Project Portfolio Management

A Case Study at Transportation Industry

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Project Portfolio Management
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The Royal Institute of Technology (KTH)
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Supervisor, KTH: Roland Langhe
Summary

Nowadays many companies are facing a number of the four biggest universal problems such as too many active projects, often double what an organization should have; many of these are wrong projects that will not provide value to the organization; projects are not linked with the strategic goals of an organization and thus they do not meet the goals of the organization; furthermore, even if every active project is a positive one, there is an overall imbalance in resource utilization, and in short and long term projects.

The main problem that was identified was evident wastage through improper selection of projects or their improper formulation, an undefined or unclear ROI. Projects are forced to compete for resources. The question that I asked was how an organization can determine if the collection of projects chosen is healthy and will provide the company with value and new opportunities. Hence the purpose – how might project portfolio management improve and promote the organization’s chances of success?

To achieve this purpose I sought to explore the enterprise project portfolio management in a project-driven organization with a blend of customer and R&D projects. The choice of the company was given due to a fact that I have worked in such the company for many years where projects are seen as critical to success of the company. Therefore, the impact of projects on the company’s competitive positioning is immense.

I have found that there is an unclear understanding of what project portfolio management is. Some units claim that the application of project portfolio management is in full pace; others show an interest in the discipline, conceding that they do not know enough about it; others view project portfolio management as just another technique of project management with a new label to what we have practiced many years, namely project management. I aim to investigate to what extent the project portfolio management is implemented in different organizational units in a company if it is implemented at all and how project portfolio management can contribute to the success of the company. Dealing with this challenge has not been so easy due to the facts mentioned previously. One of my ambitions with this thesis was to increase interest in and awareness of project portfolio management.

Project portfolio management ensures that the collection of projects chosen and completed meets the goals of the organization.

This is a qualitative study. I collected data through scientific articles and books written specifically about this area in order to acquire a good level of knowledge. I conducted a case study where the data is primarily gathered through interviews. I analyzed the findings looking specifically at the main factors concerning the extent of application of project portfolio management and a common understanding about it in the company. I looked also to the main elements of project portfolio management and tried to find the additional requirements that should be fulfilled for a successful implementation of project portfolio management.
Foreword

“The company that survive longest are the ones that work out what they uniquely can give to the world – not just growth or money but their excellence, their respect for others, or their ability to make people happy. Some call those things a soul.”

Charles Handy
Acknowledgements

I would like to express my gratitude to the people, who supported me in the research, advised me, provided me with explanations about the area or who simply encouraged me to work hard and finish the study.
I would like to thank my supervisor Professor Roland Lange, who was always ready to help me, to share his significant knowledge in the area of business research.

I thank the Company staff, who provided me with valuable information regarding portfolio management. I appreciate their interest in my research, and their open and friendly way of speaking with me.

In the end, I want to thank my families and friends for their help and beliefs in me. I do appreciate the help of those students who guided me and shared their knowledge of writing the thesis.

Best Regards,
Raska
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Definition of Terms

Transport or Transportation is the movement of people, cattle, animals and goods from one location to another. Modes of transport include air, rail, road, water, cable, pipeline, and space. The field can be divided into infrastructure, vehicles, and operations. Vehicles travelling on these networks may include automobiles, bicycles, buses, trains, trucks, people, helicopters, and aircraft. (http://en.wikipedia.org/wiki/Transport)

Global business environment according to the ICFAI center for management research can be defined as the environment in different sovereign countries, with factors exogenous to the home environment of the organization, influencing decision making on resource use and capabilities. This includes the social, political, economic, regulatory, tax, cultural, legal, and technological environments. (http://wiki.answers.com/Q/What_is_the_definition_of_Global_Business_Environment#ixzz1iFVCu0tL)

Strategy, a word of military origin, refers to a plan of action designed to achieve a particular goal. In military usage strategy is distinct from tactics, which are concerned with the conduct of an engagement, while strategy is concerned with how different engagements are linked. (http://en.wikipedia.org/wiki/Strategy#Etymology)

Process (philosophy), unifying principles which operate in many different systemic contexts. Process or processing (verb) typically describes the action of taking something through an established and usually routine set of procedures or steps to convert it from one form to another, such as processing paperwork to grant a mortgage loan, processing milk into cheese, or converting computer data from one form to another. A process involves steps and decisions in the way work is accomplished, and may involve a sequence of events. (http://en.wikipedia.org/wiki/Process)

Method is a way of doing something in a systematic way. Here word "systematic" implies an orderly logical sequence of steps or tasks. A tool provides a mechanical or mental advantage in accomplishing a task. A technique is a specific approach to efficiently accomplish a task in a manner that may not be immediately obvious. (http://www.discover6sigma.org/cat/methods-tools-techniques)

Governance: “Governance is the act of creating and using a framework to align, organize, and execute activities in a collectively coherent and intelligible manner in order to meet goals”. (PMI, 2006, p.8)

Governance is the act of governing. It relates to decisions that define expectations, grant power, or verify performance. It consists of either a separate process or part of management or leadership processes. These processes and systems are typically administered by a government.
In the case of a business or of a non-profit organisation, governance relates to consistent management, cohesive policies, guidance, processes and decision-rights for a given area of responsibility. (http://en.wikipedia.org/wiki/Governance)

**Project:** “a temporary endeavor undertaken to create a unique product, service, or result”. (PMI, 2006, p.5)

**Program:** “a group of related projects managed in a coordinated way to obtain benefits and control not available for managing them individually. Programs may include elements of related work outside the scope of discrete projects in the program” (PMI 2006, p.8).

**Program management:** “a centralized coordinated management of a program to achieve the program strategic objectives and benefits”. (PMI 2006, p.8)

**Portfolio:** “a collection of projects or programs and other work that are grouped together to facilitate effective management of that work to meet strategic business objectives. The projects or programs of the portfolio may not necessarily be independent or directly related”.(PMI 2006, p.4)

**Portfolio management:** “The centralized management of one or more portfolios, which include identifying, prioritizing, authorizing, managing and controlling projects, program and other related work to achieve specific strategic business objectives”. (PMI 2006, p.5)

**Project Management Institute (PMI)** is:” a not-for-profit professional organization for the project management profession with the purpose of advancing project management”. http://en.wikipedia.org/wiki/Project_Management_Institute

**Stage-Gate model**, also referred to as a phase-gate process, is a project management technique in which an initiative or project (e.g. product development, process improvement, business change, etc.) is divided into stages (or phases) separated by gates. At each gate, the continuation of the initiative is decided by (typically) a manager or a steering committee. (Cooper et al., 1997, 2001, 2006, 1999)

**Portfolio efficiency:** defined as the degree to which the portfolio has succeeded in fulfilling its objectives of strategic alignment, balance across projects, and value maximization. (Cooper et al., 1997, 2001, 2006, 1999)

**Research and development (R&D)**, according to the Organization for Economic Co-operation and Development, refers to “creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications". http://en.wikipedia.org/wiki/Research_and_development

**New Product Development (NPD)**, in business and engineering, is the term used to describe the complete process of bringing a new product to market. http://en.wikipedia.org/wiki/New_product_development
**Matrix Organization**, an organizational structure that facilitates the horizontal flow of skills and information. It is used mainly in the management of large projects or product development processes, drawing employees from different functional disciplines for assignment to a team without removing them from their respective positions. ([http://www.businessdictionary.com/definition/matrix-organization.html](http://www.businessdictionary.com/definition/matrix-organization.html))

**Enterprise Project Management (EPM)**, in broad terms, is the field of organizational development that supports organizations in managing integrally and adapting themselves to the changes of a transformation. ([http://en.wikipedia.org/wiki/Enterprise_project_management](http://en.wikipedia.org/wiki/Enterprise_project_management))

**Enterprise resource planning (ERP)** integrates internal and external management information across an entire organization, embracing finance/accounting, manufacturing, sales and service, customer relationship management, etc. ERP systems automate this activity with an integrated software application. Its purpose is to facilitate the flow of information between all business functions inside the boundaries of the organization and manage the connections to outside stakeholders. ([http://en.wikipedia.org/wiki/Enterprise_resource_planning](http://en.wikipedia.org/wiki/Enterprise_resource_planning))

**Timesheets** an additional module of Primavera used to collect labor actual in the Company.

**Program (or Project) Evaluation and Review Technique (PERT)**, is a statistical tool, used in project management, that is designed to analyze and represent the tasks involved in completing a given project. ([http://en.wikipedia.org/wiki/Program_Evaluation_and_Review_Technique](http://en.wikipedia.org/wiki/Program_Evaluation_and_Review_Technique))

**Primavera** is a brand name under which several project management software packages are marketed created for globally prioritizing, planning, managing and executing projects, programs and portfolios. ([http://aboutfreeware.com/search/Primavera-p6-software](http://aboutfreeware.com/search/Primavera-p6-software))

**CENELEC, the European Committee for Electro technical Standardization.**

**Process** – the Company definition according to Directive 1; GRP-40-10-05-000001: A process is a collection of related, structured activities that produce a specific service or product. It often can be visualized with a flow chart as sequence of activities.

**Project Management Office (PMO)** in a business or professional enterprise is the department or group that defines and maintains the standards of process, generally related to project management, within the organization. ([http://en.wikipedia.org/wiki/Project_management_office](http://en.wikipedia.org/wiki/Project_management_office))

**Orange Book (Project Plan)**, the Project Management Body of Knowledge, is”...a formal, approved document used to guide both project execution and project control. The primary uses of the project plan are to document planning assumptions and decisions, facilitate communication among stakeholders, and document approved scope, cost, and schedule baselines. A project plan may be summarized or detailed”. [http://issuu.com/ppguardia/docs/pmbok](http://issuu.com/ppguardia/docs/pmbok)

**Blue Book**, according to the Company definition, the output from the Bid Phase that is used to inform about the details taken by Management regarding a new commitment (the Company database).
**White Book**, according to the Company definition, the output from the Marketing Sub-Phase that is used to inform about the decision taken by the Divisional management team and in Monthly Operations Review (MOR) at the end of the Marketing Sub-Phase (the Company database).

**The Company database** is a Lotus Notes Database which is used to store and manage overall Business Process Documentation.

**Hurdle Rate**, the minimum amount of return that a person requires before they will make an investment in something. ([http://www.investopedia.com/terms/h/hurdlerate.asp#ixzz1bK0Xtu7p](http://www.investopedia.com/terms/h/hurdlerate.asp#ixzz1bK0Xtu7p))

**Knowledge Management (KM)** comprises a range of strategies and practices used in an organization to identify, create, represent, distribute, and enable adoption of insights and experiences. Such insights and experiences comprise knowledge, either embodied in individuals or embedded in organizations as processes or practices. ([http://en.wikipedia.org/wiki/Knowledge_management](http://en.wikipedia.org/wiki/Knowledge_management))

**Hermeneutical**, (hermeneutics = making sense of a written text) is the study of the theory and practice of interpretation. Hermeneutics encompasses not only issues involving the written text, but everything in the interpretative process. This includes verbal and nonverbal forms of communication as well as prior aspects that affect communication, such as presuppositions, preunderstandings, the meaning and philosophy of language, and semiotics. ([http://en.wikipedia.org/wiki](http://en.wikipedia.org/wiki))

**Semiotics**, is the study of signs and sign processes (semiosis), indication, designation, likeness, analogy, metaphor, symbolism, signification, and communication. Semiotics is closely related to the field of linguistics, which, for its part, studies the structure and meaning of language more specifically. ([http://en.wikipedia.org/wiki](http://en.wikipedia.org/wiki))

**Epistemology**, The branch of philosophy that studies the nature of knowledge, its presuppositions and foundations, and its extent and validity. ([http://en.wikipedia.org/wiki](http://en.wikipedia.org/wiki))

**Ibid**, (Latin, short for *ibidem*, meaning *the same place*) is the term used to provide an endnote or footnote citation or reference for a source that was cited in the preceding endnote or footnote. ([http://en.wikipedia.org/wiki](http://en.wikipedia.org/wiki))
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<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>COO</td>
<td>Chief Operating Officer</td>
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<tr>
<td>MOR</td>
<td>Monthly Operational Review</td>
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<tr>
<td>MORR</td>
<td>Monthly Operational Review Report</td>
</tr>
<tr>
<td>MPR</td>
<td>Monthly Project Review</td>
</tr>
<tr>
<td>MPRR</td>
<td>Monthly Project Review Report</td>
</tr>
<tr>
<td>KPIs</td>
<td>Key Performance Indicators</td>
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<td>MS</td>
<td>Milestones</td>
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<td>PMI</td>
<td>Project Management Institute</td>
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<tr>
<td>PMS</td>
<td>Project Management System</td>
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<tr>
<td>TIP</td>
<td>Transportation Integrated Processes</td>
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<tr>
<td>NPV</td>
<td>Net Present Value</td>
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<td>PI</td>
<td>Productivity Index</td>
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<tr>
<td>ROI</td>
<td>Return of Investment</td>
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<tr>
<td>ECV</td>
<td>Expected Commercial Value</td>
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<tr>
<td>OPT</td>
<td>Options Pricing Theory</td>
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<tr>
<td>PV</td>
<td>Present value of cash flow</td>
</tr>
<tr>
<td>PI</td>
<td>Productivity Index</td>
</tr>
<tr>
<td>ROI</td>
<td>Return of Investment</td>
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<tr>
<td>IRR</td>
<td>Internal Rate of Return</td>
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<td>BSC</td>
<td>Balance score carding methods</td>
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<td>PPR</td>
<td>Project Portfolio Report</td>
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<tr>
<td>PPRS</td>
<td>Project Portfolio Reporting System</td>
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<td>PPM</td>
<td>Project Portfolio Management</td>
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<td>PPMT</td>
<td>Project Portfolio Management Team</td>
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<td>PMO</td>
<td>Project Management Office</td>
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<td>CPM</td>
<td>Critical Path Method</td>
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<tr>
<td>PPR</td>
<td>Project Portfolio Report</td>
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<td>PPRS</td>
<td>Project Portfolio Reporting System</td>
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<tr>
<td>PPMT</td>
<td>Project Portfolio Management Team</td>
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<tr>
<td>R&amp;D</td>
<td>Research and Development</td>
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<tr>
<td>EAPD</td>
<td>Engineering and Product Development</td>
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<tr>
<td>CIO</td>
<td>Chief Information Officer</td>
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<td>Reg A</td>
<td>Region A</td>
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<tr>
<td>HQ</td>
<td>Headquarters</td>
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<tr>
<td>PDMA</td>
<td>The Product Development and Management Association’s</td>
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<td>ERP</td>
<td>Enterprise Resource Planning</td>
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<td>EPM</td>
<td>Enterprise Project Management</td>
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1 INTRODUCTION

In this chapter the introduction of the thesis and research background is presented. This chapter also briefly explains about the purpose of research and research questions, followed by the nature and scope of the study, finally the outline of the thesis will be presented.

1.1 Research Background

Globalization of markets and new business practices are prompting high-tech firms to reconsider their competitive strategy. A company’s success now mostly depends on its ability to grow globally. The increasing complexity of technologies in addition to shorter product life-cycles is also forcing firms to rely on R&D as a source of strategy. More importantly, firms are inclined to evaluate their technologies from a portfolio’s perspective in which a set or a sub-set of the projects are evaluated together, in relation to each other. Portfolio techniques (methods) can help strategic managers in evaluating whether a portfolio of products and projects is adequate from the perspective of long-term corporate growth and profitability.

The market of the transportation industry is highly competitive and in order to regain and ensure lasting competitiveness, the Company Strategy has prioritized Strategic Planning and Strategic Project as the main strategy objectives for the 2010/2011 annual target settings.

The Company earns its living by delivering projects. There are more than 600 major projects running in parallel at any one time, plus several hundreds of smaller projects. Nearly everything that is executed is a project business.

EAPD organizational unit, responsible primarily for the development and innovation of projects, has reached a point where control over the ongoing and new proposed projects has to be improved in order to be able to answer questions regarding total expected cost, consumption of scarce resources (human or otherwise), expected timeline and schedule of investment, expected nature, magnitude and timing of benefits to be realized, and relationship or inter-dependencies with other projects in the departments and also with other organizational units and divisions. The central position of EAPD department that is responsible for R&D projects makes the importance of visibility and communication absolutely highest. Along with these two attributes, the financial success and benefits generated from these projects is central.

There are many books, resource papers written about project portfolio management. Nowadays, more than 100 documented portfolio selection methods can be found. However, none of them seems to be dominant and problem-free. One problem is that everybody sees portfolio management a little differently.

Considering emerging needs to improve the competitiveness and profitability of the company and the facts aforementioned, the research problem and objectives were identified and developed.
Portfolio management is one of the most challenging decision-making problems in modern business (Cooper et al., 1997, 2001, 2006). First, it deals with future events, and the information used for the decisions is uncertain. Second, the environment is dynamic; the status of the portfolio continuously changes and new information becomes available. Third, investments in the portfolio are at different stages of completion, making comparisons of estimated value of investments difficult. Finally, resources to be allocated across investments are limited; funding one project may require taking resources away from another.

Levine (2005) argues that project portfolio management functions as a tool for positioning in a scenario of fierce competition because proper evaluation and analysis of the projects are based on their potential for value creation.

Project portfolio management enables companies to optimize their R&D investments in order to create value for customers. Cooper et al., (1997, 2001, 2006) states that portfolio management treats the financial resources of the company with a focus on return on investment, appropriate balance of the portfolio and strategic alignment of the portfolio with the business objectives. This allows for a better mix of projects and more efficiency in the creation of new products. It is crucial that companies adopt project portfolio management when dealing with new product initiatives.

### 1.2 Research Question

To what extent is project portfolio management implemented in the Company, and how can project portfolio management make a contribution to successful new product project development?

### 1.3 Research Objectives

The main objective of the study is to investigate how project portfolio management can contribute to corporate efficiency and increased knowledge within the area.

The goals within the study are:

- To describe the features of project portfolio management;
- To investigate if the theoretical framework of project portfolio management has empirical support from evidence in the company and to what extent;
- To identify the organizational needs and requirements for project portfolio management and present the reasons why project portfolio management is important for product development and innovation;
- To highlight the difficulties and challenges associated with the implementation of project portfolio management;
1.4 Resource Scope

The scope of this research is limited to answering the research question and providing input for the achievement of the objectives and goals of the study. The analysis will be based upon the results obtained from interviews with managers and PMO staff in the Company. The research will be conducted in two organizational units, Region A and Engineering and Product Development (EAPD).

The purpose of Region A is the overall accountability for business development, sales and operating profits in that region (UK, Asia, Central Europe). EAPD develops core products and generic systems to maintain the product portfolio in line with the Company Product Strategy. The purpose of the function is the provision of products to be applied in customer contracts by the Company Regions. The qualities of project management of R&D projects in the EAPD department have a direct impact on the success of Region A projects due to multiple dependences. The products delivered by EAPD department usually undergo certain customizations in Region A projects in order to satisfy and meet specific customer requirements. However, project types, organization context and governance organization are different and consequently, we have dissimilar application of processes, tools and techniques (methods) in these two organizational units.

The PMO and Project Management are organized separately in each of these units. These distinctions made these units attractive for the research undertaken and they were determining factors when making the choice of units for the research.

The interviews were conducted in both areas and the results were compared and used for the final findings and conclusions.

Assumptions of this report are that all managers and other representatives who were interviewed have been involved in project portfolio management and are aware of the tools and techniques (methods) used in the field as well as that their responses were candid at all times.

1.5 Target group

- Senior, executive and line managers
- Project managers, especially for new product and innovation projects
- PMO departments
- Other part of the Company
- Different companies working with new product and innovation projects
- Other companies within the same field

Since the degree project only include recommendation for the work that has to be done in order to demonstrate the importance of applying project portfolio management by highlighting their attributes, it is impossible to define in advance what the consequences of this project would be for the target group.
1.6 Expected Results and Usage

The thesis will advance my knowledge of management skills in the specific area chosen and will help in discussing recent research work performed in this field. It may also be useful in pointing out future investigations which may be undertaken in the company. I hope also that my involvement in this area in the Company will continue after completion of the thesis. After investigation of this degree thesis, the following results are expected.

