a relatively new Portfolio Review Board. During the progress of this case study, continuous efforts and actions have been taken by the Portfolio Review Board, as well as portfolio manager, to improve how they work with the portfolio.

4.2. Results related to hypotheses

Below follows a presentation of the empirical findings related to each hypothesis.

4.2.1. Communicating information is a costly activity and not prioritized

Information is shared to a wide extent within the organization, albeit, certain long term plans which are classified as secret by the product planning organization are only shared to a finite set of stakeholders. Plans which are closer to the present time are generally more accessible.

According to the organization, it is hard to create business cases with a high degree of validity. This is partly due to the perception that it is hard to retain information, specifically financial information, which is considered viable. One area which is considered especially difficult to assess is the pain of the business side, i.e. the customers of the support function, since that kind of information in general is not communicated to the support function.

A general perception was that there is too much uncertainty and risk in the overall daily activities and plans of the company which implies that updating the plans and e.g. business cases continuously creates extra work. Not everyone needs to know everything, is also an important comment made by a member of the organization.

4.2.2. Each organization tend to focus on their specific strategic objectives which render conflicts of interest in how to balance the project portfolio

There is a general understanding within the support function that their role is to support the product development organization. However, there were comments made by representatives from the product development organization that they did not perceive that the support function totally fulfilled their supporting role and could improve in terms of PPM.

One comment made by a representative from the product development side was that the support function could improve their prioritization of proposals and projects and assure that the most important projects are undertaken. Representatives from the support function share the view on the fulfillment of the main function's needs, they are not certain that they are doing nor recommending the most important projects to be undertaken. But, this is not a result of them pursuing their own agenda according to the support function, rather that there is no process which provides them with relevant guidance in their work.

Within the company's set of strategic objectives, there was one strategic objective which was directly related to the support function. That strategic objective concerned a decreased budget for the support function on a corporate level. There was no common view within the organization that this strategic objective was in conflict with other strategic objectives, but merely that this particular strategic objective was a limiting condition or target.

4.2.3. Strategic issues are not handled since focus is on execution

There is a tendency within the organization that the agenda of the Portfolio Review Board Meetings' focus on project management related issues. For the largest sub-portfolio, there is a large amount of projects and project proposals which are continuously being dealt with at these meetings. There is an expressed frustration which is related to the fact that the agenda is too packed with project management issues and it is questioned whether or not the purpose with the meeting should be to manage these activities. The argument stresses that in order for the meetings to add value, each project on the agenda should be given enough time for discussion, and the discussion should consider issues at a higher level. Not every gate in the project has to be discussed; focus should be on the significant gates where issues arise. Minor decisions should be delegated downwards to meetings at lower levels. It is also stressed that the meeting agenda should be set in time so that each meeting attendee has enough time to prepare in order to make the meetings efficient.

Within the smaller sub-portfolios there is a common perception that the number of projects is manageable. This implies a more reactive than a proactive strategic behavior.

There was no complete formal PPM process in place for the support function's portfolios. The reorganization has partly contributed to the lack of focus on project portfolio management, however; there are no tendencies that the project portfolio management work was more formalized or more strategic before the reorganization. Even though the ambition is to have a formalized PPM process, the reorganization has affected this process maturity as well.

The management approach undertaken is focused on understanding the content of the current portfolio and the purpose of those activities already underway before a more strategic focus could be taken. This implies that the Portfolio Review Board should be more selective in which upcoming project proposals to turn into projects.

When the organization faces a budget cut situation, the current praxis is to reach a budget cut goal for the overall portfolio level. This implies that each sub-portfolio has the responsibility to single out which projects to kill or put on hold. There is no high-level prioritization of which portfolios are most prioritized, nor a prioritization of the sub-portfolios. Instead, the prioritization is commenced on a project level.

The general perception of the projects within the portfolios is that all projects probably are good, but not necessarily the best, nor the most appropriate ones.

4.2.4. Project management metrics are not sufficient for measuring portfolio performance

The organization lacks a structured portfolio review throughout the PPM process, for example where an assessment of the goals of PPM is commenced.

There were no common portfolio metrics used to measure the performance of the portfolio. Albeit, there were two standardized KPI metrics used for project management which were used in order to assess the performance of each project. These metrics were compiled via a bottom-up approach into an aggregated metric for the whole portfolio. One of these project management related KPIs was at the time a high priority within the support function's top management. It was common that some interviewees regarded these metrics as valid for measuring the performance of the portfolio.

