

## Managing Innovation Project Portfolio: The Case of Philips Research

Sergey Filippov<sup>1</sup>, Herman Mooi<sup>1</sup>, Ferrie Aalders<sup>2</sup>, Roelof van der Weg<sup>3</sup>

1 Delft University of Technology, Delft, The Netherlands

2 Philips Research, Eindhoven, The Netherlands

3 ViaDW Consultancy, Apeldoorn, The Netherlands

(E-mail: s.filippov@tudelft.nl, h.g.mooi@tudelft.nl, ferrie.aalders@philips.com, rwg@viadw.nl)

**Abstract** Project Portfolio Management (PPM) has emerged as a central tool of governing multi-project environments in modern organisations. The paper presents a case study of project portfolio management at Philips Research, a research division of Royal Philips Electronics Inc., a multinational electronics company. We examine the initial conditions and main motivation to implement PPM in the company. Further, we study characteristics and specifics of managing a portfolio of innovation and research projects in Philips Research. Last but not least, we elaborate on the prospects of PPM in the company.

**Key words** Project management; Innovation; R&D; Strategy

### 1 Introduction

Project Portfolio Management (PPM) has emerged as a central tool of governing multi-project environments in modern organisations. As a basis, PPM was understood as a tool of selecting the right projects and aligning them to the company's strategy. While the project management methods address the issue of 'doing the projects right', the project portfolio management was supposed to deal with the issue of 'doing the right projects', i.e. selecting and prioritising among several projects. However, the issue is more complex. Modern PPM is a multi-dimensional concept, not limited only to initial selection of projects. Despite the recognised importance of this topic and numerous academic and practice-oriented publications on PPM, research is lacking a critical mass of empirical evidence.

This paper aims to critically examine implementation and applications of PPM in Philips Research, a research division of the multinational electronics company Royal Philips Electronics Inc. Philips Research offers an interesting environment for the study since this organisation possess a well-established, mature PPM. Moreover, all projects covered by PPM are of R&D nature. Management of R&D projects is a distinctive area of research within the discipline of project management.

The fundamental research question driving this study is formulated as: How is Project Portfolio Management used in Philips Research?

This leading research question is translated into a set of sub-questions. Firstly, while the benefits of PPM are widely acknowledged both in academic literature and consultancy reports, and each individual organisation may have its own goal in implementation of PPM that may differ from a set of commonly acknowledged objectives. Hence, the first sub-question is:

(1) Why is Portfolio Project Management applied or implemented (what are the strategic aims and motivations)?

The motivation to apply or implement PPM may impact the manner in which PPM is conducted. Companies may adopt their own idiosyncratic approaches to PPM, having PPM as a comprehensive system or as a patchwork of various processes. Alternatively, organisations may rely on PPM methodologies designed and popularised by professional project management associations and consultancy companies. The role of a portfolio manager is seen as crucial in this respect. A portfolio manager can form his/her knowledge of PPM from a specialised literature and/or other sources. This reasoning gives ground for the second sub-question:

(2) How is the project portfolio managed?

The organisation of PPM and techniques of project management may not be the optimal ones, and room for improvement may exist. As companies strive for excellence in their organisational processes, the study aims to investigate what companies perceive as deliverables of their current PPM processes, and if the current PPM practices are not optimal, in what way they are improved.

(3) How can/should the current PPM practices be improved?

The paper is structured as follows. In the next section, literature is reviewed in accordance with the main research objective. Section 3 describes the case. Finally, Section 4 concludes and provides managerial implications of the study.

## 2 Literature Review

### 2.1 Projects and portfolios

When reviewing the PPM literature it seems to be of utmost importance to outline the distinction the present theory makes between project, programme and portfolio and to separate them conceptually.

The Project Management Institute defines a project as ‘a temporary endeavour undertaken to create a unique product or service’ (PMI, 2004, p. 5). (Turner 1999) suggests a more elaborate definition:

‘a project is an endeavour in which human, financial and material resources are organised in a novel way to undertake a unique scope of work, of given specification, which constraints of cost and time, so as to achieve beneficial change defined by quantitative and qualitative objectives’.

A portfolio is a group or set of projects with varying characteristics (Meredith and Mandel, 2010), or ‘a group of projects that are carried out under the sponsorship and/or management of a particular organisation’ (Archer and Ghasemzadeh, 1999, p. 208). Smaller organisations might have only one project portfolio, while larger organisations may have separate portfolios for strategic and operational projects as the selection criteria and evaluation differ substantially (PMI, 2003).

In its landmark manual ‘The Standard for Portfolio Management’, The Project Management Institute (PMI, 2006, p. 4) provides an all-encompassing definition of a portfolio:

‘A portfolio is a collection of projects (temporary endeavours undertaken to create a unique product, service, or result) and/or programmes (a group of related projects managed in a coordinated way to obtain benefits and control not available from managing them individually) and other work that are grouped together to facilitate the effective management of that work to meet strategic business objectives’.

A crucial point of the above definition is that a portfolio is not a ‘pile’ of projects, rather it is an effectively managed collection; and it is managed with an ultimate goal of achieving strategic business objectives.

PMI (2006) outlines four main characteristics of a project portfolio. Firstly, all components of a portfolio represent investments made or planned by the company. Secondly, these components should be aligned with the company’s strategic goals and objectives. Thirdly, all components typically have some distinguishable characteristics allowing the company to cluster them for more effective management; usually this is done in programmes. And fourthly, all components of a portfolio are quantifiable, i.e. can be measured, ranked and prioritised. This is critical because an important mission of portfolio management is about making decisions about allocation of resources or choosing between different alternatives. These decisions should be based on objective (measurable) data.

