

An empirical research on the  
relationships between software  
product management and software  
project management

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## Abstract

This paper is a dedicated research on the way the fields of Software Product Management and Software Project Management collaborate with each other, within software product companies. It analyzes the dependencies between software product and software project and the relationships between product and project managers. The software product is defined based on the market success, customer satisfaction and meeting the internal business goals. Software projects are defined based on the delivery time, the quality and the cost incurred from the project development. Product and project managers are characterized upon their role specific qualifications as well as their positioning within the organizational structure of a software product vendor.

The research is theory oriented. It concludes with some theory propositions as the result of both a qualitative and a quantitative analysis. The theory propositions describe the relationships between Software Product Management and Software Project Management. The findings show that project's quality is the most influential factor for the product's market success as well as for the customer satisfaction. Product managers are proved to be more business oriented, focusing on Strategic and Tactical decision-making. Project managers need more technical skills and they are more involved with Operational and Tactical decisions.

The purpose of the research is to provide the software product companies with a benchmarking information of the current status of the market in Software Product Management and Software Project Management aspects. The results answer current business issues such as the positioning of the roles of a product manager and a project manager within the company as well as their dependencies in the organizational structure, as they are used in the contemporary market.

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# 1 Introduction

Software development companies often face the dilemma between being a product company, a services company or both [14]. A product company offers packaged software, also known as Commercial-Off-The-Shelf (COTS) software and it is licensed for use [45]. As a potential customer, acquiring a packaged product involves several activities such as the identification of the company's requirements, the evaluation of alternative products, and the selection, installation and test of one of them. A service company develops and offers customized solutions. Custom software is usually a made-to-order system and it is developed for specific users [14]. Software services can also include consulting services from the vendor company to the seller, as well as other activities such as contracting, integration, training and support.

There are also cases where software companies are involved in both product and services software as a mean to increase their revenue [14]. A current tendency, for example, is the transformation from products to services with the introduction of the Software as a Service (SaaS) model [33]. Product companies can increase their revenues, through the accumulation of contracts for services and custom software.

But regardless the balance they will choose between products and services, software companies must understand and clearly define their primary business [13]. When ISVs get involved with both product development and solution services, the confusion between software projects and services projects arise [37]. Software projects refer to the development of the software product and in the case of the product companies, software projects are the primary business [14]. Software services, on the other hand, are the customized solutions which do not only involve the development of the tailor-made software but also other services such as the consulting.

Besides the dilemma between balancing products and services and distinguishing the different kinds of projects that are involved in every case, product companies have to face another emergent issue; the evolution of the field of Software Product Management and the integration with the Software Project Management of the software development. The challenge for the Independent Software Vendors (ISVs), especially the small and medium sized companies, comes when they need to combine Software Product Management and Software Project Management [17, 24].

Quite few attempts have been made so far [6, 12, 18] to distinct between



SPdM and SPjM. One of the issues that can be noticed on those attempts is that the terms of software product and software project are used without clear definitions. Furthermore, there seems to be no clear definition of the roles of product manager and project manager and their positioning within the organizational structure of an ISV. Therefore, the main question that arises in this paper is:

*What is the relationship between Software Product Management and Software Project Management within the context of an Independent Software Vendor?*

The present research focuses on software product companies and their core business of product development and the relationship between Software Product Management and Software Project Management. Within software product companies both fields play a vital role in the organization and coordination of their activities and processes [24]. These activities and processes do not only deal with the development of the software product but also with the overall organization of the company's market strategy, the product portfolio management, the launch preparation of the product as well as the customers support and communication efforts before and after sales [25,30]. The success of those activities, therefore, is dependent to the way companies organize and coordinate Software Product Management and Software Project Management together. This includes, from one hand, the support roles in each field, that is the roles of the product and project managers [21]. On the other hand, the success of combining Software Product Management and Software Project Management together, depends on the distinct concepts of *Software Product* and *Software Project* which are managed by the respective roles [17].