Since there is no common agreement on what should be measured regarding the portfolio per se, there are no specific portfolio metrics which are used to measure the portfolio. One difficulty which is shared among the projects within the portfolio is that of measuring the business value. There is no single definition used for what business value is, but it is considered important to measure the value and effect of a project or project initiative. Several interviewees commented on that it was difficult to measure engineering efficiency within product development, in comparison of measuring efficiency in a production environment.

As for the methods used within the organization for measuring the achievement of the goals of PPM, the dominant methods relate to the goal of maximizing the value of the organizations. That is, financial methods used in a business case. Even if the projects are labeled with concern to which strategy it fulfills, there are no formal methods in place supporting strategic alignment of a portfolio. Regarding the goal of achieving a balanced portfolio, there are no formal methods considering common risk metrics which are measured in a disciplined way. Neither are other diversifiable objectives such as length of projects within the portfolio formally considered. But, there is a mapping done regarding prioritized projects with respect to classification commenced at the top intra-organizational level and the local business entities prioritization. This mapping shows a balance of projects in terms of resource allocation with respect to strategic alignment.

Regarding the metrics, quantitative metrics are preferred over qualitative metrics within the organization. One view is that quantitative metrics are more robust in comparison to qualitative metrics since the view is that qualitative metrics can be misinterpreted or manipulated easier. One

comment was that if we do not quantify the benefit of a project, it is hard to say that an appropriate balance of the portfolio is commenced.

4.2.5. Project classification is misused and therefore not trustable

Within the case company project proposals are categorized into both portfolio category, depending on the nature of the project, and classified according to priority, depending on the project urgency.

The perception is not that the classification of projects is misused in a systematical manner, but rather that there is an uncertainty in how projects should be classified in terms of priority. The main issue is that the must-do class is poorly defined and somewhat difficult to grasp, which opens up for different interpretations. Since there are no clear guidelines on what a must-do project is, the project proposer classifies the project as a must-do. This increase the odds on getting it realized, and it is difficult to argue that it is incorrectly classified. It is stated that it is important to encourage proposals of new projects but also to be critical and evaluate the proposals that arise. Furthermore it is important to question if the must-do classification of certain projects really are accurate, and benchmark with other companies to understand how they have resolved issues with e.g. new legislation. From top-management there is therefore an urge to quantify the must-do class since qualitative measurements are too subjective. It is suggested that the must-do class should relate to business impact.

4.2.6. Decision makers focus too much on the cost side of the project rather than valuing project benefits contra cost

Within the case company it is agreed that cost has a large impact on projects. It is stressed that it is important to manage cost in an efficient way, which is an area where both the main and support function have under control. Since every project has to adhere to the budget restrictions, this becomes a natural part of the daily activities related to a project.

It is stated that the benefits and value of projects could be given more attention. It is also agreed that the organization need to become better on business cases and that the Portfolio Review Board should request more solid business cases. As of today, there is an ongoing project being fine-tuned regarding development of a template for business case estimates for new project proposals. A person with good insight of the current PPM process state that most projects that run today, with one or a few exceptions, have been started without a proper business case as foundation.

Several interviewees expressed the desire to become more accurate when evaluating the benefits of the projects. A particular example was stated regarding projects that are close to completion and runs over budget. For these cases, there is a very strong force within the organization to complete the project, no matter the cost, without really doing a rational evaluation of the benefit contra the cost of the project.

Due to the case company's current situation, in terms of reorganization and new governance structure, focus varies somewhat within the different portfolios. Within one portfolio the next couple of months focus is, and will continue to be, to get control of the current ongoing projects within the portfolio. This approach was taken despite that this chairman of the Portfolio Review Board recognized the need to become more strategic. This work is stressed as necessary, even though it compromises the attention of overall portfolio strategic focus.

One comment made by a representative of the organization was that the organization as such is a very large entity and it can be easy to lose focus on the actual business and purpose of the company. There is not always a clear end-customer focus within the organization and as a consequence, internal development activities without a clear connection to the core activities of the company could be pursued. This could be a result of a technology driven organization dominated by engineers who are very passionate about new technology which in some cases results in that the business side of projects is forgotten.

4.2.7. An informal PPM process prevents effective PPM

Regarding the process and its level of formality, it is stressed that a high level of formality is important from several interviewees. But, it is also pointed out that some elements of informality are required. Representatives from the organization value a balance between formality and informality within a PPM process.

The strongest benefits with a formal process are that it emphasize the total optimization of the portfolio and counteracts the sub-optimization within the portfolio resulting from optimization of the individual projects. It is also stated that a formal process enhances transparency, and remove the influence and opportunistic behavior of single individuals. The risk of a too formal process is that it can be too detailed, and thus the people working in the process become micro-managed, which leads to inefficiency.