### 2.2 Project portfolio management: evolution and definition

In its most general form, Project Portfolio Management is a term used to describe methods for analysing and collectively managing a group of current or proposed projects based on numerous key characteristics. In this respect, the fundamental objective of the PPM is to determine the optimal mix and the sequence of proposed projects to achieve the organisation’s strategic goals, taking into account resource constraints of project management. Hence, PPM is a dynamic decision-making process enabling to meet the business strategy (Cooper et al, 1999). Likewise, (Levine 2005) describes project portfolio management as a set of business practices that brings the world of projects into tight integration with other business operations. (PMI 2003) refers to selection and support of projects or programme investments.

This view is reflected in the Standard for Portfolio Management by PMI (2006, p.5), ‘portfolio management combines (a) the organisation’s focus of ensuring that projects selected for investment meet the portfolio strategy with (b) the project management focus of delivering projects effectively and within their planned contribution to the portfolio’. PPM’s mission is not only about selection of projects, but also about their effective and efficient execution.

In a comprehensive practice-oriented guide to the world of PPM, (Rajegopal et al. 2007) describe the following benefits of PPM, inter alia, better co-ordination between different departments in an organisation, tighter alignment with organisational objectives, maximised portfolio value with optimal balance, increased transparency and streamlined decision-making, better resource utilisation. In the absence of PPM, an organisation risks to find itself in a situation when individual projects are judged on an individual basis without global vision.

### 2.3 Project (portfolio) management and business strategy

The alignment of strategic priorities (strategic fit) has become a central theme in the strategic management literature, and as the previous section shows, alignment of project portfolio with the

organisation's business strategy is the most crucial task of PPM.

The literature on alignment of the business strategy and PM is still scant; and most studies connect project management to business strategy through project selection, and perceive this link as part of the alignment process (Bard et al, 1988; Cooper et al, 1998a; Englund and Graham, 1999). Despite this straightforward view, this link is often elusive. Cooper et al (1998a) state that there is often no link between strategy and project selection. Despite clear business and strategies, the spending on projects does often not reflect the stated strategy and priorities.

These examples vividly show that the issue of alignment is more complex as it may seem at first sight.

It is only recently that the alignment of project management and business strategy has become an object of thorough scholarly examination (Arto and Dietrich, 2004; Jamieson and Morris, 2004; Anderson and Merna, 2003). For instance, Srivannaboon and Milosevic (2004) designed a theoretical framework using mediating processes that a company develops as mechanisms to ensure proper alignment.

The literature suggested that strategic priorities at the functional level to be aligned with the support business-unit-level strategies (Joshi et al, 2003). These business units are R&D, production, human resources, information technology, etc. Surprisingly, project management is rarely seen as a functional strategy, and yet the projects are basic building blocs of organisational strategy in many companies (Cleland, 1999; Srivannaboon and Milosevic, 2006).

Srivannaboon and Milosevic (2006) understand the alignment between the business strategy and project management as the degree to which priorities of the organisation's project management are compatible with priorities of its business strategy. However, as the authors observe, to date, the extant body of literature does not explicitly talk about the relationship between business strategy and project management in a cohesive and comprehensive way.

Scholars have conducted a number of empirical studies taking the strategic fit under the magnifying lens. Scholten et al. (2010) analyse differences in strategic alignment between the project manager and other executives working on the project. Existence or perception of the gap between project managers and senior executives is quantitatively confirmed; and it is shown that this gap (strategic misalignment) negatively influences the rate of project success.

Based on a research project comprised of 128 in-depth interviews in 30 companies, Blichfeldt and Eskerod (2008) identify a major problem in relation to implementation of PPM in organisations. The authors find that PPM often covers only a sub-set of on-going projects, while projects that are not subject to PPM tie up resources that initially were dedicated to PPM projects. They argue for inclusion of all projects in PPM. In its essence, the study reveals a major problem that the literature signals, namely, the misalignment between the business strategy and project management.

The need for further research on the strategic alignment between strategy and project management stems from the current business realities when projects are often chosen as vehicles of implementation of the business strategy (Morris and Jamieson, 2004). Misalignment between the business strategy and project strategy may lead to the organisation's inability to grasp new market opportunities and sustain competitive pressures.

It can be concluded that strategy can be implemented through various means, not necessarily projects. However, if projects are executed in a company, they have to be aligned with strategy.

#### **2.4 Project portfolio management processes**

PPM as a continuous activity encompasses a set of processes. Organisational Project Maturity Model 3 (OPM3), developed by the Project Management Institute, summarises the main activities essential to PPM (PMI, 2003, p. 24): (a) translating organisational strategies into specific initiatives or business cases that become the foundation for programmes and projects; (b) identifying and initiating programmes and projects; (c) providing, allocating and reallocating resources to programmes, projects, and other activities; (d) maintaining a balanced project portfolio; (e) supporting the organisational project management environment.

More specifically, Turner (2009, p.328) suggests a five-step process for PPM

- (1) Maintain a list of all current projects in a project database;
- (2) Report the status of all projects through a central project-reporting system;
- (3) Prioritise and select projects through a transparent system maintained centrally;
- (4) Plan and assign resources on all projects centrally;
- (5) Evaluate the business benefits of all projects post-completion.

All components of a portfolio must be quantifiable, i.e. can be measured, ranked and prioritised.

These characteristics are necessary for the implementation of the above list of processes. Conventional characteristics of projects, most commonly they include the project's total expected cost, expected timeline / duration and schedule of investment, consumption of resources, and expected nature, magnitude and timing of benefits to be realised in the project. Each project is evaluated in terms of its contribution to the performance of an organisation.

Most common evaluation methods are

- economic returns, which include Net Present Value (NPV), Internal Rate of Return (IRR), Return on Original Investment (ROI), Return on Average Investment (RAI), PayBack Period (PBP), and Expected Value (EV);
- benefit/cost techniques, involving the calculation of benefits to costs;
- risks, as a combination of the probability of a risk event and its impact on the project promises;
- market research approaches, used to collect data to forecast the demand for new products and services (Archer and Ghasemzadeh, 1999).