## 1.1 Research Contribution

This research is concentrated on two major management fields of the software product development industry; Software Product Management (SPdM) and Software Project Management (SPjM). Software Product Management can be considered a relative young field [50], not only in the academic environment where there is a considerable gap in researches on the particular topic, but also in the business field where software companies feel uncertain on the way Software Product Management should be organized [31,32]. Software Project Management, on the other hand, is a well established but also an ever growing field [51] with a significant amount of academic and business researches around this topic [28].

The present research deals with the construction of concrete theory propositions that will describe the aforementioned problem domain. These propositions contribute to the academic world with a valid research on the field of Software Product Management and Software Project Management by defining their relationships. It also comprises a trigger for future research, in order to investigate further aspects or further expand the ones examined in the present paper.

From a practical point of view, this research is useful to the business world, since it provides the software product companies with a benchmarking information of the current status of the market in Software Product Management and Software Project Management aspects. Finally, the results of this research answer current business issues such as the positioning of the roles of a product manager and a project manager within the company as well as their dependencies in the organizational structure, as they are used in the contemporary market.

A concrete explanation on the way this research is conducted, is presented in Section 2. Section 3 provides the theoretical background on Software Product Management and Software Project Management. The first propositions that will guide the main part of the research are constructed in Section 4 which are then translated into hypotheses and they are further tested in Section 5. Finally, Section 6 concludes this research by answering the main research question and with suggestions for future research.

## 2 Research Approach

This paper is a focused research on the way the fields of Software Product Management and Software Project Management collaborate with each other, within software product companies. To the best of our knowledge, this problem domain is still quite immature, with few researches on the interrelationships of the two concepts of Software Product Management and Software Project Management together. Therefore, the research conducted is a theory-oriented research [15] because the assumption underlying this concept is that “nothing is known yet” about the object of study.

The main results are theory propositions which describe the dependencies between the software products and software projects, as well as the relationship between the roles of product managers and project managers. As it is stated in [15] “if the research objective is theory-oriented, it does not matter whether the propositions have any practical implication and, generally speaking, it is even not commendable to assume that any proposition has practical relevance before it is tested thoroughly in a series of replicated tests”. Following this statement, the context of the present research constitutes more an attempt to describe the problem domain, rather than identifying the best practices.

### 2.1 Research Questions

As mentioned in the introductory part, the main problem domain of the research, is formalized as:

*What is the relationship between Software Product Management and Software Project Management within the context of an Independent Software Vendor?*

The above parts are further analyzed into the following research sub-questions.

1. What is the relationship between software product and software project within Independent Software Vendors ?
  - (a) What is a software product?
  - (b) What is a software project?

- (c) What are the dependencies between the software product and software project within ISVs?
2. What is the relationship between software product managers and software project managers in Independent Software Vendors ?
    - (a) What are the role characteristics of a product manager and what are those of a project manager?
    - (b) How are the roles of the product manager and project manager organized in Independent Software Vendors ?

## 2.2 Conceptual Model

Based on the above research questions Software Product Management and Software Project Management are divided into two sub-categories; the main managerial roles, that is the roles of the product manager and the project manager, and their respective parts of control, that is the software product and the software project, accordingly. The present research suggests the conceptual model as illustrated in Figure 1.

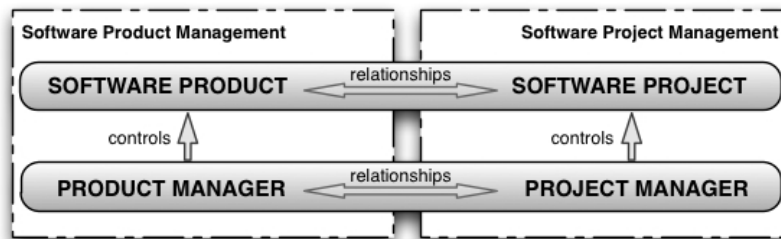


Figure 1: Software Product Management and Software Project Management Conceptual Model

In order to analyze the main problem domain, the researcher suggests the decomposition of the problem domain into two sub-problems. The first sub-problem includes the definitions of the software product and software project and the identification of the relationship between them. The second sub-problem includes the roles of product and project managers who control the product and the project, accordingly, and the delimitation of their relationship.