An informal process, on the other hand, has the benefit that with the right people, it can work very efficiently in terms of e.g. quick decision making. It is also stated that a lower level of formality can enhance and stimulate the creativity within the organization since it makes it easier to initiate projects. Within the organization, an informal process is considered favorable for people with a wide network of contacts. People with this sort of network are usually experienced people who have been working a couple of years within the company. A strong negative aspect of an informal process is considered to be that decisions become heavily dependent on the decision maker and its personal priorities. This is also a kind of sub-optimization of the total portfolio.

5. Discussion

In this chapter the discussion is presented, starting with each hypothesis. Further on a more general discussion follows, related to PPM in terms of the internal and external organizational contexts.

5.1. Discussion of hypotheses

In order to get an overview of the hypotheses presented in the literature chapter, Figure 15 plot where the hypotheses make the most impact in Archer & Ghasemzadeh (1999) PPM process. As Figure 15 shows, most of the steps in the PPM process are influenced by one or several hypotheses.

1. Communicating information is a costly activity and not prioritized
2. Each organization tend to focus on their specific strategic objectives which render conflicts of interest in how to balance the project portfolio
3. Strategic issues are not handled since focus is on execution
4. Project management metrics are not sufficient for measuring portfolio performance
5. Project classification is misused and therefore not trustable
6. Decision makers focus too much on the cost side of the project rather than valuing project benefits contra cost
7. An informal PPM process prevents effective PPM

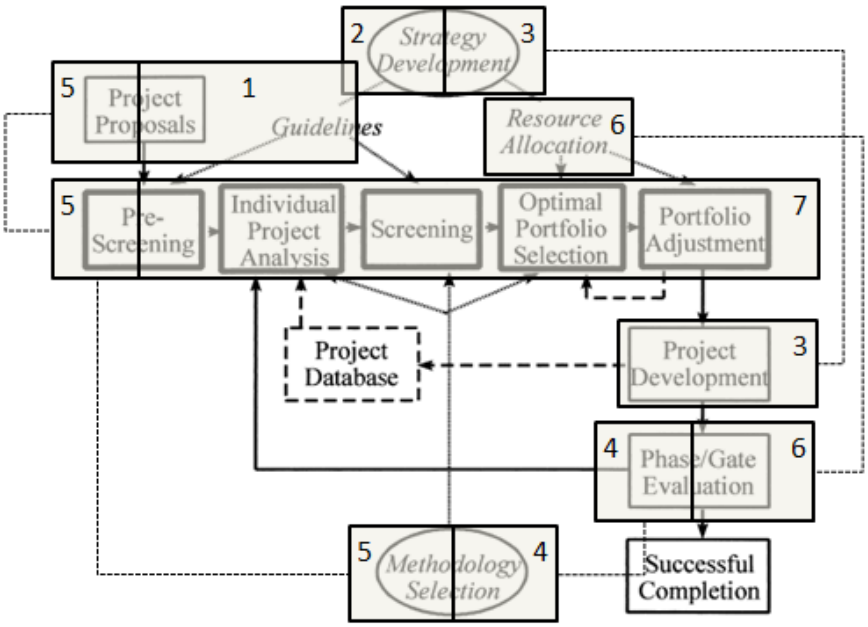

Figure 15- Plotting of hypotheses in the context of Archer & Ghasemzadeh (1999) PPM process

5.1.1. Communicating information is a costly activity and not prioritized

This hypothesis does not appear to have a strong influence or effect on the PPM activities. It could be argued that a more transparent communication of long term plans from the product planning organization could assist the support function in their long term planning activities. But, this information is rather uncertain and would most likely change, which would generate extra work.

It is important not to underestimate the difficulty of providing a good business case. In general, it is considered difficult within the organization to assess the information required to produce an accurate guesstimate of the business case parameters. This perception relates to that a strong

emphasis is put on financial metrics. A lack of developed metrics related to other important areas implies that some relevant information does not get apprehended which could assist in reaching the goals of PPM.

The size of the company contributes to impeding a good flow of information where everyone is up to date. For a person without a good overview of the organization, it can be difficult to understand the logic behind a certain project. But, it is difficult to argue for full transparency of the decisions within the organization since the transaction cost of doing so, is too high.

Everyone does not need to know everything, but some people have to know more than others. These persons should, in order to avoid confusion and provide a formal PPM process, make sure to document the basis for decisions. This, in turn implies that they need assistance in terms of business cases and strategy in order to make the right decisions. It does not appear as if it is common to deliberately withhold information for personal benefit. But, in general there is a large cost of keeping everyone informed.