In its turn, portfolio selection involves a simultaneous comparison of a number of projects on specific dimensions in order to make up a desired portfolio. Groups of available portfolio selection techniques include:

- ad hoc approaches, such as profiles (a crude form of scoring model), and interactive selection (an interactive and iterative process to choose the best project);
- comparative approaches, including Q-Sort, pairwise comparison, the Analytic Hierarchy Procedure (AHP), dollar metric, standard gamble, and successive comparison;
- scoring models, use a relatively small number of decision criteria (costs, work force availability, etc), and scores are then combined (technique called "Weighted Factor Scoring");
- portfolio matrices, meaning graphical representation of the projects under consideration on two dimensions – likelihood of success and expected economic value;
- optimisation models – select from the list of candidate projects a set that provides maximum benefits (Archer and Ghasemzadeh, 1999).

The frequency of portfolio assessment is not rigidly fixed, as it depends on the organisational context. Deloitte Consulting, for example, suggest that there is no need to re-optimize a portfolio every week, but quarterly assessments are highly recommended. Otherwise, there is no opportunity for making adjustments and tracking continued alignment.

There is no generic way of designing a PPM and each organisation should adopt specific techniques and methods reflecting its unique environment and corporate strategy. The key challenge to implement an effective PPM process is typically a political will and determination of the organisation's leadership.

Supporting IT systems may enable visibility, standardisation and process improvement, with the overall objective to manage the continuous flow of projects. Various software packages may treat projects as part of an overall investment portfolio, and rely on established financial portfolio optimisation methods, overlooking or even ignoring other important indicators. It should be highlighted that the software plays only a supportive role to PPM. Critical are the strategic decision to introduce PPM and the shift in philosophy at senior management level entailing an organisational change.

### **2.5 Project portfolio management: implementation and organisation**

As is emphasised above, PPM is not only an IT system or a set of indicators of project performance. When introduced, PPM entails substantial changes in the way an organisation is run. Firstly, PPM is unthinkable without commitment and devotion of all members of the organisation, and specifically, its senior executives. In fact, PMI's (2006) *The Standard for Portfolio Management* devotes a section to the link between PPM and organisation. Specifically, it describes roles of all actors involved in PPM – executive managers, sponsors, portfolio managers, programme managers, project managers, etc. These descriptions, however, are very generic and do not provide insights in how such system can function in practice.

Yelin (2001) argues that the role of executives in the PPM processes is one of the determinants of PPM success. Firstly, it is crucial to start with a clear organisational structure of PPM. Within this structure all roles, accountabilities, sources of information and other elements are clearly defined.

Further, Makleff (2005) argues that the implementation of PPM practices comes with change in the organisation. Because each organisation is different in terms of its maturity level and the ability to manage change, a planned phased approach should be used to implement PPM. A gap analysis should identify PPM focus areas; they are to become initial targets of PPM. Further, a governance process should be developed, entailing that consistent processes are adopted throughout the organisation. The

governance structures should be tailored to the organisational environment.

### **2.6 Portfolio management of innovation<sup>①</sup>**

Historically, the PPM process was developed for project-intensive organisations, like construction and engineering companies and R&D. Later, PPM has been deployed to govern IT investments, M&A, asset and capital management. Recently, with the growing importance attached to innovation and technology, scholars as well as practitioners have explicitly looked at the implementation of the PPM to manage innovation.

In 1991, global consultancy company Arthur D. Little was one of the first to pay a specific attention to the role of technology in PPM frameworks (Roussel et al, 1991). In its comprehensive framework four elements of individual projects are assessed – technological competitive strength, technology maturity, competitive impact of technologies, and R&D project attractiveness.

It is widely acknowledged within the discipline of innovation studies that there is a high percentage of failure of innovation initiatives. In other words, failure is inevitable when managing innovation (Tidd et al, 2005). Likewise, a high percentage of failure is recorded for projects; projects are cancelled midstream, exceed budget and/or may be too late (Anbari and Kwak, 2004). As Matta and Ashkenas (2003) put it, ‘Big projects fail at an astonishing rate’. Hence, innovation project management faces a double challenge caused by the complex natures of both innovation and projects. In this respect, PPM methods aim to improve product success rates by ensuring that a strategically aligned portfolio of innovation projects is maintained (Killen et al, 2008).

To improve project success rate, the portfolio of innovation projects must contain a balance of projects in terms of risks, project types, etc. and ensure efficient use of resources. While it is generally acknowledged that application of PPM helps improve innovation performance (Cooper et al, 1998b; Matheson and Matheson, 1998), empirical research in this area remains limited to date (Killen et al, 2007).

We shall outline several studies on the topic of innovation PPM. Ringuest et al. (1999) point to displeasure of R&D managers with performance of R&D projects and note that most conventional models and approaches for assessment of R&D projects evaluate them in isolation from each other, and fail to account for the risk-mitigating effects of incorporating projects into the existing portfolio. The authors develop a basic model addressing the risk in R&D projects.

Likewise, McDonough and Spital (2003) acknowledge that only few companies are satisfied with the way the portfolios of new product projects are managed. On the basis of a survey among New Product Development managers the authors formulate several conclusions. Some of them are as follows. Managers argue “Don’t avoid risk, manage it”. Some slack capacity should be left, thus companies that keep some development resources in reserve are significantly more likely to meet their portfolio objectives. Considering reviewing the portfolio of projects, portfolios that have a higher percentage of products that are successful in the market place are reviewed more frequently. It implies that more frequent reviews may improve performance by reducing the feedback cycle time and more quickly reducing uncertainty.