1.6.1 Results

- A better understanding of project portfolio management in general
- A better understanding of requirements needed for appropriate implementation of project portfolio management
- Common challenges and difficulties in project portfolio management

1.6.2 Usage

The results may be helpful for managers in better understanding the advantages of project portfolio management in a project-driven organization with R&D projects.

The results may also be helpful in better understanding the qualities that project portfolio management imparts to an organization.

1.7 Outline of the Thesis

CHAPTER 1 INTRODUCTION: In this chapter the introduction of the thesis and research background is presented. This chapter also briefly explains about the research purpose and the research question, followed by the nature and scope of study, and finally an outline of the thesis will be presented.

CHAPTER 2 LITERATURE REVIEW: This chapter will provide an in depth study of the literature on the project portfolio management. The literature study has been divided into several areas. Firstly, the difference between project, program and portfolio management is clarified. Furthermore, a distinct explanation of what project portfolio management is given. In addition, this chapter also focuses on the major components of project portfolio management as processes, tools, governance and technique (methods).

CHAPTER 3 RESEARCH METHODOLOGY: The chapter presents how the study was designed and conducted including explanations regarding the research strategy and the research approach used to collect the data. Further, it explains the steps which led me to discover the main problems. This is a qualitative study and I do believe it has a practical value.
CHAPTER 4  DESCRIPTION OF THE COMPANY: In this chapter, facts and details about the company are given in order to provide readers with an overview of the company, and organizational context of the organizational units (EAPD and Region A) that are the targets of the case study. Moreover, a description of products, main processes and major tools is also added so as to give a full picture of the nature of the business.

CHAPTER 5  FINDINGS AND DISCUSSIONS: This chapter presents the results that are obtained from the analysis of case study and semi-structured interviews. The replies from the respondents helped me to understand to what extent project portfolio management is applied in two organizational units in the Company and its contribution to successful new product project development. Challenges and difficulties in implementation of project portfolio management were also analysed and presented.

CHAPTER 6  CONCLUSIONS AND RECOMMENDATIONS: The conclusion of the research, limitations of the study, and recommendations for future research will be presented in the final chapter. Here the reader will be able to understand how the research question and purpose of the study have been answered. The conclusion also shows possibilities of testing the theory in practice and makes suggestions for further improvements.
2 LITERATURE REVIEW

This chapter will provide an in depth study of the literature on the project portfolio management. The study of the literature has been divided into several areas. Firstly, the difference between project, program and portfolio management is clarified. Furthermore, a distinct explanation of what project portfolio management is given. In addition, this chapter also focuses on the major components of project portfolio management as processes, tools, governance and technique (methods).

Levine (2005) states in the introduction of his book, “The emergence of PPM as a recognized set of practices may be considered the biggest leap in project management technology since the development of PERT and CPM in the late 1950s.”

Project portfolio management is critical for decision making, governance, and to ensure that business objectives are supported by the right set of projects whereas project management is critical to ensure that budget, resource allocation, activity and work are accurate and delivered on time. It appears clear that project portfolio management differs significantly from management of individual projects and programs. The development of project portfolio management starts with projects and thus each framework will be discussed in the next two chapters.

2.1 Project Management

According to PMI (2006, p.4) a project is a “temporary endeavour to create a unique product, service, or results and it lasts for a certain period of time” i.e., a project is unique and is of definite duration. Scope, Cost and Time are major elements; Quality is ultimately affected by the balance between these three elements. Projects can be seen as parts or “components” of the portfolio and hence it is important to understand the relationship between them.

Highlighted by Levine (Levine, 2005, p.464) and described by Cohen et al., (2000) the project refers to three elements called triple constraints: Outcome, Cost and Schedule/Duration. The triple constraints provided criteria for evaluation options for project decision-making. Thus, the triple constraints solved problems for both the project manager and upper management. Normally, if the feature does not satisfy the three criteria or if extensions are not granted, then it is rejected.

The project management process begins with the initiation of a project, followed by planning, execution and control, and closing processes. The Figure 1 below illustrates this process: (PMI, 2000).
Figure 1: Project Management five processes

Relaying on triple constraints caused project managers to chase after the wrong goal, satisfying constraints rather than satisfying the customer. Something is nevertheless delivered by the deadline, but it is not really what the customer wants. Consequently, lower customer acceptance leads to lower market sales and organization profit. Since something was delivered somewhere near the budget, the project was often considered a success, even if the project outcome was a failure. Obviously change was needed. Future project managers need a longer-term business orientation that takes into account project contribution to business results. That is why we have an extension of the project management discipline to portfolio management. The portfolio combines a) the organization’s focus of ensuring that projects selected for investment meet the portfolio strategy b) the project management focus on delivering projects effectively and within their planned contribution to portfolio.

Figure 2 below describes the different aspects concerning focus, scope, communication and organization between project portfolio management, program management and project management.

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Project Portfolio Management (PPM)</th>
<th>Programme management</th>
<th>Project management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focus</td>
<td>Deliverables linked to strategic objectives</td>
<td>Process to create deliverables</td>
<td>Deliverables</td>
</tr>
<tr>
<td>Scope</td>
<td>Selects, prioritises and optimises entire PP</td>
<td>Multiple-project and interdependencies</td>
<td>Single project</td>
</tr>
<tr>
<td>Communication</td>
<td>Across the business</td>
<td>Among projects</td>
<td>Within a project</td>
</tr>
<tr>
<td>Organization</td>
<td>PPMT</td>
<td>PMO</td>
<td>Project team</td>
</tr>
</tbody>
</table>

Figure 2: PPM, program and project management relationship model (Rajegopal et al., 2007, p.37)

2.2 Program Management

According to PMI (2006, p.6), “a program is a group of related projects managed in a coordinated way to obtain benefits and control NOT available from managing them individually. Programs may include elements of related work outside of the scope of the discrete projects in the program. Some projects within a program can deliver useful incremental benefits to the organization before the program itself has completed.”
Program management may provide a layer above the management of projects and focuses on selecting the best group of projects, defining them in terms of their objectives and providing an environment where projects can be run successfully.

The key difference between a program and a project is the finite nature of a project - a project must always have a specific end date, else it is an ongoing program.

There are two different views of how programs differ from projects. On one view, projects deliver outputs, discrete parcels or "chunks" of change; programs create outcomes. On this view, a project might deliver a new factory, hospital or IT system. By combining these projects with other deliverables and changes, their programs might deliver increased income from a new product, shorter waiting lists at the hospital or reduced operating costs due to improved technology.

The second view is that a program is nothing more than either a large project or a set (or portfolio) of projects. On this view, the point of having a program is to exploit economies of scale and to reduce coordination costs and risks. The project manager’s job is to ensure that their project succeeds. The program manager, on the other hand, may not care about individual projects, but is concerned with the aggregate result or end-state. ([http://en.wikipedia.org/wiki/Program_management - cite_note-2#cite_note-2](http://en.wikipedia.org/wiki/Program_management - cite_note-2#cite_note-2))

Projects are typically governed by a simple management structure. The project manager is responsible for day-to-day direction whereas a business executive and sponsor are accountable for ensuring that the deliverables align with business strategy.

Programs require a more complex governing structure because they involve fundamental business change and expenditures with significant bottom-line impact. In fact, in some instances their outcomes determine whether the enterprise will survive as a viable commercial/governmental entity.

Programs as well as projects are parts or “components” of the portfolio. As a matter of fact, the major components of a portfolio are projects and programs.

### 2.3 Portfolio Project Management

In the last forty-five years, the era of modern project management, the focus of project management was on successfully completing projects, delivering project content, and satisfying project stakeholders. A significant attention is paid to issues of schedule, resource use, cost, and quality.

While those of us in the project management discipline were joyful when we helped to achieve project management success, we were dismayed to learn that project success did not always equal business success.

Levine gives the following descriptions of the above mention situation. Across the hall from PMO, senior operation personnel were often disconnected from the projects scene “Why”, they
would ask, “are so many projects not contributing to the firm’s bottom line? “Why,” they would query, “are they critical with strategic objectives?” They searched to find the “value” in these projects. Across the hall in the PMO, they would ask, “What strategic objectives?’ “Value?” “That is not in our purview. Is it not enough to bring the project in on schedule and within budgeting? How can we perform as well and still fail to produce the results that senior management demands?” (Levine, 2005).

Levine continued by claiming that the schism was even greater than that. What about projects that do not make it to the end? Or the projects that do make it all the way through but deliver an unsuitable product? Finally, we have begun to question whether the projects should have been approved or continued past a point of limited value. So it is time to enter the era of postmodern project management, or what we now call project portfolio management (Levine, 2005).

The challenges that these bring have been compounded by the drive toward shorter product life cycle, customer involvement, and increased scope and complexity of inter-organizational relationship. Due to these tremendous changes the nature of the organizational focus has been changing by moving focus from the project to a broader business context. Thus, there is a clear difference between project- and business- oriented people within these organizations.

We are not only looking for projects that are managed well but also for projects that are right for the firm. Project portfolio management should form a partnership between the project-oriented people and the business-oriented people, represented by the governance council.

The project-oriented people are focused on budget, time and deliveries that are still important and a gauge of project health but they do not always reflect the project’s true impact on the business.

The business-oriented people are focused on the terms that reflect how the project is contributing to the larger set of objectives of the enterprise. How is the project contributing to growth, competitive advantage, revenue and cash flow, effective use of all resources, and key strategic initiatives? The focus is more on benefits, revenue, and return on investment than on costs. The project end date may not be as important as the window of opportunity.

2.3.1 What is Project Portfolio Management?

According to PMI (2006) “The PPM is the management of collection of projects and programs in which a company invests to implement its strategy in order to maximize value.”

Cooper et.al. (1997) defines project portfolio management “A dynamic process, whereby a business’s list of active new product (and R&D) projects is constantly updated and revised. In this process, new projects are evaluated, selected and prioritized; existing projects may be accelerated, killed or de-prioritized; and resources are allocated and reallocated to the active projects.” (Cooper et.al., 1997, p.17)
Cooper et.al. (2001, p.27) states that portfolio management is used to select a portfolio of new product development projects to achieve the following goals:

- Maximize the value of the portfolio;
- Seek the right balance of projects, thus achieving a balanced portfolio;
- Create a strong link to strategy, thus: the need to build strategy into the portfolio;

All components (projects, programs) of a portfolio exhibit certain common features (PMI, 2006, p.5):

- They represent investments made or planned by the organization;
- They are aligned with the organization's strategic goals and objectives;
- They typically have some distinguishing features that permit the organization to group them for more effective management;
- The components of a portfolio are quantifiable; that is, they can be measured, ranked and prioritized;

The authors, in the PMBOK, depict the project management context as follows:

“Project management exists in a broader context that includes program management, portfolio management and project management office. Frequently, there is a hierarchy of strategic plan, portfolio, program, project and subproject, in which a program consisting of several associated projects will contribute to the achievement of a strategic plan.”

The important factor to take from this extract is the recognition of a hierarchy linking strategy to projects. Figure 3 illustrates the hierarchical linkage.

![Figure 3: The hierarchical linkage](http://pmstudent.com/linking-business-strategy-to-project-strategy)
2.4 Project Portfolio Management Framework

The major components of the project portfolio management framework are: strategy, processes, governance and tools and techniques (methods).

2.4.1 Strategy

*Strategy without tactics is the slowest route to victory. Tactics without strategy is the noise before defeat.* Sun Tzu, the great Chinese general, The Art of War c. 500 B.C.

PMI sees project portfolio management as the process whereby projects are vehicle, and project management is the discipline that can bridge the gap between strategy and the realization of its related goals (PMI, 2006).

One of three major goals in portfolio management, according to Cooper et.al., (2001, p.27) is strategic alignment and thus it is very important to shed a little light on “strategy”.

This word *strategy* includes words such goal, objective, plan and team. There is no single, definitive definition of strategy. In truth, it does not matter which words we use to define it; what is key is that all members of an organization have a clearly articulated and shared understanding of the elements below.

"Competitive strategy is a combination of the ends (goals) for which the firm is striving and the means (policies) by which it is seeking to get there.” (Levine, 2005, p.138)

When you have each of the following items, consider that you have a set of strategies:

- A position or mission comprising set of products, services, customers, markets, geographies, channels, technologies (*ends*)
- A set of quantifiable goals (*ends*)
- Overarching approaches by which you will achieve the ends (*means*)
- Specific plans to apply those means and resources to achieve the ends (*project portfolio management*)

Assuming that leadership has identified the mission, goals, and strategies, the critical next level of details is identification of specific projects that will carry out the strategies. These projects become candidates for inclusion in the organization’s project portfolio. This map may be referred to as the strategic plan.

PMI (2006, p.7) shows the link between organizational strategy and project portfolio planning system depicted in Figure 4 and explains that execution of the strategy requires the application of strategic management processes, systems, and tools to develop and define high level operation planning, portfolio planning and their management.
Figure 4: Organizational Context of Portfolio Management (PMI, 2006, p.7)

Morris and Jamieson (2005) and Archibald (2003) describe a link between corporate strategy, portfolio, programs and projects in Figure 5 and Figure 6 as the logical sequence of the movement of corporate business strategy from top level to individuals i.e., the strategy articulated at the SBU (strategic business unit) level and then transformed to take the form of portfolio, programs and projects.
Just because a project supports a strategy does not guarantee it a pass into the project portfolio. The project is still competing with other candidates for the limited resources of the organization and thus must go through the organization’s standard project portfolio evaluation process. Among the criteria by which the projects will be evaluated is the degree of impact the project has on the organization’s strategies.

The sum of the individual strategy impact provides an overall project value score.
Certain critical data must be made explicit and communicated to all decision makers. One is the capacity of the organization. The most important is to source the most important and critical projects or to narrow the scope of the strategy.

2.4.2 Project Portfolio Management Governance

2.4.2.1 Portfolio Management and Organizational Governance

According to PMI “Governance is the act of creating and using a framework to align, organize and execute activities in a collectively coherent and intelligible manner in order to meet goals”. (PMI, 2005, p.8)

Portfolio management is one of several governance methods used within organizations and it is included as an integral part of organizational governance.

Organizational Governance establishes the limits of power, rules of conduct, and protocols of work that organizations can use effectively to advance strategic goals and objectives and to realize anticipated benefits. Figure 7 illustrates relationships within the organization, and all play critical, interrelated roles.

![Figure 7: Governance Structure (PMI, 2006, p.8)](image)

2.4.2.2 Portfolio Management and Operations Management

“Operations” is a term used to describe day-to-day organizational activities. This involves processes that are not necessarily project-specific. However, processes used by operational management are often outcomes of the execution of portfolio components (PMI, 2006). Both the operation and project aspects of an organization must be considered in portfolio management. The operational side of the organization uses recurrent activities and operations management processes that facilitate effective high level planning and management whereas the project side of
the organization uses program/project management processes that enable efficient project planning and implementation activities.

The following examples illustrate the relationship of operation management to portfolio management (PMI, 2006, p.10):

**Finance**

A financial function will monitor portfolio budgets, compare project spending with the allocation budget, and examine benefits realized; ensuring that financial plan adjustments are made and projected savings are taken into account.

**Marketing**

Market analysis, benchmarking, and research play a significant role in the portfolio management process. An organization’s portfolio components are driven by such considerations as market opportunity, platform development, support functions, regulatory obligations, or operational requirements. Input from the marketing function is required for some of the strategic decisions that dictate criteria to be used in selecting and managing components.

**Corporate Communication**

Since portfolio management provides key capabilities for achievement of an organization’s strategy, there may be a major focus at the executive level both on assembling and on communicating detailed information on the progress of major objectives and impacts of the components, as well as any changes to previously communicated plans. Various portfolio events or milestones need to be communicated both inside and outside the organization.

**Human Resource Management**

Enterprise resource planning can identify the skills and qualifications needed for success. Skilled resources will be then become available “in the pool” for placement into programs and projects or for related work.

**2.4.2.3 Project Portfolio Management Governance**

Governance simply means good, transparent decision making, and improving project governance is accomplished by accurately communicating current and future project performance to management in real time. Central to project portfolio management governance is to provide a structured environment for deciding which projects are important to the business, and to create project portfolio management team (PPMT), (Rajegopal et al., 2007).

Project portfolio management is a way of facilitating the integration of several critical enterprise functions (Levine, 2005). Without project portfolio management, the business of managing projects is conducted with the sense that the ultimate objective is to achieve project success. This is one reason why it is very important to involve other parts of organization in project portfolio
management team/governance. For example, the projects that comprise the project portfolio management have a significant impact on the financial condition of the firm. Most projects incur costs during their execution and generate revenue. Today’s atmosphere of regulation demands that financial reports represent a current and true picture of the asset value of projects. Therefore, project portfolio management has to integrate with the financial function as well as with other functions of the enterprise (operations).

Project portfolio management governance is designed to distribute various types and levels of responsibility among all internal and external groups involved in the project decision making process as presented in Figure 8 below:

<table>
<thead>
<tr>
<th>PPMT Internal Groups:</th>
<th>PPMT External Groups:</th>
<th>The PPMT include:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Board of directors</td>
<td>• Shareholders</td>
<td>• PPMT Sponsor</td>
</tr>
<tr>
<td>• Senior executives</td>
<td>• Regulators</td>
<td>• PPMT Leader</td>
</tr>
<tr>
<td>• Managers</td>
<td>• Customer</td>
<td>• Functional Advocate</td>
</tr>
<tr>
<td>• Workers</td>
<td>• Suppliers</td>
<td>• Project Advocate</td>
</tr>
</tbody>
</table>

Figure 8: Project Portfolio Management Team (Rajegopal et al., 2007, p.43)

The project portfolio management team intersects with the executive stream, allowing the organization to make strategic “go/kill/hold/fix” decisions on key projects in the context of managing a balanced portfolio of investment, as shown in Figure 9 below.
Each role in the project portfolio management team should have a clear and specific description. Figure 10 below illustrates typical role based challenges of PPMT.
<table>
<thead>
<tr>
<th>ROLE</th>
<th>CHALLENGES</th>
</tr>
</thead>
<tbody>
<tr>
<td>CFO/CIO/CTO</td>
<td>Cope with reduced budgets and increased expectations</td>
</tr>
<tr>
<td></td>
<td>Meet productivity goals consistently</td>
</tr>
<tr>
<td></td>
<td>Align business goals and projects</td>
</tr>
<tr>
<td></td>
<td>Use reliable measures to determine whether teams are really working on</td>
</tr>
<tr>
<td></td>
<td>the “right” projects</td>
</tr>
<tr>
<td></td>
<td>Put out fires and cut costs that prevent proactive planning</td>
</tr>
<tr>
<td>PORTFOLIO/PROGRAMME</td>
<td>Prioritise initiatives, resources, and assets across the portfolio</td>
</tr>
<tr>
<td>MANAGER</td>
<td>Assess and communicate portfolio, programme and project status</td>
</tr>
<tr>
<td></td>
<td>Identify and manage inter-project dependences</td>
</tr>
<tr>
<td></td>
<td>Ensure consistent processes across projects</td>
</tr>
<tr>
<td></td>
<td>Optimise key resources across projects</td>
</tr>
<tr>
<td>PROJECT/RESOURCES</td>
<td>Manage the project delivery process</td>
</tr>
<tr>
<td>MANAGER</td>
<td>Manage project outcomes and assess project status</td>
</tr>
<tr>
<td></td>
<td>Manage scope, planning, verification and change</td>
</tr>
<tr>
<td></td>
<td>Manage resource demand and supply</td>
</tr>
<tr>
<td></td>
<td>Maximise resource utilisation and minimise bench time</td>
</tr>
<tr>
<td>TEAM MEMBER</td>
<td>Understand day-to-day project workloads</td>
</tr>
<tr>
<td></td>
<td>Input project timesheets and expenses</td>
</tr>
<tr>
<td></td>
<td>Access project documentation</td>
</tr>
</tbody>
</table>

Figure 10: Typical role based challenges (Rajegopal et al., 2007, p.48)

Project portfolio management processes, responsibilities, cycle including the presentation of data and decision flow are presented in Figure 11 below. At the top is a team composed of executives from across functions. This team establishes organization-wide allocation of assets among investment categories in line with strategy and identifies overarching goals for the portfolio. Portfolio managers determine specific projects to launch, monitor, and measure. Based on performance measurements and external conditions, the team of executives validates or redirects the investment strategy. That team provides also strategic investment direction, funding and performance requirements and review to all portfolio managers in the enterprise. (Levine, 2005, p.222)
Figure 11: PPM Processes, Responsibilities, and Cycle – PPM Data and Decision Flow (Levine, 2005, pp.220-221)
2.4.2.4 Organizing Portfolios with an Organization

The concept of portfolio according to Rajegopal et al., (2007) and PMI (2006) is shown in Figure 12 which explains a portfolio as a collection of projects and/or programs and other work that are grouped together to facilitate the effective management of work and to meet strategic objectives of the business.