5.1.2. Each organization tend to focus on their specific strategic objectives which render conflicts of interest in how to balance the project portfolio

It appears as if the support function's intention is to focus on the main function's needs from the commenced interviews. Thus, there are no direct conflicts between the organizations as a consequence of difficulties with conflicting strategies. However, there is a general uncertainty within both the main and support function regarding which needs are prioritized from the main functions side. One view is that, it is the support function's job to understand the needs of the main function. In our assessment, that is a simplified but important notion on how to reach effective PPM. Basically, if you do not ask the right questions, you will not get any good answers. On the other hand, if you do not ask for the right treatment, it is probable that you receive treatment for something which is not prioritized.

One thing that renders a conflict is the competition of resources. This impacts the support function to a larger extent than the main function since the support functions projects require commitment from the main function. It is important to involve the customers when conducting projects which will change the environment for the customer. Otherwise, the effect of the initiative will lack buy-in and probably not have the intended effect. This results in that the support function need to make sure that there is a sponsor who confirms the business value of the project within the main function and thus ensures commitment of resources. Moreover, even if resources are available, it is important to have the right kind of resources to make a PPM process effective.

5.1.3. Strategic issues are not handled since focus is on execution

The current focus is on project management even if the need for a more strategic mindset and work related to PPM is recognized throughout both the main and the support function. An increased focus on processes within the company has resulted in an enforced position of the support function within the company.

PPM requires a more general and holistic governance than project management. Project management could imply a sub-optimization of a portfolio since focus is on the individual project whereas PPM can be synonym to a total optimization of the portfolio. Thus, there are different

capabilities or competencies required for project management and PPM where the need for objectivity is larger within PPM.

Today, there seem to be a lack of prioritization regarding which portfolio is most important. Even if the budget allocation signal some sort of ranking in terms of a portfolio's importance, possibilities or pain, a budget cut can affect all sub-portfolios, regardless of the ROI of the projects of the portfolio. Hence, a general understanding regarding which portfolio is the most important is absent.

5.1.4. Project management metrics are not sufficient for measuring portfolio performance

The company has in general a history of focusing on project management metrics, metrics which are standardized and implemented throughout the organization. This behavior permeates both the main and support functions which should be considered a strength of the company. It is important to make sure that projects keep within budget and that plans and progress gets followed up, something which is considered a strong capability of the support function. But, these metrics do not provide guidance regarding if the right things are done or not, i.e. if the right projects are undertaken. Within PPM, the most fundamental goal is connected to maximizing the value of the portfolio. This implies that it does not matter how well your projects in your portfolio proceeds. If they are not commenced as a strategy fulfilling effort, they are not, according to the definition of the goals of effective PPM, contributing to the maximization of the organizations value. Hence, each project should be prioritized according to the business value of the project.

From another perspective, if you are "doing the right things" but not "do the things right" and the projects fail, it is not a preferable scenario. Hence, PPM metrics and project management metrics complement and support each other, but project management metrics are not sufficient alone to measure the performance of a portfolio, as they are stated today within the organization. However, since there is a strong project management culture within the company as a whole, the prerequisites are good for commencing successful PPM. One way of assuring that the goals of PPM are met is to actually measure that they get done, either quantitatively or qualitatively.

Furthermore, the lack of formal portfolio metrics makes it difficult to assure that the PPM goals are achieved. This inability of assessing the state of the portfolios renders an enhanced feeling of not being in control of the portfolio among the decision makers within the PPM process. By focusing on project management within the support function, the decision makers are lured into a false sense of security of being in control of the portfolio, a state which is not viable in the long run.

Since this support function revolves around the processes and IT systems of the main function, and processes in general are unique, it is complicated to generalize metrics for the support function. We argue that it in general is harder to measure activities which are commenced far away from the customer in Porter's value chain of a company. I.e. product development activities, or operational effectiveness of such activities, are harder to evaluate than the efficiency of production related activities.

What is central in the discussion about developing metrics for a portfolio is how to measure business value. Business value should, in our opinion, consider all goals of effective PPM. The business case should thus consider more aspects than the strict financial implications related to maximizing the value of a portfolio as formulated today within the support function.

5.1.5. Project classification is misused and therefore not trustable

The classification of projects and project proposals within the case company is in accordance to theory divided into two major classes, i.e. must-do projects and should-do projects.

A weakness of the classification within the case company is that it lacks clear definitions of the different classes of projects. We believe that this has some impact of the ability to evaluate, prioritize and select the right projects.