In their book *Payback: Reaping the Rewards of Innovation*, Andrew and Sirkin (2007) describe a typical innovation project portfolio, which can be sub-divided into three groups. One third is proven winners; another third are still at the beginning phase, so they can’t be fully evaluated. The remaining one third of projects has not been successful, but they are still executed. 48 Per cent of senior financial executives surveyed by the authors expressed dissatisfaction on the financial return on innovation spending. Andrew and Sirkin (2007) found that CFOs use only a few metrics to track the performance of their innovation projects; 63% of interviewed CFOs use five or fewer metrics for monitoring.

Overall, it emerges that standard performance measures to evaluate PPM in relation to innovation, NPD or R&D projects do not exist. Metrics best applicable in one case may not be appropriate for different environments (Hauser and Zettelmeyer, 1997).

## **3 Case Study**

Philips Research is part of Royal Philips Electronics, a large multinational electronics producer,

---

<sup>①</sup> For the sake of clarity and simplicity, and without going in depth into terminological clarifications, in the current research we use the terms “innovation project”, “new product development project”, “technology project”, “R&D project”, etc interchangeably, essentially with the same meaning.

one of the largest electronics companies in the world (Table 1). It is responsible for the research and generation of new technologies.

**Table 1 Case Study Description**

|   |                                 |
|---|---------------------------------|
| Company   | Philips Research                |
| Industrial sector                               | High-tech electronics           |
| Number of projects per year                     | 380                             |
| Number of project managers                      | 340                             |
| Typical project duration                        | 3 years                         |
| Typical project budget, €                       | 450 000 (range from 0 to 1 mln) |
| Typical size of a project team                  | 2 fte                           |
| Typical type of projects                        | Research                        |
| The project portfolio share in total activities | 100%                            |
| PPM established in                              | the 1990s                       |

Before proceeding with the analysis, we outline the vision on the essence of PPM. The representative of Philips Research defines PPM as a tool to manage the ‘multi-stakeholder environment’. Many parties are involved in projects with diverse (conflicting) interests and PPM enables to reconcile these interests. PPM allows to ‘to align, compromise and balance’.

### 3.1 Relation to business strategy

It emerges that Philips Research introduced PPM for a variety of reasons, reflecting diversity of motivation. This section outlines the main thinking behind these decisions.

#### Organisational complexity and growth of projects

In Philips Research, PPM exists for quite a long time; it was introduced more than a decade ago. As a matter of fact, the company was dealing with multi-project management issues far before that time, but only later it adopted the name PPM. Research leadership felt a need to improve PPM processes and has been doing so over successive cycles since its introduction. In parallel, steps were taken to advance its supporting IT systems.

#### Doing projects right

Strictly speaking, enhancement of project management practices per se is not the real aim of PPM. Nevertheless, many organisations introducing PPM highlight the role of improved transparency and better overview of all on-going projects. This intention to improve transparency calls for greater uniformity in the way projects are organised. Achieving greater uniformity is meant to improve the project management governance, i.e. ‘doing the projects right’. In Philips Research, processes have been defined for project management that allow for a large variety of research topics to be investigated. Different levels of uncertainty can be handled, from “roadmap”-type of project with clear, relatively short-term deliverables up to more exploratory longer-term projects with less concrete deliverables.

#### Doing the right projects – Strategy alignment and commitment of senior executives

Philips Research closely aligns all its research projects with the business Sectors of its mother company. In other words, it is meant that results of research projects will be applied in products of the company’s main business lines. PPM is a well-established standard that all senior executives in the mother company are aware of. Senior executives responsible for the main business areas are intimately involved in PPM at Philips Research. The Board of Management funds projects aimed at exploration of new business opportunities or technological areas to secure long-term opportunity generation. These projects are often less directly derived from the existent business strategy.

#### Share of projects in all business operations

Commitment and dedication of senior executives is often interrelated with the share of projects to the total business (in other words, the balance between projects and activities performed on a functional basis). We identify three distinctive models of interplay between PPM and all business areas.

Model 1: Partial Overlap. PPM covers business operations only partially. Most activities are done functionally; and specific tasks are executed as projects.

Model 2: Sectoral Overlap. PPM covers only a specific business sector/area (e.g. IT). All activities in this sector are done in projects. Activities in all other areas are performed on a functional basis: either they cannot be done in projects (e.g. sales), or they there is no political will to adopt project management for them.

Model 3: Complete Overlap. PPM fully covers all business operations; it can be described as ‘projectification of an organisation’. This is the case of Philips Research, where all research activities (i.e. the primary process) are done in projects; and functional work does not exist except in supporting

areas as IT or Finance or the separated services division MiPlaza. In the research part of the organisation, we find PPM as a natural way of working, whereas other companies characterised by Model 1 or 2, have more difficulties in bridging the gap between daily routines and processes versus projects.

Trigger to implement PPM

In Philips Research, the decision to further improve its project governance and to introduce PPM (back in the 1990s) was connected to the organisational changes in its mother company and increasing competition in and commercialisation of applied research. In the 1980s, all research was organised in functional departments. At that time, researchers enjoyed more scientific freedom, and could explore new things their managers considered as interesting and/or promising. The parent company itself had a very broad range of businesses. Therefore, outcomes of these research initiatives could be easily applied in new products. The business situation changed drastically in the 1990s. The market became more competitive and the mother company decided to focus its business portfolio. Philips Research became positioned closer to the businesses of Philips, which started to pay directly for research activities. In this period, it was decided to use project management as the main tool to manage research activities. Along with that, portfolio management was introduced. After 2000, the mother company started to focus on three business areas: Healthcare, Consumer Lifestyle and Lighting. This had direct implications for Philips Research that had to focus its research activities too. The number of programmes was reduced from 8 to 3 between 2003 and 2008. In 2009 a 4<sup>th</sup> program was added, called Open Labs, doing research for 3<sup>rd</sup> parties.