## 2.3 Research Methodology

The methodology of the present thesis is centered around triangulation (Figure 2). Triangulation is referred to as the process whereby several methods of research and data collection are used such that the findings from one type of study can be checked against the findings derived from another type [35]. The objective of this process is to verify the quality of the collected information and more particularly its validity and reliability.

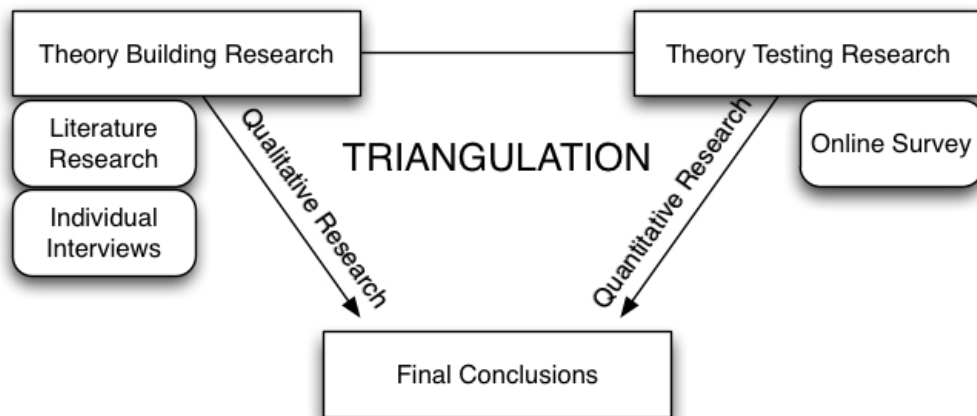


Figure 2: Research Methodology Diagram

This research follows two different methods; a theory-building (or exploratory) research and a theory testing research [15]. The theory building methodology is part of a qualitative analysis which is performed into two steps. The first step is the literature research which means the investigation of relevant theories and researches as published and described in various scientific papers and books from other researches, in similar topics. The second step includes a set of semi-structured interviews [15]. The interviews were conducted among six different software product companies, all of them operating in the Dutch market.

The outcome of the first part of the research is a set of theory propositions. In order to test to their validity, the propositions are translated into hypotheses. Then they are used in the second part of the research, the theory testing. The theory testing is achieved by translating the theory propositions into hypotheses and testing them based on a quantitative analysis. The quantitative analysis is performed upon data that have been gathered with the use of an online survey. After the test has been conducted the results of theory-testing research can be used for (re)formulating propositions,

particularly if a proposition is not supported by the test [15].

Finally, by combining the interviews and the survey methods of data collection, the research uses a data triangulation which refers to the data evaluation through multiple sources of information [54]. The information gathered from the interviews is cross-evaluated with the use of the online survey. This way also addresses any potential problems of construct validity since the multiple sources of evidence provide essential multiple measures of the same problem domain.

### 3 Theory Building - Background Theory

The Theory Building research is constructed based on a two-sided qualitative analysis. The first side is performed through an extensive literature study among various scientific and other relevant researches on the field of Software Product Management and Software Project Management. Several papers and books are referenced in an effort to collect the best and most accurate of the information available. In addition to the scientific references, various web resources have been used (blogs, podcasts, etc.) in order to investigate the current trends as well as the present thoughts of domain experts who work on these topics.

This paper, addresses the link between product and project management at a more generic level, without focusing on specific activities and processes but rather on the attributes that compose and define the two fields. As suggested in section 2.2, in order to examine the main problem domain, a division into two smaller modules is followed; Software product and Software Project; Product managers and Project managers. The rest of the paper deals with the qualitative and quantitative analysis of both sub-problems.

#### 3.1 Software Product Management and Software Project Management

The history of the concept of Product Management roots back in the early 1930's from Procter and Gamble (P&G). The term was introduced by P&G, at the company's Camay soap line, by assigning a product manager role to focus specifically on the particular product line. The success of this management approach gained popularity among other manufacturing companies and eventually became an effective organizational form for multi-product companies [21]. Yet, product management still remains complex. It requires strategic management in order to efficiently and effectively coordinate all the involved stakeholders, their responsibilities and to reach the success of the business [17].