Once a project is classified as must-do, decision-makers become less critical and do not question the projects existence to the same extent as other projects, where a more solid business case is required. It may be wise to review the must-do class and also evaluate the possibility to set different levels of must-do.

Another aspect to consider is that the case company's ability to terminate ongoing projects has been stated as low. Therefore, the defective classification of must-do projects probably impact the PPM process negatively. This follows from that an incorrectly labeled must-do project gets a high priority for resources and thus steal the attention of other potentially more important projects.

5.1.6. Decision makers focus too much on the cost side of the project rather than valuing benefits and utility contra project cost

It is clear that cost have a strong focus in most projects within the case company. The case company has a solid and well established budget process, which requires that cost is kept accordingly, plus minus a certain percentage. Therefore it is natural that focus is on cost within the portfolio, and project benefits are less addressed before projects are instigated.

There are two forms of business cases within the support function, a first estimate or a guesstimate made for project proposals, which is strictly financial. A more comprehensive business case is commenced in the first step of the company's project management process. However, it is rare that the business guesstimates, or business cases, are followed up consistently. Moreover, a structured PPM evaluation activity adjacent to the project completion is not in place where the result is evaluated with respect to the business case both in terms of financial terms or business benefits. Furthermore, the impact of a project should be assessed over a longer duration post completion, e.g. during specific milestones throughout the implementation or value realization of the project deliverables.

The absence of a systematic approach for estimating internal projects business benefits can be explained by the internal projects character, which makes it difficult to measure and estimate business value. A systematic approach, where completed projects' realized business benefits are compared to the initially estimated, could render a knowledge transfer to future process activities in terms of selection of portfolio projects.

5.1.7. An informal PPM process prevents effective PPM

In terms of formality versus informality of the PPM process, it can be stated that it is a trade-off between control and efficiency. A formal process is required in order to have control, though this does not exclude that it should not have some informal elements. The key to a successful PPM process implies to find the balance between formal and informal activities. The more complex the portfolio is in terms of number of projects etc. the more the portfolio manager needs a formalized

PPM process as a way of keeping both the portfolio management as well as the portfolio itself effective.

In general, people within the organization, for example project managers, have the incentive to maximize their own utility. This can easily lead to a state where the portfolio is sub-optimized, therefore PPM requires managers with a holistic view of the organization who can take objective decisions based on relevant data. Hence, the decision-makers involved in the PPM process should not be too committed to projects as it makes decisions subjective and sub-optimizes activities.

Another important aspect to consider regarding the PPM process is that no matter how formal the process is in terms of defined activities, its effectiveness will depend on to which extent the organization utilities the PPM process formally. If there is a culture within the organization where the user does not follow the formal steps formulated in the process, the process will not have the intended effect, even though the process become more formalized.

5.2. Summarized view of hypotheses

From the discussion above we present a summarized view, in Table 4, of the hypotheses' effect, whether or not they potentially inhibit effective PPM. It is important to note that a small adjustment of the formulation of the hypotheses, as well as to our subjective judgment criteria, could have altered the result. Thus, the results are derived from our subjective reasoning regarding the compiled data and our experiences from our time with the case organization. But, the results of the hypotheses give an indication of their impact on effective PPM.

Table 4 – Results of qualitative hypotheses test

	Hypothesis	Result
1	**Communicating information is a costly activity and not prioritized** - The transaction cost of keeping everyone informed is high, but everyone do not need to know everything - Some persons need to know more than others, i.e. the decision makers - This is a more general challenge for any organization	**Rejected**
2	**Each organization tend to focus on their specific strategic objectives which render conflicts of interest in how to balance the project portfolio** - There are no competing strategies derived from the support function or the product development organization impeding effective PPM - However, the main organization is prioritized when it comes to resource allocation	**Rejected**
3	**Strategic issues are not handled since focus is on execution** - Portfolio Review Board focus on PM issues rather than PPM due to project work overload - Not assessing strategic issues leads to a sub-optimization of the portfolio	**Confirmed**
4	**Project management metrics are not sufficient for measuring portfolio performance** - PM metrics does not cover the essential aspects of effective PPM, such as strategic alignment and balance	**Confirmed**
5	**Project classification is misused and therefore not trustable** - There is an inflation of must-do project classification, due to poor classification definitions - Partly explained by the template for project proposals	**Confirmed**
6	**Decision makers focus too much on the cost side of the project rather than valuing project benefits contra cost** - The budget process is very influential, and it is a necessity since the case company is very large and need to be in control of costs - However, it influences the ability to act strategically, and thus inhibit the valuation of projects' strategic benefits within the PPM selection process	**Confirmed**
7	**An informal PPM process prevents effective PPM** - An informal process is not necessary bad - A balance between formal and informal activities should be sought	**Rejected**

5.3. Towards an understanding of PPM for a support function

A majority of the literature regarding PPM is focused, or derived from, a product development context. In general, theory states that the PPM process should be adapted to each specific organization, but to what degree, and why? Does it require an incremental or radical change of the PPM process, and in what ways?