### 3.2 General organisation, specifics and characteristics

Reflecting differences in motivation to implement PPM and starting conditions of this implementation, there are significant variations in the actual organisation and formalized process for PPM, including budget cycle, selection criteria, assessment and review with respect to PPM. Project management literature considers programmes as an important element of a project portfolio. As stated in the literature review, portfolios are made up out of projects and programmes in general. In most companies programmes exist in various forms and shapes.

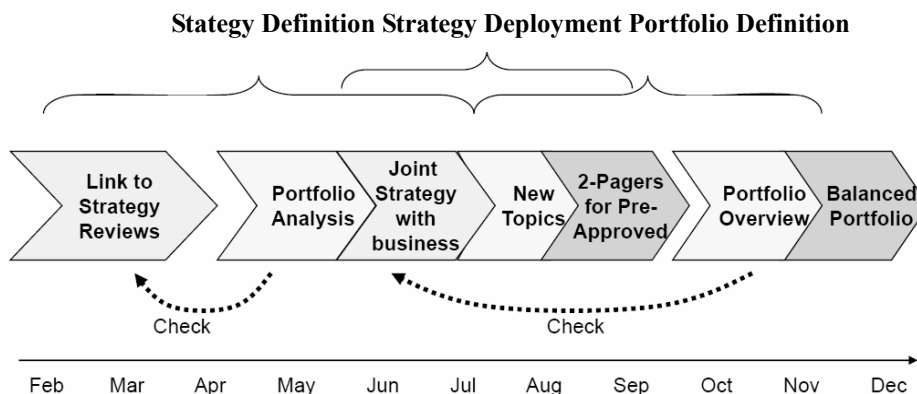
Philips Research organises all its research projects in 4 programmes, of which three are extensions of the business Sectors of its mother company. The fourth one, Open Labs, is inspired by the concept of Open Innovation (Chesbrough, 2003). Within this programme, projects, initiated and funded by external parties are executed, provided they do not compromise the commercial interests of Philips and build upon existing competencies or strengthen new ones of potential future interest for Philips. Each programme is managed by a Programme Board, made up of the Programme Manager, Account Managers, and a few others coordinating university relations or business initiatives.

Philips Research is organised in a matrix form which was introduced in the summer of 2009. The 4 programmes are executed in 5 divisions. Each division contains departments grouping researchers with a particular mix of competencies. Projects initiated within the framework of any of the 4 programmes may rely on resources from any of the 5 divisions. Each programme is managed by a Programme Board, and each division is managed by a division management team. Such organisation allows for more flexibility and streamlining of the PPM process. The main idea of this matrix system: programmes have financial resources and define the objectives of the research, and divisions have competencies and human resources to staff and execute the projects.

Planning, time and scheduling

Regarding planning of PPM, it ranges from PPM without explicit phases to PPM with distinct cycles. In the first extreme, the planning is done on the level of individual projects and they are all grouped into a portfolio. On the other hand, PPM as such can have very clear boundaries – beginning and end, and all projects should fit within this planning cycle of the portfolio.

In Philips Research, PPM is organised on a basis of an annual planning cycle (Figure 1). PPM is tightly related to strategy. Therefore, the annual cycle includes strategy definition, strategy deployment and portfolio definition. The portfolio is regularly checked against the strategy. In practice, this is done for the 4 research programmes in parallel. Boundary conditions for the programmes to fit within the overall portfolio are defined by the Research Management Team in the middle of the year. Strategy input from the Philips Sectors and Board of Management is used to balance interests. The Open Labs programme is agreed with external investors at more arbitrary points in time during the year.



**Figure 1 Annual Planning Cycle in Philips Research**

3.2.1 Financing

Limitations in available financial resources and the need to use these resources effectively and efficiently is a fundamental motive behind PPM.

The Board of Philips Group annually provides a specific budget for research. It is meant not only for the programmes, but also for a set of ‘innovation themes’ that do not coincide with the existing businesses in the 3 Sectors, but represent longer term (new business) opportunities for the company. The research programmes in Philips Research are sponsored by the three business Sectors of the mother company for about 60% of their portfolios. Overall, there are five financial sources: (1) The Philips Board of Management, (2) Contract Research paid by the Philips Sectors, (3) External parties via the Open Labs research Programme, (4) public funding (subsidies), (5) revenues from special services delivered to external parties branded under the name MiPlaza. Some projects (e.g. software development) require only workforce, while others will need expensive lab equipment or infrastructure that comes on top of workforce cost. This requires detailed financial planning per project. Projects in the Open Labs programme also need special attention in the forecasting process.

Obviously, the amount of money required for all proposed projects is often substantially higher than the available budget. Therefore, all project proposals in all programs go through a formal selection process.

3.2.2 Selection criteria and the role of the portfolio managers

Selection of projects is a critical function of PPM; as it should ensure ‘doing the right projects’. Globally, projects should be aligned with the business strategy. Philips Research tightly relates its research projects to the three Philips business Sectors. The programme managers are each responsible for the strategic alignment of their portfolio with the business and the selection process to compose the portfolio.

Two aspects influence the selection process. Firstly, the research-oriented nature of projects and secondly, substantial differences in the business lines of its mother company. In the ‘Healthcare’ programme, the long-term vision and objectives are clearly defined. Multi-year product roadmaps are agreed between business and Research. Thus there is limited room for bottom-up initiatives, and most research projects are initiated by the Programme Board in close cooperation with business management at the Healthcare Sector. The ‘Consumer Lifestyle’ programme is at the other extreme. Here more creativity and scientific freedom is expected in formulation of new ideas and projects. Shorter product life cycles and more rapidly changing market circumstances require more shorter-term initiatives and ideas. This is sometimes referred to as ‘Technology bets’. The ‘Lighting’ programme is currently in transition and therefore somewhere in between. A mix exists of ‘traditional’ product lines and roadmaps in incandescent and fluorescent lighting and completely new solution areas in solid state lighting (LED technology and applications). Priorities are well defined in the more traditional areas while at the same time there is a degree of freedom to revolutionise the industry in the new technology areas. Initiative of staff in formulating project proposals is encouraged especially in these new areas.

