

# Implementing Product Portfolio Management in Multinational Software Corporations

---

**Public version**

**Thesis Candidate**

Rudolph Christiaan (Ruud) Kuiperi  
r.c.kuiperi@students.uu.nl

**Utrecht University**

Institute of Information and Computing Sciences  
Princetonplein 5, 3584 CC Utrecht, The Netherlands

**Date**

January 2013



**Supervisors:**



**Universiteit Utrecht**

Sjaak Brinkkemper  
Professor  
Utrecht University  
s.brinkkemper@uu.nl

Slinger Jansen  
Assistant Professor  
Utrecht University  
s.jansen@uu.nl

***SWCOMP***

Ton Dobbe  
VP Product Marketing  
SWCOMP  
ton.dobbe@SWCOMP.com



## **Summary**

In this thesis we present an overview of a single exploratory case study on the topic of product portfolio management (PPM) implementation in multinational software corporations (MNCs). In this study, we look at four generally recurring issues in such implementation projects, being context, content, process and outcomes. We find that the case company has four goals that it wants to achieve by implementing PPM. These are:

1. Product portfolio information management improvement
2. Project portfolio information management improvement
3. Improvement of ability to identify opportunities for collaboration
4. Formalization and professionalization of decision making

In addition, we identify several competitive forces that drive the need for a PPM implementation, such as the threat of new entrants, the threat of substitutes due to subscription models and the bargaining power of buyers due to the economic downturn. Furthermore we find that local managers demand flexible PPM processes, limited corporate management involvement and a limited aim for collaboration initiatives. To explain these statements, we found several situational factors that affect the local managers' attitude towards certain PPM aspects.

We describe how we have designed a PPM solution that both fits the corporate demands and the local contexts by designing a light-weight information system, a flexible 4-step process and in which corporate management plays a limited role. In addition we describe how we have implemented PPM in the case company via direct, whole-system conversion by first doing a pilot implementation and thereafter implementing PPM for all subsidiaries simultaneously.

Finally, we evaluate the outcomes of the studied implementation project by means of a survey. We find strong support that three out of the four aforementioned goals have been achieved by the implementation. Furthermore we find support that eight out of 10 of the generic PPM related goals, as defined in previous studies, have also been achieved by this implementation project. And to conclude, we find that the implemented processes are flexible enough, corporate management could play a bigger role and we find strong support for the ability to identify collaboration opportunities.

### ***Keywords:***

*Product Portfolio Management, Multinational Corporations, Software Product Management, Organizational Change*

## **Acknowledgements**

Writing this thesis would not have been possible without the great support, supervision and company of a number of people. Therefore I would like to thank all people who contributed to this thesis in any way, and some people in particular.

First of all I would like to thank my company supervisor Ton Dobbe who, regardless his occupied schedule, was always available for a quick video chat from Spain with the sight of palm trees and lots of sun coming through his window. Furthermore, I would like to thank my university supervisor Sjaak Brinkkemper for his valuable feedback and discussions. I have enjoyed the experience that you brought in our feedback sessions, not only for this specific project but also for my future career, and I appreciate the trust that you expressed in my abilities. I hope I have lived up to that trust. Furthermore I would also like to thank my second supervisor, Slinger Jansen, for providing accurate and high-quality feedback for my thesis.

I would also like to thank the SWCOMP managers who participated in my research via interviews, survey responses and individual meetings. And I would like to thank my fellow MBI-students for their valuable feedback provided in the MBI colloquia. A special note should be made for Koen Ekelschot, Joris Witte and Bart Bellefroid, with whom I experienced a great time as students and entrepreneurs. Thank you, Coeni. Last but certainly not least, I am thankful for the solid and familiar basis of family and friends, providing love, support and joy in life. In particular I would like to thank my parents, my sisters Esther and Willie and my girlfriend Monica for supporting me on my way to graduation.

## **Table of contents**

<b>1</b>	<b>INTRODUCTION</b>	<b>7</b>
<b>2</b>	<b>RESEARCH METHODS</b>	<b>11</b>
2.1	Single Case Study	11
2.2	Action Research	12
2.3	Research Approach	13
2.4	Research Validity	17
2.5	Research Team	19
<b>3</b>	<b>THEORETICAL BACKGROUND</b>	<b>21</b>
3.1	Software Product Management	21
3.2	Product Portfolio Management	22
3.3	Multinational Corporations	25
3.4	Organizational Change	26
<b>4</b>	<b>CASE SETTING</b>	<b>33</b>
4.1	Company Description	33
4.2	Organizational Structure	33
4.3	Problem Statement and Objectives	34
4.4	Market Assessment	35
<b>5</b>	<b>PROJECT SYNOPSIS</b>	<b>37</b>
5.1	History of the Project	37
5.2	Corporate Diagnosing	38

5.3	Action Planning	38
5.4	Local Diagnosing	39
5.5	Action Plan Adaptation	39
5.6	Action Taking	39
5.7	Evaluating the Outcomes	40
5.8	Specifying Learning	40
5.9	Future	40
<b>6</b>	<b>GENERAL CONTEXT AND DRIVERS</b>	<b>45</b>
6.1	General Drivers for SWCOMP	45
6.2	Competitive Market Forces	47
6.3	Key Findings	49
<b>7</b>	<b>LOCAL CONTEXTUAL FACTORS</b>	<b>51</b>
7.1	Summary and concluding remarks	51
<b>8</b>	<b>TOOLS, PROCESSES AND INFORMATION SYSTEMS</b>	<b>56</b>
8.1	Central Portfolio Management Infrastructure (CPMI)	57
8.2	Portfolio Management Process	63
8.3	PPM Maturity Improvement	67
8.4	Summary and Concluding Remarks	70
<b>9</b>	<b>IMPLEMENTATION PROCESS</b>	<b>71</b>
9.1	Unfreezing the Old Situation	71
9.2	Transformation	72
9.3	Refreezing the New Situation	75

<b>10</b>	<b>EVALUATION OF OUTCOMES</b>	<b>77</b>
10.1	Data Collection and Analysis	77
10.2	Results	78
<b>11</b>	<b>DISCUSSION AND CONCLUSION</b>	<b>87</b>
11.1	Answering the Research Questions	87
11.2	Limitations	91
11.3	Further Research	93
11.4	Concluding	94

## List of tables

Table 1 Data collection methods	15
Table 2 Outcomes per sub question	17
Table 3 PIM maturity matrix (Jagroep et al., 2011)	25
Table 4 Competitive forces driving PPM goals	50
Table 6 Issues and underlying factors	52
Table 7 PIM maturity profile for SWCOMP	67
Table 8 Conversion Strategy	73
Table 9 Survey response to generic PPM goals	79
Table 10 Summary of responses about SWCOMP specific PPM goals	80
Table 11 Summary of responses about PPM costs, benefits, capabilities and use	82

## List of figures

Figure 1 Relation between sub questions and main question	10
Figure 2 Action research cycle (Susman & Evered, 1978)	13
Figure 3 Research Approach	14
Figure 4 Research domains	21
Figure 5 Software Product Management Competence Model (Bekkers et al., 2010)	22
Figure 6 Software product portfolio management competence model (Jagroep et al., 2011)	23
Figure 7 Integration responsiveness grid (Prahalad & Doz, 1987)	26
Figure 8 Organizational change model (Lewin, 1947)	28
Figure 9 Conceptual model based on theoretical background	29
Figure 10 SWCOMP organizational structure	33
Figure 11 Project timeline	37
Figure 12 Porter's (1979) five competitive forces model	47
Figure 13 Conceptual model of contextual factors	52
Figure 14 Merging corporate and local context into PPM	56
Figure 15 CPMI product dashboard	58
Figure 16 Class-diagram CPMI	59
Figure 17 CPMI pipeline dashboard	61
Figure 18 CPMI alignment charts	62
Figure 19 CPMI value charts	62
Figure 20 A typical Stage Gate process (Cooper, 2001)	65
Figure 21 PPM process activity diagram	65
Figure 22 Solution that fits corporate and local contexts	70
Figure 23 Research overview of sub questions	91



# **Part 1. Introduction and Method**



# 1 Introduction

*“The strategic performance of a company on the long run is more than just the sum of the company’s individual product strategies” (Day, 1977).*

The statement above illustrates the importance of managing a company’s products as a coherent portfolio, instead of managing each product separately. This is what product portfolio management (PPM) is about; balancing decisions about products between marketing needs, product development needs and manufacturing needs in order to optimize a company’s strategic performance (Cantamessa, 2005).

Currently, in times of economic downturn, PPM is a hot topic because of the efficiency gains associated with it. According to Jusko (2009) companies have a tendency to cut costs on product development and innovation when economic performance declines. He however argues that, especially now, companies should improve the focus of their innovation efforts instead of killing it. This is where PPM comes into play. In order to optimize the value of a portfolio, managers should gather strategic product information across their company, make strategic decisions about the entire product portfolio, and execute the strategy accordingly (Bekkers et al., 2010). Implementing the capabilities to do so is what we refer to when talking about implementing PPM.

In product software companies, together with product planning, release planning and requirements management, PPM is considered as one of the four business functions within the practice of software product management (van de Weerd et al., 2006). Software Product Management (SPM) refers to the management of a software product or software product portfolio over its entire lifecycle, aligned with the high-level company objectives (Kittlaus & Clough, 2009). Or as Ebert (2006) defines SPM, “it is the discipline and role, which governs a product (or solution or service) from its inception to the market/customer delivery in order to generate the biggest possible value to the business.” SPM differs from regular product management in the fact that software products can be copied and distributed without significant extra costs and that existing products or even sold products can easily be adapted by using patches or updates (van de Weerd et al., 2006). The downside of this flexibility is that it enforces a very high release frequency and continuous evolution of requirements, making SPM and therefore also PPM to be highly complex activities.

To complicate things more, software product managers are constantly balancing in an environment characterized by stakeholder variability (i.e. marketing, product development, customers, the company board etc.) where each stakeholder advocates its own interests and responsibilities. The complexity of the SPM environment also impacts the way PPM can be implemented in it.

It should now be noted that PPM is about managing the *entire* organizational portfolio. In the context of multinational corporations (MNCs), consisting of multiple subsidiaries that (almost) operate as stand-alone businesses across borders, this can be hard to implement. As a result of cultural and geographical considerations, corporate managers often face difficulties controlling their subsidiaries (Drori & Ellis, 2011). Furthermore there is a certain pressure between the need to be locally responsive, which enables them to be competitive and specialized in their local markets, and the need to integrate, which enables them to take advantage of economies of scale (Rosenzweig & Singh, 1991). When implementing PPM the tension between differentiation and integration could, amongst others, lead to institutional duality where, because of a corporately mandated change, subsidiaries find themselves between the pressures of maintaining legitimacy in their own country versus maintaining legitimacy in their MNC (Kostova & Roth, 2002).

Furthermore, MNCs can be the result of (multiple) mergers, where products with different backgrounds are simply combined into one product portfolio. Such rigorous portfolio mergers may lead to overlaps in product market segments, or even to product cannibalization where one of the company's products is directly competing to another product in the same portfolio (Cantamessa, 2005). Together, a high degree of autonomy and a lack of alignment are a serious threat to a MNC's overall performance. And achieving alignment is hard because corporate managers often lack control and face information gaps. When talking about MNCs in the remainder of this thesis, we refer to MNCs that operate in the software industry.

## **Research Goals and Contribution**

Although extensive research has been performed in the domains of SPM, PPM, MNCs and organizational change, research on the intersection of these domains, focusing on implementing PPM in the context of a MNC has to our knowledge not been performed in the past. Therefore, this research aims to explore the issues that arise when implementing PPM in a MNC by means of an exploratory single case study. The main question that is used to guide this research is:

*How can product portfolio management be implemented in a multinational software corporation?*

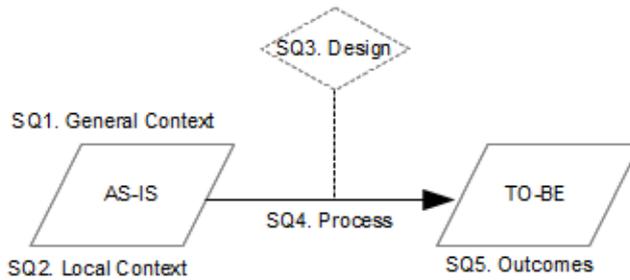
To handle this question, we focus on the four issues that according to Armenakis and Bedeian (1999) are almost always recurring when implementing change in organizations. These are *content* issues, focusing on the substance of the change, *context* issues, focusing on internal and external forces, *process* issues, focusing on how the change is implemented, and *outcome* issues, focusing on assessing the outcomes of the change. Additionally, according to Ruta (2005) MNCs should also distinguish between issues that occur on general level and issues that occur on local level. More on this is presented in the Theoretical background chapter.

Based on the above, a number of sub-questions can be formulated. Each of these sub-questions is answered in a separate chapter in part 3 of this thesis. The first and second questions focus on context issues that occur on general and local level. The third question focuses on content issues, thus on the substance of the change consisting of tools, information systems, processes etc., the fourth on process issues and the fifth on outcome assessment criterion issues.

1. What is the general context that drives the PPM implementation? (chapter 6)
2. What are local contextual factors that affect the PPM implementation? (chapter 7)
3. How can the tools, processes and information systems be designed? (chapter 8)
4. How can PPM be introduced and implemented? (chapter 9)
5. How can the outcomes of the implementation be evaluated? (chapter 10)

Together, these questions enable the analysis of an implementation project while focusing on all issues that are, according to Armenakis and Bedeian (1999), generally recurring in such projects. And by doing so, they enable to answer the main question, focusing on how PPM can be implemented in its entirety in a MNC environment. The relation between the sub questions and main question is depicted in Figure 1.

## How can PPM be implemented?



**Figure 1** Relation between sub questions and main question

By answering these questions, this study provides insights in (1) the issues that arise when implementing PPM in a MNC, (2) the issues that arise when implementing PPM in a software company and (3) additional issues that may surround these topics that can be discovered via exploratory case study research. By doing so, this research can be of value both to scientists interested in the topics of PPM, MNCs and SPM as well as for practitioners who are looking to implement PPM in a (multinational) software company.

### **Thesis Structure**

The thesis consists of four parts. In the first part we introduce the subjects (Chapter 1), research method (Chapter 2) and theoretical background (Chapter 3). In the second part we describe the case study that has been performed by drawing the case setting (Chapter 4) and by providing a project synopsis (Chapter 5). In the third part we present the case study analysis results, following the five sub research questions, which focus on general context (Chapter 6), local context (Chapter 7), tools, processes and information systems (Chapter 8), introduction and implementation process (Chapter 9) and outcomes (Chapter 10). In the final part of the thesis we discuss the outcomes and limitations, provide recommendations for further research and draw final conclusions (Chapter 11).

## **2 Research Methods**

To explore the domain of PPM implementation in MNCs, this research is set up as a single case study in which PPM is implemented in a large international software vendor. Because we were continuously involved in the day-to-day implementation process, this research can be classified as a qualitative field study, using an action research approach. According to 't Hart, Boeijs and Hox (2006), in this type of qualitative research the research plan cannot be completely nailed down. Instead, the actual execution of the research also highly depends on the day-to-day proceedings, where researchers have to maintain their flexibility in order to be able to also include unexpected events in their research. Therefore, the research approach as presented in this section is a high-level overview that we were able to deviate from to a certain extent whenever necessary. First we provide some background information about case study research and action research. Thereafter we present our research approach, the steps taken and the data collection methods used. Finally we emphasize some validity issues and general issues regarding the quality of our research.

### **2.1 Single Case Study**

According to Dul and Hak (2008), a case study is a study in which one case in its real life context is selected and where scores obtained from this case are analyzed in a qualitative manner. A case study is generally considered as a useful research methodology when the topic is broad and complex (1), when there is not a lot of theory available (2) and when context is very important (3). For our research all three conditions are true. Case study research can be theory-oriented, with a general objective to contribute to the development of theory, or practice-oriented, with a general objective to contribute to an immediate situation in practice. In the case of a scientific research project, as this thesis project is, the central objective of the study should always be theory-oriented. Within theory-oriented research there are three possible types of case study research, which are (1) exploration, (2) theory building and (3) theory testing. Because the main goal of this research was to explore the issues that arise when implementing PPM in a MNC, exploration is the term that applies most to this research.

Exploratory case studies most of the time do not start with propositions because there is no knowledge available to create such propositions (Rowley, 2002). Instead, we applied an alternative analytical strategy, using a descriptive framework based on organizational change theory, to organize the study. This resulted in the sections used in this thesis to study the different themes. These themes are the four issues arising when implementing organization change: context, content, process and criterion issues (Armenakis & Bedeian, 1999).

Single case studies can be divided into holistic studies, studying the case as one big entity, and embedded studies, identifying a number of sub units that are studied individually (Rowley, 2002). Whereas the challenge for holistic studies is not to miss important details, the challenge for embedded cases is to achieve a holistic perspective from a number of smaller studies. In our study, a balance between holistic and embedded perspectives has been established. The project was initiated and managed on a corporate holistic level whereas interviews on local subsidiary level provided a number of embedded case results to focus on for instance the impact that the PPM implementation had on local processes. Together, the embedded cases of the individual subsidiaries and the holistic view from corporate management provided a fairly complete overview of the entire case including data on corporate level and some important local details.

To summarize, our research can be classified as a single exploratory case study in which a holistic as well as an embedded perspective has been applied.

## **2.2 Action Research**

To perform the single case study, action research is used as a method to guide the research efforts and the implementation project. Therefore some background on the action research method should be provided as well. According to Rapoport (1970) "action research aims to contribute both to the practical concerns of people in an immediate problematic situation and to the goals of social science by joint collaboration within a mutually acceptable ethical framework."

Although it stems clear from this definition that action research has a very practical oriented nature, it is important to notice the goal of contributing knowledge to the scientific community (Clark, 1972). The key assumptions of an action researcher are that (1) social settings cannot be reduced for study and that (2) action brings understanding. According to Baskerville (1999), these assumptions "imply a philosophy that allows interpretive research, an idiographic perspective and qualitative data". Interpretive studies are "aimed at producing an understanding of the context of the information system, and the process whereby the information system influences and is influenced by the context" (Walsham, 2006). In interpretive research, no independent and dependent variables are defined, but the focus is on the full complexity of human sense making as the situation emerges (Kaplan & Maxwell, 1994). Using an idiographic perspective means that the study recognizes the uniqueness of each particular situation and that the aim of the study is to understand the meaning of contingent, unique and often subjective phenomena (Thomae, 1999). Finally, using qualitative data has

implications for the mode of data collection and data analysis. Commonly used qualitative data sources include observation, interviews and questionnaires, documents and texts and the researcher's impressions and reactions (Myers, 2009). To summarize, action research is performed from an interventionist viewpoint: researchers both observe and participate in the phenomena that are being studied (Baskerville, 1999).

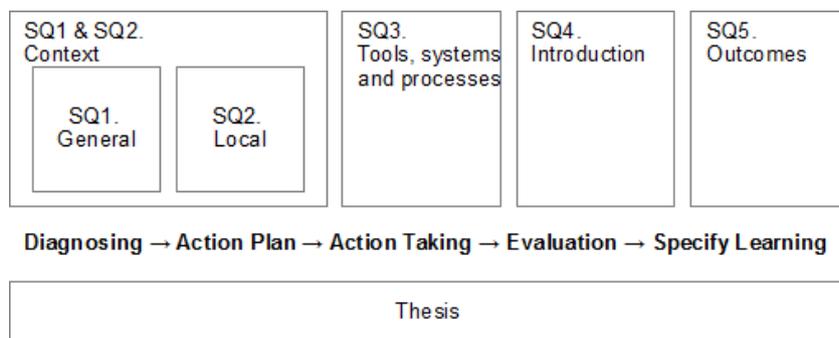
Action research generally is a cyclical process consisting of five stages, as depicted in Figure 2 (Susman & Evered, 1978). The first stage, diagnosing, is concerned with identifying the problems that provoke the desire for change. Action planning is concerned with deciding which actions have to be taken to overcome the identified problems. This activity is mainly guided by theoretical frameworks that are derived from scientific literature. Action taking is the phase where the planned actions are actually implemented in practice to achieve organizational improvements. After the actions are implemented, the outcomes are evaluated in order to decide whether the identified problems have been solved by the implemented actions. Finally, and this is what distinguishes action research from applied science, the total learning that results from the action research cycle has to be specified. This concerns organizational learning as well as scientific learning and learning for future action cycles.



Figure 2 Action research cycle (Susman & Evered, 1978)

### 2.3 Research Approach

In the introduction of this thesis we have presented the sub questions used in our research. Then, in the previous two sections we have presented some general conceptual information about case study research and action research. In this section we present how we applied and combined these concepts in our research approach. A schematic overview of our approach is depicted in Figure 3.



**Figure 3 Research Approach**

In the research approach the five sub research questions, focusing on implementation issues, are investigated for one single case while following an action research approach. First the general and local contexts have been diagnosed, investigating the drivers behind the PPM implementation. Then, the action plan has been nailed down resulting in the specification of processes, tools and information systems (in this study referred to as “content”). Subsequently, action was taken to implement the processes, systems and tools, during which we focused on implementation process issues. Evaluation of the outcomes was done to focus on outcome issues and finally the learning of the project has been specified in this thesis and in a scientific paper.

### **Data Collection and Modes of Analysis**

Although many researchers make a clear distinction between data collection and analysis, grounded theory suggests that especially in qualitative research, these two should be intertwined (Urquhart, Lehmann & Myers, 2010). In this section we describe what sources of data we have used, how we have analyzed this data and how data collection and analysis interacted.

First of all, it should be noted that we did not define any hypotheses based on our personal experience previous to our research as such preconceived expectations may hinder the objective finding of new ideas, concepts and theories (Urquhart, Lehmann & Myers, 2010). Instead, we started with only a theoretical framework to focus our efforts on resp. context issues (1), content issues (2), process issues (3) and outcome issues (4), as defined by Armenakis and Bedeian (1999).