The fact that little, or no, theory has been written on the subject in a support functional context, results in a lack of attention and recognition from industry, which creates a blind spot. When adapting the PPM process to fit a support function and the internal multi-project environment, we stress that adjustments are required to make it effective. It is possible to believe that scholars

explicitly do not want to pin point how the organizational differences affect PPM in literature, since this limits the concepts applicability.

There is a risk that using PPM within a support function could convey a false sense of security within organizations. This is so since users may be under the impression that they can apply PPM theories developed for a product development organization without any further adoptions to its intended organization. Nevertheless, adapting PPM to a support function could be a time consuming activity which should be given the required resources in order to succeed.

We stress that the challenges related to PPM in an internal multi-project environment are strongly related to the organizational differences between a support function and a main function in terms of the environment in which it acts, which is summarized in Table 5 below. These organizational differences, to a large extent affect which methods, criteria and evaluation metrics which are applicable to internal PPM compared to external PPM.

Table 5 – Characteristics of Internal and External PPM

	External PPM	**Internal PPM**
Environment	External	Internal
Organization	Main function	Support function
Project type	External projects	Internal projects
Economic context	Market mechanism	Economic planning
Value indicator	Market response, willingness to pay	Top management priorities[2], loudest voice[3]
Financial purpose	Profit driven (revenue-cost)	Focus on cost reduction
Can ignore customers	Yes	No
Can be ignored by customers	Yes	No
Can increase price	Yes	No
Can scale own organization	Yes	No

Figure 16 illustrates the environmental differences of internal- and external PPM by showing how the support function is one step further away from the market, than the main function. This is one of the reasons why we argue that internal PPM could be more difficult than external PPM. The support function has a finite set of customers with different needs. The strongest indicator, as to why internal PPM would be more challenging than external PPM, relates to the support function's absence of market mechanism. The inability for the market to respond, and to indicate appreciated value by willingness to pay, makes the prioritization and selection of projects more complex. In turn, resource allocation as well as portfolio optimization becomes more intricate. Another aspect is that it generally takes more time and is more difficult to see the effects of a change within an organization's processes, on the market.

[2] Ideal situation
[3] Actual situation

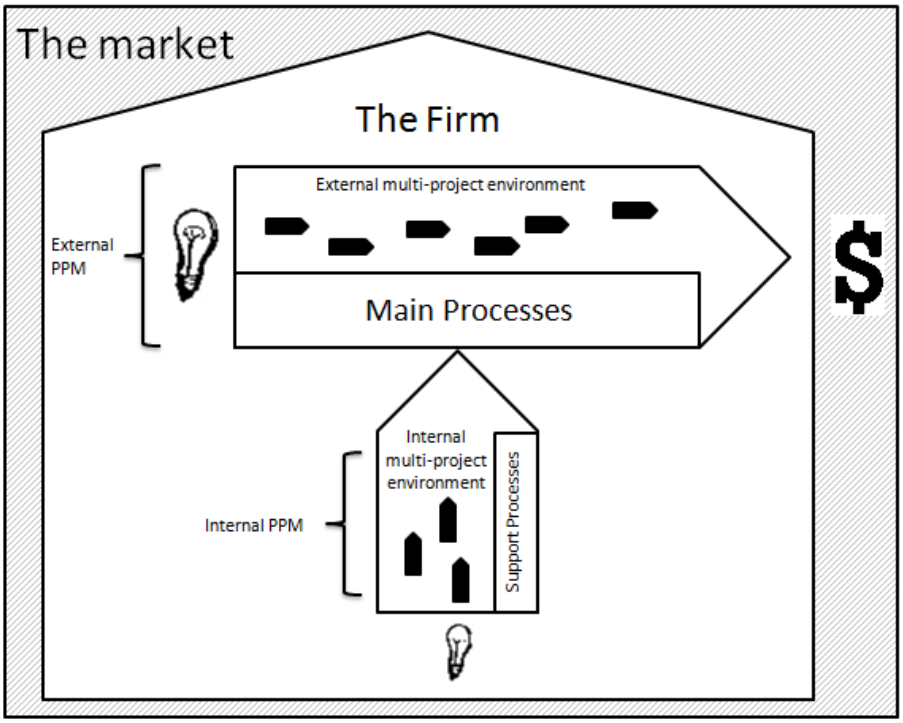

Figure 16 - The organizational context of the internal and external PPM process, and how they relate to each other as well as the market[4]

Since the PPM decision-making environment is characterized by a lot of discussion, debate and trade-offs, it is easy to oppose and question decisions validity. Therefore, PPM in general is connected to a lot of uncertainty. Internal PPM therefore puts more pressure on management to be able to handle a high level of uncertainty, since it is more difficult to verify that the "right" decisions have been taken. This can in turn create a feeling of being insufficient as a portfolio manager. Thus, we stress that internal PPM involve a higher degree of decision-making uncertainty, than external PPM.