Project proposals are raised by experts in the Research departments, within boundaries defined by the leadership of a programme (since programmes assign the budgets). An initial idea is stage-wise refined and complemented with the necessary description and planning. Negotiations take place between the involved parties on the necessary competences. Finally, the proposals are discussed with the business for approval. From start to end, this process takes 3-6 months, see Figure 1.



Philips Research is completely project-based; therefore the intrinsic tension between functional operations and project management is not observed here. Because all business activity is done in projects, the management system is tailored to projects. PPM is part of the management process 'Strategy and Programme definition' in the Research Key Process Framework. A small Program Office supervises the execution of the process as depicted in Figure 1 and coordinates improvements over successive cycles, including IT-implementation.

### 3.2.3 Monitoring, review and assessment

Regular review and assessment are critical for the success of PPM. Progress reporting can differ according to various criteria, such as frequency (weekly, monthly, quarterly), reporting level (to medium- or top-level executives, or the Board), status of individual projects versus status of project portfolio, or both, etc.

Project reviews (with representatives from Research and the involved Sectors) are held in Philips Research about 2-3 times a year; and progress reporting is done 2-4 times a year. The resulting portfolio is evaluated annually along multiple criteria, e.g. strategic fit, portfolio's potential for improving the company's competitive position, ensuring a right balance between different types of projects, existence of effective partnerships with external companies and institutes, portfolio's consistency with current and future capabilities, probability of success, time to market, etc.

A critical issue in relation to review is the decision to terminate ('kill') a project. Research and innovation are intrinsically risky activities and their outcomes cannot be always surely predicted and planned. Annually, on average about 1/3 of projects are continued; 1/3 redirected and 1/3 stopped. This is heuristics rather than a planning requirement. The fact that about 1/3 of all projects are stopped ('killed') does not mean a failure in terms of project management. They might be well on time and within earmarked budget, but stopped due to a variety of technological, business and other reasons. Furthermore, often the company sets very ambitious and far-out targets and objectives for its research projects, and thus right from the onset it is expected that not all research projects will succeed. Still, intermediate results of stopped projects can be used, patented (i.e. transformed to intellectual property) and commercialised. Knowing that specific results cannot be achieved can also be very valuable information for taking business decisions. Establishment of spin-offs is encouraged to further develop results of stopped projects in case commercialization is not pursued within Philips. Alternatively, intermediate outcomes of stopped projects can be sold to third parties if it does not undermine the competitive position of the Philips.

### 3.2.4 Project management standards and IT systems

Organisations may use a variety of techniques and approaches in managing projects. These methods are used in a combination with certain IT systems facilitating functioning of PPM.

Philips Research applies an in-house developed PM methodology. This is a deliberate choice due to the diversity of all its projects. The IT system supporting PPM is 'home-made' too. It is a database which includes detailed information about projects, deliverables, planning, project owners, progress reports, environmental impact of the projects, patterns of cooperation, etc. Furthermore, all project output is tagged and linked to the project identifier. Its overall structure has been described by Aalders and Arensman (2005).

### 3.2.5 Staff training and certification

Since successful PPM is based on 'doing the projects right', project managers play an important role in this process. Training of project management competences as well as career development in relation to project management roles are important instruments to increase the chance of successful execution. Philips Research highly values its human resources. It aims to employ 'only the best', 'excellent scientists' from a variety of backgrounds, resulting in a multi-disciplinary, multi-cultural environment with people of over 50 nationalities. Employees should be societally-aware, i.e. should be able to understand societal problems. The company has a 'Career Mobility' approach in which an employee generally stays for 5 years in a specific position, and then he/she is transferred to a different department, either within Research or in other parts of Philips.

An average project team in Philips Research consists of 2 FTE; and it can potentially imply that 50% of staff are project managers. At the same time, experience in managing a project consisting of 2 people might be not recognised outside as an asset for further career development. Philips Research does not require any professional or internal project management certification. Instead, it offers a set of in-house PM courses:

- 1-day course 'Working on a Project' for people (e.g. scientists) who have never before worked in a project-like environments;

- 3-day course ‘Managing a project – a general introduction to project management, phasing, planning, risk management, etc.;
- 2-day course ‘Project Leader @ Philips Research’ with 4 parts, each half a day long:
  - ‘Research’ – the processes and background of research-specific aspects of project management,
  - ‘Project Leader and the Team’ – how to manage creative team members in a research project environment,
  - ‘Project Leader and the Customer’ – how to manage the interaction with customers in the mother company’s sectoral businesses (or external investors),
  - ‘Project Leader and the Business’ – how to reap the value from research, e.g. new business creation, start-ups, etc.

Participation in these courses is voluntary; and hence not everyone follows all the courses systematically. Selection of employees for project management roles is largely based on seniority and experience as a researcher in a particular field. Recently, encouraging and even enforcing staff members to take project management courses have been strengthened as a means to raise project management maturity throughout the organization. Formal project management certification is seen as less relevant because of the expediting nature of the projects at hand.

‘Encouragement’ alone to follow professional courses might not be enough. Project managers overloaded with their daily routine might not have time to enrol into professional project management courses. Needless to say, if professional certification is not required by a company in order to run projects, project managers would not see its added value. Focused in-house training seems an optimal solution. Philips Research serves as an excellent example in this respect.

### 3.2.6 Staff commitment

Formalisation of project management practices (e.g. requests to regularly report project status) and enforcement to follow training courses, may trigger cultural resistance among project managers. Enforcement of discipline among project managers (specifically in terms of filling out review forms and updating on the current status of on-going projects) does not always deliver intended results. This is observed specifically in companies where review forms are complex and user-unfriendly. In order to improve reporting rates, portfolio managers might simplify these forms, allow certain flexibility and provide personal encouragement to staff.