We adhered to the common goal in grounded theory of increasing the degree of conceptualization and the theoretical scope as defined by Urquhart, Lehmann and Myers (2010) in their study on grounded theory research in information systems. During our data collection

and analysis, we furthermore adhered to the five grounded theory guidelines for information systems research, as presented by Urquhart, Lehmann and Myers (2010):

1. Constant comparison of data instances
2. Iterative conceptualization
3. Theoretical sampling
4. Scaling up
5. Theoretical integration

It should however be noted that due to the fact that we only studied one case and due to the fact that the amount of different data sources was limited (i.e. the amount of directly involved stakeholders) we were not always able to strictly follow these guidelines. For instance, scaling up theories was only possible in SQ3 about local context because that question entailed multiple embedded cases. Constant comparison, iterative conceptualization and theoretical sampling have continuously influenced the interplay between data collection and analysis because these guidelines allowed to analyze the data after every single newly received slice of data, for instance after an interview has been executed. This means that we were also able to adapt our semi-structured interview script to be more focused on the concepts found in the early interviews and to focus our document study more on specific concepts found in early observations.

Finally, in order to answer our research questions, several generic data collection methods are used. An overview of the methods used per sub question is presented in Table 1.

<i>Sub question</i>	<i>Data source(s)</i>
SQ1: General context and drivers	<ul style="list-style-type: none"> <li>- Company documentation;</li> <li>- Informal interviews with the VP, a synergy manager and a product manager for the Benelux;</li> </ul>
SQ2: Local contextual factors	<ul style="list-style-type: none"> <li>- Semi-structured interviews with eight product managers divided over seven countries;</li> </ul>
SQ3: Tools, processes and information systems	<ul style="list-style-type: none"> <li>- Observation / participation;</li> </ul>
SQ4: Implementation process	<ul style="list-style-type: none"> <li>- Observation / participation</li> </ul>
SQ5: Assessment of outcomes	<ul style="list-style-type: none"> <li>- Survey with 14 corporate and local managers shortly after the first implementation;</li> <li>- Observation / participation;</li> </ul>

**Table 1 Data collection methods**

It should be noted that besides the basic methods of observation, participation and document study that are often used in case study research we use two dedicated tools to collect data. First, semi-structured interviews are used to answer SQ2 and second, a survey is used to answer SQ5.

*Semi-structured interviews* – The choice for semi-structured interviews was made because multiple stakeholders, representing different subsidiaries, had to be interviewed about their local PPM practices. In order to allow comparison between the interviews, a focused guide of topics to be discussed should be available. However, in order to also be able to prompt for more information on specific topics and to be able to adapt the order of questions in the interviews, there should also be a certain degree of freedom. This type of freedom while focusing on certain topics is provided by the semi-structured interviews method.

*Survey* – To answer sub question five, a survey was used. First of all, by allowing participants to anonymously submit evaluation responses, as is possible with survey research, we were more certain to receive honest opinions about the project's outcomes. Second, surveys are cost efficient to develop and easy to undertake over large distances, as was important in the multinational case environment. Finally, surveys also take relatively little time to organize and to respond to in comparison to more elaborate evaluation methods such as interviews or evaluation meetings. The downside of using a survey method is that it does not allow to prompt for more information and that the questions had to be designed in advance, bringing the risk of missing out on information that turns out to be important afterwards. This however didn't offset the benefit of allowing anonymous evaluation responses, as this enhanced the validity of our results.

The format for the semi-structured interviews used to answer sub question 2 and the survey used to answer sub question 5 are included in Appendix C and D. The participants for both the semi-structured interviews and the survey are selected by the VP product marketing. This choice was made because the amount of influential stakeholders involved in the project was limited and the VP product marketing was able to point in their direction. This way, we were sure to be talking to the right persons. Furthermore, the participants often serve a role in higher management, making them hard to reach for scientific research when there is no introductory link in between. The VP product marketing served as a powerful link in this regard. The downside of manually selecting participants instead of using a random method is that it puts pressure on the validity of the research. For instance it is possible that the VP product marketing only selected product managers that he knew were positive towards the PPM

implementation. Such bias would influence the outcomes of this research. To cope with this, we asked the VP product marketing to submit a list of “important stakeholders” that we were able to use to select participants. Furthermore we asked him to ensure that we did not pass any respondents representing large subsidiaries.

### **Expected Results**

As the result of our study, we present a descriptive overview of the issues that were encountered, divided over five chapters, each answering one of the five sub questions. The descriptions, models and bullet points presented were derived from an interpretative viewpoint. This means that data was collected from a broad range of different sources and that the researcher’s interpretation of the data was used to make sense of the data stack. The result of our qualitative data analysis is not a table with numbers, neither a list of statistically accepted or rejected hypotheses. Instead, it is a descriptive narration of the issues that we incurred during the research project and how they relate to our expectations derived from scientific literature. Furthermore, bullet points, conceptual models and propositions are presented to formulate the key theoretical takeaways from our study. In general, the outcomes per sub question are presented in Table 2. The general outcome of our research, answering how PPM can be implemented in a MNC, is answered by providing the lessons learned and key takeaways that can be derived from our case.

<i>Sub question</i>	<i>Chapter</i>	<i>Outcomes</i>
SQ1. General context	6	Description, list of drivers and conceptual model of factors driving the need for a PPM implementation
SQ2. Local context	7	Description of local contexts and a conceptual model of propositions relating the opinions and situational factors in subsidiaries
SQ3. Tools, Systems and processes	8	Description of tools, systems and processes that were implemented and maturity profiles for case company based on newly implemented capabilities
SQ4. Implementation	9	Narration of issues that were found regarding the implementation approach
SQ5. Outcomes	10	Description of survey responses regarding goal achievement and design of systems, tools and processes

**Table 2 Outcomes per sub question**

## **2.4 Research Validity**

According to Rowley (2002) four elements are widely used to assess the quality of case study research. First, construct validity assesses the conceptualization and operationalization of correct data to answer the research questions. Because we played a central role in the PPM

*Research Methods*

implementation we had access to actual information and real people, ensuring high quality data that was relevant to this research. Furthermore, we had access to a richness of data sources, enabling cross-checking between different sources.

Second, internal validity assesses whether the causal relationships established in the study are real causal relations that cannot be the result of coincidence or other variables. Internal validity is only relevant for explanatory or causal studies and not for exploratory or descriptive studies (Rowley, 2002), thus not for this study.

Third, external validity is about the domain to which the findings of the study can be generalized. In the case of this study, the domain is set to be multinational software corporations that are implementing PPM. Although the objective of exploratory research is not to draw definite conclusions about certain hypotheses, a note should be made on the amount of cases needed to draw conclusions. When only performing one single case study, there is an increased risk that conclusions drawn from that case are erroneous and that these conclusions cannot be generalized and thus only have value for that specific case. Therefore, to state definite conclusions about PPM implementations in MNCs, this research should be replicated several times. Replication however takes time, and as implementing PPM is a comprehensive trajectory, in this study the amount of cases is limited to one due to time constraints. Furthermore, because our objective is not to develop or test theories, we believe that the richness of data provided by one in depth case study can provide a wealth of information as a fundament for future research, opposed to multiple higher level case studies together.

Finally, reliability is about the repeatability of the study. Are other researchers able to perform the same research for the same case? Important to ensure reliability is to carefully document the research procedures and to keep record of the actions taken. To cope with reliability in this research a record of all interviews, (video) meetings and mail conversations is kept by the researchers. This record contains information about all decisions that have been made during the project and why these decisions have been made, as well as agreements made between the researchers and practitioners.

Additionally, action research in general has a number of potential limitations and pitfalls. Baskerville & Wood-Harper (1996) identified i.e. (1) the risk of impartiality of the research team, (2) a potential lack of discipline, (3) the research being mistaken for consultancy and (4) a context-dependency leading to difficulties in generalizing the research's findings. To overcome

these pitfalls, several criteria are put in place so that the quality and reliability of the research are maintained. These criteria are:

- The roles of the researchers and practitioners and their relationships to each other may evolve over time within the research project. To cope with the potential risk of reflections performed in this research becoming influenced by a lack of impartiality, the roles of the involved actors should be continuously specified during the research at any time they change in a way that may influence the research outcomes.
- To ensure discipline on the topic of data quality, it should be specified what types of data are included and what types of data are excluded. This is specified in the previous section.
- Control over the scientific quality of the research project was furthermore executed by the scientific supervisors who were not involved in the day to day action research project. Their periodic reflections upon the way of working performed by the action research team provided an extra means of quality control.
- Usefulness of the PPM implementation in practice was primarily guarded by the VP Product Marketing. Furthermore, the solution was used and evaluated by individual product managers to ensure quality.

## **2.5 Research Team**

The implementation and research project was taken by hand by a master student Business Informatics from the Utrecht University. He was supervised by a professor and an assistant professor from the Utrecht University and a VP product marketing at the case company. The VP product marketing was at the same time responsible for the project as initiator and sponsor. At the beginning of the project, an agreement was established to provide space for scientific evaluation throughout the project. Apart from the student, his scientific supervisors and the VP product marketing, specific domain specialist were involved whenever their expertise was needed for the success of the project. For example, to implement the central project storage, technical knowledge about the software solution and specific product knowledge was derived from solution specialists and product managers.

In the next chapter the reference frameworks that are used in this study are presented. In the part that follows, the case study including a description of the action research procedures (project synopsis) will be presented. The project synopsis not only facilitates an overview of the entire project but also enables replication of the research, ensuring better reliability.



### 3 Theoretical Background

The aim of this research is to explore the issues that arise when implementing PPM in a multinational software corporation. To our knowledge, there has been no previous research on this subject, but it can be located on the interface between several more commonly studied domains, being SPM, PPM, MNCs and Organizational Change. In this chapter we present some more background information about these domains, as depicted in Figure 4. The concepts and frameworks presented in this section provide the main context for this research. They are used as the key sources (1) to assign meaning to events that occur in practice and (2) to translate scientific theories into practical solutions.

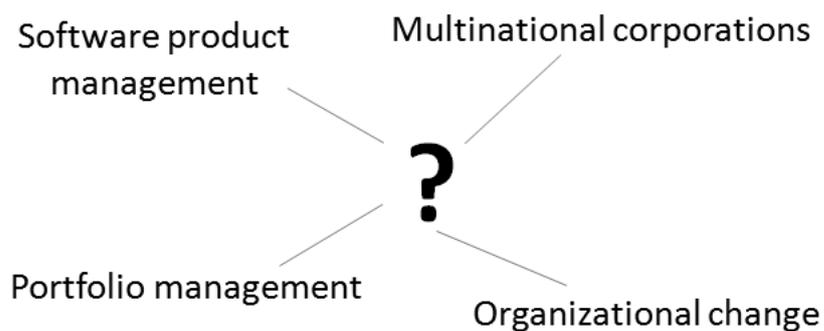


Figure 4 Research domains

#### 3.1 Software Product Management

*“Software product management is the discipline and role, which governs a product (or solution or service) from its inception to the market/customer delivery in order to generate the biggest possible value to the business” (Ebert, 2007).*

Although the importance of high quality SPM and the difficulties that software product managers have to cope with have been emphasized (Ebert, 2007), attention for product management in the context of software companies has only recently emerged. Within this evolving field of research the development of the SPM competence model (van de Weerd et al., 2006; Bekkers et al., 2010) has been one of the leading contributions. The SPM competence model divides SPM over four different business functions that are Requirements Management, Release Planning, Product Planning and Portfolio Management. These business functions each contain several focus areas that are used to guide research on the topic of SPM and that are amply picked up by other researchers in the field (i.e. Kittlaus & Clough, 2009; van den Akker et al., 2008; Jansen, Finkelstein & Brinkkemper, 2009). The SPM competence model is depicted in Figure 5.

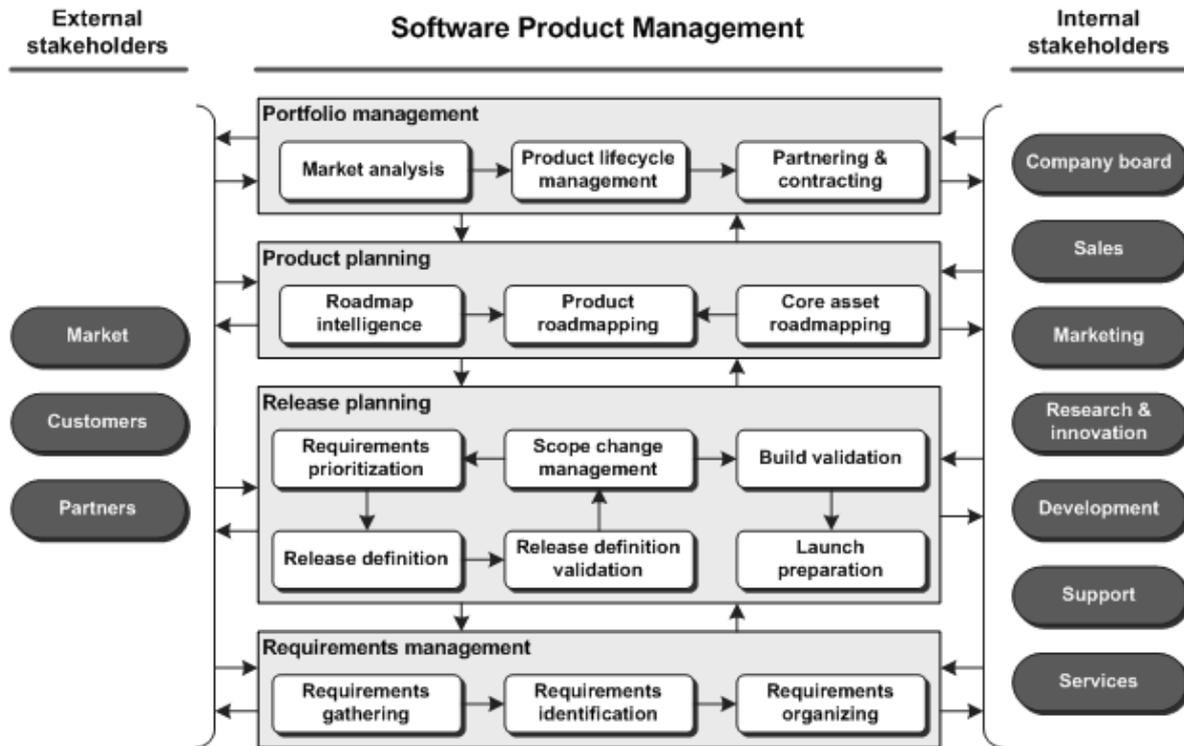


Figure 5 Software Product Management Competence Model (Bekkers et al., 2010)

The SPM competence model draws the context, consisting of four hierarchical ordered layers, in which a software product manager has to operate. Requirements Management is about continuously gathering, identifying and organizing single requirements in such a way that they can easily be selected for a specific release. Preparing and successfully creating such a release is part of the Release Planning function. Product Planning makes sure that the product releases are in line with a specific product strategy. And at the highest level, Portfolio Management guards the overall quality of the product portfolio. To distinguish the management of a portfolio of products from other types of portfolio management, such as managing a portfolio of business applications or a portfolio of projects, we refer to it as Product Portfolio Management (PPM). The next section explains PPM in more detail.

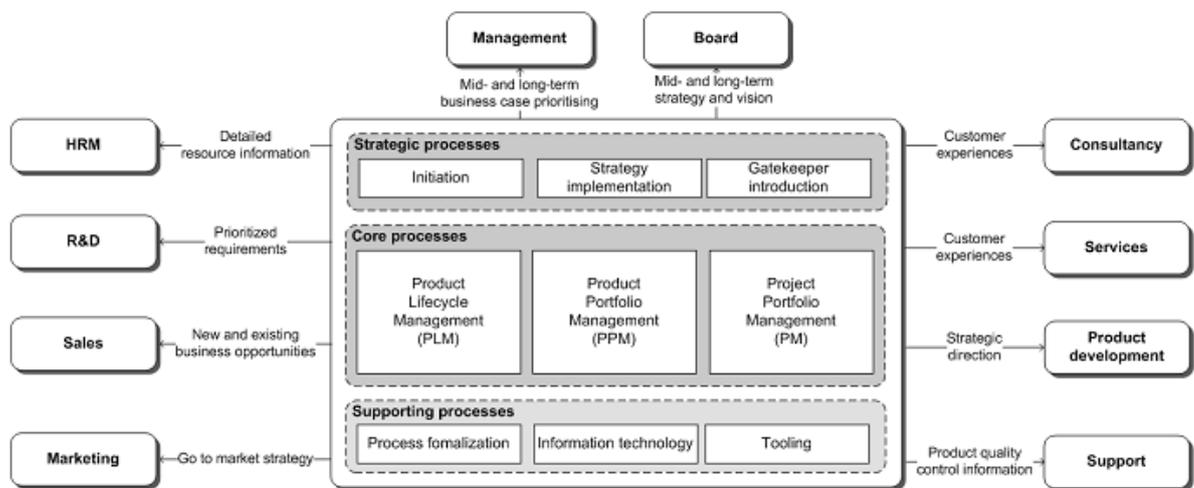
### 3.2 Product Portfolio Management

*“Product portfolio management concerns the strategic information gathering and decision making across the entire product portfolio” (Bekkers et al., 2010).*

PPM is the term used for managing investment decisions over time following profit and risk criteria (Kittlaus & Clough, 2006) and concerns the strategic information gathering and decision making across the entire product portfolio (Bekkers et al., 2010). According to the SPM competence model PPM consists of the focus areas Market Analysis, Product Lifecycle

Management and Partnering & Contracting. Market Analysis provides external market information that is essential for successful decision making, Product Lifecycle Management is about managing all products in a company’s product portfolio in order to maximize the overall portfolio value and Partnering & Contracting is the focus area that focuses on establishing partnerships, pricing models and distribution channels.

Jagroep et al. (2011) developed the Portfolio Implementation Model (PIM) to aid product managers at implementing PPM. The PIM consists of the PPM Competence Model, which presents an overview of the interdependencies between the different concepts that are part of PPM, and process descriptions for each focus area on how to implement the capabilities. The competence model consists of three layers, each containing several subjects that are of importance when implementing PPM. The PPM competence model is depicted in Figure 6.



**Figure 6 Software product portfolio management competence model (Jagroep et al., 2011)**

The strategic processes, Initiation, Strategy Implementation and Gatekeeper Introduction, are subjects that guide an organization in realizing a fully operational PPM implementation. Initiation is about assessing the current situation and determining what the desired future state is, Strategy Implementation concerns the development and communication of a company-wide portfolio strategy and Gatekeeper Introduction is about determining who is responsible for capturing information from the external environment.

At the core of the PIM competence model, there are Product Lifecycle Management (PLM), Project Portfolio Management (PM) and PPM. PLM is defined by Stark (2011) as the business activity of managing, in the most effective way, a company’s products all the way across their life cycles. PLM is important to PPM as different stages of a product life cycle have different

measures and strategic objectives related to them. PLM supports strategic decision making across the entire product portfolio by providing managers with the necessary information about the current state of a product.

Next to PLM, PPM consists of processes that are directly related to performing PPM in practice, while PM is about managing a portfolio of projects. In this context, a project portfolio can be defined as “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” (Project Management Institute, 2008). Blichfeldt & Eskerod (2007) define PM as “the managerial activities that relate to the initial screening, selection and prioritization of project proposals, the concurrent reprioritization of projects in the portfolio and the allocation and reallocation of resources to projects according to priority”. In this paper we use a shortened version of this definition for reasons of clarity: *Project portfolio management concerns the managerial activities that relate to the selection and prioritization of projects and to the allocation of resources accordingly.*

Although some scientists now argue that product management and project management are completely separate disciplines, there is a clear interdependence between them. Cantamessa (2005) notices that the product development processes within companies are almost universally operated on the basis of projects. In this context it may be safely claimed that strategic decision making and execution about the product portfolio is coincident with PM, as in practice decisions about product investments are made by selecting and prioritizing projects, which is what PM is about.

To proceed, in the bottom layer of the PIM the supporting processes are designed to facilitate the creation of all instruments required for PPM. Process Formalization is about defining and optimizing a company’s PPM processes and information capabilities, Information Technology is used to support a structured PPM process by delivering the required information and Tooling is concerned with the commissioning of specific portfolio tools such as the BCG-matrix to enhance PPM and in particular communication about the product portfolio.

In addition to the overview of interdependent processes related to a PPM implementation, the PIM also provides a maturity matrix that supports the assessment of a company’s current maturity concerning the implemented PPM capabilities. The rationale behind such a maturity matrix is that capability development in software companies is often not a straightforward practice and that it is often impossible to implement a fully mature process from scratch.

Therefore, capability improvements are mostly implemented in an incremental manner, step-by-step. Maturity matrices are a successful means to support such incremental capability implementations as they present the different maturity stages that a company encounters on its way to process improvement (Steenbergen et al., 2010). They can be used as a guideline for companies that are seeking capability improvements. In the PIM maturity matrix, depicted in Table 3, the numbers indicate the maturity level at a certain focus area, while the letters indicate the placement of specific capabilities relative to their maturity levels. A complete list of the PIM capabilities is presented in Appendix A. Both the implementation processes as well as the maturity matrix provided by the PIM are used during the research project.