Another aspect that we believe influences the internal PPM process, making it more complex than the external PPM process, is its meta-process dimension. The Internal PPM process supports the support functions in its processes which in turn support the main functions processes, which is also illustrated in Figure 16.

As we have stressed earlier, the support function acts in a complex organizational environment, which results in what we call the Internal PPM Paradox. This implies that in order for the support function to know the value of their work, they have to ask their customers, how they perceive the support function's actions. But on the other hand, in order for the support function to secure its position within the company, it is important for them to signal, and argument for, that the work they do is of value for the main organization. Thus, this impedes the interest within the support function to evaluate if the work they perform is valuable.

[4] Model inspired by Lars Mathiassen, Georgia State University, through personal communication.

6. Conclusions

In this thesis we have explored challenges of effective PPM for a case organization operating in an internal multi-project environment, and which challenges are derived from the support functional setting. Below follows our conclusions from our research questions which will be handled separately.

What are the challenges that the case organization experience in terms of project portfolio management?

We have identified a set of activities, elements and organizational aspects which impede effective PPM within the case organization.

The current PPM process has not reached a mature state and is dominated by informal activities. Missing formal activities identified which impede effective PPM are: structured portfolio reviews, and PPM methods considering all goals of effective PPM.

One major challenge related to the case organization, is that important elements of the PPM process are missing. The most critical formal element we have identified as missing within the case organization is the absence of established portfolio metrics.

Furthermore, the Portfolio Review Board focuses on project management activities, which inhibits effective PPM. Over time, this calls for a more strategic view of the portfolio instead of the current operational focus.

The reorganization's effect is an environment where processes and governance structures are not yet in place, which makes it difficult to have an effective PPM process. This creates a feeling of uncertainty which affects how effective the PPM decisions are perceived, but not necessarily how effective they actually are.

What challenges are related to the fact that the case organization is a support function?

The support function faces many challenges which are similar to any other general organization in terms of PPM and resource allocation. But, there are some specific challenges regarding PPM which can be related to the organizational setting of a support function.

It is important to measure and evaluate the project portfolio and the projects within both a product development stetting and a support setting. What distinguishes a support function is the complexity of measuring business value since the end-market is further away than for a product development organization. This implies that there is a need for a more sophisticated set of KPIs.

The process support function need to ensure commitment of resources to a larger extent than the main function. Projects within the support function often involve allocation of the product development resources as well, which makes the activity more complex and creates dependencies.

Why would PPM be more difficult within a support function than within a main function?

If external PPM in general is considered difficult, we argue that internal PPM is even more complex. There are some aspects which distinguish internal PPM from external PPM.

The major challenge is that the prerequisites and the organizational environment are fundamentally different for a support function than for a main function. What it funnels down to is the difference in access to market response, which is available to the main function, but not to the support function to the same extent.

This implies that the support function acts within an environment without a market mechanism, which impedes economic efficiency. Thus, an efficient allocation of resources is hampered which therefore inhibits effective PPM.

To conclude, this thesis main contribution to academia is the recognition of a lack of theory describing the distinction between internal PPM and external PPM. We have illustrated the discrepancy between the two concepts by using a market contextualization for the different organizations and its effect on PPM in order to cover the gap within literature. Albeit Elonen & Artto (2003) make an attempt on categorizing differences between external PPM and internal PPM, we argue that there is a need for a more profound contextualization of PPM from an economic perspective.

The lack of this contextualization, from a theoretical perspective, implies that the discrepancy and its effects are not recognized as important aspects affecting effective PPM in industry. Hence, it is important to understand the fundamental differences and prerequisites distinguishing a support function acting in an internal multi-project environment, from the main function acting in an external multi-project environment.

Further studies and research could be undertaken which will validate and verify the impact of the internal PPM contextualization for an internal multi-project environment.