![Portfolio Sub-structure / Portfolio Concepts (PMI, 2006, p.5)](image)

Figure 12: Portfolio Sub-structure / Portfolio Concepts (PMI, 2006, p.5)

There are different ways how the portfolios can be organized within an organization. One way can be related to the domain or scope of organizational coverage, that is, business groups, units, divisions, departments and teams. Domains are spawned by business strategy and they enable projects to be grouped based on strategic significance to the organization, as in Figure 13 below.

- Strategic/enterprise
- New products
- Infrastructure
- Maintenance
- Cost reduction
- Organization-wide portfolio
- Divisional and departmental portfolio
- Multiple portfolios per organization
- Smaller portfolios based on scope of work
- Mandatory
- Strategic
- Business support
- Experimental
- Infrastructure
- Maintenance
- Cross-organization

Figure 13: Different ways to organize a portfolio (Rajegopal et al., 2007, pp.99-104)

2.4.3 Project Portfolio Management Process

According to PMI (2006, pp.23-41), project portfolio management processes are aggregated into two groups, 1) aligning group, and 2) monitoring and controlling group, as presented in Figure 14 below:
Aligning Process Group – how projects will be categorized, evaluated, and selected for inclusion, and managed in the portfolio. The processes within this group are most active at the time the organization refreshes its strategic goals and defines short-term budget and plans for the organization.

Monitoring and Controlling Process Group – how to review performance indicators periodically for alignment with strategic objectives. The purpose of this process group is to ensure that the portfolio as a whole is performing to predefined criteria determined by organization as ROI and NPV.

Portfolio management is accomplished through processes, applying knowledge, skills, tools and techniques (methods) based on received inputs and generating outputs PMI (2006). The standard presumes that the organization has a strategic plan, along with mission and vision statements as well as strategic goals and objectives.

According to Levine, there are five distinct phases in the project portfolio process, as Portfolio Inventory, Portfolio Analysis, Planning, Tracking and Review and Re-planning. Other authors have used similar divisions of the processes. Nevertheless of the divisions and names of the phases or processes, they are agreed on that the project portfolio process is dynamic, iterative, and ongoing and must be managed artfully depending on project life cycles as well as organizational issues, like budget cycle (Levine, 2005).

However, I based my description of the project portfolio process on PMI (2006, pp.23-41) because it illustrates the process in a chronological way that can be applied within any portfolio types and organizations, see Figure 15 below. They even provide the mandatory information regarding inputs and output for each stage and possible tools, techniques (methods) that utilities the portfolio decisions.
Figure 15: Project portfolio management processes with inputs, outputs and tools and techniques / methods (the figure drawn by myself based on the material from PMI, 2006, pp.23-41)
2.4.3.1 Aligning Process Group

**Identification**

The purpose of this process is to create an up-to-date list, with sufficient information, of ongoing and new projects that will be managed through portfolio management. Key activities within this process include:

- Compare ongoing projects and new project proposals with predetermined project definition and related key description;
- Reject projects that do not fit within the predetermined definition;
- Classifying identified projects into classes, such as project, program, portfolio and other works;

**Categorization**

The purpose of this process is to group identified projects into relevant business groups to which a common set of decision filters and criteria can be applied for evaluation, selection, prioritization, and balancing. Key activities within this process include:

- Identify strategic categories based on the strategic plan;
- Comparing identified projects to the categorization criteria;
- Grouping each project into only one category;

**Evaluation**

This is the process for gathering all relevant information to evaluate projects, with the purpose of comparing them in order to facilitate the selection process. Key activities within this process include:

- Evaluating projects with a scoring model comprising weighted key criteria;
- Producing graphical representations to facilitate decision-making in the selection process;
- Making recommendations for the selection process;

**Selection**

This is the process necessary to produce a short list of projects based on the evaluation process recommendation and the organization’s selection criteria. Key activities within the process include:

- Selecting projects based on the evaluation results;
- Comparison to selection criteria;
- A final result is a list of components for prioritization;
Prioritization

The purpose of this process is to rank projects within each strategic or funding category (e.g., innovation, cost savings, growth, maintenance, and operations), investment time frame (e.g., short, medium, and long-term), risk and return profile, and organizational focus (e.g., customer, supplier, and internal) according to established criteria. Key activities within this process include:

- Confirm the classification of projects in accordance with predetermined strategic categories;
- Assigning scoring or weighting criteria for ranking projects;
- Determining which projects should receive highest priority within the portfolio;

Portfolio Balancing

The purpose of this process is to develop the portfolio project mix with the greatest potential, to collectively support the organization’s strategic initiatives and achieve strategic objectives. Key activities within this process include:

- Adding new projects that have been selected and prioritized for authorization;
- Identifying projects that are not authorized based on the review process;
- Eliminating projects to be suspended, reprioritized, or terminated based on the review process;

Authorization

The purpose of this process is to formally allocate financial and human resources required to either develop business cases or execute selected projects and to formally communicate portfolio-balancing decisions. Key activities within this process include:

- Communicating portfolio balancing decisions to key stakeholders, both for projects included and those not included in the portfolio;
- Authorizing selected projects and inactivating or terminating projects of the portfolio;
- Reallocating budget and resources for inactive and terminated projects;
- Allocating financial and human resources to execute selected portfolio projects;
- Communicating expected results (e.g., review cycle, timeline performance metrics, and required deliverables) for each selected project;

2.4.3.2 Monitoring and Controlling Process Group

Portfolio Reporting and Review

Aim to helping the organization to effectively monitor its portfolio to ensure that it is still balanced as a whole and that its individual projects stay aligned and perform as expected.
Strategic Change

The purpose of this process is to enable the portfolio management process to respond to changes in strategy.

2.4.3.3 Defining prioritization criteria

Defining the right prioritization criteria will support and enhance the alignment of project work with the business strategies within the organization. It is intended to provide a starting point from which to establish a project prioritization process. Prioritization is the process in which some project work is given preference over other project work, based on specific prioritization criteria which represent the business strategies.

According to Rajegopal et al., (2007, pp.156-175) the following steps are recommended when engaging in a prioritization process:

- Identifying the business strategies:
- Defining strategy related criteria
- Defining proposal content requirements
- Establishing weighted values of the criteria
- Defining the project scoring model

Identifying the business strategies

As a strategy is to implement a vision and a project is to implement a strategy. A basic understanding of business strategy fundamentals must exist so as to put the portfolio in the proper context and thereby support the development of an effective portfolio management process. The strategy defines the direction from which actions are measured for their contribution to organizational benefit. Upon discovering the strategy, the PPMT must document it findings, as this serves to determine the criteria against which to assess projects and their relative value.

Defining strategy related criteria

A criterion is standard on which a judgment or decision may be based. The prioritization criteria establish a tangible relationship between the proposed work and the business strategies of the organization. Each element of the business strategy must correspond with a prioritization criterion, as shown in Figure 16 below.

<table>
<thead>
<tr>
<th>Business strategy</th>
<th>Prioritization criterion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expand globally</td>
<td>Market penetration</td>
</tr>
<tr>
<td>Be profitable</td>
<td>Return on investment (ROI)</td>
</tr>
<tr>
<td>Maintain our financial position</td>
<td>Up-front investment</td>
</tr>
<tr>
<td>Leverage success, without leveraging assets</td>
<td>Uses existing technology</td>
</tr>
</tbody>
</table>
As criteria are highly dependent on strategy, the PPMT must understand that different strategies suggest different criteria. Typically, financial criteria are of ultimate importance for making resource allocation decisions; however, broader strategic, commercial and technical values are significant as well. Typical criteria are shown in Figure 17 below.

When defining the criteria, the focus must be on equity in the representation of business strategies. A well set criterion allows for differentiation between “clear winners” and “obvious losers”. The prioritization criteria may undergo several rounds of reconsideration and validation as the PPMT’s understanding of the process grows.

<table>
<thead>
<tr>
<th>Intangible</th>
<th>Tangible</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strategic</strong></td>
<td><strong>Commercial</strong></td>
</tr>
<tr>
<td>Support of core competences</td>
<td>Clear market need</td>
</tr>
<tr>
<td>Synergy with other projects</td>
<td>Right market timing</td>
</tr>
<tr>
<td>Consistency with executive leadership/business intuition</td>
<td>Improves competitive positioning</td>
</tr>
<tr>
<td>Supports corporate reorganization</td>
<td>Obvious value proposition</td>
</tr>
<tr>
<td>Meets shareholder interests</td>
<td>Gains access to new markets (market penetration)</td>
</tr>
<tr>
<td>Matches corporate culture</td>
<td></td>
</tr>
</tbody>
</table>

**Figure 17: Project criteria (Rajegopal et al., 2007, p.162)**

**Defining proposal content requirements**

Based on the need to assess projects using the define prioritization criteria, the PPMT should determine what information is required about projects within each domain/portfolio. In many ways each portfolio may have its own unique informational requirements and the project information submitted to the PPMT should support the meeting of the relevant criterion.

**Establishing weighted values of the criteria**

The PPMT evaluates each criterion in relation to the other criteria and establishes a weighted value of each, indicating the relative significance of each criterion. The weight is defined as an assigned multiplier associated with each criterion for the purpose of quantifying the relationship between the various criteria. Weights of 0.5, 1.0, 1.5 (below norm, norm, above norm) are easier to assign as well as a scale 1-to-10. Weighting is not an exercise in how much more important
one criterion is than another; rather it is an exercise in identifying their relative strategic and business emphasis.

**Defining the project scoring model**

A scoring model is the system of rules and practices used to apply the prioritization criteria to all projects within a specific domain. A scoring anchor is the written description of the measurement applied to the numeric value of the scoring model. The weighted totals are tabulated for each project in the domain/portfolio. The project score on each prioritization criterion (1 to 5) is multiplied by the prioritization criterion weight (0.5, 1.0, and 1.5). It is best to adapt the scoring model so that it best meets the portfolio/domain needs. An example of the scoring model is shown in Figure 18.

<table>
<thead>
<tr>
<th>MARKET PENETRATION (weight: 1.5)</th>
<th>ROI (weight: 1.0)</th>
<th>UP-FRONT INVESTMENT (weight: 0.5)</th>
<th>USES EXISTING TECHNOLOGY (weight: 1.0)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1= No new markets</td>
<td>1= Negative ROI</td>
<td>1= Exceeds current budget</td>
<td>1= difficult to acquire</td>
</tr>
<tr>
<td>3= Growth in existing markets</td>
<td>3= Breakeven</td>
<td>3= Within current budget</td>
<td>3= Easily acquired</td>
</tr>
<tr>
<td>5= Intro to target market(s)</td>
<td>5= positive ROI</td>
<td>5= None required</td>
<td>5= No new technology</td>
</tr>
</tbody>
</table>

Figure 18: Creating a portfolio scoring model (Rajegopal et al., 2007, p. 165)

Each domain /portfolio will have its own scoring model and it is recommended to evaluate each scoring model individually to ensure that:

- Each model reflect the portfolio’s /domain’s role;
- The prioritization criteria are clearly understood;
- The prioritization criteria is appropriately weighted for the domain /portfolio;
- The rating scale is defined;
- Clear scaling anchors are set to provide meaning to the ratings;
2.4.4 Project Portfolio Management Tools and Techniques (Methods)

Project portfolio management is a set of processes, usually supported by a set of tools/software (Levine, 2005). A project portfolio management tool is above all a business tool, not a project management tool and therefore should support a business interpretation of the project management process and should look to empower executives with information. Therefore the development and application of some new practices and tools are necessary. Likewise project portfolio management integrates traditional projects and business functions, and integration of the various project management and project portfolio management tools should be carried out. The traditional project management processes and tools have focused on managing projects but the project portfolio management practices and tools have to support project prioritization, selection but also maintaining the pipeline.

Project portfolio management is a complex and multifaceted task. Management judgment is required but appropriate tools also help. In selecting the tools to use it is vital to remember that their role is to help managers come quickly to decisions that are not only good but can also be justified and communicated. Finally, managers must remember that different tools are appropriate at different stages in the life of a development/innovation project or indeed any project. In the early stages judgments may be mostly intuitive and only later, as the facts clarify, will full financial analysis be helpful (Goffin, 2005).

The choice of tool depends on the type of projects as well as the stages that projects are in a portfolio, as shown in Figure 19 and Figure 20 below.

![Figure 19: Appropriate validation methods for different types of projects (Goffin, 2005)](image-url)
The financial tools have clear limitations at the beginning of projects due to the lack of reliable information. The limitation of financial projections has led companies to look for more broadly based approaches to project portfolio management in which financial data may be included, but only as one of several factors. The argument is that where financial figures are considered unreliable one can improve the project selection process by including other criteria that are known to be well-correlated with the success of new products. The simplest set of such generic factors for a new product might include market size and growth rate; level of competition; how well the project fits with company strategy and so on.

According to Goffin (2005), the elements of a good portfolio tool are:

Valuation criteria:

- Each individual project should represent good value to the organization.
- The collection of projects must make efficient use of the resources available. Where projects compete for scarce resources it must be clear how the allocation between them is to be made.

Portfolio Balanced Criteria:

- High-risk projects may have to be balanced to low-risk once to ensure that the overall exposure to risk is acceptable. The organization may also want to maintain a balance of projects over time and possible across the areas of the business.
- The innovation portfolio must fit and respond to the company’s strategic needs. Periodically good projects may have to be delayed or aborted in favor of others in more strategically important parts of the business.
Management Criteria:

- The management process should be as open as possible.
- The information on which decisions are made should be collected with care, to minimize avoidable bias.
- When ongoing projects are cancelled, the process must ensure that staff motivation is retained.

Choosing a Valuation Method:

Every evaluation method has its strengths and weaknesses, and the choice of which to use depends on the level of uncertainty and the amount of choice open to managers as the project progresses. An NPV calculation is appropriate for a single-phase, relatively low-risk project. However, if there are many decisions points, ECV or a Monte Carlo simulation are more useful. Greater uncertainty demands an Internal Rate of Return calculation at least, or a switch from financial methods to a scoring system. It is often appropriate to use several methods to provide extra certainty.

The team that does this review must be in a position to take the necessary actions so it will generally be at a divisional or corporate level in order to have the scope and power to do the job. There is, however, some debate about whether portfolio reviews should generally be conducted together with those for individual projects, or separately. Cooper advocates the project reviews should be conducted at time required by the work program and not constrained to an artificial timetable. Hence portfolio reviews should be separated. However, good communication between the processes is essential; one would not wish to give a project the go-ahead at its project review only to have it axed by the portfolio process the next day. (Goffin, 2005)

Cooper et al., (2001) has described the portfolio tools in relation to the three major goals of portfolio management demonstrating that how the tools could help portfolio management in making a good-decision.

2.4.4.1 Goal 1: Maximizing Value of the Portfolio

Net Present Value (NPV) to Get Bang for Buck:

NPV is difference between the sum of the discount cash flows which are expected from the investment, and the amount which is initially invested. NPV is an effective way of expressing how much value a long term project investment will result in, and it has become an industry standard method.

Expected Commercial Value (ECV):

ECV seeks to maximize the expected value, or expected commercial worth of the portfolio, subject to certain budget constraints.

ECV= [(PV*Pcs –C)*Pts]*D
ECV = the expected commercial value  
PV = the present value of cash flow, after launch (this is strictly income stream; none of project cost – development, capital, and so on – have been subtracted from this stream)  
Pcs = the probability of commercial success (a number from 0 to 1.0)  
C = commercialization or launch cost remaining to be spent on the project  
Pts = the probability of technical success (a number from 0 to 1.0)  
D = development costs remaining to be spent  

The Productivity Index (PI):  
PI is a variant of the ECV method that considers risks and probabilities of projects; it shares many strengths and weaknesses. The PI tries to maximize the financial and economical value of the portfolio for a given resource constrains.  
PI = [ECV * Pts – R&D] / R&D  
ECV = the expected commercial value  
Pts = the probability of technical success  
R&D = the R&D costs remaining in the project  

Options Pricing Theory (OPT):  
OPT is a fairly new concept but some financial experts claimed to be the correct valuation method because they consider that NPV and DCF is “misused” and sometimes unfairly penalizes certain types of projects, especially high-risk projects. When the project is high-risk one.- that is when the probability of technical or commercial success is low and the cost to undertake the project are high then NPV and DCF considerably understate the true value of the project.  

Dynamic Rank-Ordered List:  
The advantage of this method is that it can rank-order projects according to several criteria concurrently, without being as complex and time-consuming as a full-fledged, multiple- criteria model. NPV, IRR, strategic importance of the project, probability of technical success can be some of the criteria.  

Valuation Methods: Scoring Model:  
Some of the more important success factors that are correlated with the probability of the new product are the following:  

- Having a unique, superior products  
- Targeting an attractive market  
- Leveraging internal company strength (products and projects, competencies, and experience in both marketing and technology).  

These strong predictors of success as tools should be used for selecting projects.
Check Lists as Portfolio Tools:

Some firms use checklists instead of scoring models at their review or Go/Kill meetings. The questions are similar in both methods but scoring procedure and end result are quite different. In a checklist method, the answers are yes/no. a single “no” answer is a knockout: It kills the project. The checklist are most effective at project review to weed out poor projects but they are not good for project prioritization, since there is no 0-100 total project score that facilitates rank-ordering projects.

Paired Comparison:

In this method, managers compare project ideas against each other, one pair at a time. Here the question, “If you had a choice, which of the two projects would you do?” There is discussion, and a consensus vote is reached on each pair. Projects are then rank-ordered according to the number of times they receive a “yes” vote in each paired comparison. This method is very useful at the very beginning of projects when almost no information is available.

2.4.4.2 Goal 2: Achieving a Balanced Portfolio

The new techniques, such as the increasingly popular bubble chart, are superb vehicle for presenting multidimensional data in intelligent, useful format. They are so impressive as to allow us to overlook the possibility that the data displayed may not sit on a solid foundation. The bubble-charts and Web forms as too simple and shallow to support the depth needed to analyze significant undertakings. Significant undertakings require in-depth business plan with market positioning, detail financial model, trade-offs studies, and competitive analysis.

Bubble Diagram:

The typical bubble diagram shows development process on two-dimensional X-Y plot. X-Y axes can be any dimension of interest, although some dimensions have proven particularly popular as fit with business or corporate strategy, “newness to market”, strategic importance to the business, reward based on financial expectations, competitive impact of technology, R&D cost to completion, managing risks (risk impact matrix).

Variants of Risk-Reward Bubble Diagram:

The most popular bubble diagram is the risk-return chart. About 44 percent of businesses with a systematic portfolio management scheme in place use this bubble diagram or one like it. One approach is to use a qualitative estimate of reward, ranging from “modest” to “excellent”. The argument here is that too heavy an emphasis on financial analysis can do serious damage, notable in the early stages of a project. The other axis is the probability of overall success (probability of commercial success times probability of technical success). In contrast, other firms relay on very quantitative and financial gauges of reward, namely, the probability – adjusted NPV of the project, resource breakdown and so on.
2.4.4.3 Goal 3: The Need to Build Strategy into the Portfolio

Linking Strategy to the Portfolios: Approaches

Strategic fit is the first and easiest to envision because it addresses the question: “Are all your projects consistent with your articulated strategy?” Many companies use these three approaches to deal with strategic alignment:

Top-Down Approach
This approach begins with the vision, goals, and strategy, and from this, new product initiatives and/or resource allocations are decided. Generally, there are two approaches.