	0	1	2	3	4	5	6	7	8	9	10
<i>Strategic processes</i>											
Initiation			A		B				C		
Strategy implementation				A			B		C		
Gatekeeper introduction					A		B				
<i>Core processes</i>											
Product portfolio management		A			B	C		D	E		F
Product lifecycle management		A	B		C		D				E
Project portfolio management			A		B		C		D	E	
<i>Supporting processes</i>											
Process formalization							A		B		
Tooling					A			B			C
Information technology					A			B			C

**Table 3** PIM maturity matrix (Jagroep et al., 2011)

### 3.3 Multinational Corporations

Now that we know the positioning of PPM within the SPM domain, in this section we examine the context in which PPM is implemented in our study: MNCs. MNCs are usually large organizations operating in multiple countries worldwide. They often consist of multiple subsidiaries that (almost) operate as stand-alone businesses in different countries. As described earlier, these subsidiaries are often geographically dispersed and are hard to manage from a central point of view. Numerous studies have been performed on MNCs in general, on coordination mechanisms for MNCs (e.g. Martinez & Jarillo, 1989), on ways to structure a MNC (e.g. Birkinshaw & Morrison, 1995), on human resource practices in MNCs (e.g. Rosenzweig & Nohria, 1994) and on knowledge management in MNCs (e.g. Gupta & Govindarajan, 2000). For our study, especially the tension between differentiation and integration is important, thus we will elaborate some more on this so called organizational duality.

Kostova and Roth (2002) performed research on the adoption of organizational practices by subsidiaries in an environment that can be characterized by organizational duality. Organizational duality refers to the pressures that emerge between integration and differentiation as subsidiaries try to be legitimate in their own country while serving the needs of their MNC. Kostova and Roth (2002) looked at institutional context and relational context to explain the adoption of organizational practices by subsidiaries and found that both of these factors influence the implementation and internalization of a new practice.

Prahalad and Doz (1987) extensively described the aforementioned tension between integration and responsiveness to local demands in their book “The Multinational Mission.” In this book, they present a two-by-two grid in which these pressures are clearly explained. This integration responsiveness grid (IR-grid), as depicted in Figure 7, is an often used mechanism to explain management challenges in a MNC. The idea behind it is that on the one hand MNC’s should aim to integrate globally to benefit from economies of scale, but on the other hand their subsidiaries should be responsive to local demands to remain competitive in their direct markets. This tension has numerous implications for management and structuring choices for MNC’s, and is in this research also expected to influence a PPM implementation on an entire portfolio level, aiming for more integration.

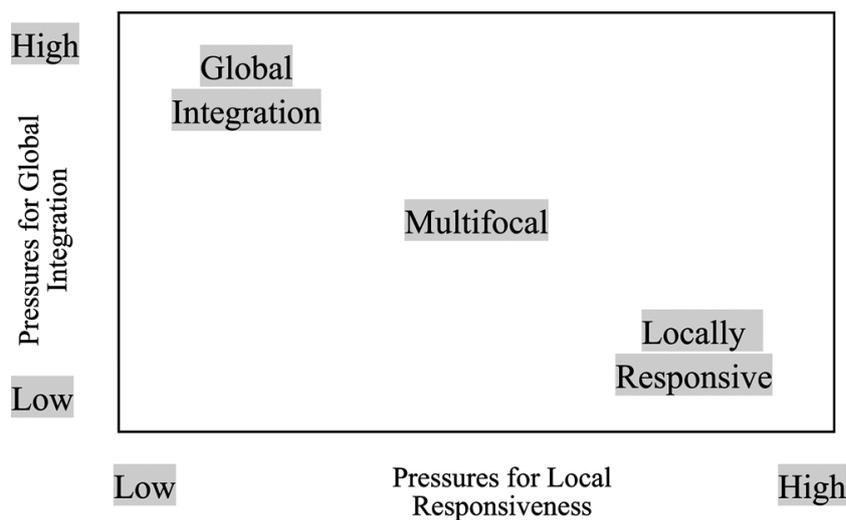


Figure 7 Integration responsiveness grid (Prahalad & Doz, 1987)

### 3.4 Organizational Change

Finally, organizational change is the research domain that copes with implementing changes, such as PPM, in an organization. It has also been subject to numerous studies. In this section we describe research that is directly relevant for our study. According to Armenakis and Bedeian (1999), who performed a literature study on research about organizational change,

four issues are almost always recurring when implementing change in organizations. These are content issues, focusing on the substance of the change, context issues, focusing on internal and external forces, process issues, focusing on how the change is implemented, and criterion issues, focusing on assessing the outcomes of the change. These issues are a clear way to focus research on organizational change projects and are thus also used in this study to organize the sub research questions.

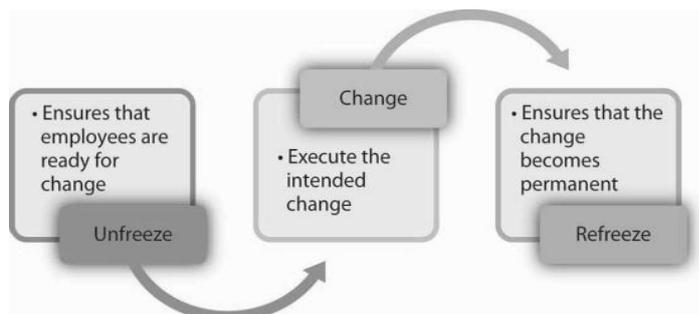
In addition to the four issues presented above, Ruta (2005) performed research on implementing an HR portal in a MNC. He found that to study context issues, MNC's should also distinguish between issues that occur on general level and issues that occur on local level. In our research we therefore added this distinction to create a fifth research sub question.

With regard to *content* issues, Vollmann (1996) identified eight facets to look at when implementing change. These are strategic intent, competencies, processes, resources, outputs, strategic response, challenges and learning capacity. Additionally they identified six organizational dimensions and resources that should be considered. These are culture, configuration, coordination, people, information and technology. Together, these facets and organizational dimensions are useful to prompt questions about the content of a proposed organizational change.

For studying the *context* side of organizational change, both external and internal variables should be considered (Armenakis & Bedeian, 1999). External variables are for instance the firm's industry and the competitive forces in this industry, whereas internal variables are for instance organizational design variables such as size, mission and working style. In the field of SPM, Bekkers et al. (2010) have performed significant research on the topic of contextual dimensions that influence SPM processes. They use the term "situational factors" to coin such contextual elements. According to Bekkers et al. (2010), a situational factor "contains information about the process, the context of the organization and the organization itself". Situational factors are for instance used in the SPM situational assessment method (Bekkers et al., 2010) to determine the desired maturity stage for a certain company, and may also be of similar use in the context of PPM. Bekkers et al. (2008) created a list of 27 situational factors that are relevant in the context of SPM methods and processes. These situational factors are divided over five categories that are business unit characteristics, customer characteristics, market characteristics, product characteristics and stakeholder involvement. For each situational factor, Bekkers et al. (2008) determined their influence on the four SPM business functions by means of expert interviews. According to Bekkers et al. (2008) customer

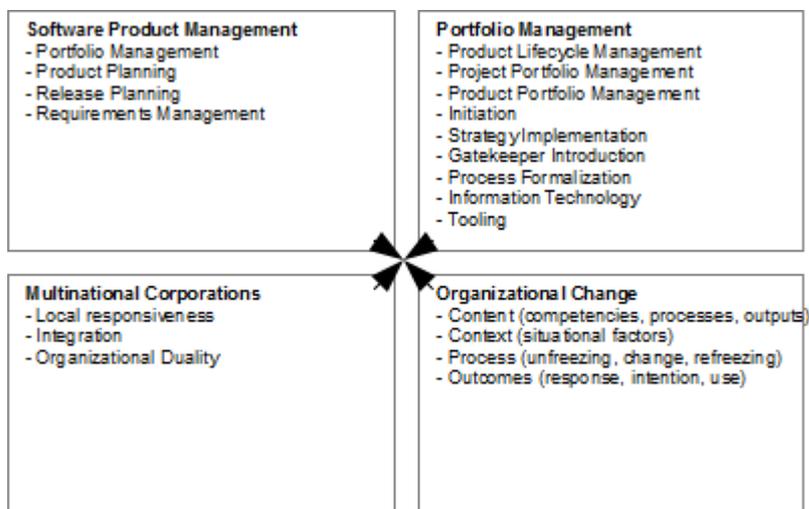
characteristics constitute the most important category of situational factors regarding PPM. Within this category, especially customer loyalty and customer satisfaction are regarded as very influential. But also customer variability, the number of customers and the type of customers play a significant role in the context of PPM process selection. Second important are the situational factors that relate to stakeholder involvement. Especially the company policy, the amount of customer involvement and the amount of partner involvement are influential factors here. Ranked third and fourth are the product characteristics and market characteristics, with application age and product lifetime being by far the most influential factors and with market growth, market size and the type of sector also being of significant importance. Finally, business unit characteristics are rated as least important concerning PPM processes. The entire list of situational factors and their weights according to Bekkers et al. (2008) is depicted in Appendix B.

One of the most used models to explain change *processes* in the context of organizations was developed by Lewin (1947), as depicted in Figure 8. According to this model, organizational change should be implemented in three phases. The first phase is about unfreezing the as-is situation by creating awareness amongst people who are affected by the change. These people should be willing to leave their existing habits and norms in order to adopt the change. The second phase is about transforming the organization from the as-is to the to-be situation. This phase is about having a viable migration plan, consisting of a (hard) technical side and a (soft) organizational side (Dennis, Wixom & Tegarden, 2005). The conversion strategy, consisting of a style, location and module, gives substance to the hard side of the migration plan, whereas change management takes care of the soft side. Extensive research has already been performed on the topic of managing change for organizations (e.g. Weick, 1976; Hanson, 1996; Beck & Cowan, 1996; Baets, 2002; Parsons, 1977; Rittel & Webber, 1973), which is a research subject in itself. Finally, after transforming an organization from the old to the new situation, the new situation should be frozen by ensuring it becomes the standard way of working.



**Figure 8 Organizational change model (Lewin, 1947)**

Finally, *evaluating the outcomes* of organizational change is not straightforward, especially when given that the objectives for each change are different. Some researchers (e.g. Becker, 1992; Becker et al., 1996 and Meyer & Allen, 1997) have used commitment as a measure for the success of organizational change. The rationale behind this is that when employees feel more committed to the required change, because they feel the benefits for their organization, they are more likely to accept the change. Other indicators of bad organizational change are cynicism (e.g. Dean, Brandes & Dharwadkar, 1998) and stress (e.g. Callan, 1993). More concrete in the context of information systems, Venkatesh et al. (2003) developed the unified theory of acceptance and use of technology. The general line of reasoning in this theory is that (1) how individuals respond to using an information system will affect (2) their intention to use it, which in turn affects (3) the actual use of it. Based on this model Ruta (2005) also uses reactions to a system, intentions to use the system and actual use of the system as criteria to measure the success of a HR portal implementation in a MNC.



**Figure 9 Conceptual model based on theoretical background**

Finally, to summarize the organizational background, we created a more mature conceptual model in which we depict the subjects that we focus on in this research. These subjects have been identified based on our literature study and are depicted in Figure 9. These are high-level focal points that we can use to scope our efforts, but they do not provide exact directions or verifiable hypotheses. In the next part of the thesis we present the case setting, including the problem statement and project synopsis.



## **Part 2. Case Overview**



## 4 Case Setting

In this chapter, we present an overview of the case company and the problem statement that triggered this project. Furthermore, a market assessment of the current state of affairs of PPM in the market is included to be able to place the problem statement in a broader perspective.

### 4.1 Company Description

In our case study, PPM is implemented in a large international software vendor headquartered in The Netherlands, in this study referred to as SWCOMP. SWCOMP develops and manages software products for various private and public business domains. They currently employ approximately over 5,000 people across different continents, gaining total revenues of more than € 400 million in 2011. SWCOMP manages and sells a number of global products and different geographical regions within SWCOMP also provide specialized solutions for local small and medium-sized businesses (SMEs). Thus, the regional subsidiaries of SWCOMP also optimize their own market approach by optimizing their own mix of international and local products, based on local opportunities. In the current situation, each subsidiary operates in an almost entirely autonomous manner, where higher management uses mostly financial information to evaluate the subsidiaries' performance.

### 4.2 Organizational Structure

As required for a case company in this research, SWCOMP is a multinational corporation. It operates across a wide number of geographic and business areas. Therefore, each subsidiary varies in size, maturity and mode of operating. A high level overview of the company structure is depicted in Figure 10.

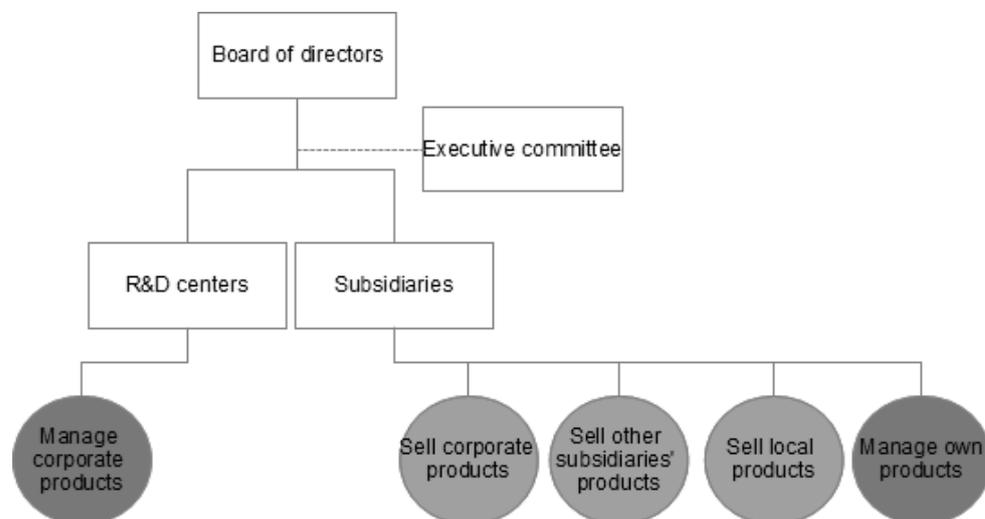


Figure 10 SWCOMP organizational structure

Just like most other MNCs, SWCOMP is managed by a board of directors, consisting of a chief executive officer (CEO), a chief financial officer (CFO) and three chief operating officers (COO's) who are responsible for the company's performance in specific geographic or business areas. The executive committee that forms the corporate management division for SWCOMP consists of the managing directors of the largest geographic or business areas in the group. They meet with the board of directors every two months to discuss corporate and local strategy, market conditions, product issues and competitive issues.

Overall, SWCOMP manages and sells three kinds of products. These are the corporate international products, local subsidiaries' products that have international potential and purely local products. The corporate flagship products are managed and developed by two corporate R&D centers and sold by local subsidiaries and partners. Other subsidiaries develop and manage their own products, sometimes connected to the flagship products but often they stand alone. Some of these products have the potential to also be sold by other subsidiaries whereas some products are only sold in their local market. In general, every subsidiary is different concerning amount of products, type of products, markets etc. Most of them became part of SWCOMP as a result of acquisitions, thus bringing their own products, market, culture and organizational structure into the company. And yet most subsidiaries are able to retain their own way of working, only tuning with corporate management once in a while and only being evaluated based on financial performance. We are thus coping with a highly decentralized organization where PPM has to be implemented across a number of almost entirely autonomously operating subsidiaries. In this context it is important to note that the PPM implementation project has been initiated by the VP product marketing, who is a member of the executive committee. The project has thus been initiated centrally, opposing the decentralized nature of the company.

### **4.3 Problem Statement and Objectives**

The autonomous way of operating the different subsidiaries on the one hand meant that these subsidiaries had a high amount of freedom concerning product development but on the other hand it meant that there was a decent chance that these subsidiaries were regularly reinventing the wheel, that is developing the same product component at the same time without knowing, thereby unnecessarily spending scarce resources. To overcome this, more collaborative efforts between the different subsidiaries had to be established while the freedom of these subsidiaries had to be kept intact as much as possible. A problem attached to this goal was however that management had limited insight in regional product information and corresponding development projects. This was a problem as, in order to successfully make

strategic decisions about the entire product portfolio, managers require strategic product information (Bekkers et al., 2010). Additionally, a generally recurring theme in the organization's product management, as identified by a consultancy effort in 2011, was process formalization. Product managers at SWCOMP recognized that, although there should be a balance between formalization and autonomy, more structure was required. This entailed more centralized processes and more coordination by higher management. To summarize, the goals of the implementation project at SWCOMP are listed below:

1. Improve ability to identify opportunities for collaboration
2. Create group-wide insights in product portfolio
3. Create group-wide insights in what large projects all subsidiaries are doing
4. Professionalize decision making processes

#### **4.4 Market Assessment**

A market benchmark study is used to get insight if the company excels in certain areas, in which areas the company is lacking behind and what areas should be focused on for the upcoming years. Such insights help the company to understand its current position in the context of the market. Based on this knowledge, decisions about certain aspects of the company's PPM implementation that need to be improved can be made more easily.

Data about the performance of other company's on certain topics, such as PPM, is not always easily available. It is possible that a company only has access to a limited amount of benchmarking data, but at least some data is better than no data at all. In the case of SWCOMP we found a benchmarking study on the topic of PPM, commissioned by Planview and performed by Appleseed Partners and OpenSky Research in 2011, which provided useful insights in the challenges and current practices that other companies are currently involved in.

The study showed that 57% out of 922 companies said that one of their biggest pain points was to be involved in too many projects compared with the amount of resources they have available. This leads to, among others, project team members being spread too thinly, delays in the project pipeline and team members rushing and 'cutting corners' to finish a project on time (Cooper & Edgett, 2009). And although the importance of successfully balancing between the available resources and the amount of development projects is also stressed by Cooper, Edgett and Kleinschmidt (2002), only 25% of the companies that participated in the survey rated themselves good or excellent at planning their resource capacity.

Other issues mentioned by the respondents were decisions being made too late (43%), missing time-to-market (38%), no consistent way to measure the value of projects (32%), politics dominating the decision process (28%), inability of cutting costs without cutting the future (27%) and inability to address risk and uncertainty in a structured manner (22%). Only 5% of the respondents reported to be experiencing no issues on the topic of PPM at all.

Also, 50% of the companies that participated in the survey said that managing changing priorities because of changes in the business environment was their biggest risk. Other important PPM risks mentioned were missing time-to-market, missed understanding of the customers' requirements, not meeting the expected revenue targets and not cutting lower value products and projects that take away resources from higher value products and projects.

The main cause for these risks seems to be the lack of reliable data and limited access to information. In this case, only 30% of the respondents reported to operate data-driven when it comes to prioritizing products and projects, while over 60% works on an ad-hoc, personal basis. When prioritizing products and projects, most of the respondents mentioned strategic alignment, competitive positioning and potential revenue as the most important criteria. Other criteria used are margins, brand positioning, resource availability, market share and risk score. Although most of the respondents recognized the importance of strategic alignment, only less than half of the respondents rated their own ability to align products and projects with strategy as good or excellent.

What stands out is that almost 70% of the survey respondents indicated that their companies are currently revising and improving their PPM implementation because of the higher competitive pressures due to the recession. It thus seems necessary to improve PPM these days in order to keep up with the competition. However, it also became clear from the survey that although organizations report to be improving their PPM practice, they still mainly rely on manual solutions such as hand-made spreadsheets.

Knowing the SWCOMP problem statement and how it relates to the broader market context, before proceeding to the actual case study analysis part, the next chapter presents a project synopsis to show an overview of the project for scientific reliability and clearness.

## 5 Project Synopsis

In this chapter we present an overview of the different stages we passed while implementing PPM in SWCOMP with the purpose of providing objective insights into our activities and the occurrences related to them. An in depth analysis of those occurrences, answering the sub research questions, takes place in the third part of this thesis.

Figure 11 provides an overview of the project timeline, referring to the different activities that are part of the action research cycle, as presented in Chapter 2. The activities are adapted to fit the project at hand by inserting separate diagnosing activities for respectively corporate and local contexts. Furthermore, the broad action plan has already been defined only after the corporate diagnosing activity. Therefore an “action plan adaptation” activity is added to the timeline to modify the action plan based on the local diagnoses. Finally, “History” and “Future” phases have been added to emphasize the long term nature of the project. Each of the phases is described in a separate section in this chapter.

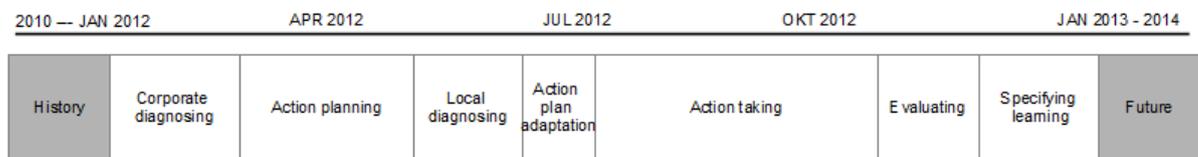


Figure 11 Project timeline

### 5.1 History of the Project

Before we proceed to our implementation project it is important to note that SWCOMP already had some history concerning the topic of PPM. The interest in PPM improvement for SWCOMP has been initiated two years before the start of our research project by the executive committee, of which the VP product marketing is a member. On behalf of the executive committee the VP product marketing has since then always been directly involved with the PPM implementation.

During the years 2010 and 2011, another graduating master of Business Informatics student from the Utrecht University conducted a theoretical research on how to implement PPM, which was commissioned and supervised by the VP product marketing (Jagroep et al., 2011). He performed an extensive literature research to identify best practices concerning PPM related processes and evaluated his propositions by means of expert interviews. This finally led to his first proposal of the PIM, as earlier described, which he evaluated by means of a consultancy effort at SWCOMP. The advice from this consultancy effort is regarded a starting point for our implementation project.

Parallel to our implementation project at SWCOMP, Jagroep et al. (2011) continued their research on improving the PIM as part of a PhD dissertation. It is thus important to notice that the PIM is still evolving.

## **5.2 Corporate Diagnosing**

The first phase of the project started with an analysis of the problem statement and the general context around it. Documentation about and tools used in previous PPM related activities were studied and frequent (video) meetings with the VP product marketing led to a bigger understanding of the case situation. Furthermore, scientific literature, best practices and example cases were studied to improve expertise on the subjects of PPM, SPM, multinational corporations and organizational change.