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8. Appendices

8.1. Complementary discussion regarding hypothesis 4

According to theory, there are several ways of measuring a portfolio. If the general notion regarding what gets measured gets done holds, it is important to develop metrics for a portfolio. Furthermore, it is important to measure relevant things. The next step in this pursuit is to break down the PPM goals into formulated sub-goals which are relevant for the support function's portfolios and identify relevant metrics which assist in fulfilling those goals.

The metrics could e.g. relate to the goals of effective project portfolio management but should also be applicable to the portfolio content. The difference in time scope for portfolios, projects, and processes motivates a need for a wider set of KPIs for measuring the state of a portfolio. This is based on that a project is temporary while a process and a portfolio are considered continuous.

As for the view on the quantitative versus qualitative metrics, our view is that it is important to measure the actual process itself which the projects revolve around. This implies that all processes ideally should have appropriate ways of measuring performance, and not necessarily by using the same metric for every process.

In order for the support function to get closer to effective PPM, we have identified three different dimensions of KPIs aiding this cause, the 3Ps; Portfolio KPIs, Project KPIs, and Process KPIs illustrated in Figure 17.

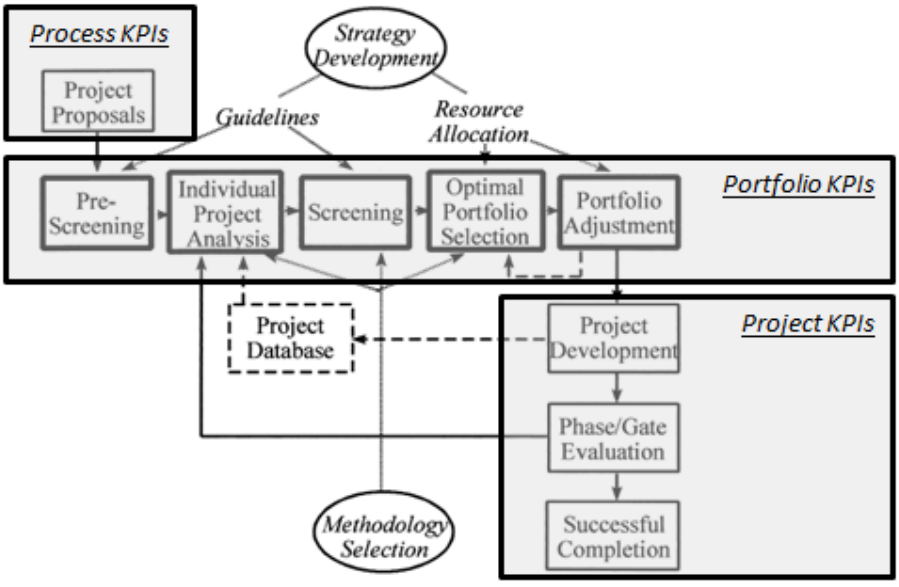

Figure 17 – How different types of KPIs relate to different activities within the PPM process

- *Portfolio KPIs* should be derived from an organizational top down approach which relates to doing the right things in accordance with the three goals of effective PPM; achieve a strategically aligned portfolio, maximize the value of the portfolio, and achieve a balanced portfolio.

- *Project KPIs* assesses the projects progression and relates to project management activities which is important since it relates to doing things right.

- *Process KPIs* should be derived from an organizations specific processes and aid management when assessing potential pain within an organization from a bottom up perspective. Process KPIs should focus on two aspects; the processes' operational effectiveness, i.e. how the process perform over time, and its capability enhancement, i.e. doing things differently.

As for the Process KPIs, it is important to distinguish between quantitative and qualitative KPIs to assess the pain within an organization. Even though one way of identifying pain is by measuring operational effectiveness which usually is a quantitative measurement which could be related to administrative tasks within an organization, this way should not be the only way to measure pain. For example, if a particular process has decreased its efficiency in terms of a certain KPI, this does not imply that the particular process itself is the best way to do something. Instead, a question could be raised if the organization is in need of a changed process, another IT system, or an enhanced capability which may call for qualitative KPIs, this could be related to strategic positioning.

A formulation of Process KPIs could potentially imply an increased demand on the main function, as well as the maintenance part of the support function, in terms of output which could be one of the reasons as to why these kinds of KPIs are rare to find today. It is relatively easy to measure the administrative tasks related to product development, but how do you measure engineering efficiency? This is not an easy question to address. Developing individual metrics for each and every process within the main function could potentially be a costly activity, but, it could prove to be a rewarding one.

When a support function change the processes used by the main function, this will inevitably impact the main function somehow. Hence, it is important to understand the effect of a project on a process, something which e.g. could be done with the formulation of a business case, and then an evaluation of that business case after project completion and implementation.