Product Roadmap:
Product Roadmap answers to questions: “If this is our strategy, then what projects must we or should we do?” This approach goes a long way toward shaping the eventual development portfolio and the ultimate result is a series of product or platform development and their extensions on a time scale.

Strategic Buckets Model:
Strategic Bucket Model focuses more on resource allocation. It answers the questions: “If this is our strategy, then how should we be spending our development funds?” It starts with vision, goals, and strategy and then moves to setting aside funds or buckets of money destined for different types of projects.

Bottom-Up Approach
This approach begins with a set of opportunities in the form of new product proposals i.e., focuses on selection the best in light of the business’s strategy and goals.

Top-Down, Bottom-Up
This combination of the two approaches has merit because it overcomes deficiencies in both. It begins at the top, with strategy development, a product roadmap, and strategic buckets of money. It also proceeds from the bottom with a review and selecting of the best projects. The decisions from both approaches have to be reconciled via multiple iterations.

Balance score carding methods (BSC):

BSC method enables organizations to clarify their vision and strategy and translate them into action. It provides feedback around both internal business process and external outcomes in order to continuously improve strategic performance and results.

Monte Carlo Simulation:

Monte Carlo methods are a class of computational algorithms that rely on repeated random sampling to compute their results. They are used to model phenomena with significant
uncertainty in inputs, such as the calculation of risk in business. This method is most applicable in a huge portfolio with many and long projects there uncertainty is very high.
3 RESEARCH METHODOLOGY

The chapter presents how the study was designed and conducted including explanations regarding the research strategy and the research approach used to collect the data. Further, it explains the steps which led me to discover the main problems. This is a qualitative study and I do believe it has a practical value.

3.1 Research Strategy and Philosophy

Various research strategies have been identified in literature and choice of strategy will depend upon the research question, research objective, the amount of time and existing knowledge. According to Collis and Hussey (2003) classification, there are the following types of research: descriptive, analytical, predictive and exploratory.

**Descriptive** research uses ‘quantitative techniques to collect analyze and summarize data’ and **analytical** complements it by providing an in-depth understanding of the identified phenomena. Basically this kind of the resource is concerned with acquires and analyzes of numbers. **Predictive** research is founded on assumptions about future events when you do not have enough information to be certain i.e., with limited evidence. **Exploratory** research is usually applied when previous or no studies exist. Case studies fall in this category. Based on this classification my thesis can be classified to exploratory.

On the other hand, research strategy is presented by a **quantitative** and a **qualitative research**. The differences between strategies are related to a consideration of how a research could be conducted, what methodological assumptions are appropriate to a research.

The qualitative approach of a data collection, its analysis and interpretation presents by words. The approach has more narrative structure and can include a case-study design. This differs from a quantitative approach where a researcher puts focus on a survey and an experimental research and use numerical data to conclude a study. (Creswell, 2009)

A qualitative data has a meaningful way and allows a researcher to investigate a case by a real manner. A researcher can express his own meaning of a study. (Saunders et al., 2009, p. 482).

3.1.1 Qualitative Research

All research (whether quantitative or qualitative) is based on some underlying assumptions about what constitutes 'valid' research and which research methods are appropriate. In order to conduct
and/or evaluate qualitative research, it is therefore important to know what these (sometimes hidden) assumptions are.

Orlikowski and Baroudi (1991), following Chua (1986), suggest three categories in qualitative research based on the underlying research epistemology: positivist, interpretive and critical, see Figure 21 below.

Positivists generally assume that reality is objectively given and can be described by measurable properties which are independent of the observer (researcher) and his or her instruments.

Interpretive researchers start out with the assumption that access to reality (given or socially constructed) is only through social constructions such as language, consciousness and shared meanings. The philosophical base of interpretive research is hermeneutics and phenomenology (Boland, 1985). Interpretive studies generally attempt to understand phenomena through the meanings that people assign to them. Interpretive research does not predefine dependent and independent variables, but focuses on the full complexity of human sense making as the situation emerges (Kaplan and Maxwell, 1994).

Critical research focuses on the oppositions, conflicts and contradictions in contemporary society, and seeks to be emancipatory i.e. it should help to eliminate the causes of alienation and domination.

3.1.1.1 Modes of Analysis

Although there are many different modes of analysis in qualitative research, just three approaches or modes of analysis will be discussed here: hermeneutics, semiotics, and approaches which focus on narrative and metaphor. The common thread is that all qualitative modes of analysis are concerned primarily with textual analysis (whether verbal or written). All these three approaches can be treated as both an underlying philosophy and a specific mode of analysis.

Semiotics is primarily concerned with the meaning of signs and symbols in language. The essential idea is that words/signs can be assigned to primary conceptual categories, and these
categories represent important aspects of the theory to be tested. The importance of an idea is revealed in the frequency with which it appears in the text.

Narrative is defined by the Concise Oxford English Dictionary as a "tale, story, recital of facts, especially story told in the first person." There are many kinds of narrative, from oral narrative through to historical narrative. Metaphor is the application of a name or descriptive term or phrase to an object or action to which it is not literally applicable (e.g. a window in Windows 95). Qualitative research strategy, interpretative research method applying hermeneutics techniques for data collections and analysis is adopted in my theses.

Hermeneutics as a philosophical approach to human understanding, it provides the philosophical grounding for interpretivism. As a mode of analysis, it suggests a way of understanding textual data. The following discussion is concerned with using hermeneutics as a specific mode of analysis. Hermeneutics is primarily concerned with the meaning of a text or text-analogue (an example of a text-analogue is an organization, which the researcher comes to understand through oral or written text). The basic question in hermeneutics is: what is the meaning of this text?

"Interpretation, in the sense relevant to hermeneutics, is an attempt to make clear, to make sense of an object of study. This object must, therefore, be a text, or a text-analogue, which in some way is confused, incomplete, cloudy, seemingly contradictory - in one way or another, unclear. The interpretation aims to bring to light an underlying coherence or sense" (Taylor 1976, p.153).

The idea of a hermeneutic circle refers to the dialectic between the understanding of the text as a whole and the interpretation of its parts, in which descriptions are guided by anticipated explanations (Gadamer 1976, p. 117). It follows from this that we have an expectation of meaning from the context of what has gone before. The movement of understanding "is constantly from the whole to the part and back to the whole" (ibid, p. 117).

This thesis is a qualitative, interpretive study. It has described the development of trustworthiness and hence the quality of a hermeneutic phenomenological study by setting out the links between the theoretical principles of the methodology and the methods used. I consider that attention to this process has helped to bring out both the strengths and the limitations of the methodological approach.

3.2 Research Approach

The current research is being conducted through case study analyses of two organizational units where the data would be collected through semi-structured interviewees. These case studies are conducted at:

- EAPD organizational unit
- Region A organizational unit
To answer the research questions, there is a need to understand how the project portfolio management is applied in the organization. The steps of my reasoning are shown in Figure 22 below.

![Figure 22: Steps in the qualitative approach](image)

Data collection is carried through two major steps: 1) design case study 2) conduct case study (with semi-structure interview). After that, the analyses of the evidences are done through investigations and with a support from theory. Finally conclusion and implications based on evidence obtained are developed and presented at the end of the thesis.

### 3.3 Case Study

It is based on an in-depth investigation of a single individual, group, or event. Furthermore, a case study is a type of qualitative observation that means that it is concerned with the collection of ‘words’ and it is most commonly defined as the ‘examination of a particular event, institution or group’ ([http://en.wikipedia.org/wiki/Case_study](http://en.wikipedia.org/wiki/Case_study)).

Another important aspect in planning my research is whether to go for cross-sectional study which is snapshot taken at a particular time or to go for a longitudinal study which is representation of events over a given period of time (Saunders et al., 2007). Due to time constraint the research cannot be conducted over a longer period of time so I will perform cross-sectional studies. Such studies are usually conducted when researcher is interested in diverse answers (Bryman and Bell, 2003). Case study strategy will be used and data will be collected over a short period of time. This case study is undertaken at the Company.

My research is mainly focused on clarifying our understanding and to seeking insights of project portfolio management and its contribution to product project development, and highlighting challenges and difficulties that usually an organization faces when trying to implement project portfolio management.

By conducting a case study, I focus on exploration and description, not on the discovery of a universal, generalizable truth, nor do look for cause-effect relationships. Unlike more statistically-based studies which search for quantifiable data, the goal of a case study is to offer new variables and questions for further research. F.H. Giddings a sociologist in the early part of the century, compares statistical methods to the case study “on the basis that the former are concerned with the distribution of a particular trait, or a small number of traits, in a population, whereas the case study is concerned with the whole variety of traits to be found in a particular instance” ([http://writing.colostate.edu/guides/research/casestudy/com2a1.cfm](http://writing.colostate.edu/guides/research/casestudy/com2a1.cfm)).
3.4 Data Collection and Data Analysis

There are five types of data collected in case studies:

- Documents from different company’s data bases
- Interviews
- Direct observation
- Participant observation
- Artifacts

3.4.1 Interviews

I have decided to conduct my case study through interviews and observation. In order to obtain primary data through interviews, the researcher is faced with the choice between unstructured, semi-structured, and structured. According to Collis and Hussey (2003), in structured interviews, participants are read out a ‘pre-determined and identical set of questions’ in a specific tone of voice that avoids influencing the outcome of the results. In semi-structured interviews, the interviewer prepares a set of questions before hand, but the flow of the conversation ultimately determines which will be chosen. Finally, in unstructured interviews, informal conversations are carried out with the purpose of fully exploring a single topic.

In this case study, semi-structured interviews were conducted with managers and responsible people from key areas of the Company. The purpose of this type of interviews was to conduct ‘exploratory discussions to reveal and understand not only what and how, but also to place more emphasis on exploring the why’ (Saunders et al., 1997; p. 212). One of the objectives was to build on the explanations of phenomenon by the interviewees in order to formulate new knowledge on possible definitions and meanings for existing theory. An interview guide was previously prepared, with questions and topics that had to be covered. Because of the flexible nature of semi-structured interviews, respondents had the chance to provide insights according to the flow of the conversation. According to Saunders et al., (2000), semi-structured interviews have exploratory qualities that allow for the discussion of certain areas that can help better formulate and understand the nature of the research question. Saunders et al., (2000) also suggests that managers are more prone to being interviewed than to respond to long and complex questionnaires.

3.4.2 Observation

Qualitative observation can be seen as a study where the researcher is a part of that organization under a longer or shorter time (Holme & Solvang, 1997). Both interviews and observations are
considered as a very adequate method for the data collections as I have been engaged in project management and PMO area for many years.

Observation can be used with a form of meetings whereas interviews can be used to get an insight into the work of each person. There is a very high requirement on the researcher as she by seeing, hearing and asking will get an understanding about the subject (Holme & Solvang, 1997). The observation method is flexible both before and after the research unlike other resource methods that are characterized by determined hypothesis and procedures.

Holme & Solvang (1997) differs between Open and Hidden observation. The Open observation means that the individuals who are observed are aware of the observations and participations of the researcher. An ultimate precondition is that the group accepts the researcher presence. The advantage with the hidden observation is that nobody from the group is aware that they are observed. The likelihood is therefore higher that the researcher gets a fair and honest picture of how the work is proceeding in the group. However, this technique also puts very high requirements on the researcher since she should not disclose her identity.

### 3.5 Choice of Company

To conduct the case study analysis, the biggest challenge is to select the unit of analysis that can provide the researcher with the relevant and in depth information about the research question. As project portfolio management is not widely used in the company but there is lot of talks about it, I have decided to conduct an investigation in that area.

I have worked in R&D projects in different roles for almost 15 years, so the choice of a unit fall naturally to EAPD. To have something to compare and recognize pattern I have chose one more organizational unit, namely Region A. The fact that the units are operating in a rapidly changing global business environment has been an additional challenge.

Moreover, I also needed to take into consideration that fact that the company is willing to share information; I also considered the ease of access to data from the company. Keeping in view all the advantages and factors, and my urge to get a deep understanding of project portfolio management, I have selected the Company.

### 3.6 Validity and Reliability

The reliability and validity of results are important to describe as this report is based on research and would be publicly available.

Validity is defined as followed in the Oxford dictionary; “The quality of being well-founded on fact, or established on sound principles, and thoroughly applicable to the case or circumstances; soundness and strength (of argument, proof, authority, etc.).” (Oxford English Dictionary online, 2008). Validity is related to the correctness of the method chosen to check the incidents or values.
The definition of reliability is “The extent to which a measurement made repeatedly in identical circumstances will yield concordant results.” (Oxford English Dictionary online, 2008). Reliability is concerned with the possibility of obtaining the same results from performing the same test repeatedly.

### 3.6.1 Validity

In this report, we have some theoretical data and some practical information from the company. Theoretical data was collected from text books, e-books, articles published in international journals and internet sources. The validity and reliability of this data has no doubt.

The issues related to quality of data with semi-structured interview have some limitations concerning reliability, validity, forms of bias, and generalizability and also regarding ethical issues. Validity is concerned about the findings that are really true what it appears. Following measures have been taken to construct validity:

- Multiple sources of information have been used to collect the evidences by interviewing different people in the same department and asking the same set of questions and also by protecting the data from the researcher biases.
- Chain of evidences have been used in the data collection phase by making notes of observations and interviews that allows to cross check of particular sources of information.
- Review of the draft of the case study report by the member in the company during the report-writing phase.

The sample value is too low and the results are based on the narration of respondents so the validity is low. However the reliability is high as the results will be approximately same if repeated. Following measures have been taken to ensure internal validity.

- During the data analysis phase, diagrams, illustrations and displays were used to assist explanation of the phenomena.
- Cross-checking of the results was done that helped to achieve coherence in internal findings.

The concept of external validity raises the issue of how people or organizations are selected. The external validity of the results could be limited as data from only two organizational units of the companies have been taken into consideration, therefore, the results may not be generalizable outside the research context.

### 3.6.2 Reliability

There are four threats to reliability, which are participant error, participant bias, and observer error and observer bias. In order to make the results of our case study reliable, following measures have been considered.
• All data is collected from the company databases so thus, there is an evidence and reference to that information.
• Semi-structured case study protocol has been used during collecting the information.
• The collected information was stored in an electronic form in order to organize and document the mass amount of information.
• All efforts have been made to record all the observation as concrete as possible.
• Development and refinement of case study protocol by taking the expert opinion from the researchers.

3.7 Limitations

The strength of our research is that the interviews were conducted at two different organizational units, EAPD and Region A. The both organizations have different governance structure (project/program and portfolio driven) and different types of projects (internal and external; innovation, platform, development, maintenance). Therefore, the research provides an in depth knowledge of different portfolio practices in different types of organizations and also highlight the common difficulties that are associated to the project portfolio management.

The weakness in our research is that in both organizations the portfolio management process is not official documented and suffer of a lack of knowledge and experience. Thus, the results and discussions can be viewed as a subject to participant bias.

Many aspects regarding the project portfolio management have been unexplored due to the respondent’s lack of time and genuine motivation for doing this. The time they were working on this was not considered as working time.

The fact that I have been working in the company can be considered as the strength. This enables me to access many documents that would be restricted due to company’s confidentiality. Although I could not use that information, that helps me to find an optimal direction of my research focus and during the forming the interview questions.

Since the resource was just conducted in two organizational units, the results of the research cannot be considered as universal and generally valid for the whole Company. This was a clear weakness.

Since the portfolio management is a business process, a lack of no including the business and strategic units in interviews has to be considered as a weakness, as well.

The answers obtained are based on respondent’s belief and perception of the situation therefore the conclusion may not be flawless. The fact that I am employed at the Company can be considered as a weakness in this context since the interpretation of the data may be biased.

A fact that that organizations would be reluctant to publicize the results of their implementations of portfolio management – publicly admitting failure might damage stakeholder confidence and revealing the sources of success might, particularly in the private sector, be seen as giving away a source of competitive advantage, could be seen as a weakness.
Among the limitation of the resource also lies the small sample size (13 semi-structured interviews). This can be attributed to the little time available as well as the overall period to completion this research.
4 DESCRIPTION OF THE COMPANY

In this chapter, facts and details about the company are given in order to provide readers with an overview of the company, and organizational context of the organizational units (EAPD and Region A) that are the targets of the case study. Moreover, a description of products, main processes and major tools is also added so as to give a full picture of the nature of the business.

4.1 Facts

The Company chosen is one of the global leaders in the transportation equipment, manufacturing and provider of services. Its wide range of products includes different kinds of vehicle and complete transportation systems. Revenues of $10.0 billion US for fiscal year ended January 31, 2009.

The workforce is about 34,200 people with engineering and production sites in 56 countries and service centers in 20 countries.

The Company products should enable the operation of safe, efficient and cost-effective transportation systems that easily cross national boundaries reflect the demands of both operators and passengers. This vital and fundamental demand is met by the extensive and accumulated experience of the Company.

The Company offers a comprehensive portfolio of transportation systems including:

- Integrated control systems;
- Computer and relay based interlocking systems;
- Automatic protection and operation systems;
- Radio based control and signaling systems;
- Wayside equipment;

These systems are keys to increased availability, line capacity and operational line speeds to meet the requirements of every operator. They are paramount to the effective, efficient and profitable operation of the rail systems of the future.
4.2 Organization

The organization is presented in Figure 23 below:

The business is organized into the following supporting functions which offer expert support to the business worldwide:

- Operations
- Finance
- Contracts & Legal Affairs, Intellectual Property, Bid Approval & Claim Management
- Treasury, Mergers and Acquisitions
- Project Management
- Information Services
- Human Resources
- Sales and Business Development
- Strategy
- Communication
- Engineering

Engineering and Product Development (EAPD)

The Engineering and Product Development (EAPD) develop core products and generic systems to maintain the product portfolio in line with the Product Strategy. Product development is undertaken in line with the requirements of applicable CENELEC series standards to reflect good practice within the environment. EAPD department through R&D financing undertake new product development (NPD).
Region A

The purpose of the unit is the overall accountability for business development, sales and operating profit within Region A and its countries. The region is directly responsible for all functional resources in the region and takes the lead for the entire business process in the region, as well as the full responsibility for statutory requirements, both on permanent and temporary sites set up within the region and its countries.

4.2.1 Project Management System (PMS)

The PMS was developed by Project Management experts to support projects in achieving their goals. The PMS is based on the main elements: People, Processes & Tools, and Governance but is supported by having the appropriate environment or organization (such as PMOs in place, the Core Team implemented etc.), see Figure 24 below.

Figure 24: The main elements of PMS

Project management involvement begins at the Bid phase but project management leads from the Start Up phase onwards. Although processes typically run across phases, the processes have been allocated to the various phases of the project for the purpose of simplicity, see Figure 25 below.

Figure 25: Project Management Phases

Each process has its own process cycle as initiating, planning, executing and closing, shown in Figure 26 below:
4.2.2 Processes

In 2011, a new tool was deployed at the Company in order to enable employees to find processes and process related information. The process approach has been changed from functional to value driven processes. In the functional processes, each function describes what they need to do, but very little focus on doing it as a team. In the value driven processes, the focus is on what each process has to deliver, and the team who executes this process needs to deliver it together.

The Company Processes are divided into sub-groups as Management Processes, Core Processes and Supporting Processes as shown in Figure 27 below:
4.2.3 Tools

4.2.3.1 Primavera

Primavera P6 software, Primavera newest release, is an integrated construction project management product created for globally prioritizing, planning, managing and executing projects, programs and portfolios. By utilizing what-if scenario modeling, capacity analysis, tabular scorecards and optimization functionality, P6 enables users to align their portfolios with their strategic objections. Other capabilities of Primavera P6 include project proposal workflow, automatic portfolio creation and maintenance, configurable criteria modeling, top-down planning, interactive scorecards, rich graphics, portfolio capacity planning, team collaboration and performance reporting, the vendor said.