In addition, a choice has been made for the specific technology to be used for the development of the information infrastructure. SWCOMP performance management software was suggested by the VP product marketing and agreed on by the other team members. To get acquainted with the tool, the researcher enrolled in a three days training course.

Finally, based on the case information acquired in the first phase of the project, the research proposal was finished and discussed with the university supervisors. Once a research agreement had been established between the student researcher, the VP product marketing and the university supervisors, the project was officially started.

## **5.3 Action Planning**

As soon as the problem statement and corporate demands were clear, the action planning phase was initiated. In this phase, a first high level plan, based on the case requirements, best practices and scientific literature, was created. This implementation plan contained process descriptions for how and when PPM activities should be performed and by whom. Furthermore it contained a data model in which all information requirements, as identified up to then, were presented. This action plan served as a tangible plan for managers to shoot at in the next phase.

Additionally, the performance management system was set up and credentials to access it were arranged for the researcher. The VP product marketing in the mean time identified all important stakeholders that should in some way be informed or involved in the project. This list of stakeholders was used to plan interview sessions for the next phase, Local diagnosing.

## **5.4 Local Diagnosing**

To initiate the local diagnosing phase, the VP product marketing and the researcher organized an alignment web meeting, for which all important stakeholders were invited. In the end, representatives for seven different subsidiaries participated in this meeting. The meeting was used to present the problem statement and create awareness that changes were ahead. Furthermore, the implementation plan as created in the previous phase was presented by the researcher to inform the stakeholders and to give food for thought for the upcoming individual interview calls.

In the individual calls, the researcher interviewed a total of eight local product managers, divided over eight subsidiaries in seven countries. The two product managers in The Netherlands were visited and interviewed in real life, whereas the other six product managers were interviewed via online video conference software or regular phone. The interviews had an average duration of approximately 80 minutes (ranging between 45 minutes and 2 hours). They had a semi-structured nature to focus on certain topics while being able to prompt for more information during the interviews. The interview script is included in Appendix C.

## **5.5 Action Plan Adaptation**

The remarks and ideas that were received from the product managers in the previous phase were used to adapt the action plan to better fit the local context. For example, detailed process descriptions were broadened to fit an environment characterized by stakeholder variability and some information requirements were added or removed from the data model. The adapted action plan was then again discussed with the VP product marketing and with a synergy manager who was responsible for creating more collaboration across SWCOMP. As soon as they agreed with the plan, it was time to take action.

## **5.6 Action Taking**

Action taking entailed the design and implementation of the PPM infrastructure. The major part of this phase was about designing and building the PPM tool using the SWCOMP Business Analytics software package. During product development a number of evaluation moments were used to make sure development was in line with the expectations. Furthermore, when the tool was 80% finished, it was evaluated with two group or synergy managers in The Netherlands. This only led to some minor adaptations as they already were fairly positive about the tool. With the first version of the PPM tool finished, it was time to create an implementation plan and start rolling the infrastructure out across the group.

In this second part of the action taking phase, the conversion strategy has been chosen and followed. This meant that first the product management team for one of the largest corporate products was instructed and invited to participate by means of a video conference presented by the researcher, before all other subsidiaries were invited. To inform all stakeholders about the newly implemented PPM capabilities, an online conference was set up by the VP product marketing. This presentation was attended by over 40 managers from all across the group, and interested actors included the CEO and CFO. After this presentation some minor technical issues had to be fixed before all stakeholders were invited to participate.

## **5.7 Evaluating the Outcomes**

The moment that all stakeholders were able to participate in PPM was only short before the end date of our project. Evaluation could therefore only be done based on first responses and initial expectations. In discussion with a number of product managers and corporate managers, the VP product marketing identified some minor improvements early on, which were already implemented shortly after the first release. To further evaluate the first outcomes of the project, a survey has been conducted by the researcher. This survey focuses on whether the participants believe that the PPM related goals are achieved by the implementation and on their first impressions of the tools, processes and information systems. The survey format is included in Appendix D. Because the survey has only been conducted within a few weeks after the initial use of the new PPM toolset, long term evaluation moments are still ahead and should be undertaken by future researchers or stakeholders in the company itself.

## **5.8 Specifying Learning**

Specifying learning was the activity that ensured knowledge creation for the scientific community. This was a continuously ongoing core activity during the project, as contributing to the scientific body of knowledge was the main objective for this project. The main result of this activity is this thesis document and a scientific paper. Furthermore, as the result of this phase, two presentations about the project at the master's of Business Informatics colloquium have been held by the researcher and a final graduation presentation was organized to finish the project.

## **5.9 Future**

As noted before, the implementation has only been evaluated based on first impressions, as the project's end date approached quickly after launch. Although these early evaluations point in a positive direction, it is important to also evaluate on longer term whether the PPM capabilities are beneficial, how these benefits can be measured and communicated and what

improvements are still to be made. In addition, it is important to note that the information systems have just yet been implemented and should still become a standardized way of working for most stakeholders. This means that SWCOMP corporate management should pay attention to change management related activities to ensure that the new PPM processes become a habit and become ingrained throughout the company. And finally, not only for SWCOMP but also for the scientific community, it would be interesting to monitor the PPM implementation closely in the upcoming years as this enables to learn from real data and draw conclusions about managing the roll out of PPM and about the long term benefits.



## **Part 3. Case Analysis**



## 6 General Context and Drivers

PPM implementations are provoked and affected by certain strategic drivers. The impact that PPM has on organizations becomes clear from previous research. However just implementing PPM because it generally has such a positive impact on companies does not provide a proper case for companies to initiate a PPM implementation. Often a real desire to implement PPM stems from specific strategic drivers that occur at a certain moment in time. These drivers have an important impact on determining what exactly should be implemented and on how the implementation takes place. Therefore this chapter dives into the following sub question:

*What is the general context that drives the PPM implementation?*

In this chapter we elaborate on this question by looking into the corporate motives behind the PPM implementation in the case of SWCOMP.

### 6.1 General Drivers for SWCOMP

SWCOMP initiated their PPM implementation in order to “*work smarter as a group*”. SWCOMP finds a major part of its history in acquisitive growth. As a result of the acquisitive growth, SWCOMP consists of highly independent subsidiaries and a large portfolio of products. Within this portfolio, every product has its own stack, there are multiple levels of duplication, maintenance and development activities cope with capacity shortage, time-to-market is sometimes too long and the profitability is under pressure because of limited leverage. The situation can be compared with a restaurant where a number of chefs each prepare their own dish. The chefs all know the recipe for their dish and are the best at preparing it. However, there is a decent chance that all chefs, or at least a number of them, need rice for their dish. In such a case, they can decide to all cook the rice by themselves, or they can use one big saucepan to cook all rice together, thereby saving energy, time, and stove space and so on. This is exactly the direction that SWCOMP wanted to take by implementing PPM to identify potential areas for synergy.

As main reasons behind the PPM implementation, SWCOMP stated that as a group they have enough capacity to compete successfully, as a group they have the necessary time to find the innovations of the future and as a group they have the combined budget to realize these innovations.

To start performing as a group was however a hard thing to do as there was only limited insight in the product and project portfolio on corporate level. This is why the focus for the PPM implementation was on four items, as described earlier:

1. Collaboration opportunity identification
2. Product information management improvement
3. Project information management improvement
4. Process professionalization

These goals also (partly) reflect the goals that have been identified in previous research by Cooper, Edgett and Kleinschmidt (2002), who identified nine reasons for companies to implement PPM. Additionally Saaksvuori and Immonen (2008) agreed with most of these reasons and added another one, leading to a total list of ten reasons for companies to implement PPM:

1. Financial reasons
2. Maintaining competitive position
3. Allocating resources efficiently
4. Align portfolio with strategy
5. Focus resource spending
6. Balance portfolio
7. Improve horizontal communication
8. Improve vertical communication
9. Objective decision making
10. Identify best product mix

In our research, when evaluating the outcomes of the implementation project, we will both focus on the achievement of the four SWCOMP specific goals and on the achievement of generic PPM goals.

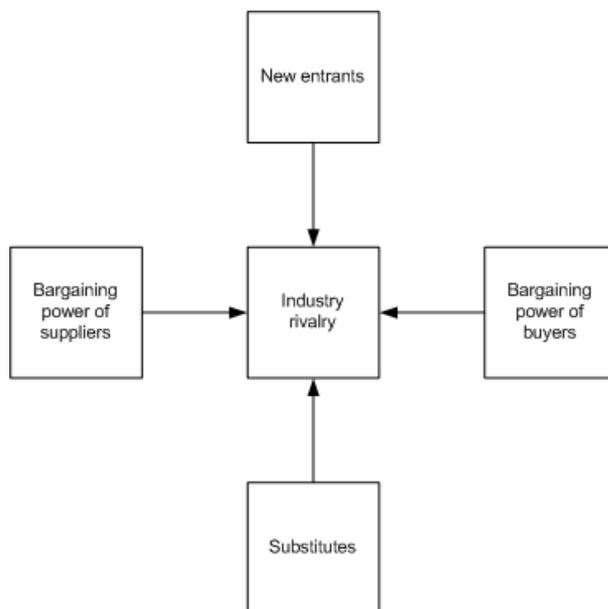
Besides the PPM implementation, SWCOMP also worked on the implementation of several other capabilities to improve its performance as a group, such as centers of excellence and a unified development platform. It is clear that SWCOMP assigned high priority to improving its performance as a group. But why did SWCOMP suddenly start to focus so much attention on performing as a group? Why not, say, five years earlier? What are the market events that triggered this need?

The main reasons for this change in perception can be found in changing competitive forces that affect the attractiveness of the business software market. In the next section we will elaborate more on this.

## 6.2 Competitive Market Forces

SWCOMP wants to be amongst the global leaders in the market for business software. This market is, just like every other market, characterized by certain competitive forces that change over time. Recently, the interplay between these forces started to shape an environment in which performing as a group for SWCOMP became more and more important.

In this section we use Porter's (1979) five forces model to explain the competitive forces that play an important role in the market for business software.



**Figure 12 Porter's (1979) five competitive forces model**

The five competitive forces, as depicted in Figure 12, reveals why industry profitability is what it is. Together, the threat of new entrants entering the market, a high bargaining power of suppliers, a high bargaining power of buyers, the threat of potential substitutes replacing the product and rivalry amongst competitors constitute the five main competitive forces for industries. The five forces model provides a framework for strategy makers to determine the structure of their industry so that they can successfully anticipate and influence competition over time. For each industry, the competitive forces shape a different structure. Understanding this industry structure and the factors that affect the structure is a good starting point for strategy making. In the remainder of this section, we discuss the factors that change the structure of the competitive forces for the business software market.

### **New entrants**

At first there is the threat of new entrants entering the market. These new entrants bring more capacity to the market and have a strong desire to gain a share of the market. This puts

pressure on prices, costs and the rate of investment that is necessary to compete (Porter, 1979).

In a SWCOMP corporate memo the threat of new entrants having “mega opportunities to become new leaders” was stated as one of the major 2012 threats to the company’s market position. Porter (1979) mentions supply-side economies of scale as one of the strong barriers against new entrants entering the market. These economies arise when larger companies can spread their (fixed) costs over multiple units and employ more efficient technologies. SWCOMP’s PPM goal of “working smarter as a group” seems to perfectly fit this barrier.

Additionally, at the other side of the supply chain also demand-side benefits of scale can positively affect the threat of new entrants in the market. These demand-side benefits of scale arise when a company has a strong brand in a market where references are very important. In such a case the buyer’s willingness to pay for a product increases when other buyer’s positively patronize the company. For example, when talking about ERP systems one SWCOMP product manager stated that references are very important in his market. According to him, phasing out an ERP solution with strong local brand recognition to be replaced by an international (but locally unknown) ERP solution would be impossible. Chances are in such a case that customers will take the step away to another ERP product vendor that has more local references, instead of using the recommended international ERP product from the same vendor.

### **Substitutes**

A substitute product “performs the same or similar functionality as an industry’s product by a different means” (Porter, 1979). One of the most threatening situations is when the substitute offers an attractive price-performance ratio. This is the case with the advent of software as a service (SaaS) solutions in the business software market.

According to a memo issued by SWCOMP corporate management in 2011, the market for business software is “rapidly transforming” as the result of a major technology shift. “There is a growing trend among customers to purchase their solutions using a subscription model, with their software delivered as a service”. SaaS can be seen as a threat to short term profitability because it is typically delivered in a pay-as-you-go model. It thus takes longer for recurring revenues to reach a point where they cover sales and set-up costs. Therefore, now more than ever, efficiency in the product development and R&D departments has become of vital importance.

### **Bargaining power of buyers and suppliers (combined)**

Buyers and suppliers can affect the market structure when they play a vital role in the supply chain. Travel agencies for instance are very dependent on flight carriers for their product and service offerings.

In the market for business software, there especially is a shift in the bargaining power at the buyer side. Buyers can capture more value by forcing down prices and by demanding better quality or service. According to Porter (1979) buyers are especially hunting for bargains when they earn low profits, are strapped for cash or when they are otherwise under some kind of pressure to cut costs. With the economic downturn at this moment, this is definitely the case for many buyers.

In general, SWCOMP even considered the year 2012 as a year full of uncertainty because of the poor state of many of the world's major economies. In their 2011 annual report they stated that "price pressure on license sales and services is likely to remain while investments will remain cautious because of the economic downturn". As an effect especially the public sector is coping with budget cuts. This continues to impact the public sector license revenue for SWCOMP.

### **Industry rivalry**

Finally, high industry rivalry generally limits the profitability of an industry (Porter, 1979). The degree to which rivalry limits the profit potential depends on the intensity and the basis of the competition. According to Porter (1979), rivalry often intensifies in a natural way over time when the industry matures and growth slows down.

In the market for business software this is not different. According to the earlier mentioned SWCOMP corporate memo, "consolidation of the market changes the vendor landscape once again". And additionally, in the 2011 annual report SWCOMP stated that "the continuing trend of consolidation in the IT sector leads to further concentration of market share. Larger competitors gain cost advantages by economies of scale. This enables them to further strengthen their market position". This is especially risky for SWCOMP as they are relatively small compared to their main competitors. This in turn makes its R&D costs relatively high.

## **6.3 Key Findings**

To summarize, changes in technology, the threat of new entrants, economic pressures and a lack of economies of scale forced SWCOMP to improve the efficiency of their resource spending in order to remain at the forefront in terms of competitiveness and profitability. This is what drove SWCOMP to turn onto implementing PPM. These findings are summarized in Table 4. We

expect that different forces shape different PPM goals. Thus in the case of SWCOMP, the forces mentioned on the left side of the table drive the goals mentioned on the right side of the table. But in companies with different pressures, the PPM related goals may also be different.

<i>Forces</i>	<i>PPM Goals</i>
<p>Internal forces</p> <ol style="list-style-type: none"> <li>1. History of acquisitions</li> <li>2. Large portfolio of similar/duplicating products</li> <li>3. Capacity shortage</li> </ol> <p>Competitive forces</p> <ol style="list-style-type: none"> <li>1. Increased threat of new entrants</li> <li>2. Increased threat of substitutes (SaaS products)</li> <li>3. Increased bargaining level of buyers (Economic downturn)</li> <li>4. Increased industry rivalry (Market consolidation)</li> </ol>	<ol style="list-style-type: none"> <li>1. Improve ability to identify collaboration opportunities</li> <li>2. Improve product information management.</li> <li>3. Improve project information management.</li> <li>4. Professionalize processes</li> </ol>

**Table 4 Competitive forces driving PPM goals**

In the next chapter we dive into the local context within the SWCOMP subsidiaries to see how that (may) affect the PPM implementation in a different direction.

## 7 Local Contextual Factors

THIS CHAPTER HAS BEEN REMOVED FOR CONFIDENTIALITY REASONS

### 7.1 Summary and concluding remarks

To conclude this chapter, we present an overview of how situational factors are similar or different across the SWCOMP subsidiaries. Based on these similarities, differences and managerial statements we present a number of propositions about how situational factors affect the PPM implementation in a MNC. This conceptual model of propositions serves to answer the question stated at the beginning of this chapter: “what are local contextual factors that affect the PPM implementation?” Furthermore the propositions can be used as a starting point for future research on this topic.

It became clear from the interviews with local managers that SWCOMP subsidiaries had a highly autonomous way of operating. There was usually almost no involvement from corporate management and often corporate management did not have clear insights in what was happening on local level. Additionally, most of the subsidiaries reported high levels of responsiveness to local conditions such as customer demands, partner demands and changes in standards and legislation. On top of that, the subsidiary managers stated that because of the acquisition history there were big technological and market differences between them. This made it extremely difficult to collaborate and implied that advanced PPM processes and corporate involvement were unsuitable.

Furthermore, typical situational factors such as the importance of time to market, the development methodology (agile vs. not-agile) and the size of the team that is responsible for a product were found to be recurring themes to consider when implementing PPM. The first, time to market, seemed to influence both the difficulty of collaboration and the rigidity of the PPM processes. An agile development methodology and a small product team mostly seem to preach for simple and flexible processes as they do not require transparency, which is offered by more formal processes and as they do require the ability to respond in an agile manner to changes in the market. The entire list of issues and their underlying factors is presented in Table 5.

<i>Surface issue</i>	<i>Underlying factors</i>
Collaboration should not be forced	Degree of being different Structure of autonomously operating subsidiaries Importance of time to market
Process should be flexible and fast	Level of responsiveness to local conditions Degree of being different Importance of time to market Agile development methodology Small team size
Corporate management should only play minor role	Level of responsiveness to local conditions Degree of being different

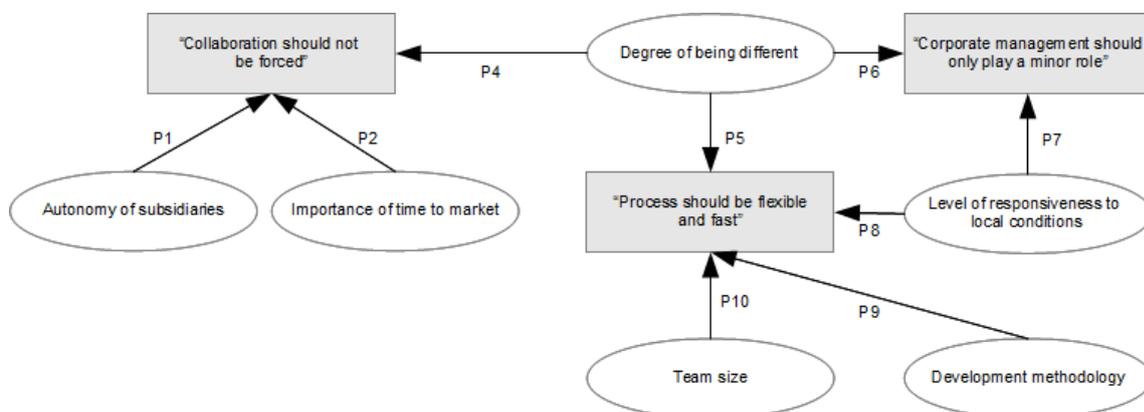
**Table 5 Issues and underlying factors**

### Conceptual model of propositions

Finally, we present a conceptual model containing 14 propositions about the relations between cultural and situational factors and surfacing issues surrounding a PPM implementation. This model serves to answer the question asked in this chapter:

*What are local contextual factors that affect the PPM implementation?*

The propositions in the model are derived from the situational profiles presented in this chapter and related to issues brought up by local managers. They directly stem from the issues and underlying factors as found in a number of subsidiaries, depicted in Table 5. Although the propositions are not evaluated or validated in this thesis, they do provide an interesting starting point for future research as we believe that most of the propositions will also be true for similar PPM implementations. The conceptual model, containing the propositions, is depicted in Figure 13.



**Figure 13 Conceptual model of contextual factors**

The propositions are discussed in more detail in the remainder of this section.

*Proposition 1: A prevailing structure of autonomously operating subsidiaries makes it more difficult to achieve collaborations across an MNC.*

We expect that in MNCs with a prevailing structure of autonomously operating subsidiaries it is more difficult to achieve collaborations. This is supported by the local managers in two different subsidiaries who stated that “collaboration will be very difficult because it is not in the DNA of the organization.”

*Proposition 2: When time to market is important, international collaborations become more difficult.*

We expect that subsidiaries in sectors where time to market is important will have difficulties to collaborate with others. This is supported by one manager who stated that “a lot of small differences in time to market make it difficult to develop something quickly.” It is not hard to imagine that when you need an app right away, while another country still has two years to develop it, collaboration is not going to work.

*Proposition 3: When time to market is important, the PPM process should be flexible and fast.*

Additionally, we expect that markets where time to market is important require flexible and fast PPM processes. This is supported by two subsidiaries who stated that “decisions should be made fast so that market opportunities are not missed.” When the process becomes too rigid and decisions take too long chances are that the subsidiary will get behind compared to its competitors.

*Proposition 4: A high degree of differences in technology or market between subsidiaries makes it difficult to collaborate.*

When the technologies used or markets served by subsidiaries are different, it is difficult to combine products or to collaborate on product development. In this regard, one of the managers stated that “collaboration only pays off in the case of a monolith, a completely standalone product.” And additionally one manager mentioned that for them collaboration is easier because they are only creating extensions to the corporate ERP suite, so they do not have to cope with different technologies.

*Proposition 5: A high degree of differences in technology or market between subsidiaries means that PPM processes should be flexible and fast.*

We expect that local differences between products and markets require flexible PPM group processes. This is supported by two managers who for instance mentioned that “categorizing projects in one portfolio is difficult because we are all so different.” We can also imagine that when collaboration becomes too difficult, local managers don’t see the point anymore of participating in comprehensive group PPM processes.

*Proposition 6: A high degree of differences in technology or market between subsidiaries means that corporate management should only play a limited role in local decision making.*

When local differences are big it is almost impossible for corporate management to be involved in local decision making. One manager for instance stated that “every subsidiary with a budget for product development should be able to manage that budget itself.” And one manager wondered, “How can someone in another country determine what should be developed for our market?”