In Philips Research, formal reporting is often viewed as a burden by staff members. Nonetheless, around 70% of projects are well reported, 20% provide reasonable reporting, and only 10% provide no formal reporting at all. This does not mean that there is no structured communication between the project and its customers. On the contrary: where communication is tight, formal reporting is often seen as additional bureaucracy and administration. This challenge is understood by the company leadership, and therefore certain flexibility in reporting is allowed. For example, instead of filling out a standard reporting form, a project manager can submit slides of the presentation he/she gave to the project customer.

## 3.3 Challenges and improvement

### Challenges

Philips Research sees challenges in its further maturity and growth of PPM. For example, more and more aspects will have to be included in PPM, several aspects of project management need to be enhanced, and more interfaces with stakeholders need to be managed because of Open Innovation. Different types of financing entail a need for better planning and financial control. More specifically, there is a tension between the internal annual PPM cycle and external contract research. All the projects are so far assessed and planned in specified sequences. An external investor can approach Philips Research with a project proposal at the end of the PPM cycle, when the portfolio has been formed. When the project proposal seems attractive, it has to be accommodated in the portfolio at short notice.

Another challenge is the risk of ‘Sectorisation’ of Research, stemming from segmentation across the programme lines. Each programme has its distinctive features (linked to the business cycles of the Sectors), but Philips Research strives for cross-fertilisation of knowledge and synergy in execution. In the execution, there is a continuous tension between the creative process, requiring an expediting approach, and being a reliable innovation partner towards the Philips Sectors and external contract partners, who ask for delivery on pre-agreed milestones and timing.

### Plans for further improvements

Philips Research, possessing a well-established and reasonably mature PPM for more than a decade, still has further plans for improvements. A renewed process definition has been made recently, including new aspects like more detained financial planning and planning of required services from MiPlaza.

Alignment between the different programmes is strengthened to reduce growth of subtle differences in PPM towards the 3 Philips Sectors and also to external contract partners. Simplifications are pursued for the projects that will be continued in the coming year to reduce administrative actions and proposal review. In the coming months, the related IT-tooling will be adapted stepwise to support the new process for the 2011 portfolio in its various stages. A longer-term trajectory has also been defined which should lead to adoption of more readily available (commercial) IT-solutions over a 2-year period. Increasing flexibility in starting and stopping projects is one of the business requirements anticipated. Conditions for higher project management maturity will be improved as well by increasing the number of larger projects. Such projects will require more dedicated project managers who can strengthen their competencies in this and receive recognition for doing so.

#### 4 Concluding Remarks

The empirical evidence collected in the case study is broadly consistent with literature and supports its main tenets, specifically the issue of strategic alignment, PPM processes and organisation, and common challenges of PPM. This study provides further empirical support to it and contributes to the extant body of literature.

To help businesses improve their PPM practices, the study benchmarks the effective PPM tools and methods to support managerial decision-making. The study is rich in its managerial implications. PPM should be introduced pro-actively, in anticipation of growing organisational project complexity, not when it is already late. In doing so, strategic commitment of senior executives should be secured. An organisation should know exactly what it wants to achieve before embarking on a transition towards PPM. If expectations of PPM are not expressed, actually developed PPM is unlikely to deliver solutions to the problems of organisational project complexity. In introducing PPM, organisations should keep in mind that PPM entails a change in the way projects are managed and organised. IT-systems play only a supportive role, but do not equate to PPM. As a business process, PPM needs to be continuously adapted to changing business requirements and dynamics. This sets challenges to the flexibility of mindset and IT tools within the organisation.

#### References

- [1] Aalders, F. & Arensman, C. Kanaliseren van Kennis (Proces- en Informatiemanagement Philips Research)[J]. *Tijdschrift voor Informatie en Management*, 2005, (7): 42–47
- [2] Anbari, F.T. & Kwak, Y.H. Success Factors in Managing Six Sigma Projects[C]. Proceedings of PMI Research Conference (London, UK), Newtown Square, PA: Project Management Institute, 2004
- [3] Andrew, J.P. & Sirkin, H.L. Payback: Reaping the Rewards of Innovation[M]. Harvard: Harvard Business School Press, 2007
- [4] Archer, N.P. & Ghasemzadeh, F. An Integrated Framework for Project Portfolio Selection[J]. *International Journal of Project Management*, 1999, 17(4): 207–16
- [5] Arto, K. & Dietrich, P. Strategic Business Management Through Multiple Projects, in Morris, P.W.G. & Pinto, J.K. (eds.). *The Wiley Guide to Managing Projects*, Hoboken, NJ: Wiley, Inc, 2004. Pp. 144–76
- [6] Bard, J.F., Balachandra, R. & Kaufmann, P.E. An Interactive Approach to R&D Project Selection and Termination[J]. *IEEE Transactions on Engineering Management*, 1988, 35(3): 139–46
- [7] Blichfeldt, B.S. & Eskerod, P. Project Portfolio Management – There’s More to It Than What Management Enacts[J]. *International Journal of Project Management*, 2008, 26(4): 357–65
- [8] Cleland, D.I. *Project Management Strategic Design and Implementation* (3<sup>rd</sup> ed.)[M]. New York, NY: McGraw-Hill, 1999
- [9] Chesbrough, H. *Open Innovation: The New Imperative for Creating and Profiting from Technology*[M]. Boston: Harvard Business School Press, 2003
- [10] Cooper, R.G., Edgett, S.J. & Kleinschmidt, E.J. Best Practices for Managing R&D Portfolios[J]. *Research-Technology Management*, 1998a, 41(4): 20–33
- [11] Cooper, R.G., Edgett, S.J. & Kleinschmidt, E.J. *Portfolio Management for New Products*[M]. Reading, Mass.: Addison-Wesley, 1998b
- [12] Cooper, R.G., Edgett, S.J. & Kleinschmidt, E.J. New Problems, New Solutions: Making Portfolio Management More Effective[J]. *Research Technology Management*, 2000, 43(2): 18–33
- [13] Cooper, R.G., Edgett, S.J. & Kleinschmidt, E.J. Benchmarking Best NPD Practices[J]. *Research Technology Management*, 2004, 47(1): 31
- [14] Cooper, R.G., Edgett, S.J., & Kleinschmidt, E.J. *New Product Portfolio Management: Practices and*