Some commercial vendors of project portfolio management software emphasize their products' ability to treat projects as part of an overall investment portfolio. Project portfolio management advocates see it as a shift away from one-off, ad hoc approaches to project investment decision making. Most project portfolio management tools and methods attempt to establish a set of values, techniques and technologies that enable visibility, standardization, measurement and process
improvement. Project portfolio management tools attempt to enable organizations to manage the continuous flow of projects from concept to completion.

Primavera P6 software application tools include some features as mention here (Figure 28 below):

- Primavera P6 Dashboards
- Primavera P6 Portfolios
- Primavera P6 Projects
- Primavera P6 Resources
- Primavera P6 Administration

as well as:

- Primavera P6 Portfolio Analysis
- Primavera P6 Capacity Planning
- Primavera P6 Executive Summary
- Primavera P6 Performance Status
- Primavera P6 Issues
- Primavera P6 Risks
- Primavera P6 Gantt Chart
- Primavera P6 ROI

4.2.3.2 Timesheets (P6 Progress Reporter)

Timesheets (P6 Progress Reporter) has links with every version of Primavera and it is meant to provide the financial functionality in a timesheet that is a powerful addition to this EPM system. With Timesheets (P6 Progress Reporter), a single timesheet can update tasks in Primavera with hours, costs and progress, update the HR system with exception time, update the ERP or Finance system with payroll and billing information and keep track of things like multiple rates, banked time, flex time and more, see Figure 29 below. However, the Company uses timesheets to collect labor actual.
4.2.3.3 Other Tools

There are several other tools as presented in Figure 30 below.

<table>
<thead>
<tr>
<th>Tool</th>
<th>Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change Approval Database (CAPD)</td>
<td>Change Management</td>
</tr>
<tr>
<td>Generic WBS Template</td>
<td>Work Breakdown Structure (WBS)</td>
</tr>
<tr>
<td>I-GUMP</td>
<td>Bonds Management</td>
</tr>
<tr>
<td>MS Project, Primavera Project Planner, Generic DFS Template</td>
<td>Detailed Project Schedule (DPS)</td>
</tr>
<tr>
<td>Project Ranking Tool</td>
<td>Bid Process</td>
</tr>
<tr>
<td>Project Management eBoK</td>
<td>Knowledge Management</td>
</tr>
<tr>
<td>Project Tracking Database (PTD)</td>
<td>Project Communication Management</td>
</tr>
<tr>
<td>Project Portfolio Reporting System (PPRS)</td>
<td>Monthly Operational Review (MOR)</td>
</tr>
<tr>
<td>Risk &amp; Opportunity Portfolio Database (ROP)</td>
<td>Risk &amp; Opportunity Management</td>
</tr>
</tbody>
</table>
5 FINDINGS AND DISCUSSIONS

This chapter presents the results that are obtained from the analysis of case study and semi-structured interviews. The replies from the respondents helped me to understand to what extent project portfolio management is applied in two organizational units in the Company and its contribution to successful new product project development. Challenges and difficulties in implementation of project portfolio management were also analysed and presented.

The discussion is focused on eleven topics which are: portfolio practices; strategic alignment; process; tools and techniques (methods); portfolio reporting; resource allocation; PMO; types of the projects and the balancing of the portfolio; size of portfolio; challenges and difficulties. Each chapter is organized from the analysis of the interview, adds some citations from the respondents and finishes with an explanation of how the matter should work according to the theory. This has helped me to gradually identify the knowledge gap that exists in the company based on the case study of these organizational units. I put equal effort into interviewing the representatives from the units; thus, I tried to present their answers in equal proportions. However, a determinant factor was the content of their answers (quality) and not quantity.

Finally, the chapter ends with a summary of the findings, mainly focused on the differences in the project portfolio application in these two organizational units.

Looking into the main elements of project portfolio, I tried to find the additional requirements that should be fulfilled for a successful implementation of project portfolio management. My intrinsic interest was to get a deep understanding of the project portfolio in new product development and R&D organizations where I have been working for almost 15 years but also based on how important project portfolio management is in new product development and innovation as described by Cooper, R.G, Levine, H. A and PMI.

Region A organization was selected to observe the similarities and patterns observed in the first organization.

5.1 Project Portfolio Management Practices

In order to determine whether project portfolio management is applied as a formal business methodology, respondents were asked these questions. In addition, they were asked to explain in more detail what project portfolio management is and how it is implemented in their organizational units.

EAPD Respondent 1 stated:

*We make grouping of the project according to the product road map that is revised on a yearly basis. This work results to four organizational and product/project. The product planning is*
always done for long- and short term (one year, three year and five years). The strategic initiatives are described and communicated by the top management. Technical capabilities are primarily described by the product managers. In a joint discussion between the product managers, functional and departmental managers a list of the projects are created. This list is used as a basis for budgeting and resource capacity analyses. There is not a strong methodology for selection and prioritizing of the projects in these lines. In many cases, it is about “we must have this functionality, let’s implement it” and “we must deliver to China…”

EAPD Respondent 2 stated:

_We do not apply the same criteria when resource and screening the projects. Sometimes, I have the feeling that a “squeaking wheels” mentality prevails without having objective criteria that count the same for everybody. That is why we put an extreme focus on specific projects and deliverables forgetting the importance of deliveries from low-prioritized projects that appear very important at the last minute of the delivery._

Region A Respondent 1 stated:

_There have been papers and reports about project portfolio methodology and I really wonder whether we need it. On the one side it seems so complicated, time-consuming and costly, and on the other side some of the processes offer a simple formula for a complex condition. Some processes deal with financial valuations of the proposed projects, such as benefits, return on investment, or net present value without directing much effort toward how these values can be determined. Despite our large analysis, we feel often that the executives make decisions based more on “gut feeling” and environmental conditions than on the outcomes of our analysis. Sometimes they have just ignored or discarded our analysis without having a healthy debate._

During the interview it was apparent that there was an evident distinction in application of the concept of project portfolio management. On the one hand, the interviews in the EAPD organization indicate that project portfolio management is seen as doing a series of projects or as a roll-up of projects into an umbrella group which corresponds to the EAPD organization. Thus, the follow-up of the status and performance of the portfolio is still based on individual projects not as a portfolio of the projects. However, some projects have considered starting some selection and prioritization practices, but still without having a fixed setting of criteria.

On the other hand, the interviews in the Region A organization indicate that the organization has already implemented some elements of the project portfolio framework, but not in a standardized way that is widely approved and accepted as a corporate approach.

The centralized view of the projects in the Region A enables top management to identify projects' strengths and weaknesses, to specify the resource constraints, to define the interdependencies of the projects and thus the selection and prioritization of projects. The existence of the project portfolio in the Region A has led to improved accountability and decision-making both at the portfolio and project level. Since the Region A projects are fully dependent on EAPD deliveries, the project portfolio practice must be adapted to the scope of the work, but not to organizational
units as it is today. Consequently, EAPD projects must be a part of the scope of Region A portfolio.

I believe that the positive impact of project portfolio management that has already been evident in the Region A will have a positive influence on the R&D projects in EAPD. The EAPD management will seriously reconsider implementation of project portfolio management in full scale. The prerequisites exist; it is just up to top management to decide on it and organize it.

5.2 Strategic Alignment

As Cooper stated (2001, p.23), “corporate goals, objectives, and strategies must be the basis for new product projects portfolio selection”. More than ever, the management of technology and R&D is strongly linked to corporate strategy and a firm’s competitive success. This is especially true for multinational companies, which face a much broader scope of possible strategic direction. Portfolio management must reflect the overall strategy of the business; indeed it is the embodiment of this strategy. It cannot be said too often that portfolio analysis and resource allocation must be intimately linked to strategy formulation. Several respondents from both parts of the organization were asked about the strategy and strategic alignment of the projects and their answer presented here indicated the same situation that is described in the previous chapter.

EAPD Respondent 3:

*The top management specifies the new product goals and areas of focus. When the area of focus comes to EAPD this is where new product development effort will be directed. They also specify desired level of EAPD and new product spending in specific arenas of focus. For example how much to spend on certain product categories. The decisions are always made at a higher level of the organization. We feel that we are not enough involved in the decision-making process and we feel that also we did not get enough information about the basis on which the decision was made.*

Region A Respondent 2:

*To win the Baltic and Nordic market and sign the general agreement concerning the renewal of traffic systems was a very important strategic initiative. As a result we have started many new projects that include new product development projects with strong focus on a number of strategic goals related to this strategic initiative.*

Region A Respondent 3:

*“Road to China” is one of the highest strategic initiatives so we were involved in that work and were informed from very beginning about the importance of winning the market.*

The answers obtained from the respondents showed that there was a lack of communication regarding the strategy of EAPD. The top management spent many hours at the meetings customizing the investments into development of strategies that will drive the organization forward. However, the tactical plans for the goals these strategies are intended to make happen
are not fully described, so it is impossible to measure and thus achieve them. It is often based on the assumption of a “can-do” attitude which cannot be counted on to deliver on complex and interdependent strategies. It ignores issues of cross-functional resource allocation and competing priorities that weight the organization down. Neither of the respondents had any documents that illustrated the strategy of their departments, i.e., strategic plans, program plans and project plans were not available to them.

The last answer indicates that rating the degree of linkage between projects and strategy and communicating it would be of a great help. Among the other criteria that projects will be evaluated upon, the degree of impact the project has on the organization’s strategy is very important. According to Levin “Perhaps the greatest risk to an organization’s ability to deliver on its strategies, goals, and mission is committing to more projects that it can be deliver” (Levin, 2005).

In Region A, strategic initiatives and goals are described and communicated to both management and people. This is due to the nature of the business that is characterized by having a contract with a customer. However, determining an R&D strategy may be harder because of the long-term nature of the development and thus of the investment.

A lack of clear identification of specific projects that will carry out the strategy has been noted as a weakness common to both units. This should be described in strategic plans according to Figure 31 presented below. However, the strategic plans are not developed. They are often in the form of Power Point slides with much generalized information that is not sufficient for decision making, winning confidence and credibility. Furthermore, Project Plans (Orange Book) are missing for many EAPD projects whereas White and Blue Book within Region A should be produced in an early phase, reviewed within the team and communicated clearly.

![Figure 31: Strategic elements and alignment (Levine, 2005, p.141)](image-url)
As Cooper highlighted in his book “senior personnel must have consensus on key issues (for example, new product goals or project priorities) – something that is often lacking – and ensure that this common position is understood lower down in the firm” (Cooper, 2001).

One way to involve senior management in the decision process is by integrating selection models into an interactive decision support system, which seems to have been applied in the Region A organization. Their statement: “the top management has involved us in planning how the active project list evolves over time; which new projects are added to the list, when, and what role each should play in the total portfolio” shows that the communication is much better.

5.3 Project Portfolio Processes

Firstly, the project can be seen as the operationalization of strategy. Secondly, new product process or Stage-Gate model focuses on individual projects. The gates in the new product process must be working well in order for the entire portfolio management process to perform. Then third, there are aligning and monitoring & controlling processes that enable managers to stand back and consider all projects – those that are active versus those on hold - together. In the reviews the key decisions are made, especially decisions to resource projects. Strategic imperatives may be identified. The prioritized list derived from gate decision and gate scoring model enable projects to be ranked against each other. Decision may be made to reprioritize some projects and to elevate others (Cooper, 2001). The balance of the portfolio is also reviewed with various bubble diagrams and pie charts. If all three elements of the process exist – strategy, the process, and the portfolio review with its various models and tools – then a harmonized system should yield an excellent portfolio.

The questions regarding the project portfolio processes: namely categorization, evaluation, selection for inclusion and ranking of the projects in the project portfolio were asked and the answers were collected from both organizations.

EAPD Respondent 4 stated:

*The Stage-Gate process has been introduced in some part of the EAPD organization as in Hardware department. A template is produced that describes what should be achieved in order to pass the gate and enter the next stage. According to the product development process there are four gate reviews as: G1 Start Up, G2 Design, G3 Implementation, G4 Verification and Validation. Each Gate review contains the check list of the mandatory steps with described acceptance criteria.*

Region A Respondent 4 stated:

*The Stage-Gate Process is applied to several of our projects and it helps monitoring and controlling of the individual projects. When it comes to prioritization, the standard criteria are not consistently applied. Sometime, we just compare one project to another when we feel that there are commonalities.*
During the interview with the respondents about the project portfolio process, I found that there was some confusion between Stage-Gate process that belongs to the management of individual projects and other processes, mainly selection, prioritization and balancing that belong to the project portfolio management process. However, it was found that the concept of Stage-Gate has been moderately applied in some Region A projects and in very few projects in EAPD departments (for instance in Hardware Department). The documentation and templates of that process were prepared by PMO Region B that was responsible for a roll-out of the process. The process was reviewed by some organizations and certain necessary adaptation done.

The Stage-Gate is good for moving a new product projects from idea to launch i.e., from beginning to end. The Product Development and Management Association’s (PDMA) best practices study concurs: “Nearly 60 percent of the firms surveyed using some form of Stage-Gate Process” (Cooper, 2001).

The project managers found this process very helpful. Some technicians see this as an increase of paper work, others consider that the process in itself does not yield much in proportion to the given effort but in general this is a clear acknowledgment that the process in itself is good and it helps move product development faster. Furthermore, the process has increased communication not just within a project but also outside the project organization which is seen as a big strength.

Dr. Robert G. Cooper is the father and developer of the Stage-Gate process that is now widely used around the world to drive new and innovative products to market, see Figure 32 below. Looking at his model, Discovery stage is basically replaced with Start-Up in the Company which means ideation, technical research, seeking new technological possibilities, working with lead and innovative users or undertaking product value analysis with customers, using voice-of-customer to capture unarticulated needs and customer problems, competitive analysis and using an own strategic planning exercise to uncover disruptions, gaps and opportunities in the market place, are not covered in this process. Of course, many of those activities are done but not as an integral part of the process which can lead to a shortage of good new product ideas.

Figure 32: Stage-Gate Process Framework (Cooper, 2001)
5.3.1 Portfolio selection, evaluation, scoring, ranking and balancing of the project portfolio management

Due to the above mentioned ambiguity in understanding the differences between the processes for individual projects and project portfolio, the question was asked again. According to the respondents, the application of the project portfolio processes can be depicted in the following manner.

EAPD Respondent 5:

*The proliferation of the project is too high so without the selection process we would soon come into a situation of undertaking much more work than we can deal with. From previous experience this always impacted the quality of the work and caused delays.*

*Having prioritized the projects with accurate benefit numbers, the evaluation team can allocate resources to the portfolio. As I see it we have no defined criteria how the selection and prioritization of the project should go so therefore we have a lot of work when we really need to do this. It would be of a great help to have a template and lists we can follow every time and focus on the quality in our estimate not waste time in defining new criteria again and again.*

Region A Respondent 5:

*Selection criteria are very important when creating a project portfolio. I would say strategic alignment and financial value of the project weigh more but it can heavily be influenced by managerial behavior. Some managers focus more on financial methods whereas some focus more on marketing. The success in China's market was so important so financial values of projects were deliberately subordinated to other strategic goals.*

In the Region A, due to too many projects to bid and insufficient resources to execute them, the selection of projects has started before the bidding process. People from the top management to project management level are involved in the process. The selection process is seen as very complex and difficult since it involves many critical factors that have to be considered such as the probability of technical success, market condition, government regulations, and many other factors that are important to consider.

To achieve consensus between all the members involved in project selection is seen as very challenging. This has been always the case but in an environment where universal selection criteria do not exist as in the Region A, this selection process has given a lot of headaches to the members. Moreover, some dissatisfaction has been observed. Due to the lack of a formal process, some decisions were considered as biased and not made on a mutual consensus.

The lack of visible selection criteria leads to many problems. Sometime the governance waits too long before making go/kill decisions. The indetermination about such important decisions causes critical resources to be inefficiently used. One of the respondents answered: *“We never kill projects; we just wound them. The resources are often just removed from projects little at a time and end up being spread so thinly that all projects are set up for failure.”*

According to Cooper (Cooper et al., 1997, 2001, 2006) once the portfolio is selected then individual projects are prioritized by a scoring model. Weights are related to criteria like
criticality and complexity. Based on the scoring result, a ranking order is produced, displaying the relative attractiveness of the projects. Risk and financial criteria were found to be most dominant factors. Pie charts and bubble diagrams are used to display resource capacity. Review of the portfolio is done on quarterly basis then new decisions regarding new projects and putting or removing some of the existing are made.

As Rajegopal highlighted that evaluating, scoring and prioritizing projects ensures that all project work is evaluated by the same standards and is given equal consideration. When plying the scoring models, the emphasis is placed on meeting the prioritisation criteria in support of the business strategies, with projects evaluated on the basis of their contribution of the business strategies. Best practice is to score, evaluate on a project-by project basis, that is, with each single project score against the full set of prioritisation criteria, then the next project, and so on until the full set of projects within the domain has been scored and evaluated. It is strongly recommended that projects are not scored on a prioritisation criterion-by-criterion basis, as this approach only serves to encourage competition between projects by attempting to rank-order the projects against each criterion. (Rajegopal et al., 2007)

Normally key business issues come up as a result of project prioritization, including:

- Testing of the soundness of current business strategies, and identification of missing strategic aims that have somehow been overlooked. There is a potential for misusing the PPM process to reverse-engineer or even adjust the business strategies which is admitted by some respondents from Region A. Therefore the PPMT must avoid the temptation to redefine the organization’s strategies and maintain the appropriate relationship between strategy and the portfolio management process. The organization strategy should undergo reviews, modifications and updates but this should not be done at this stage of the work.

- Questioning of the validity of previously used management decision making processes, and recognition of the underlying reasons for their success or failure.

- Examination of the appropriateness of the organizational structure for managing project work. The PPM process interface with the organizational proposal process – it does not replace it. A fact that is consistently noticed in both organizational units (Region A and EAPD) was that too many demands on the proposal process were placed and thus it was difficult to prepare them. Therefore, project teams attempted to proceed without them. It is important to bear in mind that as the PPMT gains more experience in applying the criteria using the project proposal information, the proposal content requirement may need to be redefined.

Based on the information presented in Chapter 2.4.3.3 (Defining prioritization criteria), the examples of scores entered into the scoring model are shown in Figure 33 and Figure 34. The PPMT leader should facilitate the scoring process to accomplish two important goals: a content goal and a process goal. The content goal is to score the projects within the portfolio for prioritization; the process goal is to promote active debate/discussion among PPMT members. Perhaps the biggest benefit of the scoring model is the interactive discussion and dynamic decision making of the PPMT membership.
The categorization, evaluation, selection of the projects in EAPD is conducted just in those cases when it is required by the top management or when there are some other urgent reasons. As highlighted in each book written about project portfolio management, one of the keys to making the best decision is understanding the criteria used to judge and prioritize projects. My research has shown that there are various organizational factors that influence the implicit and explicit prioritization in place. Organizational culture and history may play a critical role. For instance, marketing and sales people when they are presented in the governance tend to force a strong pull on resources devoted to advertising or incremental improvements in existing products. The other factors that can influence prioritization process have to do with the firm’s time horizon. An organization in a difficult financial position or facing serious short-term cash issues might choose to focus its resources on products closer to market. In contrast, a firm in a stronger financial position might be able to afford to initiate more new projects that will not be ready for the market until several years out (Cooper et al., 2006).
Some comments in EAPD were recorded regarding the difficulty of advancing projects further into the development process because of academic scientists having a bias toward funding earlier stage research projects. They emphasize early stage research and new projects look always better than ongoing projects, based on the fact that they seem promising.

That is why it has been so important to find and define a new process that improves product success, profitability, and speed to market and to build best practices into new product development.