*Proposition 7: A high level of responsiveness to local conditions means that corporate management should only play a limited role in local decision making.*

When subsidiaries need to be very responsive to local factors, such as customer involvement, partner involvement or changes in standards and legislation, corporate management should restrict its role to a minor one. As an example, one of the subsidiaries, being very sales driven, highly supports the idea of “the small corporate management.” This is also in line with the Delegation Principle (e.g. Milgrom & Roberts, 1992), which states that the presence of ‘local knowledge’ in divisions is a reason to decentralize decision rights.

*Proposition 8: A high level of responsiveness to local conditions means that the PPM processes should be flexible and fast.*

When local conditions are very important to the subsidiary, it should also be able to respond to these conditions very quickly. One manager stated “we only develop when customers are behind the project.” Furthermore a number of subsidiaries are involved in a lot of not-optional projects that have to be developed because of changes in standards or legislation. In such a case strictly formalized processes are not in place because in the end it is merely important to respond to market changes and make decisions based on what is directly needed.

*Proposition 9: An agile development methodology means that the PPM processes should be flexible and fast.*

In agile development environments detailed plans are often only made on short hand. This requires the ability to respond fast to changes in requirements. On this regard one manager states that “decisions have to be made fast in order to maintain agility” and “when the process becomes too rigid you risk losing some of your agility.”

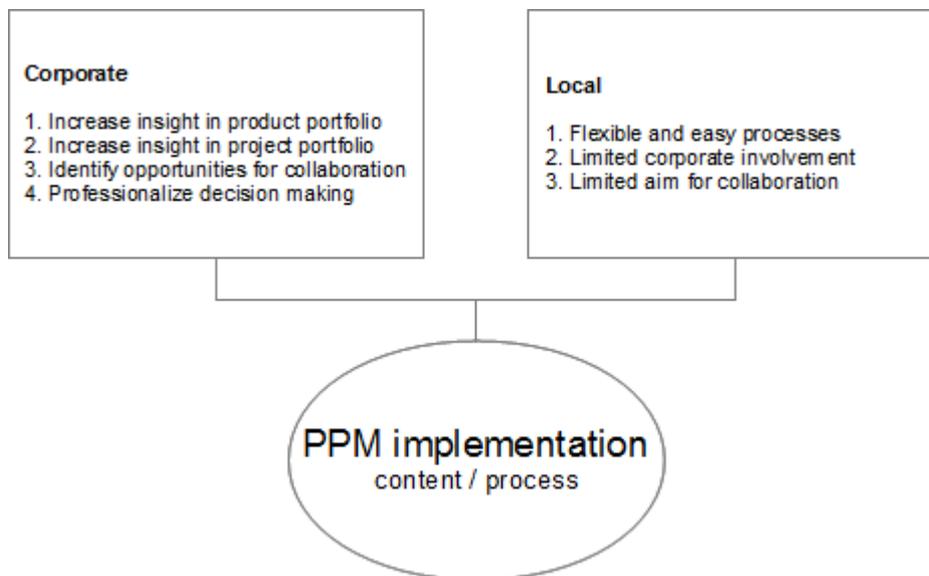
*Proposition 10: Having only small teams responsible for product development means that the process should be flexible and fast.*

When there are only small teams responsible for product development there is no need for transparency, as stated by two managers. In case of small teams, rigid processes only hinder decision making so they should be avoided.

To conclude this chapter we take a small step back to the beginning of this chapter. The aim of this chapter was to answer the question “What are local contextual factors that affect the PPM implementation?” To do so, we investigated the local context of eight subsidiaries divided over seven countries. Based on this we created a conceptual model containing 10 propositions about the relationships between local contextual factors and PPM implementation issues. We believe this model is useful to explain PPM related issues in a MNC, but the model will have to be tested in future research before it can be accepted. Finally, the outcomes of this chapter are used as input for the next chapter, where we present our implementation approach and the content of the implementation project.

## 8 Tools, Processes and Information Systems

In the previous chapters we have presented the situational PPM demands on general level (7) and local level (8) for SWCOMP. We have seen that on the one hand corporate management wanted to increase product portfolio insight (1) and project portfolio insight (2) across its subsidiaries, improve the ability to identify opportunities for collaboration (3) and work towards more uniform processes (4) while on the other hand local managers demanded flexible processes, limited corporate involvement and only a limited aim for collaboration and participation on a company-wide portfolio. The tension between the corporate and local play fields or the tension between integration and differentiation is thus clearly present, as can be expected from a PPM implementation in a MNC. Balancing somewhere in the middle between these corporate and local pressures, a PPM solution had to be implemented. This tense playfield, as the starting point for this chapter, is depicted in Figure 14.



**Figure 14 Merging corporate and local context into PPM**

In this section, we reflect on the design choices that have been made for the PPM implementation in order to benefit both corporate managers and local managers without impeding one or another, by answering the following question:

*How can the tools, processes and information systems be designed?*

First of all, it is important to recall that the PPM implementation has been initiated by the executive committee, thus by corporate management. The goal is to implement more PPM capabilities on group level as to increase SWCOMP's performance as a group, not to optimize all PPM processes on local level, possibly impeding local managers in their tasks. To achieve this

goal, we implemented a Central Portfolio Management Infrastructure (CPMI) that provides functionality to share information about the product and project portfolios across the group. Furthermore, a more formalized group-wide PPM process has been defined to facilitate use of the CPMI and to professionalize PPM decision making. In this chapter we will examine the CPMI, the facilitating process and finally we will take a look at the PIM maturity matrix to reflect upon the PPM maturity improvement that has been made by implementing the CPMI and PPM process.

## **8.1 Central Portfolio Management Infrastructure (CPMI)**

The CPMI has been developed to facilitate information sharing about products and projects, to enable analysis of the entire company's portfolio and to enable easier identification of opportunities for collaboration. Furthermore it is the backbone behind all corporate or group-wide PPM processes, enabling more formalization and professionalization of decision making. The CPMI has been developed by using a performance management solution that is being developed and managed by one of SWCOMP's recently acquired product teams. This performance management solution enables consultants without any programming experience to construct performance dashboards, input forms and the necessary database cubes. The choice for this tool has been made by the VP product marketing who, because of the recent tool acquisition, was also interested in the tool's capabilities in general. In this section we describe in more detail how the CPMI works.

The CPMI is deployed on a dedicated SWCOMP server and can be accessed via a regular web browser that supports Java. Only people with a SWCOMP intranet account, who are selected by the executive committee to participate in the CPMI, are able to log on to the system. Based on their role and whether they are involved in any product management or portfolio decisions, approximately 30 people have been selected to participate. These are mainly product managers from SWCOMP subsidiaries worldwide. The CPMI distinguishes between two roles: corporate managers and product managers. The functionality provided to these role types is almost similar, but corporate managers have some added functionality to support their approval task in the PPM process and to maintain the information system. New project categories should for instance from time to time be inserted to keep the solution workable and in times of acquisitions new subsidiaries should be added.

In line with the goals to improve group-wide insights on both products and projects, the CPMI consists of a product (PPM/PLM) and a project side (PM), interconnected with each other in the way projects relate to products. The CPMI can be navigated based on organizational levels. So it

is possible to apply a focus on the entire SWCOMP portfolio, but also to focus on the portfolio of one specific subsidiary or on a combination of several subsidiaries. For both the product portfolio and the project portfolio sides there is a dashboard that shows information about the respective portfolio. An example of the product portfolio dashboard is shown in Figure 15. This dashboard shows information about the composition of a specific portfolio in terms of lifecycle phases, product areas, sales territories, development platforms and development languages.

**THIS IMAGE HAS BEEN REMOVED FOR CONFIDENTIALITY REASONS**

**Figure 15 CPMI product dashboard**

### **Information Requirements and Collection**

Note that the information presented in these graphs was found to be relevant for SWCOMP, which does not automatically mean that this also applies to other MNCs. Information requirements differ per organization and should be elicited as so. In the case of SWCOMP, all information requirements have been decided on in meetings between the research team and the VP product marketing, bringing organizational requirements and best practices together. Furthermore the interviews with local product managers about their subsidiaries' context provided additional information requirements that seemed to be valuable on local level. With regard to the product lifecycle phases that are used, being development, introduction, growth, maturity, revitalization, decline and phase out, it should be noted that at first hand the lifecycle model as proposed by Saaksvuori and Immonen (2008) had been used. This model contains more lifecycle phases before the launch of a product (initiate, design, build, test and release) and only a few phases after launch (evolution and phase out). In a meeting with the VP product marketing and a corporate product manager however it was decided to change to a lifecycle model, as defined by the corporate product manager, in which the more mature SWCOMP products could better be described. Some modifications are for instance the addition of a revitalization phase, enabling to express that a product is being revived, and the distinction between growth, maturity and decline to be more specific about the current situation of products that are already in the market. On the other side, some pre-launch phases have been combined because not a lot of new products are being developed across SWCOMP, and thus a too detailed distinction between these development phases would not be valuable in the CPMI.

Because the CPMI is a standalone system, meaning that it is not connected with other information systems across the group, all data is gathered via input forms that have to be updated by the responsible product managers. This choice has been made because some of the data that is required in the CPMI was spread over too many different systems across the group,

making integration too expensive, and furthermore because a main part of the required data, such as formal business cases, only existed in the heads of managers. Integration with existing systems would thus have been an expensive operation to gather only a small part of the required data and has therefore been left out of scope. A complete overview of the information that is used in the CPMI (company specific) is presented in a simplified UML class diagram notation in Figure 16.

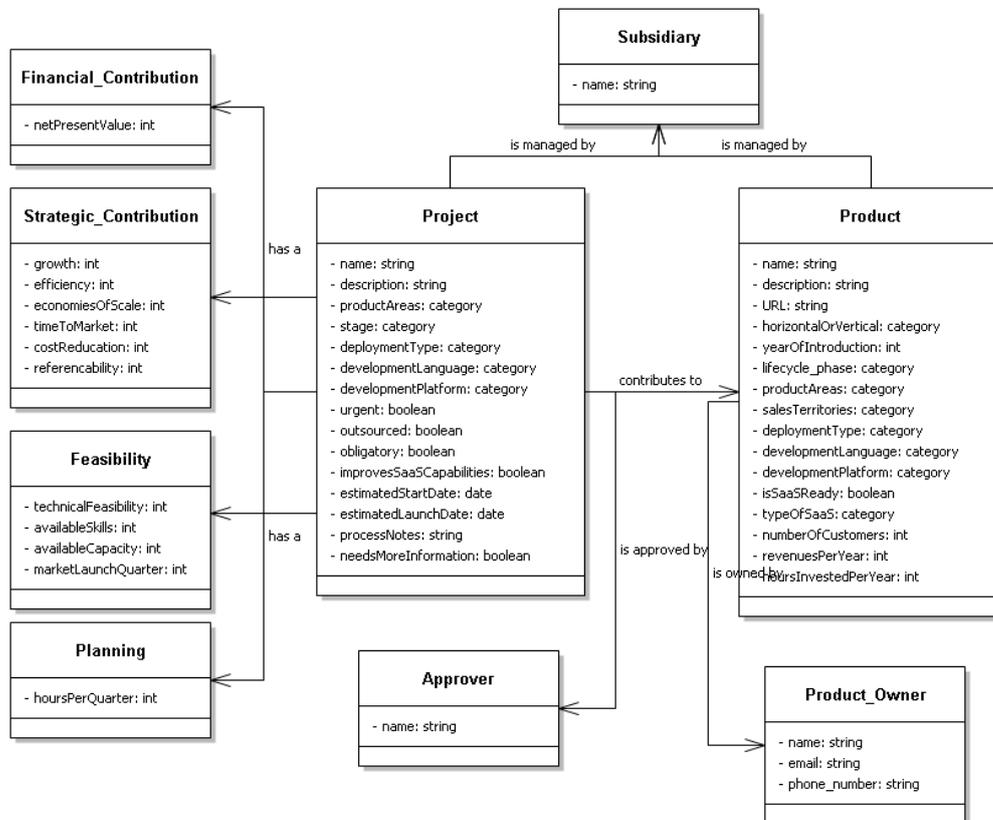


Figure 16 Class-diagram CPMI

## Product Portfolio Management

The product dashboard, as shown in Figure 15, makes it possible to see the composition of the portfolio for the navigated organizational level. It is possible to view more information about a certain product dimension by clicking the graphs. For instance by clicking on Sweden in the Territories graph it is possible to view a list of all products in the navigated organizational level that are being shipped to Sweden. Furthermore, a navigation menu in the product part enables to view the total list of products on the navigated organizational level and enables to add new products to the portfolio.

Via the list of products, product information can be edited and for each product in the portfolio it is possible to reflect in more detail on the current situation. For example, sales data about the amount of customers over the past four years, data about the financial benefits of the product in the same period and data about the total amount of hours invested to maintain the product can be used to decide whether a product is still worth investing or whether it should be phased out in the near future. Finally, for each product it is possible to view a project dashboard showing the composition of the portfolio of projects that relate to the selected product. This switch to a projects view instead of a products view is important because product investments are made on the basis of go/kill decisions about projects (Cantamessa, 2005). So after reflecting on the product portfolio it is important to execute the project portfolio accordingly.

### **Project Portfolio Management**

For this task the PM part of the solution is in place. As mentioned earlier, the PM part can be used for one specific product via the product list, but it can also be used for an entire organizational level via the tab button on the top right of the page. Thus similar to the product part, also the project part can be filtered based on organizational level (entire organization, selected group of subsidiaries or only one subsidiary). The PM part also consists of a dashboard, a list view and input functionality. According to Cooper, Edgett and Kleinschmidt (2002) portfolio management should reflect on four elements of the project portfolio. These are:

- Amount of projects in relation to capacity;
- Balance of the portfolio;
- Alignment of the portfolio with strategic objectives and;
- Value of the portfolio;

The first element is used to make sure that the right amount of projects with regard to the available capacity is picked up. Doing too many projects can cause pipeline overload, resulting in project workers bungling their tasks and delivering erroneous work, whereas doing too little project is off course a waste of resources. Balancing the portfolio is about creating balance between long term, short term, high risk, low risk and types of projects. In line with this is aligning the portfolio with strategic objectives, thus making sure that the right amount of a specific project type is picked up with regard to the pre-defined strategy. This is a powerful way to examine whether the strategy is really being executed in day to day operations. Finally, maximizing the value of the portfolio is about prioritizing projects and making sure that resources are spent on the projects that deliver the highest contribution to the company. These four elements play a key role in the PM part of the CPMI.

First, on top of the dashboard there is the Pipeline section, as shown in Figure 17. The Pipeline section shows what is happening in the project portfolio, when projects will be executed, if there is enough capacity to do so and how many active projects there currently are in the portfolio. The goal of this section is to make sure that the project pipeline doesn't get overloaded with too many projects compared to the amount of resources available. This is important as the result of such a pipeline gridlock may be that time-to-market becomes too long or that important activities for a project are omitted because there are not enough resources available (Cooper and Edgett, 2009). In this part, it is important to determine the amount of available resources per quarter, per product. Based on the amount of available resources, resource constraints can be put in place. Projects are ordered based on their priority, and only the highest priority projects that fit within the resource constraints are picked up. The others are simply put on hold.

The term "resources" in this context refers to the available work capacity in hours per quarter. The choice for hours as a measurement has been made in dialogue with the VP product marketing. Other options were to use full time equivalents (FTE's), expressing the amount of full time employees available, or financial measurements, expressing the financial capacity for salaries and investments. The choice for hours has been made because the VP product marketing regarded this as the least ambiguous and thus most transparent option.

**THIS IMAGE HAS BEEN REMOVED FOR CONFIDENTIALITY REASONS**

**Figure 17 CPMI pipeline dashboard**

The second part of the project dashboard is about aligning the project portfolio to strategic objectives and to make sure the portfolio is balanced across important themes. In this part, target values can be inserted as strategic buckets. These buckets can be compared to actual investments, showing whether there are too many or too few projects for a specific bucket. For instance, it may be clear that there are too many resources invested in modifications of current products while there are not enough resources spent on new product development. Thus, this part of the solution helps to make sure that the strategic targets for the projects are fulfilled, not only by assessing the strategic contribution of individual projects using a scorecard approach, but also by assessing the actual spending of money. Targets and actual spending can be monitored for project types, deployment categories, product areas and development platforms. Note that once again these categories are found to be applicable to SWCOMP, but

do not automatically apply in the same way to other MNCs. The alignment part of the dashboard is shown in Figure 18.

**THIS IMAGE HAS BEEN REMOVED FOR CONFIDENTIALITY REASONS**

**Figure 18 CPMI alignment charts**

The final part of the project dashboard is about the value and balance of the project portfolio. Here, two-by-two matrices (see Figure 19) are used to show the value of projects in terms of net present value (NPV) related to strategic contribution and feasibility. Optimizing the value of the portfolio is about making sure that the projects that are of the highest strategic or financial value to the business are included in the portfolio. To judge projects on their value to the business, they are transformed into business cases. The financial value of a project can be assessed using the renowned measure of net present value (NPV) while the strategic value and feasibility of a project can be assessed by using a scorecard mechanism where several items should be rated on a scale of one to 10. The scorecard approach is especially useful when the ratings are set during specific product team meetings, where discussions lead to better insights. The use of such formal business cases forces a more formal way of project selection across the company and at the same time helps to professionalize decision making. More on the use of these formal business cases is presented in the next section.

**THIS IMAGE HAS BEEN REMOVED FOR CONFIDENTIALITY REASONS**

**Figure 19 CPMI value charts**

### **Project Evaluation Methods**

Regarding the choice for financial contribution, strategic contribution and feasibility as evaluation criteria for a project, it must be noted that numerous project evaluation methods exist. According to Poh, Ang and Bai (2002) they can either be classified as weighting and ranking methods or as benefit contribution methods. Weighting and ranking methods are methods where projects are prioritized in relation to each other. For example, scoring charts do not have a meaning unless you can compare a project's ratings to other projects. On the other hand, benefit contribution methods evaluate the direct contribution of a project to the company's strategic goals. Economic analysis and cost-benefit analysis are examples of this type of method. Similarly, Cantamessa (2005) defines four types of project portfolio evaluation methods. These are financial methods, optimization methods using for instance a linear programming model, multi-criteria methods where projects are being evaluated based on a number of criteria and bubble charts where projects are plotted on a two-by-two matrix to

evaluate for instance net present value versus risk. The choice for NPV, strategic contribution and feasibility as evaluation methods for SWCOMP has been made because these measures were already being used by the product management team for one of the corporate flagship products, and were regarded by this management team as the most important measures. Also the specific criteria that are used to assess strategic contribution and feasibility were already defined by this product management team. An example of a criterion that is used to assess a project's strategic contribution is its contribution to economies of scale. For strategic contribution a total of 6 criteria is used, whereas for feasibility 4 criteria are in place. The average of these scores is used to calculate the overall scores for either strategic contribution or feasibility.

Besides the product and project dashboards, the CPMI contains filtered lists of products and projects, all kinds of single-product or single-project views, such as detailed functional and technical descriptions, and the necessary input functionality. With the presented functionality the CPMI was expected to be capable of providing group-wide insights in the product and project portfolios, enable the identification of opportunities for collaboration and enhance decision making about product investments.

## **8.2 Portfolio Management Process**

The previous section demonstrated the functionalities that are provided by the CPMI. The CPMI makes it possible to create group-wide insights in the product and project portfolios and to view more detailed information about these products and projects. Now, to facilitate optimal use of the CPMI and to professionalize decision making, a more formal process has been defined. This process and the choices made are presented in more detail in this section.

### **Product Portfolio Management**

On the topic of product information it should be noted that this only changes to a limited extend over time. For instance, as soon as a product has been entered in the CPMI, the description and functional details often do not change anymore. Additionally, new products are only added to the portfolio once in a while. Because the only product modifications are fairly simple update operations, no formal process has been defined to support this. However, product managers are asked to update their product information as soon as any changes occur. For most of the lifecycle numbers, this means that once every year, the product manager should update the results of last year and verify whether all information is still correct. This also fits well with the corporate approach of organizing strategic planning sessions once a year, which makes it possible to manually alert managers to update their data beforehand.

## **Project Portfolio Management**

More interesting is the project part, because this is where strategy is really being executed (Cantamessa, 2005). New projects are initiated more often and these projects really determine in what direction the company is currently heading. Additionally, opportunities for collaboration should also be identified on project level, so the process of managing the project portfolio deserves some more attention. Before the PPM implementation project, local product managers were enjoying the complete freedom to make PM decisions in the way they preferred most. For instance, one subsidiary had a fairly formal process in place where a large number of stakeholders were directly being involved in rating and prioritizing projects, whereas another subsidiary only had an informal process in place, in which the product manager made decisions based on gut feeling and conversations with several stakeholders. To formalize these decision making processes a bit, without interrupting on local processes, a high level PM process has been defined for the use of the CPMI. The main goal behind this process is to ensure transparency, comparability and readiness of portfolio information across the group by ensuring that all product managers pass the same information requirements for their projects.

The process is inspired by the Stage Gate process as defined by Cooper (2001). This is one of the most used PM methods in business and one of the most cited PM methods in scientific literature. The main assumption in the Stage Gate process is that projects move from stage to stage as they develop from idea to launch. Between every stage, there is a gate where several information requirements should be met before a go/kill decision can be made to move the project to the next stage or not. The idea behind this is that go/kill decisions should not only be made at the start of a project, but also at specific times during the project. Additionally, specifying information requirements that should be met in order to pass a gate ensures a certain degree of professionalism in decision making. A typical stage gate process is depicted in Figure 20.