- Performance[J]. *Journal of Product Innovation Management*, 1999, 16(4): 333–51
- [15] Englund, R.L. & Graham, R.J. From Experience: Linking Projects to Strategy[J]. *Journal of Product Innovation Management*, 1999, 16(1): 52–64
- [16] Hauser, J. & Zettelmeyer, F. Metrics to Evaluate R, D&E[J]. *Research Technology Management*, 1997, 40(4): 32–38
- [17] Jamieson, A. & Morris, P.W.G. Moving from Corporate Strategy to Project Strategy, In Morris, P.W.G. & Pinto, J.K. (eds.). *The Wiley Guide to Managing Projects*, Hoboken, NJ: Wiley, Inc, 2004. Pp. 117–205
- [18] Joshi, M.P., Kathuria, R. & Porth, S.J. Alignment of Strategic Priorities and Performance: An Integration of Operations and Strategic Management Perspectives[J]. *Journal of Operations Management*, 2003, 21(3): 353–69
- [19] Killen, C.P., Hunt, R.A. & Kleinschmidt, E.J. Managing the New Product Development Project Portfolio: a Review of the Literature and Empirical Evidence[C]. *Proceedings of the Portland International Conference on Managing Engineering and Technology (PICMET)*, Portland, 2007
- [20] Killen, C.P., Hunt, R.A. & Kleinschmidt, E.J. Project Portfolio Management for Product Innovation[J]. *International Journal of Quality & Reliability Management*, 2008, 25(1): 24–38
- [21] Levine, H. *Project Portfolio Management: A Practical Guide to Selecting Projects, Managing Portfolios, and Maximizing Benefits*[M]. Hoboken, NJ: John Wiley & Sons, 2005
- [22] Makleff, G. The Seven Habits of Highly Effective IT Portfolio Management Implementations, In Matheson, D. and Matheson, J. *The Smart Organisation: Creating Value through Strategic R&D*, Boston, MA: Harvard Business School Press, 2005
- [23] Matta, N.F. & Ashkenas, R.N. Why Good Projects Fail Anyway[J]. *Harvard Business Review*, 2003, 81(9): 109–114
- [24] McDonough, E.F. & Spital, F.C. Managing Project Portfolios[J]. *Research-Technology Management*, 2003, 46(3): 40–46
- [25] Meredith, J.R. & Mandel, S.J. *Project Management: A Managerial Approach* (7<sup>th</sup> ed.)[M]. Hoboken, NJ: John Wiley & Sons, 2010
- [26] Morris, P.W.G. & Jamieson, H.A. *Translating Corporate Strategy into Project Strategy*, Newton Square, PA: Project Management Institute, 2004
- [27] PMI. *Organizational Project Management Maturity Model (OPM3)*. Knowledge Foundation, Newton Square, PA: Project Management Institute, 2003
- [28] PMI. *A guide to the Project Management Body of Knowledge* (3<sup>rd</sup> ed.), Newtown Square, PA: Project Management Institute, 2004
- [29] PMI. *The Standard for Portfolio Management*, Newton Square, PA: Project Management Institute, 2006
- [30] Rajegopal, Sh., McGuin, Ph. & Waller, J. *Project Portfolio Management: Leading the Corporate Vision*. Basingstoke: Palgrave Macmillan, 2007
- [31] Ringuest, J.L., Graves, S.B. & Case, R.H. Formulating R&D Portfolios that Account for Risk[J]. *Research-Technology Management*, 1999, 42(6): 40–43
- [32] Roussel, P.A., Saad, K.N. & Erickson, T.J. *Third Generation of R&D – Managing the Link to Corporate Strategy*, Arthur D. Little, Inc, 1991
- [33] Scholten, V., Mooi, H. & Wijngaard, P. The Influence of the Gap Between Project Manager and Executives on Project Results[C]. *Proceeding of the PMI Research and Education Conference*, Washington, DC, 2010
- [34] Srivannaboon, S. & Milosevic, D. The Process of Translating Business Strategy in Project Actions, In: Slevin, D., Pinto, J. & Cleland, D. (eds.). *Innovations Project Management Research*, Newton Square, PA: Project Management Institute, 2004
- [35] Srivannaboon, S. & Milosevic, D. A Two-way Influence Between Business Strategy and Project Management[J]. *International Journal of Project Management*, 2006, 24(6): 493–505
- [36] Tidd, J., Bessant, J. & Pavitt, K. *Managing Innovation: Integrating Technological, Market and Organisational Change* (3<sup>rd</sup> ed.)[M]. Chichester: John Wiley & Sons, 2005
- [37] Turner, J.R. *Gower Handbook of Project Management* (4<sup>th</sup> ed.)[M]. Aldershot, UK: Gower Publishing, 1999
- [38] Turner, J.R. *The Handbook of Project-Based Management: Leading Strategic Change in Organizations* (3<sup>rd</sup> ed.)[M]. London, UK: McGraw-Hill, 2009
- [39] Yelin, K. The Role of Executives in Effective Project Portfolio Management, In Levine, H.A. *Project Portfolio Management: A Practical Guide to Selecting Projects, Managing Portfolios, and Maximizing Benefits*, Hoboken, NJ: John Wiley & Sons, 2001: 217–27