Portfolio selections and balancing have many hinder that are related to methods as well as to managerial behavior. I identified some hinders that cause a problem in the selection and prioritization phase. The biggest bottleneck occurs when the management has to make choices. If there is high confidence in estimates and high consensus about decision objectives, the project selection model can be given plenty of responsibility. If the members making the decision disagree on the priorities of the objectives, the decision is made by negotiation. On the other hand, if the consensus is high, but confidence on estimates is low, the decision calls for judgment. In this case, the selection model is only used as a guide, and the portfolio is formed using the judgment and experience of the decision makers. The main purpose of the selection here is only to be a guide because the decision is based on the judgment and experiment of the decision makers (Cooke & Slack, 1991). In a situation where there is no consensus and low confidence in the estimate, the situation calls for strong leadership and reconsideration of the strategy and used processes. The adjustment can be used as a tool to define the problem areas in the process.

Having no consensus and confidence in tools and estimates are the big obstacle in EAPD which cause the prolongation of decisions and a waste of time and energy.

5.4 Project Portfolio Tools and Techniques (Methods)

As Levine highlighted in his book that “tools does not make the decision for you but they can support and facilitate you in making decisions. Indeed, there is tremendous power and utilization in them”. Good project portfolio tools can significantly contribute to the project portfolio management and sometimes they determine the success of the project portfolio. Several people were asked about the tools and techniques (methods) that support project portfolio management in order to determine which and how much they were used.

EAPD Respondent 6 stated:

*We use Primavera primarily for resource planning and time reporting. The reluctance to plan projects in Primavera due to complexity and a long uphill learning curve is still present. The information from Primavera is indeed extracted to Excel documents where different graphical presentations and scenarios are presented. Moreover financial information is not integrated with Primavera so the information about costs is not available in the tool and thus must be consolidated in separate excel documents. Some features that exist in Primavera are not efficiently used which leads to extra work.*
Region A Respondent 6 stated:

We use Primavera for project planning and resource allocation. In addition to it, we do produce different bubble charts, diagrams, decision tree analysis, risk analysis, peak year sale, capacity charts in order to analyze and visualize the data that will be used in different review meetings and will be a basis for making decisions.

Levine (2005, p.5) addressed the issue concerning project portfolio management tools. Many project portfolio management tools offer extended ability to display values of the project without supporting the creation of valid data. A user’s expectation is that the tools assist in simplifying the prioritization of complex issues and data. It seems and in some cases it is evident that these admirable tools might focus too much on the details and miss the big picture. On the other hand, there is tremendous power and utility in these display methods. A little caution is called for, because the quality of the display is not a direct indication of the quality of the data. Without a meticulous, structured approach toward developing the data, you might be manipulating and displaying only junk (Levine, 2005).

One way to reduce the likelihood of bad data is to have a seamless connection from the data generators to the data displays. This proves that the data is developed using accepted practices that provide an audit trail back to the source. So everybody can be assured of being able to answer to the question “Where did that come from?”

This was an intention with implementation of Primavera, but due to the complexity of the environment, the audit trail back would be very complex. To simplify this, some additional pieces of software were developed but they turned out to be equally unreliable and needed much more adaptation than anticipated. Moreover, complexity for users has been increasing.

Furthermore, there is another extreme as in Primavera's capability for presenting extensive, multidimensional data which is really impressive but it allows us to overlook the possibility that the data displayed may not sit on a solid foundation. The skeptics go so long as in some statements cited here “I do not think I will ever see the day when Ford executives look at a project portfolio bubble chart to pick which cars to build. I do not think that IT executives could decide on a Web-based expense report over an upgrade to Office 2999 or vice versa using the PPM tools” (Levine, 2005).

The message that I can derive from these declarations is that we need to understand the available tools and techniques (methods) and be prepared to apply them where practicable but not blindly. Every data-based process is subject to somebody fouling up the numbers. Diligence and dutiful wariness must be built into the process.

One challenge of project portfolio management is to bring several functions together under the same umbrella: projects, operations, finance, resources, and marketing. Each of these is supported by automated information system. A challenge under project portfolio management is to bring these computer-based systems together. Furthermore, extended capabilities must be added to support the intended benefits and to support integration of the individual systems. Since we have an enterprise resource management system (ERP) and multifunctional management system we have an underlying structure to move in the desired direction.
However, the answers from the respondents have shown that Primavera is not integrated with other functions as for example with Finance. The Figure 35 below shows the complexity in generating the information.

![Primavera Landscape Diagram](image)

**Figure 35: Tools Landscape**

In light of the possible techniques (methods) used, it is crucial to have a distinct and specific idea of the purpose. For example, ranking methods do not satisfy content requirements, only usability requirements – they are simple to use, but not very effective. Mathematical programming is very extensive if it is used together with simulation in order to handle uncertainties and they are often suitable for very big projects lasting over some years. Additionally, some key figures such as total ROI and IRR, and the results from sensitivity analysis and simulations are used as adjustment tools.

Visual representations are the most favored methods (Cooper et al., 1997a) as shown in the literature as well as seen in reality. The main advantage of the visual methods is their ability to assemble much information into a single element. Further, their illustrative nature helps to see if the portfolio is imbalanced. The most referred visual techniques are bubble diagrams, histograms and charts. As presented in Chapter 2.4.4 (Project Portfolio Management Tools and Techniques (Methods)), the appropriate tools and techniques (methods) are suggested. By looking at benefits and disadvantages associated with each methodology, some notes are made. First, basic economic methods are quite similar and can be substituted for each other. Usually they are suitable for short-term planning and investments. Decision analysis is more suitable for long-term investment with factors that are more uncertain and have more alternative decision points. Second, scoring methods seem to be complementary to other models since they only can include intangible factors in the evaluation.
Without clear criteria there is no chance of creating a project portfolio that will be successful. The set of criteria and their mapping must exist on each level from the strategy level to project level.

5.5 Portfolio Reporting

Portfolio Reporting is a very important part of project portfolio management where we raise the visibility of the portfolio to all key stakeholders as well as demonstrating progress and highlight issues throughout the project and portfolio life cycle. Building relationships with key stakeholders is essential to gaining trust and awareness. The answers concerning the portfolio reporting were gathered and they are represented here.

EAPD Respondent 7 stated:

We have MPR meetings where the status of each project is presented. Usually, they are scheduled for whole year. There is a template that is common for R&D projects that has to be updated by each project manager (See Appendix). The template must be updated by hand thus accuracy and reliability of data cannot be guaranteed. On the other hand, it is time consuming.

Region A Respondent 7 stated:

MORs meeting on a monthly basis is our way of reporting the status of the projects. Then, we have an opportunity to meet a Core Team and ask for support if needed. PPRS is good in a way that we have a system used by all but it is not an easy and quick system. The information is based on Primavera and data from finance. The issue that should be raised is a standardized way of working i.e., decide what is minimum data. Today, some people do too much of the work whereas some do not. Consequently, the qualities of the reports are not good. However, EAPD projects are not treated in PPRS so vital information about the status of new product development is missing.

The most common internal reporting within the company is the monthly operational review (MOR) report used in Region A and monthly project review (MPR) report used in EAPD. The MORR is a standardized, central report which essentially consists of several individual overviews of project critical data. It gives an overview of key performance data and trends across the project, such as: basic project data, key financial data (margin, margin development), adherence to schedule, projects key performance indicators (KPIs), and trend analysis. The creation of project reports and the analysis of project portfolios are supported by the Project Portfolio Reporting System (PPRS). The PPRS is a web-based tool designed to standardize and speed up MORR creation. The time saved can be used efficiently to interpret the data and to solve underlying issues.

The information is generated from Primavera to PPRS. The crucial prerequisite is that the project status in Primavera is updated. In order to increase the accuracy and quality of the presented data, the PMO Region A has decided to introduce mandatory update of all the projects before generation of the reports. The reporting is done on a monthly basis and is presented in the meeting to the top management including the president of the Company. The minutes of the meeting are written and sent to all concerned with relevant details and action points. The MORR
template ensures consistency and comparability. However, it is flexible as the amount of mandatory information varies depending on the project ranking (A, B, C/D, and E) and the current project phase.

MPRR are based on a template that is updated by project managers. The reporting is done on a monthly basis and presented to the senior management of the EAPD. The minutes of the meeting are written, sent to the participants and stored in databases. The reporting is primarily done by hand so it generates a lot of the work for project managers before the review meeting. Thus the accuracy and reliability of the information can be questioned. Financial information is generated from the financial databases; the direct hours are generated from Primavera. Milestones and resource planning are maintained in Excel documents and they lack the connection to the info from the system. The content of the MPRs is also flexible depending on the project type.

It is essential to choose tools that are scalable and flexible, avoiding excessive and restrictive systematization that integrates with peripheral applications and are able to evolve as the business evolves. It is also essential to manage the “Big Brother Syndrome” – the suspicion that the business is only using Timesheet technology to keep tabs on the staff. To increase visibility, utilization and productivity should be the main point of the reporting. Also, role based visibility should be emphasized that provides a fast and effective means of integrating the strategic with the operational part, enabling drilling through layers of management in order to manage project milestones, resource capability, budget allocation as well as keeping close tabs on project progress (Rajegopal et al., 2007, pp.23-28).

Primavera Analytics is an enterprise-wide single-source of the truth portal providing transparency into project performance appropriate for every role in an organization so everyone can drill directly into a project’s work breakdown structure (WBS) to pinpoint and correct problem areas, see Figure 36 below. This feature is incorporated in the tool but unfortunately not in use.

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**Figure 36: P6 Primavera dashboard**
5.6 Resource Allocation

An understanding of organizational project capacity is an essential precursor of balanced decision making. To make sure that resource allocation is considered accurately, the questions regarding what resources (people, facilities, and technology) are available for project work and what functional areas they represent, and how that will affect their allocation were asked and some answers are presented here.

EAPD Respondent 8 stated:

*We start producing the capacity charts on a monthly basis that give us an indication where and on which projects the resources are allocated. They are a basis for review and discussion about the critical resources, over allocation and also work overload. The various scenarios are produced. They help us to plan recruitment of contractors and employees in advance.*

Region A Respondent 8 stated:

*Primavera timesheet module provides us with the information about consumed hours on each activity per person on a monthly basis which reinforced our forecasting accuracy.*

There is a very high awareness about the importance of proper resource allocation in both organizational units. Maximizing the value of projects and portfolios through proper resource allocation has been seen as essential elements for increasing productivity in the company. Still it is not uncommon to find that the projects request much more project hours than are available to devote to project work. It is not uncommon to see that a number of critical resources have 200 percent of their time committed. Nor is it rare to see 100 person-days committed each month. A reasonable assessment of the organization’s available resources must go hand-in-hand with decision objectives. To be able to make this analysis, the data must be collected and reported in a consistent format and Primavera as a central data base for all projects connected with HR data base is really a great help. Due to this fact, the capacity charts of resource availability is produced and presented on a monthly base. An example is shown in Figure 37 and Figure 38 below:
The answers from the respondents showed that it is not enough to extract project info and resource demand from project plan to get a reliable resource capacity. This should be a first step. What is also needed is to:

- Validate project info and resource demand with project sponsor;
• Updating the project registry;
• Performing preliminary analysis of resource capacity and demand;
• Create an action plan;

5.7 PMO

Many businesses want to improve project and portfolio outcomes as well as provide critical project information for executives or institute an analytical project decision projects, are turning to create a PMO (a means of managing projects within an enterprise environment). PMOs are becoming a standard feature within many organizations and are viewed as the operational center supporting any project within the business. The questions about the presence and role of PMOs in both organizational units were asked and the answers collected and presented here.

EAPD Respondent 9 stated:

_We handle projects differently even in the same department. We do not work with a standardized methodology. This is really difficult because you sometime do not know whether you are on the right track or not. There is no PMO organization in EAPD. Though, there are some people spread in the unit working on some questions but not in a joint manner._

Region A Respondent 9 stated:

_We do have a PMO office that facilitates us with methodology, new templates, lessons learned, training and much other information. Yes, PMO has helped us in achieving better results._

PMO facilitates the collection and transfer of the data and provide unification of project direction, priority assignment of limited resources and also transfer of information back to the various project managers so that they have the information available for making rational corporate-beneficial decisions rather than just project-beneficial decisions. However, it seems that the role and responsibilities of the PMO are not always clear.

In evaluating the role of PMO it is very important to have clear pictures over two key roles they can serve. First it is tactical where the PMO provides direct support to projects and secondly there is a strategic role where the PMO supports the project portfolio management methodology, which in addition supports project prioritization, performance management and benefits realization. Based on the interview, some impediments to the potential of PMOs are noticed and they are also highlighted by Rajegopal et al., (2007) as:

• PMO resourced by generalists/administrators;
• Lack of formal project management qualifications;
• Adaptation of informal processes for developing project management competency;
• PMO leadership lacking in strong business acumen and commercial training;

Region A has a PMO unit, resources with quite different skills, though still in need of people with strong knowledge about project management and not least portfolio management methodology.
The majority of the resources spent their time in generating a very basic but a large quantity of the data, struggling with the complex and user unfriendly tools. EAPD has no PMO. However there are some people doing some PMO work but in an unorganized way without any common goal and approach. Since the focus is on financial issues, people with that skill are engaged. There are no people with other needed skills. According to Rajegopal, the focus of the PMO is to coordinate and communicate on all programs and projects in the enterprise, as well as to be knowledge centre (see Figure 39) with regard to training, leadership, mentoring, best practices, project governance standards, and so on (Rajegopal et al., 2007, p7).

![Figure 39: The PMO as knowledge centre (Rajegopal et al., 2007, p.37)](image-url)

5.8 Types of projects and the balanced portfolio

The goal of balancing the project portfolio is to achieve a balanced set of projects in terms of a number of key parameters. These include long-term versus short-term; high-risk versus lower-risk; and across various markets; technologies; product categories; and project types (for example, new products, improvements, cost reductions, maintenance and fixes, and fundamental research). In EAPD departments might be new and improved products, but also cost reductions and manufacturing or process improvements. Fundamental research and platform developments should also use up considerable technical resources and be part of the portfolio.

EAPD Respondent 10 stated:

*We do basically have a mix of some projects types but we are happy when we see many new development, innovation and platform projects where we can really contribute with our resource’s skill. We know also these projects are most attractive and challenging for our engineers. Nobody wants to work just with NCR’s and other small corrections.*
Region A Respondent 10 stated:

*We are very aware of maximizing the value of the company by choosing proper projects and portfolios. The financial figures are always decisive but we have a keen ear to marketing analysis and we do undertake projects that are not always promising in order to win new markets.*

Cooper illustrates (Cooper et al., 2006) the dilemma that the management faces when deciding which projects ought to be in the portfolio. The arguments for and against are often controversial. If the portfolio is to consider a number of different types of projects, then how does one rank or prioritize them against each other? This issues of whether all projects should be compared against each other has proponents on both sides of the arguments. Some firms studied simply set aside envelopes or buckets of money for different types of projects. Within each envelope, projects are rated and ranked against each other. The strategic buckets model is an example of this route. Using Strategic Buckets solves two problems:

Firstly, it removes the task of comparing and ranking unlike projects to each other. Ranking dissimilar projects against each other is a very difficult task due to the nature and quality of information that differs greatly between project types. Secondly the criteria for comparison are different. The strength in this method is that by setting aside buckets of money or resources, one is assured that spending and resource allocation across different types of projects mirrors the business’s strategy – that the right balance among projects is the result.

The respondents from the interview could not show the current situation – the current breakdown either of projects or spending in their business. For example they did not know the percentage of funding going to new products versus maintenance work versus fundamental research; or R&D spending breakdown across markets or technologies. Portfolio balancing is also important in order to manage risk. The financial experts understand well that diversity is the essence of risk management. So if attaining the correct risk profile in the portfolio is an objective, then the balance of projects in terms of risk and reward is an important dimension of portfolio balancing.

Here is a sample list of possible parameters to consider when seeing balance here (Cooper et al., 2006, p.75):

- Fit with business or corporate strategy (low, medium, high);
- Inventive merit;
- Strategic importance to the business (low, medium, high);
- Durability of the competitive advantage (short, medium, long-term);
- Reward based on financial expectations (modes to excellent);
- Competitive impact of technologies (base, key, pacing, and embryonic technologies);
- Probabilities of success (technical and commercial success as percentages);
- R&D cost to completion (€);
- Time to completion (years);
- Capital and marketing investment required to exploit (€);
5.9 Size of Portfolios

This aspect of project portfolio management was addressed by asking very logical questions such as how much project work is enough and how much is too much and a summary of the answers are presented here.

EAPD Respondent 11 stated:

*We have not considered this so therefore we cannot answer but we have to take into consideration our resource capacity.*

Region A Respondent 11 stated:

*This aspect is not analyzed accurately before we get clogged by many proliferated projects and over allocation of our critical resources.*

The questions regarding the size of the project portfolio has caused many doubts. It seems that this aspect has not been considered accurately. Proceeding on the basis that projects generate value and benefits, then we can conclude the more projects that we have in the pipeline, the better off we will be. This is of course not true because the demand for projects usually exceeds the capacity to execute them all. Overload leads to delays that erode the value and benefits of the venture.

In contrary, there is significant feedback from successful firms that tends to show that doing fewer projects actually improves the bottom line. The message is very clear: limit work in pipeline so that projects can be completed with increased profits and satisfied clients.

Cooper illustrated the results of too many project in the pipeline as very serious. Some negative effects are listed here (Cooper et al., 2006, p.187).

- Time to market starts to suffer as projects end up in a queue – waiting for people and resources to become available.
- People are spread very thinly across projects having so many “balls in the air”.
- Quality of information of projects is deficient due to lack of time.
- Stress levels go up and morale suffers and the team concept starts to break down.

Without clear criteria there is no chance to create a project portfolio that will be successful. Figure 34 below shows how it is important to take into consideration all criteria from the strategic to the project level in order to correctly decide on the portfolio size. The Figure 40 below shows how strategies compete to enter the portfolio.
The questions about the challenges and difficulties in this area have been asked and the answers are collected and presented here.

EAPD Respondent 12 stated:

*Management support is essential in any introduction of new tools, processes, procedures. We have not had good experience with the application of Primavera. On one side, this work was considered as peripheral in terms of the investment on knowledge and consistency in a use in the different projects but on the other side it turned out to be very important when producing the resource capacity charts.*

Region A Respondent 12 stated:

*We are too much driven by customers so any “big bang” changes in our work will require extra resources. There is a very strong culture of how things should be done so the changes can just be carried out with a very strong management support.*

There are many challenges the literature has presented ([http://hosteddocs.ittoolbox.com](http://hosteddocs.ittoolbox.com))
Below is a summary of the answers from the interview with some key statistics, case histories and insights into this growing area.
There are three areas that are consistently mentioned in both literature and interview answers, divided in this way:

- External challenges which actually mean customer relationship;
- Internal challenges which mean cultural implications related to workforce and management and knowledge;

**External Challenges – Customers**

Projects are often driven and defined by customers who set the milestones, schedules etc. This leads to difficulty in defining what a project is internally as each case may be different. This is the situation that Region A has been facing on a daily basis. One more challenge for them in that direction is that to clarify which project requirements should be put on them and which functionality should be implemented by R&D projects.

Despite the fact that the interface to the customer is always through the customer projects, not R&D project, which are basically internal, the representation of R&D must be included in every kind of communication. It is very often that only R&D people are able to deal with the technical requirements and help the customers in defining them.

Transportation industry as well as the defense industry tends to be monopolistic customers which will dictate the kind of projects. Project timescales reflect product life-cycles and can be up to 40 years long. Here the companies using project portfolio management as a planning tool can be affected by customer prioritization. The other end of the spectrum is a three to four month project timescale e.g. mobile sector or financial markets. Here companies using project portfolio management process perceive the product life-cycle as too short to use the process.

However, for both long and short term projects there is a perceived project portfolio management challenge but in reality this can be addressed.