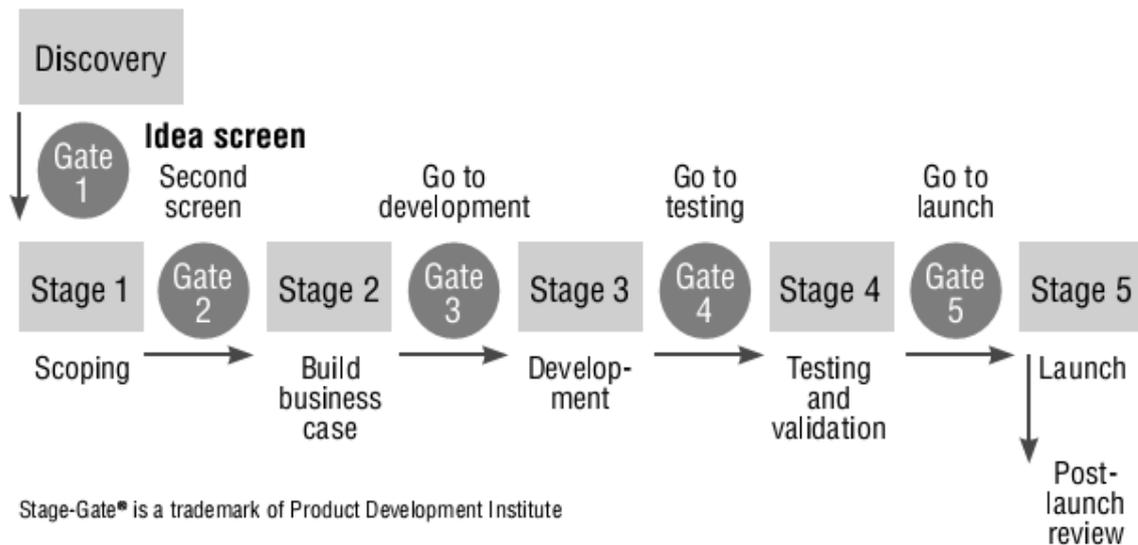


Figure 20 A typical Stage Gate process (Cooper, 2001)

As said, our implementation of the portfolio management process for SWCOMP is inspired by the Stage Gate process, but is adapted to fit the company’s context. An overview of the SWCOMP process in simplified UML activity diagram notation is presented in Figure 21.

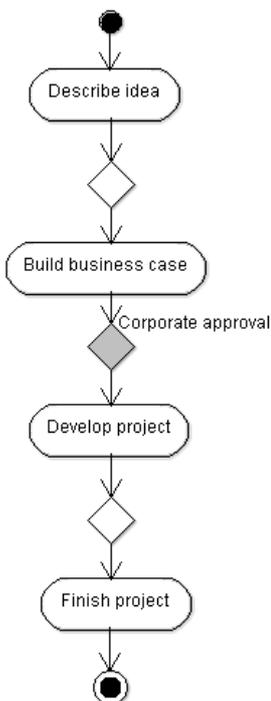


Figure 21 PPM process activity diagram

There are a number of differences between the stage gate process and the SWCOMP process but most importantly, we limited the number of stages and gates. This is because some of the stages and gates were not found to add enough value the CPMI for managers to be required to

update their project information every time a project moves to the next stage. Too many low value activities were expected to downgrade the value of the CPMI instead of upgrade, as it would risk information to not be updated frequently enough anymore because of managers' perceived lack of added value. We therefore removed the scoping, testing and the post-launch review stages. Thus the SWCOMP process now only consists of an idea, business case, development and finished stage, separated by formal and informal gates. These are elaborated on below.

In the idea stage, product managers should provide descriptive information about the new project they are considering. Thereafter, they should decide for themselves whether or not to continue the project. When they decide to continue the project, they should create a formal business case, in which values should be assigned to pre-defined dimensions about a project's financial contribution, strategic contribution and feasibility. This more formal business case construction leads to higher transparency, for instance preventing management's pet projects to be executed anyway and preventing the portfolio to drift away from strategic goals because of customer requests. Furthermore, one of the main reasons that business cases should be created is that the portfolio review board plays an important role in the next gate. This is the only formal gate, for which pre defined information requirements should be met. To have some grip on what projects are being executed and whether there are any opportunities to collaborate, the review board has to approve all project that take more than 20 days or cost more than \$20.000 before they can be moved into the development stage. This ensures that no single major project passes the border unseen, so that the review board always knows what is being developed and whether any subsidiaries are possibly reinventing the wheel. The idea to install such a project weight criterion was brought up by corporate management in need of more control and insight in "where the bucks are going." The final decision to move a project from business case to development should however still be made by the responsible local product manager, as he is the person who knows best what should happen with the product. When a project has been approved, it can be moved into the development stage and subsequently into the finished stage. For these final gates, there are no additional information requirements, and go or no-go decisions should be made by local managers in the way they prefer. Altogether, this process was expected to ensure optimal use of the CPMI and participation by all subsidiaries.

### **Corporate Review Board**

It has been mentioned before that a corporate review board has been installed in SWCOMP. This board consists of three people, being the VP product marketing, the VP R&D and a

corporate product manager. Together they are responsible for reviewing the product and project portfolios from time to time and for approving projects in the project portfolio management process. With regard to reviewing the portfolio, all kinds of views in the CPMI can be used. Dimensions they use are for instance the amount of hours that is being invested in maintenance versus the amount of hours that is being invested in new product development. Or the increasing or decreasing trend lines of customer numbers for a product, meaning that maybe a product should be phased out in the near future. By filtering and reviewing the product and project portfolios a number of times per year, the alignment with strategic objectives and the overall value of the portfolios can be better secured.

### 8.3 PPM Maturity Improvement

Finally, we take a look at the PIM maturity matrix (Jagroep et al., 2011) to reflect on how the implementation of the CPMI and the related process has led to an increase in maturity for SWCOMP. As described earlier this matrix contains the entire spectrum of capabilities (identified up to now) that can be implemented to achieve a fully mature PPM profile. The capability profiles for SWCOMP, before (light grey) and after (dark grey) the PPM implementation, are depicted in Table 6.

	0	1	2	3	4	5	6	7	8	9	10
<i>Strategic processes</i>											
Initiation			A		B				C		
Strategy implementation				A			B		C		
Gatekeeper introduction					A		B				
<i>Core processes</i>											
Product portfolio management		A			B	C		D	E		F
Product lifecycle management		A	B		C		D				E
Project portfolio management			A		B		C		D	E	
<i>Supporting processes</i>											
Process formalization							A		B		
Tooling					A			B			C
Information technology					A			B			C

**Table 6 PIM maturity profile for SWCOMP**

It should be noted that some capabilities mainly apply on local level and are less relevant on group or corporate level. In these cases a conclusion on whether the capabilities are implemented or not is drawn based on the majority of subsidiaries, as investigated during the

interviews about the local context, or based on the local processes that are stimulated by the CPMI.

Before the implementation project, SWCOMP was at PPM maturity level 1 out of 10, with 9 out of 32 capabilities implemented. During the project 17 capabilities were implemented, summing up to a total of 26 out of 32 capabilities implemented. This has led to an increase in maturity level from level one to level five on a scale to 10. For each of the focus areas the selected improvements are discussed in the remainder of this section.

### **Initiation**

Clearly, the PPM implementation has been initiated (A) and an implementation trajectory (B) has been created and followed to improve SWCOMP's maturity. Capability A and B have thus been implemented. Capability C, the creation of a portfolio plan, has been left out of scope.

### **Strategy implementation**

Strategic directions (A) and roadmaps (B) are mainly decided on at local level. However during the interviews about the local context and during a consultancy effort in 2011 it became clear that the majority of subsidiaries do this in some way. So capability A and B were already implemented and are also supported by the CPMI by presenting the functionality to determine strategic targets per product. Capability C, creating a corporate portfolio strategy, has been left out of scope because corporate management doesn't want to interrupt too much on local strategy.

### **Gatekeeper introduction**

The topic of gatekeepers, people who are responsible for gathering information from the outside environment, is not addressed in this implementation project. Capability A, defining information requirements, is already achieved as most of the subsidiaries have a natural tendency to collaborate with stakeholders in order to collect information from the outside environment, such as changes in laws and legislation. Capability B, formalizing the gatekeeper function, is not achieved. This is not regarded to be relevant as for most of the subsidiaries information is already gathered by a team of people.

### **Product portfolio management**

With regard to PPM, capability A, B and C were already implemented and D, E and F have been implemented during this project. This means that product managers, roadmaps and multifunctional core teams were already part of PPM for most of the subsidiaries. Now, also the organizational portfolio has clearly been defined by using the CPMI and a portfolio review board

has been appointed to assess the portfolio once in a while. This board, which is also responsible for approving project in the PPM process, consists of three people: the VP of product marketing, the VP of R&D and a corporate product manager.

### **Product lifecycle management**

In the PLM focus area, capabilities A, B and C were already implemented, focusing on a PLM vision and PLM integration in roadmaps. Capability D, creating a centralized product information storage, is one of the biggest wins in this project, achieved by implementing the CPMI. Integration with the entire supply chain, capability E, was not regarded to be valuable for SWCOMP, for one reason that supply chains differ per subsidiary. Thus the costs for implementing this capability would have been too high compared to the benefits delivered by it.

### **Project portfolio management**

PM is the focus area where the biggest improvement has been made. Before the implementation project, no capabilities were implemented, whereas after the implementation project all capabilities, ranging from A to E have been implemented. There now is a central project repository (A) containing structured portfolios (C) and the processes to use these have been defined on corporate level (E), partly on local level (D) and business cases are required before projects can be executed (B).

### **Process formalization**

In this focus area, capability A, defining the processes, has been implemented. Capability B, creating uniform protocols, has not been implemented because this would too much interrupt on the variety of local processes across the group.

### **Tooling**

Before the PPM implementation project, no dedicated PPM tools were available. There were only some ad hoc tools in place, such as spreadsheets. Now, a dedicated tool environment with dashboards and all kinds of comparison matrices is implemented (capability A to C).

### **Information systems**

Before the implementation project, no dedicated PPM information system was in place. With the implementation of the CPMI, this has changed. Now reports are automatically generated and data can be visualized, filtered and sorted from numerous perspectives. Thus, capability A, IT assessment, and capability B, automation, are implemented. Capability C, integrating systems

across the group, has not been implemented for previously mentioned reasons (costs too high compared to benefits).

## 8.4 Summary and Concluding Remarks

In general it should be clear that we designed the PPM implementation with both a corporate and a local context in mind. Corporate management initiated the PPM implementation and demanded more insight and integration, whereas local managers demanded freedom and flexibility in their decision making processes. To balance between these demands, a group-wide infrastructure with limited information requirements (for instance technical specifications or requirements for projects should, although requested by some group managers, not be included), supported by a high level PPM process, has been implemented. In addition, only the local process elements that are necessary for a good use of the CPMI have been defined. Local managers still enjoy the freedom to make their own decisions and manage their portfolio the way they prefer. In Figure 22 we depict how the general and local contexts have been combined into one PPM solution.

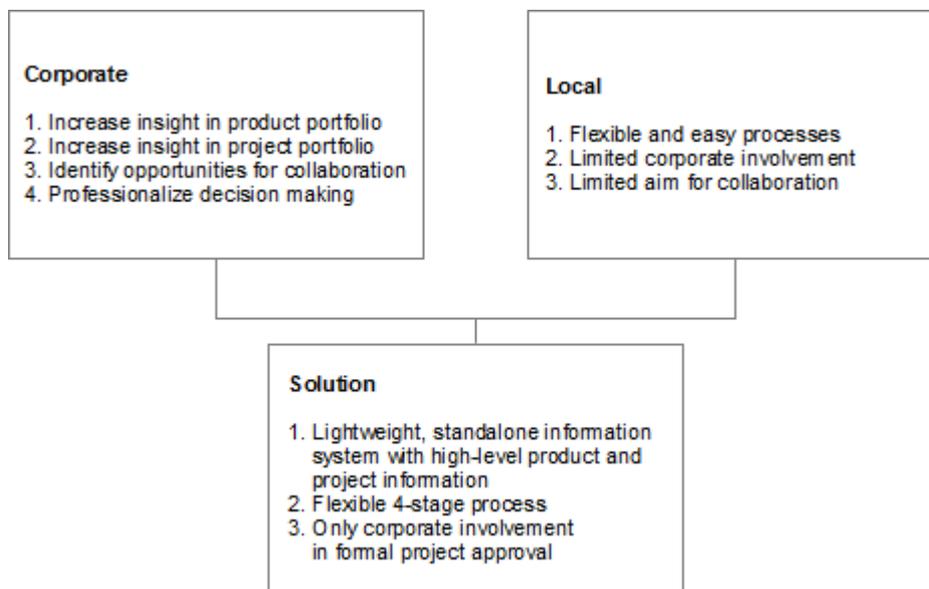


Figure 22 Solution that fits corporate and local contexts

Now that we have presented what has been implemented in SWCOMP, the next chapter will elaborate more on the implementation process, showing how the CPMI and the related processes have been introduced in the company.

## **9 Implementation Process**

In the previous chapter, the design of the PPM implementation at SWCOMP, containing the CPMI and related processes, has been presented. In this chapter we elaborate more on how the CPMI and processes have been implemented and rolled out across SWCOMP by answering the following question:

*How can PPM be introduced and implemented?*

We adhere to the generic organizational change model as developed by Lewin (1947), consisting of an unfreezing phase, a transformation phase and a refreezing phase, to explain the change process for SWCOMP. This model has been described in the theoretical background chapter of this thesis.

### **9.1 Unfreezing the Old Situation**

To gather insights and to create awareness at the same time, local product managers of the largest subsidiaries involved in product development were invited to participate in interview sessions with the PPM implementation team approximately four months before the actual PPM conversion was initiated. At that moment, the project team had already developed a plan for the PPM infrastructure, based on previous research and best practices. This enabled the product managers to shoot on real ideas, instead of punching in the dark. Furthermore, to create awareness that performing as a group was getting more and more important, the SWCOMP corporate management issued a corporate memo a year before, in which the need for change was explained. Furthermore a general information session, a month before the individual product manager interviews started, served to provide clarity and directions for the upcoming changes. The research team, including the VP product marketing, presented the high level plans for this implementation project and invited product managers to ask questions and provide suggestions. After the general meeting and especially after the individual interviews all product managers were well aware of the PPM implementation. Opinions and expectations varied heavily between “very interesting to see what others are doing” and “seen all kinds of group synergy projects, but none of them succeeded,” as described in the local context chapter.

An explanation to the more skeptic reactions and resistance can again be found in the tension between corporate integration and local differentiation. This is a typical conflict between the playfields of higher and lower management. Local managers may tend to protect their own field of expertise by having a “mind your own business” feeling towards corporate management, whereas corporate management may have a lack of trust towards local managers, demanding

too much insight in local processes. De Caluwé and Vermaak (2006) refer to this conflict as “oerconflict”. This is a Dutch term used often in change management literature to describe the basic, always present (“oer”) conflict between higher and lower management. The silver bullet in this conflict can be found by means of a good balance between trust and control, or between differentiation and integration. Because numerous studies about these kinds of change management conflicts have been performed, we will not elaborate more on this. It is however important to understand that changes, like the implementation of PPM in SWCOMP, always provoke resistance because human beings have a natural tendency to dislike change. Although this is an entire new field of study, some more on this in relation to implementing PPM is presented in the section about Change Management.

## **9.2 Transformation**

*Conversion strategy* - In this section we look at the conversion strategy that has been used at SWCOMP. As described in the theoretical background chapter, conversion strategy can be expressed along three dimensions, being conversion style, conversion location and conversion modularity. At SWCOMP the old way of managing the entire portfolio of products and projects only consisted of the ad hoc gathering of information and creation of snapshots over time by using (advanced) spreadsheets and comparable tools. Therefore, conversion to the new way of managing the portfolio, entailing a continuous company-wide portfolio management process, is about introducing an entire new paradigm on portfolio thinking across the organization, where the PPM processes are converted from ad hoc passive information gathering and delivery towards continuous involvement and coordination. In this case we regard the conversion style for the PPM implementation at SWCOMP to be direct, meaning that the new PPM processes immediately replaced the old ad hoc processes. It is however possible that ad hoc information gathering may sometimes (for instance at yearly portfolio planning meetings) still be used to confirm that the information flows in the new processes are up to date for the entire organization.

Concerning the conversion location strategy at SWCOMP the choice was made for a pilot implementation, followed by simultaneous conversion for all other subsidiaries. First, the PPM processes and CPMI were implemented in one of the largest product management teams in the organization, responsible for the corporate ERP flagship product. The choice for this product management team has been made because the VP product marketing, responsible for the PPM implementation, is also a member of this product management team. Furthermore the other product management team members were regarded to be well informed about the purpose

and expectations for the implementation and would thus be capable of producing valuable feedback on the outcomes and use of the PPM implementation. Improvements suggested by this product management team could then first be implemented before the implementation in other subsidiaries was initiated by means of a group meeting. In this meeting the VP product marketing presented the CPMI and related processes to approximately 40 SWCOMP (product) managers worldwide, before they were individually invited to participate in PPM. A deadline for inserting and updating all current product and project information for all subsidiaries was set four weeks after the CPMI had been implemented for all subsidiaries. After this deadline, all information was regarded to be available via the CPMI and only regular update processes for modifications or new products and projects were necessary to operate the information system.

To continue about the conversion strategy, conversion modularity, as a third dimension, does not apply to the PPM implementation at SWCOMP. Although it is always possible that improvements or additional implementations will be made in the future, the envisioned PPM infrastructure has been implemented in its entirety at once. So we can speak of a whole-system conversion strategy. The infrastructure is fairly simple and lightweight and therefore modular conversion, like sometimes chosen in comprehensive ERP implementations, made no sense in this case.

The conversion strategy used at SWCOMP is summarized in Table 7.

<i>Conversion Strategy</i>	<i>Type</i>
Style	Direct
Location	1 Pilot, then Simultaneous
Modularity	Whole-system

**Table 7 Conversion Strategy**

*Change management* - Next to the hard side of the transformation, being conversion, the people side of the transformation is at least as important. This is what change management is about. Numerous management books and scientific studies on the topic of change management have been performed and it can be considered as a large standalone research topic itself. Furthermore, as the PPM implementation has just only been finished, managing for change and refreezing the situation is only just starting. Therefore we will not go into detail about change management practices, but we will provide some high level recommendations that we learned from the SWCOMP case.

First of all, at local level we described a certain degree of resistance against implementing a central PPM process and especially against forcing that all larger projects should be shared in

order to receive corporate approval. In this regard it is important to notice that, as is the case in most change projects, the opinions varied between the different managers. Although a general fear for some sort of “big brother is watching us” situation was found across them, some were actually very positive about the PPM implementation. A famous change management advice in this regard is to look at the stakeholders as if they were a cycling pack. In such a pack there are riders in the front, riders in the middle of the pack chasing the front and riders in the back or even riders going the wrong way. Just like a Tour de France television producer would do, it is important to focus most of the attention on the first group of early adopters and to even pamper them. Focusing on them and the benefits they are creating would provide valuable examples to ensure that the pack follows in the short term. Then at the end, the people at the back have one choice: to join or to lose. In the context of SWCOMP we would also advise corporate managers to pamper the proponents and early adopters of the PPM implementation and make sure that the benefits they experience are also clear to the main pack.

One thing that makes it harder for this strategy to work at SWCOMP, is that the value delivered by the PPM implementation increases as the amount of active contributors increases. It is thus important to involve enough managers to contribute in the beginning, as this will determine the early value that is displayed by the implementation. One way of making sure that the PPM implementation would become of high value right from the start, was to demand that all local managers would submit their information within two weeks after the launch of the new PPM system. Although we recognize the need for quick information sharing, this approach easily provokes resistance as the managers were forced to contribute in a corporately defined time schedule. This is the same type of resistance coming from obliging the managers to share all major projects in order to receive corporate approval: if you take a part of their freedom, they will try to reclaim it.

Another issue provoking resistance was the earlier mentioned problem with the installed server. After the launch of the PPM environment, a number of instability problems with the server occurred, making the information system unavailable until further notice. In the end, this caused a delay of more than a month. This, in combination with the earlier mentioned two weeks deadline to submit all data, caused fierce resistance from a number of local managers. This resistance was mainly expressed via e-mails received by the VP product marketing in which local managers stated that they were at least unhappy about the situation. In response to the issues that occurred, the deadline for information submission was postponed.

These issues occurred only recently before the publication of this thesis. We are therefore unable to provide more insights on how these issues influenced the outcomes of the PPM implementation on the long term. We would however strongly recommend SWCOMP to take a positive approach in refreezing the new PPM situation, by pampering proponents and neglecting opponents. Contribution to the new PPM paradigm should be rewarded and the benefits of participating should be made clear.

When aiming to create a win-win situation, it is also important to examine how local managers' performances are being evaluated. As long as this is only on the basis of the financial performance of their specific subsidiary, their willingness to contribute to the group performance will remain limited. This line of reasoning was also expressed by one of the local product managers who noted that the majority of product managers barely even attend important conferences on group-level because they feel that they have something more important to do.

To summarize we provide a list of lessons learned and recommendations concerning the introduction and implementation of PPM in MNCs:

- Pamper the proponents, neglect the opponents
- Demonstrate the benefits to the other stakeholders
- Consider evaluation and reward mechanisms to stimulate participation
- Some formal rules and regulations to stimulate participation can be useful
- Minor technical issues can provoke major people issues

### **9.3 Refreezing the New Situation**

Because this thesis research project ended only a few weeks after the initial PPM implementation, we cannot yet speak about people getting accustomed to the new way of managing their portfolios. The CPMI has only been in place for a short period, and the data has only been up to date for a couple of weeks. Reflection on if and how the new situation could become a habit, replacing the old way of working, can only be provided by future evaluations (after one or two years).



## **10 Evaluation of Outcomes**

In this final analysis chapter, we evaluate the outcomes of the PPM implementation project in order to find an answer to sub question 5:

*How can the outcomes of the implementation be evaluated?*

In the first section we describe how we have collected data for our early evaluation. Thereafter we describe how we have analyzed this data. Finally in the third section we present the results from our early evaluation. It should be noted that this evaluation only took place right after the respondents' first encounter with PPM. Most of them did not have the time to really use the system and the evaluation is thus based on first impressions. More evaluations, one or two years ahead, should be performed to be able to draw more definite conclusions.

### **10.1 Data Collection and Analysis**

To assess the outcomes of the PPM implementation, we conducted a survey containing questions about the first impressions that corporate and local managers had of the PPM implementation. The survey consisted of four parts, focusing on (1) the professional role of the respondent, (2) his believes about whether the general PPM goals had been achieved, (3) his believes about whether the SWCOMP specific goals had been achieved and (4) his general attitude towards the PPM implementation. The survey template is included in Appendix D.

All stakeholders playing some role in the PPM implementation were right after the first demo presentations invited by the VP product marketing to participate in the survey. The original survey plan was to evaluate the PPM implementation after two weeks of use. However technical issues with the server caused a few weeks delay before the system could actually be used. Due to graduation time pressure, we also had to switch to an evaluation based on first impressions from the demo presentations and we only had a couple of days to receive responses, limiting the amount of responses. It should be noted that the aforementioned technical server issues, in combination with the obligation to submit data within a short period of time, may have provoked some negative attitudes towards PPM. It is possible that these issues have influenced the outcomes of this evaluation to a certain extent; however that can only be concluded in one or two years ahead.

In total 15 stakeholders, being 11 product managers, one corporate manager, one synergy manager, one director of business development and one R&D director, responded to the survey. Thirteen of them noted to be mainly held responsible for the performance of (single) subsidiaries, whereas only the corporate manager was in his role mainly held responsible for

group performance. The respondents had been active for SWCOMP between one and 22 years, and seven of them already had a history of four to 18 years with their own subsidiary before their subsidiary was acquired by SWCOMP.

To analyze the data from the survey, we performed a trend analysis to see the broad picture and to uncover the main patterns. This choice has been made because the limited amount of responses does not allow us to perform valid statistical analyses on the data and because gathering more responses was impossible due to the limited amount of time and the limited amount of stakeholders involved. In the next section we describe the main patterns and the early impressions found in the survey.

## **10.2 Results**

In this section we present an overview of the responses regarding (1) the ability of the PPM implementation to contribute to certain generic PPM goals, (2) the ability of the PPM implementation to contribute to the SWCOMP specific PPM goals and (3) the benefits, costs, capabilities and use of the PPM implementation. At the end we also elaborate some more on individual comments that have been made by the respondents.

### **Generic PPM Goals**

First of all, regarding the generic PPM goals, 10 statements about the contribution of the new PPM systems to SWCOMP's ability to achieve these goals were given. For these statements, and all other statements in the survey, respondents were asked to what extent they agreed on a scale from one to five (1=totally disagree; 2=disagree; 3=neutral; 4=agree and 5=totally agree). Each statement refers to one of the 10 generic PPM goals, as described in Chapter 6. A summary of the responses is presented in Table 8.

It can be seen that most of the statements were supported to some extent. This means that the majority of respondents agree that most of the generic PPM goals can be achieved by the PPM implementation. The goal that is supported most is that of horizontal communication improvement. It is clear that the respondents expect that the PPM implementation will improve communication and alignment between the individual subsidiaries. This is a positive sign, as improving communication and alignment is the keystone to improving the ability to identify more opportunities for collaboration. Other goals that are highly expected to be achieved by the PPM implementation are improving the ability to focus resources on high priority projects, improving the ability to align the portfolios with strategic objectives and improving the ability to maintain the competitive position.

<i>Statement</i>	<i>Totally disagree</i>	<i>Disagree</i>	<i>Neutral</i>	<i>Agree</i>	<i>Totally agree</i>
The PPM implementation improves SWCOMP's ability to allocate resources efficiently.	0	4	4	4	3
The PPM implementation improves SWCOMP's ability to align portfolios with strategic objectives.	0	1	2	7	5
The PPM implementation contributes to SWCOMP's financial performance.	0	2	8	2	3
The PPM implementation improves SWCOMP's ability to maintain its competitive position.	0	1	3	7	3
The PPM implementation improves SWCOMP's horizontal communication (i.e. between subsidiaries).	1	0	0	6	8
The PPM implementation improves SWCOMP's vertical communication (i.e. between corporate management and subsidiaries).	0	3	4	4	4
The PPM implementation improves SWCOMP's ability to make well informed decisions about the portfolios.	0	2	3	5	5
The PPM implementation improves SWCOMP's ability to identify the ideal product mix for the company.	0	3	2	7	3
The PPM implementation improves SWCOMP's ability to focus resources on high priority projects.	0	1	3	6	5
The PPM implementation improves SWCOMP's ability to achieve a balanced portfolio of projects.	0	2	2	7	3

**Table 8 Survey response to generic PPM goals**

The only goals the respondents are unsure about are whether the PPM helps to improve the company's financial performance and whether the PPM improves the ability to allocate resources efficiently. Regarding the PPM implementation's contribution to SWCOMP's ability to allocate resources efficiently, the responses were strongly divergent. This can be explained by people having different attitudes towards the implementation but maybe also because of how people define "efficiently allocating resources." It is possible that multiple interpretations of efficiently allocating resources cause different results. Furthermore, a strong majority of respondents reported to be neutral about the PPM's contribution to the company's financial performance. From this, it can be concluded that either people do not see the financial benefits of the PPM implementation or the PPM implementation does indeed not deliver any direct financial benefits.

On the topic of improving the ability to make well-informed decisions, one of the disagreeing managers noted that to really make high-value portfolio decisions, live meetings are most important and much more powerful than "only some information in an application." He

pleaded for more live meetings with product management teams and also with corporate managers such as the VP of R&D.

In general the results found in this section point towards a positive direction with clearly more respondents agreeing than disagreeing that the PPM implementation helps to achieve certain goals.

### SWCOMP Specific Goals

For the SWCOMP specific goals, four statements have been presented to the respondents, asking them to what extent they agreed or disagreed on the same scale between one and five as presented in the previous section. Each statement covers one of the four project PPM goals, as described in the problem statement chapter. A summary of the results is presented in Table 9.

<i>Statement</i>	<i>Totally disagree</i>	<i>Disagree</i>	<i>Neutral</i>	<i>Agree</i>	<i>Totally agree</i>
The PPM implementation improves SWCOMP's ability to create group-wide insight in the products that are managed.	0	0	2	3	10
The PPM implementation improves SWCOMP's ability to create group-wide insight in what all subsidiaries are doing (projects).	0	0	3	4	8
The PPM implementation improves SWCOMP's ability to make objective decisions about the product and project portfolios.	0	2	5	5	3
The PPM implementation improves SWCOMP's ability to identify potential areas for collaboration.	0	0	1	5	9

**Table 9 Summary of responses about SWCOMP specific PPM goals**

For the SWCOMP specific goals, the respondents highly believe that three out of the four goals can be achieved with the PPM implementation. It is clear that the respondents are positive towards the PPM implementation's ability to create group-wide insights about the product and project portfolios. Furthermore they also have high expectations of the PPM implementation's ability to identify areas for collaboration. This stands out, as one of the findings from the local context was that in a company with a history of acquisitive growth, where subsidiaries differ significantly and where time to market is an important measure, the local managers attach low value to efforts that aim for collaboration. One possible explanation is that although managers attach low value to the success chances of collaboration, they do recognize the ability of the PPM implementation to help them identify opportunities in which collaboration might be possible.

The only SWCOMP goal that respondents are less sure about is the contribution to the company's ability to make objective and professional decisions about the portfolios. The responses to this statement show that people may be unsure about how decision making processes around the PPM system will be arranged in the future or that they just do not directly see how this can be achieved by the current implementation. We believe that this statement depends to a greater extent on the way the PPM processes are executed in practice. Therefore, we recommend corporate management to spend sufficient effort to this part and we believe that the outcomes can only be evaluated when the stakeholders have been involved and using the processes for a longer period of time.

### **Benefits, Costs, Capabilities and Use**

In the two previous sections we have presented how people responded to their first impressions about the PPM implementation's ability to achieve certain generic and SWCOMP specific PPM goals. In general, the respondents' beliefs about achieving certain goals point towards a positive direction. In addition to their beliefs about achieving goals, in this final part of the survey we have focused on their general beliefs about the costs, benefits, capabilities and use of the PPM infrastructure. The respondents have been presented with nine statements, again asked to show their agreement or disagreement on a scale between one (totally disagree) and five (totally agree). The statements in this section have been presented in two directions, so both in a positive and in a negative manner, eliminating the chance of people blindly filling out the survey by agreeing to all statements. A summary of the responses is presented in Table 10.

First of all, regardless the positive responses to the PPM implementation's ability to achieve certain goals, it becomes clear that the respondents are less sure about the benefits, costs, capabilities and use of it. The variety between responses is much larger in this part than it was on the previous goal-related parts, indicating that there is no strong support or resistance towards certain aspects of the implementation yet. In general, the respondents do feel that the PPM implementation is a valuable addition to SWCOMP and they agree that it improves the ability to collaborate across subsidiaries.

<i>Statement</i>	<i>Totally disagree</i>	<i>Disagree</i>	<i>Neutral</i>	<i>Agree</i>	<i>Totally agree</i>
The PPM implementation can be directly beneficial to my job role.	1	2	4	4	4
The benefits delivered by the PPM implementation do not compensate for the effort that is needed to participate.	3	3	6	2	1
I consider myself to be a proponent of the PPM implementation.	1	1	4	3	6
Corporate management should play a bigger role in portfolio management.	1	2	4	5	3
The PPM implementation improves SWCOMP's ability to collaborate across subsidiaries.	0	1	3	5	6
Contributing data to the PPM information system takes too much time.	1	3	8	2	1
I feel motivated to contribute to the PPM implementation.	2	2	4	3	4
The PPM process is too rigid and formal.	1	4	6	2	1
The PPM implementation is valuable for SWCOMP.	0	1	5	5	4

**Table 10 Summary of responses about PPM costs, benefits, capabilities and use**

Furthermore, although divergent, the respondents also seem to agree that to some extent the PPM implementation can be beneficial to their own job role. With regard to this statement, one respondent also commented “the benefits for the individual employees or subsidiaries are not quite clear yet; this will become clearer over time probably,” indicating that time is needed to point out the benefits and that conclusions about this statement can only be drawn after one or two years of use.

The respondents also indicate that the implemented processes and the effort that is needed to participate are not too heavy but also not too light. This is a positive sign as one of the recurring comments in the local context was that the managers were afraid that the processes would be too demanding or not flexible enough with regard to their degree of being different, their responsiveness to local conditions, their small team sizes and their agile development methodologies. In line with this, with regard to the role that corporate management plays, the respondents also more or less seem to indicate that corporate management could even play a larger role, opposing their statements in the local context about the limited role that corporate management should be playing. This indicates that the role of corporate management might be

kept too small because of the pressures experienced from the local context or that corporate management is expected to be involved in other aspects of PPM than the aspects that were discussed when performing the local context interviews. For instance, it seems that the local managers don't want corporate management to play a decisive role, but they do want corporate management to play a coordinating role.

### **Final Comments**

That it is too early to draw definite conclusions about the success of the PPM implementation is also made clear in the comments that were made by the respondents, such as "I have not tested it yet," "we need to use it for a period of time to validate future requirements" and "we are just entering data and discovering, it is too early to answer this question." In addition, also the technical issues that occurred right after the first implementation, hindering the first input, were mentioned by some participants who for instance stated "the tool is not working properly yet so there is not much experience on entering data" and "there was, of course, the stability problem, but we also mustn't forget that the solution was implemented swiftly and almost instantaneously available."

With regard to the role that corporate management plays in PPM, the respondents expect rapid response to projects that are waiting to be corporately approved, which was to be expected. More notably a number of respondents also express a desire for corporate management to play a more active role in the context of PPM. For instance one respondent would like to see "the continual assessment and communication regarding the portfolio items" and "road mapping of core solutions in relation to local solutions." One other respondent demanded corporate management to play an active role in live meetings and discussions, as he indicates that a product portfolio cannot be governed based on "some information in an application." It should be clear that information systems and live meetings and discussions do not exclude one or another. They should be deployed together to optimize PPM decision making. Another interesting comment made by a number of respondents is that they expect corporate management to play a role in coordinating and aligning local initiatives that cover the same topic and in allocating opportunities for joint efforts between subsidiaries. The goal in this part, according to one respondent, should be to "strive for corporate guidelines and standardization."

In addition some respondents also gave some suggestions for improvements and additional requirements that they consider to be valuable additions. One respondent indicated that it would be useful to distinguish between business lines to enable easier identification of cross-

sell opportunities. And in line with this another respondent mentioned that corporate management should “facilitate cross-border initiatives to cross-sell local products, i.e. to do local products international in order to cut costs and save time.” Another respondent noted that “it would be a great asset if we were able to extend the functionality with the possibility of planning, timesheets and pre and post calculation options to monitor progress and results of projects.” And in line with that another respondent mentioned that “it would be useful to consider the inclusion of product performance key performance indicators (KPI’s), such as number of support calls, pipeline opportunities, development backlog etc.” Meetings with for instance a synergy manager and a group manager also indicated that information requirements differ significantly across job roles. For instance, the group manager indicated that he would have liked to go one step further by also gathering individual project requirements in the PPM information system. This was however excluded for reasons of efficiency and flexibility. Time has to tell what requirements are valuable to add, and which are not. To underline this, one respondent noted that “in fact the PPM implementation is in an early lifecycle stage and will require more development; but that we have started using it however is already a benefit to the corporate organization that will only improve over time.”

To summarize, the respondents seemed to be mostly positive towards the PPM implementation. They do believe that the majority of PPM goals, and especially the SWCOMP specific PPM goals, can be achieved by PPM. It also became clear that there is still room for improvement, with suggestions for information requirements, doubts about the benefits for individual employees and uncertainty about how the PPM implementation can help to professionalize decision making. These are things that corporate management has to focus on in the upcoming months. Evaluations one or two years ahead should point out if the PPM implementation has really delivered on its promise.

## **Part 4. Discussion and Conclusions**



## **11 Discussion and Conclusion**

In this study we have analyzed the implementation of PPM in a MNC by means of a single exploratory case study, in order to find an answer to the question:

*How can product portfolio management be implemented in a multinational software corporation?*

In this chapter we conclude our study and discuss the findings and limitations of our study. Thereafter we present a number of directions for further research that we believe can be valuable for future development of the scientific research domain. Finally, we conclude this chapter, and therewith also this thesis, by summarizing our key findings and by answering the main research question.

### **11.1 Answering the Research Questions**

In this section, we show how we have answered the sub research questions. Recall that in our research the sub questions were derived from the scientific model that was used by Armenakis and Bedeian (1999) and Ruta (2005) to explain change in multinational organizations.

#### **SQ1. What is the general context that drives the PPM implementation?**

With regard to the first research question we have looked at the SWCOMP specific goals for the PPM implementation, to the company specific reasons behind these goals and to the external environmental factors that provoke the need for a PPM implementation. We have conducted several interviews with the corporate VP product marketing who is responsible for the PPM project initiation and we had access to extensive company documentation such as corporate memos, year-end reports and project initiation documents. To analyze the external environment, we used Porter's five forces model (1979).

We have seen that SWCOMP pursued four goals with their PPM implementation. First they wanted to increase insights in the group-wide product portfolio. Second they wanted to create and share insights in what all subsidiaries are doing. Third, on the basis of these insights they wanted to stimulate and achieve more collaboration across subsidiaries. And fourth, they wanted to create more uniform processes to professionalize decision making about the product and project portfolios. When looking at related scientific literature, we can see that these goals also (partly) reflect a lot of the PPM goals that have been identified in previous research, such as maintaining a competitive position, aligning resources efficiently, formalization of decision making and aligning the portfolio with strategic objectives (i.e. Cooper, Edgett & Kleinschmidt, 2002; Saaksvuori & Immonen, 2008).

Finally, we have seen that the SWCOMP PPM implementation was initiated because of several environmental pressures, of which the most influential seemed to be the conversion of on premise products to SaaS products, the economic downturn and the consolidation in the market. Each of these pressures provoked the need to spend resources more efficiently, by for instance increasing coordination and collaboration across the group. This was a generally recurring theme throughout the project.

### **SQ2. What are local contextual factors that affect the PPM implementation?**

To answer this second sub question, we interviewed eight product managers, representing eight different SWCOMP subsidiaries, divided over seven different countries. For all of these subsidiaries, we analyzed the local context in terms of situational factors such as team size, development methodology and managerial attitudes.

We found a huge variety in managerial responses to the planned PPM implementation, but were able to distil some recurring subjects, which were then used to create a model of propositions related to local context variables. In general, the local managers were interested but void towards the PPM implementation. We found three recurring statements, being that corporate management should only play a minor role, processes should be kept flexible and that collaboration should not be forced too much. To explain these statements, several situational factors seemed to be recurring, but need to be proven in further research. Some of the most important were the level of responsiveness to local conditions, the importance of time to market, the development methodology and the team size. Some of these situational factors, namely the size of the team, the development philosophy, the localization demand and stakeholder involvement, were also identified in previous research by Bekkers et al., 2008 to play a role in SPM. However, the situational factors that they identified to be the most influential to PPM, being customer loyalty, application age and product lifetime were in this study not found to be recurring factors influencing the implementation of PPM. An explanation for this can be that these factors are more influential to the actual execution of PPM than that they are factors influencing the implementation of PPM in general. It is also possible that these factors were not found because of the format of the semi-structured interviews in which these factors didn't come up into the conversation or that the researcher did not point them out as important recurring subjects from an interpretative viewpoint.

In general it became clear that local managers have a strong desire to make their own decisions and have all kinds of reasons, mainly related to agility and intra-organizational differences, to advocate for this. Finally, what became clear from the local context is that managers experience

a certain degree of “institutional duality”, or pressure between being legitimate in their local context versus being legitimate in their multinational context, as defined by Kostova & Roth (2002). This is a pressure that was already expected to be found at the beginning of this research and that can be highlighted as one of the most influential phenomena in a multinational PPM implementation. It became clear that implementing PPM is about implementing a group-wide practice that impacts an entire organization, which should be treated with the same caution as, for instance, an ERP system or HR policy implementation.

### **SQ3. How can the tools, processes and information systems be designed?**

To find an appropriate design for the content of the PPM implementation, we were involved in the project as participating researchers. This meant that we were able to answer this question by searching for an appropriate content design ourselves. We have shown how the designed content consisted of a central information repository and a guiding process description to ensure proper use of the infrastructure.

With our PPM design we were able to improve SWCOMP’s PPM maturity level from one to five on a scale from null to 10, implementing a total of 17 PPM related capabilities. The important challenge in this stage again was to maintain balance between the global and local organizational pressures.

The information requirements for the information repository were identified based on best practices and desires for information from either corporate or local managers. We believe these information requirements can be of similar use for other cases, however it is important to note that each company has its own specific variables, goals and environmental factors that determine what kind of information is important. As an example, we found a high demand for SaaS and cloud related information at SWCOMP because of the current shift from on premise to SaaS solutions. In a number of years, this information will probably only be of minor importance and other strategic themes may require more attention. Having this said, it should be clear that also for SWCOMP these information requirements are only a snapshot in time of what is important at this right moment. The requirements should be regularly updated based on information requests from both corporate and local managers.

In addition to the information repository we designed a process to perform portfolio management across the group. This process was inspired by best practice processes found in literature and was adapted to the situation at hand. For SWCOMP the process consists of four stages, being idea, business case, development and launch, all separated by decision gates where certain information requirements should be met. The choice for this project is

dependent on the different variables as found in the local context chapter: small, differentiated subsidiaries have a strong desire for flexible and simple processes whereas large, comparable subsidiaries can benefit more from rigid processes.

To summarize, our design for the PPM implementation consisted of a:

- lightweight information system
- 4-step flexible process
- limited amount of corporate involvement

Although our content design can be an important source of inspiration, it is hard to derive any scientific statements from it. The main lesson learned from this sub question is that content follows context and that the challenge is to achieve balance between corporate and local demands without impeding one or another.

#### **SQ4. How can PPM be introduced and implemented?**

The fourth sub question was about the process of implementing PPM throughout the company. Using the generic change model as developed by Lewin (1974) such a process consists of three phases: unfreezing, transition and refreezing. For each of these phases we reflected on how SWCOMP executed that part of the implementation.

To unfreeze the situation at SWCOMP, we had to create awareness that a PPM implementation was necessary. This was done by means of corporate memos, group presentations and individual system analysis interviews. When the most important stakeholders were aware that change was ahead, the transition phase was initiated. This phase consisted of both the hard side of developing the infrastructure and the soft side of managing for change. Especially the people's side of the transition should be carefully managed, as a PPM implementation in a MNC impacts the entire organization. As this project ended shortly after the first introduction of PPM across the company, corporate management should keep focusing attention to change management in the upcoming months. In line with this, refreezing the new situation is also something that has to happen in the upcoming months. Making sure that the new PPM situation becomes a regular habit for all managers will take time, and this can only be evaluated on the long term.

#### **SQ5. How can the outcomes of the implementation be evaluated?**

The final sub question focuses on the outcomes of the PPM implementation project. To answer this question we have performed a survey with 15 responding product managers and corporate managers. In this survey we focused on (1) whether the PPM implementation helps to achieve

certain generic PPM goals, (2) whether it helps to achieve SWCOMP specific PPM goals as presented in the problem statement chapter and (3) general opinions about the content, use, costs and benefits of the PPM implementation.