**Internal Challenges (Cultural – Management)**

The biggest road block to implementing project portfolio management is cultural hurdles. Senior management usually underestimates how big these barriers are. As a matter of fact, they need to take ownership of project portfolio management and need a strong capability to sell its benefits to board level. Currently senior management is avoiding buying in the process because they may get exposed. If a project portfolio management process is in place politics and manipulation around pet projects become much more difficult. Some may also like imprecision because it means individuals cannot be held responsible for failing projects. Project portfolio management brings a level of detail that may create a fear factor amongst some senior managers.

However, there are also many failure stories. Success is found more within the IT sector and not yet enterprise wide.

**Internal Challenges (Cultural – Workforce)**

There is a big brother perspective. Project portfolio management makes it difficult to hide mistakes and the workforce hasn’t accepted project portfolio management as a valuable process.
Internal Challenges (Knowledge)

There is a lack of knowledge from consultants in this area. Organizations implementing project portfolio management are looking for a confidence boost from consultants but there is too much reliance on consultants to solve the problem. We should not forget that implementation of project portfolio management is a change in management process which requires senior executives to champion the change.

Even though project portfolio management has been advocated by software consultants, they are not equipped to address issues around change management.

Furthermore, the consultancy market for project portfolio management tends to use a ‘bus load’ of consultants for large software deployment and this is a dead end. In addition, greater part of project portfolio management vendors design at a very high level of maturity (e.g. level four of five) but the majority of companies is below level three.

5.11 Difficulties

The interview answers collected in the previous chapter are fully relevant for this question so therefore they are not presented here.

Obviously, the average project manager is not in a position to implement project portfolio management alone. Without the support and active involvement of managers at the highest levels of the organization, there is no meaningful project portfolio management. Nevertheless, these senior managers are not likely to initiate project portfolio management unless there is a documented need for it. In other words, a PPM case that should be built and presented to the senior management should describe the problems presented below:

- Frequent difficulty finding enough people to put together a solid project team;
- Excessive project delays due to “not enough resources”;
- High turnover due to “burn out” of key project contributors because they are working on too many projects and spending too many overtime hours;
- Frequent change of status of projects (i.e., moving from “active” to “on hold” to “top priority” and back);
- Completion of projects that don’t really meet a strategic need;
- Intense competition, rather than cooperation, among departments and sub-organizations when staffing and funding projects;

When documenting the resource requirements to senior management, there are some tasks that should be done correctly. Firstly, it is important to create project plans that accurately spell out the resources required to complete each task and activity. Secondly, capturing the actual hours spent completing project tasks and activities. In addition, to present a summary showing planned and actual time spent by each person in the organization on every project to which he or she is assigned in order to demonstrate who’s overloaded. Be able to demonstrate all incidents of resources that are “stolen” across projects, excessive overtime and large-effort-but-ultimately-useless projects are very important. Finally, by conducting project “post mortem” evaluations,
gather information about how systematic project portfolio management might have prevented problems and encouraged successes.
5.12 Summary of Findings

This chapter presents a summary of the findings based on the research data. The purpose is to provide us with a better understanding of project portfolio management in two organizational units, EAPD and Region A organizational units and its level of application. The chapter also includes reflections on the main objectives and underlying goals defined in Chapter 1.3 (Research Objectives) with a purpose to provide supporting information in order to answer the final research questions and draw the final conclusion.

After conducting the semi-structured interviews in both organizational units, it was evident that project portfolio management is not widely implemented and accepted in the company. Moreover, there are the evident differences in the application of project portfolio management, its understanding and acceptance. Both units have been doing business organized primarily in projects without having a systematic and standardized methodology as regards project portfolio management. However, the project management discipline within the individual projects has been strongly implemented and practiced. There were many solid projects but also those that were pet projects of executives, or poor projects that should have been killed or handled differently. Some projects were taking far too long. Even the small projects seemed sometimes to take forever. While there were promising projects according to the firm’s view, the portfolio was considered.

A problem that has been observed is that everyone sees portfolio management a little differently. The financial sector looks to portfolio management to allocate scarce financial resources efficiently and achieve shareholder value. The technical community looks to portfolio management to pick the right projects and develop new products. Meanwhile, marketing people expect from portfolio management faster times to market. The strategist sees the portfolio as a support to the corporate strategy, vision and mission. CIO prays that portfolio management will deliver big winners and positive financial results. The price for not having an effective project portfolio management and project selection for new projects is seen as very high. That is why the management of the company has devoted a considerable amount of effort to solve the problems which could be solved in implementation of project portfolio management.

Due to the increased competition on the market, technical complexity and much broader scope of possible strategic directions require the active involvement of top management, who direct both short- and long term strategy. This implies that a commitment, both in terms of time and actions, is needed. This also means that the management has to be supported with a formal project methodology not only on individual project level but also as a portfolio of projects (Cooper et al., 2006).

Having a formal project portfolio management process supported by the organization brings results faster and more efficiently. Without having the formal process, project management becomes a social science, with absence of objectivity and excess of personal interests. Whenever this happens, there are usually no results but a tremendous amount of work.
The introduction of some parts of project portfolio management, especially in Region A unit, results in better allocation of human and financial resources. Organization of the portfolio governance improved decision-making process where senior managers on a regular basis discuss and prioritize in a joint manner. There is also an understanding of the importance of the new methodology and a present urge to go further in implementation of it. The positive outcome from this work has been recognized and they are ready to share their experience with EAPD unit.

Another important issue that has arisen was the difference in portfolio practices in these two organizational units. The concept is fairly new, so it is common that one encounters skepticism but also suffers lack of the appropriate expertise. In addition, a proof of the benefits of having project portfolio management is not well communicated. There is a concern about the proportion what could be gained by implementing this methodology that seems very costly. Nevertheless, no other and easier way is known.

Obviously, the real focus of the project portfolio management is how to ensure that the projects contribute to a successful enterprise, so the company goes beyond the project management community. Project portfolio management brings the project community and the operation community together to achieve business success in a fully integrated project environment with the ongoing business.

However, project portfolio management cannot be accomplished solely within the project domain. It requires the participation of several core components of the firm and integration of several systems within the organization. Concerning this point, the integration of the tools and deployment of the same procedures and practices should be constantly reviewed and be subject of improvements.

Moreover, the project portfolio management is an iterative process which means that there is built in self-correcting capability so it is beneficial to have a go.

5.12.1 The Research Objectives and Goals

The main objective of the study defined in Chapter 1.3 (Research Objectives) was to investigate how project portfolio management could contribute to the corporation efficiency and increased knowledge within the area. In addition, four research questions were specified to be answered and the result was able to present after finalizing the findings. The result is presented before the final conclusion with a purpose to provide more support to it.

- **To describe the features of project portfolio management** which is extensively done in the theoretical part of the thesis, see Chapter 2.1 (Project Management), Chapter 2.2 (Program Management), Chapter 2.3 (Portfolio Project Management), and Chapter 2.4 (Portfolio Project Management Framework).

- **To investigate if the theoretical framework of project portfolio management has empirical evidence in the company and to which extent;**
The answer to this question can be found in the answers to the main objective of this research, presented in Chapter 6.1.1 (Research Question Part 1). The empirical evidence exists. The extent to which project portfolio management is applied is not meant to be measured and presented by using numbers and mathematical models or to be stated by percent out of 100% that stands for full implementation of project portfolio management. The descriptive statements are used to express it.

There are several reasons why it might be anticipated that there would be limited hard empirical evidence to demonstrate the impact of project portfolio management, including: the current general degree of maturity in the practical application of project portfolio management; methodological difficulties in measuring its impact; and the assumed strength of the normative case outlined above (the case just seems so self-evident), which can act as a disincentive to formal evaluation of the business case for project portfolio management.

These factors are reviewed briefly below:

- The Company has not reached a level of maturity where overall portfolio progress and impact on organizational performance can be evaluated formally.

- Problems with outcome measurement and attribution are compounded by the fact that even if we can show that certain changes in outcome are correlated with specified input/process changes, this does not demonstrate causation i.e., performance improvement may be due to some other factor or the relationship could be the reverse of that proposed. However, improved project delivery may lead to the adoption of a portfolio management approach rather than vice versa. Thus measuring the impact of portfolio management is problematic because many of the benefits will be non-financial (although they may well ultimately contribute to improved financial outcomes) or difficult to measure (what is the value of poor projects that are not started for example?) or attributed to the application of portfolio management rather than improved project and program management or indeed to routine management practice.

So, for several reasons, I have found limited empirical evidence supporting the case for project portfolio management – and that which does exist could be expected to be more qualitative than quantitative in nature.

Notwithstanding issues in measurement and the limited maturity of portfolio management practices, there are many theoretical cases supported by research evidence in the UK, US and Australia (Reyck et al., Jeffery and Leliveld, Cooper, Killen and so on) and case studies that demonstrate that portfolio management can reduce costs, enable performance improvements and reduce risk.

Additional benefits are linked with increasing process maturity and active management of the portfolio, but such benefits are often more difficult to measure in financial terms since they relate to factors such as improved strategic alignment and a more balanced portfolio in terms of risk exposure, product life cycle stage and alignment with the organizations’ capacity to absorb change.
Robert Cooper, Professor at McMaster University in Canada, has researched and written extensively on the subjects of NPD and innovation – and he reaches similar conclusions. One benchmarking study undertaken with the American Productivity & Quality Centre concluded “Exceptional performance in product development is no accident. Rather it is the result of a disciplined, systematic approach based on best practices.” In short, organizations that adopt these practices were found to consistently outperform the rest. Cooper asserts that, “Numerous studies have confirmed that there is no direct link between a company’s increase in spending in R&D and their success rate with new products. What then, if not spending, drives new product success? Significant productivity gains (in NPD) are possible through astute project selection. In fact, top performing businesses are four times more likely to deploy such practices, namely effective portfolio management.”

• To identify the organization needs and requirements for project portfolio management and present the reasons why project portfolio management is important for product development and innovation;

As cited by Rajegopal et al., (2007), 44 percent of new product projects fail to meet their profit objectives, and 49 percent are launched late to market. I cannot support the similar statement given by Region A with percentages but the concern was raised with emphasis on R&D project that caused a lot of delays. They also rate innovation, platform and development projects as “very critical” to their future business success. Therefore they seek ways to improve their new product success, profitability, and speed to market and to build best practices into their product methodology.

Cooper et al., (2001, p.364) uncovered the reasons for the importance of project portfolio management:

• Financial – to maximize return, to maximize R&D productivity; to achieve financial goals;
• To maintain the competitive position of the business – to increase sales and market share;
• To properly and efficiently allocate scarce resources;
• To forge the link between project selection and business strategy;
• To achieve focus – not doing too many projects for the limited resources available, and to ‘resource’ the great projects;
• To achieve balance – the right balance between short term and long term, high risk and low risk ones, consistent with the business’ goals;
• To better communicate priorities within the organization, both vertically and horizontally;
• To provide better objectivity in project selection;

• To highlight the difficulties and challenges associated with the implementation of project portfolio management;

Both the challenges and difficulties associated with the implementation of project portfolio management can be related to organizational culture. I confine myself to emphasising that real change in how things are done inside an organization, as required by the move to a project portfolio management approach, cannot happen unless its culture is changed first. The
fact is also that a corporate culture is difficult to change because it reflects the implicit values, norms and behaviours of an organization. Anticipating and accommodating change proactively, rather than reactively, is the most effective course of action. Even more fundamentally, it is important to understand that change is a political process that requires corporate managers and project managers to share a vision of how users’ lives will change (presumably for the better) because of the new system and then get the users to agree to implement the changes necessary to make it work.

As project portfolio management represents a new way of doing business, a knowledge management (KM) strategy is a part of change management. The KM can be defined as the offering of a comprehensive series of accelerated learning interventions that will increase organizational knowledge of the project portfolio management. Dissemination of knowledge must be planned with the recognition that it is a critical mechanism for getting employees to adopt changes. Learning is always an opportunity to reinvigorate the workforce.

Unfortunately, change often induces fear, and employees often also experience uncertainty and doubt about the implementation of project portfolio management. In particular, employees fear the visibility, accountability, and oversight that come with a portfolio approach to managing projects and resources.

The training events should be an opportunity to receive inputs from employees for the fine-tuning of the processes as the employees learn new functions.

In the light of the challenges, difficulties and pitfalls that have been reported by the majority in the organization that were implementing project portfolio management and those seen in my research, a conclusion as to which are most important can be presented in this way:

- Teamwork and being networked in the organization.
- Right set of people appropriately dedicated to design, implement, and champion, participate in, and nurture the project management system.
- Having a project portfolio management process owner that should report to the commercial side of the business, not the technology side.
- The communication that occurs at all level of the organization and tools that enhance communication are vital. Issues are identified and communicated so that risk can be managed.
- The portfolio tools do not make decisions for the team but they lead to communications that result in the team’s making a decision. Often it is not the decisions that are most meaningful but the exchange of info that occurs as the team systematically reviews each project for its status, deliverables, strengths, weaknesses, opportunities, and threats.
6 CONCLUSIONS AND RECOMMENDATIONS

The conclusion of the research, limitations of the study, and recommendations for future research will be presented in the final chapter. Here the reader will be able to understand how the research question and purpose of the study have been answered. The conclusion also shows possibilities of testing the theory in practice and makes suggestions for further improvements.

6.1 Conclusions and Recommendations

The aim of my work was to investigate if the theoretical framework of project portfolio management has empirical evidence in the company and to which extent and its contribution to successful new product project development.

Semi-structured interviews were used to collect data. Several respondents were chosen for the interview, primarily people from the project management and PMO areas. The research question has been answered in two parts; the first part is related to which extent the project portfolio management is applied in the Company and in the second part, I tried to investigate how the project portfolio management contributes to successful new product project development.

The summaries of the analyses that led to the conclusions are presented in Appendix 1 (Table 1 – Table 4).

6.1.1 Research Question Part 1

“To which extent project portfolio management is implemented in the Company”?

The analysis of the data collected for the first question was expected to be simple and straightforward but it was not in fact so. Output captured from the analysis varied because the understanding of project portfolio management varied not just from unit to unit, it even varied from person to person. Training about project portfolio management methodology is really needed in order to enable the management and other involved people to acquire the solid knowledge and understanding that can enhance communication. As with other business processes, the implementation should follow a path: personnel -> process -> systems. Regardless, people were very interested in the methodology and sensed that there was a growing need for it.

As mentioned in Chapter 3 (Research Methodology) the case study would be conducted and date would be collected over a short period focusing on exploration and description, not on the discovery of universal, generalizable truth. This is a qualitative study so; no quantitative data is expected to be presented.
The main purpose of this type of research was to reveal and understand not only what and how, but also to place more emphasis on exploring the why (Saunders et al., 1997, p. 212).

The interviews conducted in Region A unit revealed that the project portfolio management was considered when selecting and prioritizing programs and projects, and not to manage programs or projects. There is little on implementation. A variety of methods, techniques (methods) and tools is used. Furthermore, Primavera's new version that supports portfolio management has been rolled out through the entire Company which clearly means that full application of project portfolio management is feasible and supported by one of the best tools that exists on market. They rely on portfolio efficiency because they have seen some benefits. On the contrary, in the EAPD unit the concept of project portfolio management is not very well understood, nor widely applied. Every endeavor made by some enthusiastic people in that direction has ended in the management of individual projects. However, the demand for a good project portfolio management has been recognized in EAPD. Even Region A clarified an urgent need for a better management of R&D projects due to many interrelationships and dependencies between the customer and R&D projects.

The recognition that the project portfolio management is a unique skill set and required investment in specialized training is imperative. To have common management language, processes and reliable tools and governance organization are absolutely essential for the successful implementation of the project portfolio management methodology. Then the methodology will help guide the employees to take corrective actions and do right things when direct supervision is not available and no one is watching. The key is in having a common methodology, a common way of setting priorities and a common way of measuring the performance. As highlighted by Levine (2005, p. 432) “the language of business today, which is not English, French, or Spanish but project portfolio management”.

According to Cooper (Cooper et al., 2006), it takes time and energy to build a good decision model. It can easily happen that the entire system collapses if shortcuts are taken in the wrong place. Project portfolio management has to cover the entire company (or a smaller, separate entity) to the same extent. In this case, EAPD and Region A should decide on implementation of project portfolio management covering the business of the both units. Then, the contribution of project portfolio management will be possible and measurable.

6.1.2 Research Question Part 2

“How project portfolio management contributions to successful new product project development?”

In the second part of my research I have tried to find how project portfolio management contributes to successful new product development. An extensive amount of literature was reviewed in order to answer the research questions. An application of consistent project portfolio processes, reliable tools, and common ways of reporting with the support of the governance has a direct impact on the efficiency of organizations and yields the most positive results to the business (Rajegopal et al., 2007).
Therefore, the separate questions about the vital elements of project portfolio management were asked in order to get insights and draw a conclusion. These elements are also described in the Chapter 2 (Literature Review). Summary of the interview results that is used to draw the conclusions is presented in Appendix 1. The conclusions for each separate part are presented here.

6.1.2.1 Strategy

The interview questions were grouped around the major key parameters of the business and corporate strategy as:

- Alignment (projects are aligned with business objectives; strategic fit; leverages core competence);
- Value (portfolio contains very high value projects);
- Strategic (spending reflects the business strategy);
- Timing (projects are done on time (no gridlocks));
- Balance (portfolio has a good balance of projects);
- Right Number (portfolio has right number of projects);

The final conclusion in this part was undoubtedly that a lack of clear identification of specific projects that will carry out the strategy has been noted as a common weakness in both organizational units.

Recommendation:

Linking the strategic objectives of an organization with projects, and doing work to accelerate progress are critical components to helping the business achieve all of its goals. Poor strategies implemented well are still poor strategies. Having a common language to view the organization holistically, new skills in strategic planning, and executives to share that knowledge will remove conflicting politics and problems in measurements.

6.1.2.2 Project portfolio process

The data collected showed that some processes from the aligning process group (identification, categorization, evaluation, selection, prioritization, balancing and authorization) are known in Region A and understood by some employees and moderately efficient fashion applied. Some of them are better applied than others, such as identification, categorization, and evaluation. Selection and prioritization process lack standard and documented criteria. The process has brought a better balance of approved projects, which in turn, generated a more complete portfolio. The balanced portfolio allows for a holistic approach to project selection and prioritization. The most determinant criteria in the balancing phase is strategic alignment and resource constraints where bubble diagrams, histograms and other charts are of a great help. Consistently seen, there is no unified approach in this direction between Region A and EAPD which creates conflicting objectives and a confused approach. The biggest challenge still remains in EAPD because it is there that an urgent need exists.
Recommendation:

Firstly, this means that EAPD has to create a clear vision for the decision process. Secondly, they will need to assign some people to create simple procedures. A network for reliable and coherent data gathering is also necessary. The implementation should be started in EAPD, because there the biggest challenges are, and then be extended to other department, definitely to Region A. The pros and cons of this prototype process should be carefully examined.

Above all, it is utterly important to create prioritization procedures and guideline, the project ranking model, establishing the project weighted values of the criteria and defining the project scoring model. This is best achieved through well defined and documented models and the work of a disciplined team that applies the process consistently and effectively.

The efficiency of any process will largely depend on the coordination of responsibilities for monitoring efforts. If the monitoring is left for the project personnel, it is unlikely that they will report about degrading prognoses as is seen in the Stage-Gate process. Therefore the regular project’s audits and review should be conducted.

However, there are strong convincing reasons that implementation of the process can change or even improve decision-making, whether or not the process itself is used correctly. The wise use of the process required that it is divided into simple and unambiguous procedures. An iterative approach enables the management to detect and change some elements in the process if it is not satisfied with them.

6.1.2.3 Tools and Techniques (Methods)

According to Cooper et al., (2005), none of the current portfolio methods available is superior in all aspects. They all have strengths and weaknesses. Ranking, mathematical programming, decision trees are essentially maximizing methods; portfolio metrics and strategic buckets are balancing methods. The software tools used in project portfolio management primarily represent a way to automate the processes, to make them more effective and efficient by reducing human error and tedious administration to a minimum. Simply possessing a project portfolio management software tool does not mean that you have a project portfolio management process and are actively managing your projects as a portfolio of investment which is really the case within the Primavera portfolio features.