We found that the majority of the respondents were mostly positive about the ability of the PPM implementation to achieve certain goals, especially the SWCOMP specific goals. In particular the information management capabilities for products as well as projects and the ability to identify opportunities for collaboration were rated high. In the contrary, the respondents did not seem to know what to expect about the PPM implementation's ability to improve decision making about the portfolios. This goal should receive sufficient attention in the upcoming period of time by ensuring that the processes will be used well and that the new PPM paradigm becomes a regular way of working.

In addition to the positive responses to the PPM's abilities to achieve certain goals, it also became clear that the implementation is flexible enough and that the role that corporate management plays is not too large. Instead, the respondents even indicated that corporate management could play a more important role. Furthermore, regardless their reticent attitude towards collaboration in general, the respondents also seemed to be positive about the abilities to identify opportunities for collaboration.

For the future we believe it is important for corporate management to arrange the processes around PPM and, together with the proponents on local level, to demonstrate the benefits that the infrastructure delivers. Opponents should be neglected and the more impartial people should be motivated based on the benefits shown by the proponents. Evaluations in the future have to point out whether the PPM implementation really delivers on its promise.

## **Overview**

To conclude, in Figure 23 we show how the answers to our sub question provide an overview of the entire PPM implementation. This image serves to identify the silver bullet in our study, relating the key findings from the different sub questions together in one coherent overview.

**THIS IMAGE HAS BEEN REMOVED FOR CONFIDENTIALITY REASONS**

**Figure 23 Research overview of sub questions**

## **11.2 Limitations**

Although our research has provided valuable in depth insights in how PPM can be implemented in a MNC, the results should be treated with caution.

First of all, it should be noted that we only studied one single case. The results of such a single exploratory case study are interesting to get inspired and to create insights in a specific research domain, but they cannot be statistically generalized. Often the results of a single case study become too rich and too specific for that single case setting therefore lacking the general characteristics that a useful scientific theory should have. Therefore, to draw more externally valid conclusions about this study, it should be replicated several times. Because of the high workload of this one case, performing multiple case studies was not possible because of the limited time and resources that were available to this thesis project.

Second, as noted earlier, the evaluation of the outcomes of this case has only been executed to a limited extend because of the limited amount of time that was available after the introduction of the information system. Definite conclusions about whether the implementation has helped SWCOMP to achieve the PPM related goals and whether the implementation approach can be regarded successful can only be drawn after one or two years of use. In line with this we also expect that based on early feedback and user experience, improvements can still be made before a sufficient PPM level can be achieved.

An issue that may limit the construct validity for this case study is that the research participants, including the local managers, have all been selected by the VP product marketing. This was done because he knew where to find the most important stakeholders and was able to connect the researchers with the stakeholders. Such a non-random selection procedure limits the validity of the research, as we cannot guarantee that the same results will also be found in a random environment. In our case we cannot exclude the possibility of the selected participants being more positive or more biased towards the project, compared to the average of all participants.

Another threat to validity was what some researchers call “going native.” That means that the researcher in a case study or action research setting becomes too involved in the project, for instance because he starts working for the case company during the execution of his research. When this happens, the risk is that the researcher cannot analyze the case in an objective manner anymore and that he may become biased. In our case, we have also been involved in SWCOMP for more than a year, which also influenced emotions and feelings about the case company, therefore limiting our objective view on the case.

To summarize, we have performed an extensive case study, providing a wealth of data. We consider our research to be reliable and we consider the construct validity to be sufficient.

However there are limitations to the external validity of this research, therefore more similar case studies should provide more general conclusions about this research domain. Furthermore, we provide a wealth of broad data about the topic, but based on these insights more focused studies are needed to formulate useful scientific theories.

### **11.3 Further Research**

Based on this study's findings and the limitations as presented in the previous section, we have a number of recommendations for further research in the domain of PPM in multinational software companies.

First of all, the outcomes of the SWCOMP case should be evaluated several times. Early evaluations can still result in PPM improvements, whereas evaluations one or two years ahead can enable real conclusions about whether the PPM implementation was successful or not and whether the PPM related goals were achieved or not. Furthermore these evaluations can provide valuable lessons and best practices for MNCs on how to implement PPM. We therefore recommend SWCOMP to maintain an ongoing scientific relationship to enable future evaluations.

Furthermore, as noted in the previous section, we only studied one single case. To enhance the external validity of this research, the study should be replicated several times. Because performing such a study takes a lot of time and money, we suppose that more focused case studies, only looking back on PPM implementations instead of participating and organizing them, can provide valuable insights about the generalizability of our results already.

Finally, one of the outcomes of our research that we believe to be a fertile ground for future research is the model of propositions that we presented in the chapter about local context. This model provides all kinds of causal relationship between situational factors and the desired type of PPM implementation. We believe this model can be extended and evaluated, in order to create some sort of decision criteria model to enhance choices about e.g. the type of PPM process, the amount of information required by the system, the degree of corporate involvement and more. This can help practitioners to make more informed decisions about the design of their PPM implementation and can improve the success rates of such PPM implementation projects significantly. In addition, due to fact that we noticed that PPM implementation projects experience the same issues and challenges as other large implementation projects in MNCs, we believe that these propositions may also count for similar implementation projects like HR policy changes and corporate process changes.

## 11.4 Concluding

To conclude this thesis, we summarize our research and formulate an answer to our main question:

*How can product portfolio management be implemented in a multinational software corporation?*

We have seen that PPM implementation projects in MNCs cope with the same issues and challenges as we expected to find based on other types of large implementation projects in MNCs, such as ERP system implementations. The issues in these types of projects can, as in our case, be divided in four categories, being context, content, process and outcome issues. For each of these categories we have described and analyzed the way SWCOMP coped with it and by doing so we provide a richness of data about how PPM can be implemented in a MNC. To answer our main research question, we cannot provide a step by step guide or a process model that describes exactly the path to be followed to successfully implement PPM, because the guidelines and requirements for such PPM implementations vary per case. However we do provide valuable insights and inspiration for practitioners that may help them to design PPM in such a way that it suits their situation. For PPM implementations in MNCs it is especially important to consider both the global and the local context and to find an optimal balance between these contexts. We believe that only when global and local demands are seriously considered, PPM implementations in MNCs stand a good chance of succeeding.

## References

- van den Akker, M., Brinkkemper, S., Diepen, G., & Versendaal, J. (2008). Software product release planning through optimization and what-if analysis. *Information and Software Technology, 50*(1–2), 101–111.
- Alonso, R., Dessein, W., & Matouschek, N. (2008). When Does Coordination Require Centralization? *The American Economic Review, 98*(1), 145–179.
- Appleseed Partners and OpenSky Research. (2011). *2nd annual benchmark study: product portfolio management*. Planview.
- Armenakis, A. A., & Bedeian, A. G. (1999). Organizational Change: A Review of Theory and Research in the 1990s. *Journal of Management, 25*(3), 293–315.
- Baets, W. R. J. (2002). *Wie orde zaait zal chaos oogsten: een vertoog over de lerende mens*. Uitgeverij Van Gorcum.
- Baskerville, R. L. (1999). Investigating information systems with action research. *Commun. AIS, 2*(3es).
- Baskerville, R. L., & Wood-Harper, A. T. (1996). A critical perspective on action research as a method for information systems research. *Journal of Information Technology, 11*(3), 235–246.
- Beck, D. E., & Cowan, C. (1996). *Spiral dynamics: Mastering values, leadership, and change*. Wiley.
- Becker, T. E. (1992). Foci and bases of commitment: are they distinctions worth making? *Academy of management Journal, 35*(1), 232–244.
- Becker, T. E., Billings, R. S., Eveleth, D. M., & Gilbert, N. L. (1996). Foci and bases of employee commitment: Implications for job performance. *Academy of management journal, 46*–482.

- Bekkers, W., Weerd, I. van de, Brinkkemper, S., & Mahieu, A. (2008). The Influence of Situational Factors in Software Product Management: An Empirical Study. IWSPM '08 (pp. 41–48). Washington, DC, USA: IEEE Computer Society.
- Bekkers, W., Weerd, I., Spruit, M., & Brinkkemper, S. (2010). A Framework for Process Improvement in Software Product Management. In A. Riel, R. O'Connor, S. Tichkiewitch, & R. Messnarz (Eds.), *Systems, Software and Services Process Improvement* (Vol. 99, pp. 1–12). Berlin, Heidelberg: Springer Berlin Heidelberg.
- Birkinshaw, J., Morrison, A., & Hulland, J. (1995). Structural and competitive determinants of a global integration strategy. *Strategic Management Journal*, 16(8), 637–655.
- Blichfeldt, B., & Eskerod, P. (2008). Project portfolio management – There's more to it than what management enacts. *International Journal of Project Management*, 26(4), 357–365.
- Callan, V. J. (1993). Individual and organizational strategies for coping with organizational change. *Work & Stress*, 7(1), 63–75.
- de Caluwé, L., & Vermaak, H. (2006). *Leren veranderen: een handboek voor de veranderkundige*. Kluwer.
- Cantamessa, M. (2005). Product portfolio management. In J. Clarkson & C. Eckert (Eds.), *Design process improvement* (pp. 404–435). London: Springer London.
- Checkland. (1991). From framework through experience to learning: the essential nature of action research (pp. 397–403).
- Clark, P.A. (1972). *Action research and organizational change*. London, United Kingdom: Harper and Row.
- Cooper, R. G. (2001). *Winning At New Products: Accelerating The Process From Idea To Launch*. Basic Books.
- Cooper, R. G., & Edgett, S. J. (2009). Effective Gating: Make Product Innovation More Productive By Using Gates With Teeth. *Marketing Management Magazine*, (March - April), 12–17.

- Cooper, R., Edgett, S., & Kleinschmidt, E. (2002). Portfolio management for new product development: results of an industry practices study. *R&D Management*, 31(4), 361–380.
- Day, G. S. (1977). Diagnosing the Product Portfolio. *The Journal of Marketing*, 41(2), 29–38.
- Dean, J. W., Brandes, P., & Dharwadkar, R. (1998). Organizational cynicism. *Academy of Management review*, 23(2), 341–352.
- Dennis, A., Wixom, B. H., & Tegarden, D. P. (2002). *Systems Analysis and Design with Uml (Wie)*. John Wiley & Sons.
- Drori, I., & Ellis, S. (2011). Conflict and Power Games in a Multinational Corporation: Sensegiving as a Strategy of Preservation. *European Management Review*, 8(1), 1–16.
- Dul, J., & Hak, T. (2008). *Case Study Methodology in Business Research*. Butterworth Heinemann (Vol. 129). Butterworth-Heinemann.
- Ebert, C. (2007). The impacts of software product management. *Journal of Systems and Software*, 80(6), 850–861.
- Ghoshal, S., & Bartlett, C. A. (1990). The Multinational Corporation as an Interorganizational Network. *The Academy of Management Review*, 15(4), 603–625.
- Gupta, A. K., & Govindarajan, V. (2000). Knowledge flows within multinational corporations. *Strategic Management Journal*, 21(4), 473–496.
- Hanson, E.M. (1996). *Educational administration and organizational behaviour*. Boston: Allyn & Bacon.
- 't Hart, Boeije, & Hox. (2007). *Onderzoeksmethoden (7th ed.)*. Amsterdam, the Netherlands: Boom Onderwijs.
- Jagroep, E., van de Weerd, I., Brinkkemper, S., & Dobbe, T. (2011). Implementing software product portfolio management (pp. 67–76). Presented at the 2011 Fifth International Workshop on Software Product Management (IWSPM), IEEE.

- Jansen, S., Finkelstein, A., & Brinkkemper, S. (2009). A sense of community: A research agenda for software ecosystems (pp. 187–190). Presented at the 31st International Conference on Software Engineering - Companion Volume, 2009. ICSE-Companion 2009, IEEE.
- Jusko, J. (2009). Portfolio Management in a Down Economy. *Industry Week*, 258(5), 48.
- Kaplan, B., & Maxwell, J.A. (1994). Qualitative research methods for evaluating computer information systems. *Evaluating health care information systems: methods and applications*, 45–68.
- Kittlaus, & Clough. (2012). The Elements of Software Product Management. *Software Product Management and Pricing* (pp. 39–115). Berlin, Heidelberg: Springer Berlin Heidelberg.
- Kostova, T., & Roth, K. (2002). Adoption of an Organizational Practice by Subsidiaries of Multinational Corporations: Institutional and Relational Effects. *The Academy of Management Journal*, 45(1), 215–233.
- Lee, S. G., Ma, Y.-S., Thimm, G. L., & Verstraeten, J. (2008). Product lifecycle management in aviation maintenance, repair and overhaul. *Computers in Industry*, 59(2–3), 296–303.
- Lewin, K. (1947). Frontiers in Group Dynamics II. Channels of Group Life; Social Planning and Action Research. *Human Relations*, 1(2), 143–153.
- Martinez, J., & Jarillo, J. C. (1989). The Evolution of Research on Coordination Mechanisms in Multinational Corporations. *SSRN eLibrary*.
- Meyer, J. P., & Allen, N. J. (1997). *Commitment in the Workplace*. Sage Publ.
- Milgrom, P., & Roberts, J. (1992). Organization and Management. *EnglewoodCliffs, NJ: PrenticeHall*.
- Myers, M.D. (2009). *Qualitative research in business & management*. London, United Kingdom: Sage Publications.
- Parsons, T. (1977). *Social systems and the evolution of action theory* (62). Free Press New York.
- Poh, K. L., Ang, B. W., & Bai, F. (2002). A comparative analysis of R&D project evaluation methods. *R&D Management*, 31(1), 63–75.

- Porter, M. E. (1979). How competitive forces shape strategy. *Harvard Business Review*, 57(2), 137–145.
- Prahalad, C.K., & Doz, Y.L. (1987). *The multinational mission: balancing local demands and global vision*. New York: The Free Press.
- Project Management Institute. (2008). *The Standard for Portfolio Management (2)*. Project Management Inst.
- Rapoport, R. N. (1970). Three Dilemmas in Action Research. *Human Relations*, 23(6), 499–513.
- Rittel, H. W. J., & Webber, M. M. (1973). Dilemmas in a general theory of planning. *Policy sciences*, 4(2), 155–169.
- Rosenzweig, P. M., & Nohria, N. (1994). Influences on Human Resource Management Practices in Multinational Corporations. *Journal of International Business Studies*, 25(2), 229–251.
- Rosenzweig, P. M., & Singh, J. V. (1991). Organizational environments and the multinational enterprise. *Academy of Management review*, 340–361.
- Rowley, J. (2002). Using case studies in research. *Management Research News*, 25(1), 16–27.
- Ruta, C. D. (2005). The application of change management theory to HR portal implementation in subsidiaries of multinational corporations. *Human Resource Management*, 44(1), 35–53.
- Saaksvuori, A., & Immonen, A. (2008). *Product Lifecycle Management* (3rd ed.). Springer.
- Smircich, L. (1983). Concepts of Culture and Organizational Analysis. *Administrative Science Quarterly*, 28(3), 339.
- Stark, J. (2011). Product Lifecycle Management. *Product Lifecycle Management* (pp. 1–16). London: Springer London.
- Steenbergen, M., Bos, R., Brinkkemper, S., Weerd, I., & Bekkers, W. (2010). The Design of Focus Area Maturity Models. In R. Winter, J. L. Zhao, & S. Aier (Eds.), *Global Perspectives on Design Science Research* (Vol. 6105, pp. 317–332). Berlin, Heidelberg: Springer Berlin Heidelberg.

- Susman, G.I., & Evered, R.D. (1978). An assessment of the scientific merits of action research. *Administrative Science Quarterly*, (23), 582–603.
- Thomae, H. (1999). The Nomothetic-Idiographic Issue: Some Roots and Recent Trends. *International Journal of Group Tensions*, 28(1-2), 187–215.
- Ulijn, J. M., Lincke, A., & Karakaya, Y. (2001). Non-face-to face international business negotiation: how is national culture reflected in this medium. *IEEE Transactions on Professional Communication*, 44(2), 126–137.
- Urquhart, C., Lehmann, H., & Myers, M. D. (2010). Putting the “theory” back into grounded theory: guidelines for grounded theory studies in information systems. *Information Systems Journal*, 20(4), 357–381.
- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS quarterly*, 425–478.
- Vollmann, T. E. (1996). *The Transformation Imperative: Achieving Market Dominance Through Radical Change*. Harvard Business Press.
- Walsham, G. (2006). Doing interpretive research. *European Journal of Information Systems*, 15(3), 320–330.
- van de Weerd, I., Brinkkemper, S., Nieuwenhuis, R., Versendaal, J., & Bijlsma, L. (2006). Towards a Reference Framework for Software Product Management (pp. 319–322). Presented at the Requirements Engineering, 14th IEEE International Conference, IEEE.
- Weick, K. E. (1976). Educational Organizations as Loosely Coupled Systems. *Administrative Science Quarterly*, 21(1), 1.

## Appendix A. PIM capabilities (Jagroep et al., 2011)

<i>Capability</i>	<i>Description</i>
	<i>Initiation</i>
A	Perform initial assessment
B	Create implementation trajectory
C	Create portfolio plan
	<i>Strategy implementation</i>
A	Establish strategic direction
B	Create strategic roadmap
C	Create portfolio strategy
	<i>Gatekeeper introduction</i>
A	Define information requirements
B	Formalize gatekeeper function
	<i>Product Portfolio Management</i>
A	Define product manager tasks
B	Construct departmental roadmap
C	Establish multifunctional core teams
D	Define organizational portfolio
E	Perform external assessment
F	Establish portfolio review board
	<i>Product Lifecycle Management</i>
A	Define and communicate corporate PLM vision
B	Define departmental PLM vision
C	Integrate PLM in roadmap
D	Establish central product information storage
E	Integrate ecosystem
	<i>Project Portfolio Management</i>
A	Establish central project administration
B	Create business cases
C	Define separate portfolios
D	Define PM processes
E	Define corporate PM tasks and processes
	<i>Process formalization</i>
A	Define processes
B	Define uniform protocols
	<i>Tooling</i>
A	Establish tool collection
B	Establish dedicated tools
C	Establish governance tooling
	<i>Information technology</i>

A	Assess current systems
B	Automate processes
C	Integrate systems

## Appendix B. Situational factors in SPM domain (Bekkers et al., 2008)

	Average weight	Standard deviation
<b>Business unit characteristics</b>	1,82	
Development philosophy	1,45	1,036
Size of business unit team	2,18	1,401
<b>Customer characteristics</b>	3,54	
Customer loyalty	4,09	1,973
Customer satisfaction	3,91	1,921
Customer variability	3,18	2,040
Number of customers	3,27	1,794
Type of customers	3,27	1,794
<b>Market characteristics</b>	2,44	
Localization demand	2,00	1,789
Market growth	3,36	2,111
Market size	3,18	2,228
Sector	3,09	2,023
Standard dominance	1,73	1,618
Variability of feature requests	2,18	1,779
<b>Product characteristics</b>	2,77	
Application age	4,20	2,201
Defects per year	1,73	1,191
Development platform maturity	2,64	2,203
New requirements rate	2,91	2,212
Number of products	2,73	2,149
Product lifetime	4,55	1,753
Product size	2,73	2,005
Product tolerance	1,45	0,820
<b>Stakeholder involvement</b>	3,09	
Company policy	3,45	2,339
Customer involvement	3,36	1,748
Legislation	2,36	1,912
Partner involvement	3,18	1,888

## Appendix C. Semi-structured interviews script

*Purpose of the interview:*

- *Alignment*
  - *Insight in organization/unit*
  - *Insight in processes*
  - *Insight in information requirements*
  - *Ideas, opinions, remarks etc.*
- 

### Organizational

1. Can you brief me about your organization? (e.g. how many products do you manage? What are the most important products? In which countries do these products sell? How many employees are active in your organization?)
2. Can you brief me about your role in the organization?

### Portfolio management

1. How do you currently manage your product portfolio?
2. How do you determine whether you should invest in a product or divest?
3. How do you determine whether a project idea should be executed or not? Do you create business cases?
4. What information (internal and external) do you use:
  - a. To evaluate projects (idea, business case, in development, launch)
  - b. To evaluate products
5. How do you collect the information?
6. How do you present the information?
7. Which people do you (often) interact with in the context of product (portfolio) management? Who are the information owners? Who are the process owners?
8. Do you use any system / template / document for portfolio / project / product evaluation? If so, can you share it with me?

## **PPM infrastructure**

*Our goal is to set up an infrastructure across SWCOMP that supports information sharing about products and projects. It should answer “what do we have?” and “what are we working on?”*

*Furthermore, it is recognized that there is a need to increase the formalization/professionalization of decision making about products and projects.*

1. How do you feel about the ideas that Ton and me presented in the first alignment meeting?
2. What do you think should be the main purpose of the PPM infrastructure?
3. Do you have ideas or expectation of how the infrastructure can be beneficial to your organization in particular?
4. How do you believe a central product information storage can benefit SWCOMP and your organization in particular?
5. How do you believe a central project information storage can benefit SWCOMP and your organization in particular?
6. What type of information do you think would be useful to make available in the PPM infrastructure?
7. How do you feel about creating business cases for new project ideas, giving projects a rating score for their strategic contribution and risk, and calculating financial NPV, IRR and Payback?
8. How do you feel about sharing all projects that take longer than 20 days / more than € 20.000 with corporate management so they can determine whether there are opportunities for collaboration before approving the project?

## **Overall project**

1. What are the project risks and difficulties according to you?
2. Do you feel I am missing any important information? Do you feel we should do something different?

*Thank you for participating in this meeting. I will off course keep you updated about the progress we are making. Currently I have some more meetings with important stakeholders planned. Afterwards I will continue with building prototypes of the PPM solution. I hope you are also willing to provide feedback on the prototypes once they are available. If you have any additional comments, questions etc. feel free to contact me at [ruud.kuiperi@SWCOMP.com](mailto:ruud.kuiperi@SWCOMP.com).*

## Appendix D. Survey format

THIS PART HAS BEEN REMOVED FOR CONFIDENTIALITY REASONS