Analyzing the gathered data from the interview, enables me to see a variety of methods and techniques used, though sometime unnecessarily and too much. The nature of each method must be understood in order that it be applied correctly, which is not always the case.

An evident problem that I have noticed is related to data gathering and presenting. There are many software tools and systems that are not compatible and thus not integrated. An example is Primavera with financial system and reporting tools. The tools should increase accuracy and reliability in presenting complex data. The information should be possible or easy to acquire
which is not the case. The system might be used incorrectly since the interviews showed that many people do not rely on the data from Primavera due to the low quality of the data. There is still great reluctance to use Primavera. The level of diligence and discipline the tool require is difficult to answer to due to high time consumption and no existing common approach. The proper work done in one project does not contribute to the whole portfolio. It is the contribution of all projects that matters. Also, users should be given education about both models and tools in order to prevent misinterpretation.

**Recommendation:**

Whereas project planning tools focus on the operational aspects of project delivery, a project portfolio management tool should provide for continual strategic assessment and optimizing, enabling the business to undertake the following iterative steps:

- Align projects with business strategy;
- Make project selection and prioritization decision;
- Manage and balance the project portfolio pipeline;
- Analyze resource demand and capability;
- Track project portfolio performance;
- Initiate corrective project portfolio actions;

**6.1.2.4 Governance**

The governance organization can support the initiatives when they are involved in the process and the procedures and rules are clear.

The interviews from Region A show that the atmosphere is open; it allows discussion and having opposed opinions. Decisions are made at face-to-face meetings in joint manner and they are communicated to the rest of the organization, usually through Lotus Notes (enterprise collaboration software for personal and organizational effectiveness) but it is not uncommon at “all employee meetings”. However, the rule and procedure how to manage the project portfolio must be clarified and adopted by the governance.

The governance in EAPD exists on project (program) level. They are primarily responsible for MPRs. Governance of portfolio level must also exist once project portfolio management takes place. The role description and responsibility, which are lacking, must be documented and well-understood.

As Levine (2005) highlighted, as with each business process, project portfolio management must be governed by senior managers, executives not handed over to PMO or smaller project management organizations.

**Recommendation:**
Portfolio governance, as any organization, can have unlimited amount of hierarchies but a three-level organization enables the best coordination between the different levels in the hierarchy. A superordinate belongs to the upper level hierarchy (corporate level). In the middle-level (division level), there are ordinates. Subordinates are in the lowest level (business line level). Each decision-making unit has its own responsibility area. Inter-level information flows are used to exchange information and to give coordinative instructions. There may be situations, where subordinates and ordinates have so much influence so their decision is characterized “must-do” which leads to deadlock situation in the upper level. They can be solved by changing the upper level objectives and criteria or by decreasing the power of the lower level units (Winkofsky et al., 1981; pp.268- 283).

According to Levine (2005, p.26), there are no new functional positions defined for project portfolio management. Rather, project portfolio management is seen as a process, to be supported by the PMO and senior personnel that is already in place in the firm under the leadership of the COO or equivalent. What is different within the project portfolio management process is that the individual responsibilities for the project portfolio are executed within a structured, integrated PPM team. A growing popular term for the process of guiding the portfolio is governance. This is especially so in the information technology area, where the term of IT governance is becoming synonymous with project portfolio management.

### 6.2 Suggestion for further research

The investigation of how project portfolio management is implemented and applied in two organizational units of a large organization is a main contribution of this study.

The study suggests a deeper investigation through the research of the whole Company. It is recommended that a continuation of the study be made in 2-3 years from now, when the project portfolio management according to intention will be widely established and thus the results will be more evident.

A decision for doing new research has to be supported by the management and also HR function in order to enable the researcher to conduct the work and get proper support.
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Information regarding the company, processes is chiefly found in the homepage:

The Company database (last visit Oct. 2011)
## APPENDIX 1 – SUMMARY OF ANALYSES

<table>
<thead>
<tr>
<th>CONCLUSION</th>
<th>STRATEGY</th>
<th>EAPD</th>
<th>REG A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alignment (Projects are aligned with business objectives / Strategic fit/leverages core competence)</td>
<td>Strategic fit/leverages core competence</td>
<td>Strategic fit/leverages core competence</td>
<td></td>
</tr>
<tr>
<td>Value (Portfolio contains very high value projects)</td>
<td>Strategic bucket methods are not used</td>
<td>Strategic bucket methods are not used</td>
<td></td>
</tr>
<tr>
<td>Strategic (Spending reflects the business strategy)</td>
<td>Financial value is not used to rank projects against each other. Neither hurdle rate in order to make Go/Kill decisions on individual projects.</td>
<td>The financial value is used in analysing the success of the projects but not directly related to the strategic elements.</td>
<td></td>
</tr>
<tr>
<td>Timing (Projects are done on time (no gridlocks))</td>
<td>This is very a very critical aspect of R&amp;D project. The general opinion is that the planning is not good or unrealistic due to many factors as 1) no focus on planning 2) undefined the work scope 3) insufficient input 4) change of requirements 5) other constant changes</td>
<td>Project generally suffer delays, primarily due to the delays of R&amp;D deliveries or regulations issues. Lack of realism in capturing key factors of the projects/portfolio problems.</td>
<td></td>
</tr>
<tr>
<td>Balance (Portfolio has a good balance of projects)</td>
<td>Development, regulations (UNISIG ERTMS), platform, maintenance, process improvement and tools projects are the part of R&amp;D project. There is no analysis regarding the effort that should be put on them in terms of the balance. There is no either criteria which split is the optimal.</td>
<td>This is dictated by customer so there is no particular focus on analysing the balancing. The categorization of the projects could be done in this way in order to find and adress the problems: 1) projects with well-defined goals with well-defined methods to achieve those goals 2) projects with clearly defined goals but poorly defined methods to achieve those goals 3) projects with goals that are not clear, but well-defined methods or life-cycle to achieve them 4) projects where neither the objectives nor the methods are known.</td>
<td></td>
</tr>
<tr>
<td>Right Number (Portfolio has right number of projects)</td>
<td>Ad-hoc situation. High proliferation of the projects which leads to resource bottleneck.</td>
<td>No consistent approach but “appropriate” projects are considered. Time to market start to suffer as projects end up in a queue – waiting for people and resources to become available is an obvious consequence.</td>
<td></td>
</tr>
</tbody>
</table>

Table 1: Strategy – Summary of Analysis & Conclusion
Table 2: Processes – Summary of Analysis & Conclusion

<table>
<thead>
<tr>
<th>Processes</th>
<th>EAPD</th>
<th>REG A</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONCLUSION</td>
<td>There is a strong management process of individual projects though no applied consistently through the project life-cycle. Stage-Gate process is fairly new and just used in some projects. Project portfolio management processes do not exist in a formal and documented way but there are some elements that belong to PPM. The approach is rather confusing and creates conflicting objective but an urgent need exists and it is recognized.</td>
<td>There is the well-described project management process that is not consistently applied across all projects. However some rules and procedures should be simplified for example who is gate keeping group and their accountability to GoKILL or prioritize.</td>
</tr>
<tr>
<td>Project Management Process</td>
<td>There is the well-described project management process but it is not applied. Projects do not get support from the management through their action in those cases when the project manager tried to do it.</td>
<td>There is the well-described project management process that is not consistently applied across all projects. However some rules and procedures should be simplified for example who is gate keeping group and their accountability to GoKILL or prioritize.</td>
</tr>
<tr>
<td>Stage-Gate Process</td>
<td>No use</td>
<td>The process is used in some projects.</td>
</tr>
<tr>
<td>Program Management Process</td>
<td>There is no formal program management process. However, some program managers use the Road Map model to describe the plans of programs.</td>
<td>There is no formal program management process. However, some program managers use the Road Map model to describe the plans of programs.</td>
</tr>
<tr>
<td>Portfolio Management Process</td>
<td>Some parts of Portfolio Management process is described but on a very high level. No application.</td>
<td></td>
</tr>
<tr>
<td>Tools and Techniques (Methods)</td>
<td>EAPD</td>
<td>REG A</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>------</td>
<td>-------</td>
</tr>
<tr>
<td><strong>Conclusion</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variety of the methods, techniques and tools are used, though sometime unnecessary and too much. The important is: 1) To understand the nature of each method/technique and tool in order to be able to apply them correctly. 2) Tools and methods must be integrated 3) Criteria must exist for each method and techniques and they are consistently lacking.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Valuation criteria</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Portfolio Balanced Criteria</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Management Criteria</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Choosing a Valuation Method</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td><strong>Maximizing Value of the Portfolio</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paired Comparison</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Check Lists as Portfolio Tools</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Valuation Methods: Scoring Model</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Dynamic Rank-Ordered List</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td><strong>Achieving a Balanced Portfolio</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bubble Diagram</td>
<td>There is a tool but it is not used.</td>
<td>There is a tool but it is not used.</td>
</tr>
<tr>
<td>Variants of Risk-Reward Bubble Diagram</td>
<td>There is a tool but it is not used.</td>
<td>There is a tool but it is not used.</td>
</tr>
<tr>
<td><strong>The Need to Build Strategy into the</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product Roadmap</td>
<td>The Strategic Road map is used by product managers to described how they want to go or achieve their desired objectives.</td>
<td></td>
</tr>
<tr>
<td>Strategic Buckets Model</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Balance score carding methods (BSC)</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Monte Carlo Simulation</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Primavera - Project Management Module</td>
<td>It is primarily used with purpose to create a number of activities used for time reporting that is compulsory. The planning with regard to the work scope is done due to the customer's demand and thus customized to the contractual milestones. Regardless the underlying cause, the planning of individual projects is an integral part of the project management routines.</td>
<td>It is primarily used with purpose to create a number of activities used for time reporting that is compulsory. The planning with regard to the work scope is done in very few projects and often during a certain time period due to a specific management focus on a specific project. Otherwise, the planning is lacking for more than the majority of projects. Problems: complexity, diligence and discipline the tool require; lack of practical knowledge</td>
</tr>
<tr>
<td>Primavera - Portfolio Management Module</td>
<td>It is not used. However, some experiments are done with the main purpose rather to see how the tool works than to introduce the portfolio planning in its real meaning.</td>
<td>It is not used and there is no plan or initiative for making a try for this.</td>
</tr>
<tr>
<td>Portfolio Dashboard</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Primavera Timesheet</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Table 3: Tools and Techniques (Methods) – Summary of Analysis & Conclusion
<table>
<thead>
<tr>
<th>EAPD</th>
<th>GOVERNANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CONCLUSION</strong></td>
<td><strong>The governance exists on project (program) level. A governance of portfolio level must also exist once project portfolio management takes place. The role description and responsibility, which are lacking, must be documented and well-understood.</strong></td>
</tr>
<tr>
<td>Management of Operation</td>
<td>BT RCS Operation supports each part of the BT RCS. The R&amp;D Projects are run from different part of EAPD, so there is no a centralized unit as PMO/PPM/Management of Multi-Projects that could connect the operations and projects functions. There is no structured, consistent, and meaningful flow of information between these two groups.</td>
</tr>
<tr>
<td>Project management (perspective of the project as an agency for change and uncertainty management)</td>
<td>Yes</td>
</tr>
<tr>
<td>Program management (perspective of the project as a temporary organization and a product function)</td>
<td>No</td>
</tr>
<tr>
<td>Portfolio Management (perspective of the project as an agency for resource utilization)</td>
<td>No</td>
</tr>
<tr>
<td>PMO</td>
<td>There is no PMO functional unit but there are few people working on PMO questions.</td>
</tr>
<tr>
<td>Portfolio Reporting</td>
<td>No</td>
</tr>
<tr>
<td>Resource Allocation</td>
<td>The care about resource allocation has been taken the last year on the divisional level. What is need is: 1) extract project info and resource demand from project plan 2) validation project info and resource demand with project sponsor 3) updating the project registry 4) performing preliminary analysis of resource capacity and demand</td>
</tr>
</tbody>
</table>

Table 4: Governance – Summary of Analysis & Conclusion
APPENDIX 2 – SEMI-STRUCTURED INTERVIEW QUESTIONNEIR

The purpose of this questionnaire is to get some practical information about handling the lagging performance of team members by managers.

The purpose of this questionnaire is to evaluate the importance of ‘Pulse’ meeting activity towards minimizing the lagging performance of team members.

Name_____________________ Designation________________________
Company________________________ Email_______________________

PART 1: INTERVIEWER BACKGROUND

• What is your current position in organization?
• What are your roles and responsibilities?
• How long have you been working with projects?
• How big and long are projects on average?
• How many people are involved in each project?
• Can you explain how you organize the project?
• Which problems do you usually face in the projects? Please explain them.
• Could you give us some ideas for improvements? Please explain them.
• Could you give us an example of a successful project? Please explain the success criteria?
• What do you think which factors that lead to the success of these projects?
• What are the minimum criteria for the projects to be considered? E.g. financial result
• Which kinds of projects do you undertake? Could you categorize them?
• Do you have different process and methods of work for different projects?

PART 2: PPM PRACTICES

• Have you heard about project portfolio management?
  o If yes, please explain.
• How do you know about PPM?
• Do you know if PPM methodology has been used in your projects/departments/units?
  o If yes, please explain the methodology that you are playing?
• Do you have any documentation that supports the methodology?
  o If yes, please explain it.
• Do you think, the knowledge about PPM is spread throughout your whole organization?
• Do you think that portfolio management is a good system?
  o Can you mention some advantages?
• How do you measure the impact of using the portfolio management?
• Do portfolio techniques (methods) help in achieving results and how you measure the success of them (for example: customer satisfaction; user requirements; project success with regard to time, cost and outcomes; financial results)
• Do portfolio techniques (methods) help in balancing priorities? (Resource priorities; priorities between projects)
• Can you tell me what kind of training methods was available before you started implementation?

PART 3: STRATEGIC ALIGNMENTS

• Do you have an articulated NPD strategy?
  o If yes, explain more in detail and show documents about it.
• Do you know what strategy of your company is?
  o If yes, please provide me with a description.
• Do you know what strategy of your unit/department/organization is?
• Could you list down some strategic initiatives and goals that have been undertaking for coming years?
• Could you explain in which way your project supports the strategy of the unit?
• Do you measure strategic alignment of projects?
  o If yes, please provide me with more details.
• Is the strategy communicated within your department?
  o If yes, please tell me how it is communicated, how often and who does it.

PART 4: PROCESSES (General)

• Does your team review new product practices, perhaps using an actual case, and assess whether you management group is handling risk appropriately?
• What do you know about a new produce process and how much you follow it in your projects?
• Do you have different process for new product development projects and platform process?
• How do you conduct voice of-customer analysis since it is a powerful tool for uncovering new product opportunities?
• How do you catch and develop new ideas?
• How do you catch potential outside sources of ideas?
• Does your company do a solid job in terms of user needs-and-wants?
• When implementing new product process, do you make any effort to reduce cycle times of projects?
• Do you have and review your marketing plans for new product launches?

PART 5: PPM PROCESSES: PROJECT SELECTION, EVALUATION, SCORING

• Have you ever heard about portfolio selection techniques?
  o If yes, please explain how you know about it?
• Do you have a project selection process?
  o If yes, could you describe it to me and show the documentation?
• Do you have a visible list of go/kill and prioritization criteria for selecting projects (other then financial criteria if you even have those)?
• Have you ever heard about portfolio evaluation techniques?
If yes, please explain how you know about it?

- How do you review the success of performance of your portfolio?
- How often do you review your portfolio?
- How do you report the status of your portfolio? Do you use templates and metrics?
- How decisions are made regarding the portfolios? Which procedure do you have?
- Do you think that your management team foster an objective and not biased decision-making environment.

PART 6: TOOLS AND TECHNIQUES (METHODS)

- Which tools do you use and know?
- Describe the purpose of each tool.
- Is there reliance on data obtained from the tools?
- Are they user friendly and broadly accepted?
- How do you protect good projects to be killed in favor of these who are represented by “squeak wheel” or “pet” projects?
- Which techniques (methods) are popular and most appreciate?
- Do you use the same tools and techniques (methods) for similar work or it varies among departments and projects? What does it depend on?
- Do you have trainings about new tools?

PART 7: PORTFOLIO REPORTING

- How do you communicate the decisions to the rest of the organization?
- Which kind of reports do you have and for which purpose?
- Who is receiver of reports?
- Who does reports?
- Do you think they really wanted that information and use for the real actions or just use the reports for showing that the report in itself is done?
- What is a content of the reports?
- How do you follow actions decide during follow-up meetings of the reports?
- At which occasion do you present the reports? How often?
- Who is team that you present the reports?

PART 8: RESOURCE ALLOCATIONS

- Are you suffering from a resource crunch in your new product pipeline?
- How do you conduct resource capacity analysis?
- What is input and what is output of that analysis?
- Do you have enough of the right resources to handle projects currently in your pipeline?
- Do you have enough resources to achieve your new product goals?
- How do you know about resource capacity of the department/units?
- Who is producing those reports (capacity charts)?
PART 9: PMO

• Do you have a PMO in your organization?
• If yes, please give me details how it is organized.
• Who are the people working in PMO, their responsibility and education?
• How does PMO help you?
• How does PMO cooperate with other management functions?

PART 10: TYPES OF PROJECTS AND THE BALANCED PORTFOLIO

• What is the split of projects by type?
  o Please, draw a percent breakdown pie chart.
• What is the breakdown by project type in terms of total resource spent; that is, to which types of projects has your money and effort been devoted?
• What is the breakdown by sales and profits; that is, which types of products or projects are generation the revenues and profits? What is the success rate by type?

PART 11: SIZE OF PORTFOLIO

• How do you decide on the amount of work that can be undertaken by your department?
• How do you resolve over allocation?
• What actions do you undertake in case of a lack of assignments?

PART 12: DIFFICULTES AND CHALLENGES

• What do you think what are the biggest difficulties when comes to successful running projects in your company?
• What are the biggest challenges that should be undertaken in short- and long term for the perspective of your work and need?
• What do you think which are the biggest difficulties the organization faces in order to deliver projects on time, within budget and a satisfactory quality?

PART 13: PRIMAVERA QUESTIONNAIRE

I add here also a questionnaire that was sent by PMO Region A regarding critical issues related to Primavera as a tool and methods about project scheduling, time reporting, budgeting/forecasting, portfolio management, resource planning. The responsible person for collecting answers were interview by me and the answers were used in this report.
Dear all,

In order to identify and address issues related to the current setup and usage of Primavera, a working group with representatives from Region1, Region2, Region3, Region4 and PCS PMO has been formed. For the working group to better understand which critical issues may exist and how to resolve them, a set of standard questions has been compiled to be sent out to some of the key Primavera users within each region.

Please take a few moments to answer these questions. Your response is highly important and will help us to address any issues which you may have.

1. What do you use Primavera for today? (e.g., project scheduling, times reporting, budgeting/forecasting, portfolio management, resource planning etc.)
   - Does Primavera meet your expectations? (e.g., functionality, user friendliness, availability of information, templates etc.)
   - How do you see the current Primavera setup and processes add most value to your work?
   - How could the PCS setup and use of Primavera be further improved? (2 things in order of priority)

2. What OOS level of detail would be the best for your business needs?
   - Taking into consideration the answers to the previous question, how much planning support would be necessary in order to manage your project / project portfolio?

3. How much time on a monthly basis do you (and your project core team) spend on Primavera and related processes?
   - What is the split between different activities? (e.g., scheduling, resource management etc.)
   - How could the added value from Primavera be increased without spending more time on Primavera and related processes?

4. Does your current organisation sufficiently support the use of Primavera?
   - How could we be organised to get more out of Primavera / to get better Primavera support?

5. What kind of additional Primavera-related training do you need?
   - How would the additional training improve your ability to use Primavera and the information coming out of Primavera?

6. What is the best with Primavera?
   - What is the worst with Primavera?