Project management is more than 50 years old, born as a management approach for construction projects [51]. In the area of software development, project management remains a continuously growing and ever changing landscape. Wysocki [51] provides a concrete definition of the Software Project Management : "Software development project management is the

discipline of assessing the characteristics of the software to be developed, choosing the best fit software development life cycle, and then choosing the appropriate project management approach to ensure meeting the customer needs for delivering business value as effectively and efficiently as possible.”

In the current academic literature, quite few attempts have been made to clarify the terms of Software Product Management and Software Project Management , differentiate them and find a way to complementary use them for the success of the software product company. Although, there are no contemporary researches that directly address the comparison between the two terms, some of them, partially cover several related aspects.

In an industry research conducted by Gartner [38], a decision framework is presented, describing how to use product and project portfolio management in a complementary way and support them with software tools. In more details, they have identified several interdependencies between product and project portfolio management that lead to business success:

- Product portfolio management enables the identification of project portfolio management needs.
- Project portfolio management influences product portfolio management based on capacity, time and resource availability.
- Product and project portfolio analyses focus on the identification of the right set of projects, to yield to the right sets of products.

Ebert [18] presents, in a recent article on Software Product Management, the difference between product management and project management scope. More specifically, Ebert provides an overview of the product management scope, within a product life cycle, and depicts the way the various projects integrate towards the product life cycle. According to this view, project management focuses on delivering a product or a product release within time, budget and quality, whereas product management focuses to the overall market success of the product.

Finally, attention has also been paid in the link between new product-related business opportunities (upstream processes) and product development (downstream processes) [16]. Lehtola et. al. [37] identified practices that seem to strengthen the link between business planning and software development in the field of requirements engineering such as the separation



of business goals from resource allocation and the need to include different stakeholders in different activities.

### 3.2 Software Product and Software Project

What distinguishes Independent Software Vendors from other types of software companies, and what distinguishes Software Product Management from other types of software management is the attribute of the software as a product. Xu and Brinkkemper [52] are the first that noticed the need for differentiation between software as a product and of other types of software (e.g. embedded software). Throughout literature, several attempts have been made to provide definitions of the software, indicating its attribute as a product.

Kilpi [31] indicates that a software product consists of as many as three components: the software, the support service of it and the idea behind the product. Xu and Brinkkemper [52] define a software product as a packaged configuration of software components or a software-based service, with auxiliary materials which is released for and traded in a specific market. Kittlaus and Clough [32] refer to software product as a product (meaning a collection of components which one party - the vendor, combines, to transfer defined rights to a second party -the customer) whose primary component is software (meaning an intangible, economic good which value is defined through its functionality).

By defining software as a product is not enough to justify the need for a different software management control. Software is a product but significantly differentiates from other common goods. As Messerschmitt and Szyper-ski [40] state in their book of Software Ecosystems, software significantly differs than most material goods. A single software application and its supporting infrastructure are decomposed into many internal units, which are often supplied by different vendors and with different ownership.

In addition, Stepanec [48] refers to various reasons why software is different. One of them, that is worth mentioning here, is the statement that “Unlike other products, software is not constructed but rather designed into existence”. Analyzing this statement, Stepanec provides an example comparing the construction of a road and the development of a software product. While road construction consists of a sequence of well defined phases, software development in contrast is a process of continuous research, during which there

is no point where definitive plans can be drawn.

For the software project several definitions can be found throughout literature. Wysocki [51] describes a software project as “a complex undertaking by two or more persons within the boundaries of time, budget, and staff resources that produces new or enhanced computer code that adds significant business value to a new or existing business process”. Another definition from [29] suggests that a software project has two main activity dimensions: engineering and project management. The engineering processes generally specify how to perform engineering activities such as requirement specification, design, testing, and so on. The project management processes, on the other hand, specify how to set milestones, organize personnel, manage risks, monitor progress, and so on. This book focuses on the project management process.

In order to understand the difference between Software Product Management and Software Project Management, the first step should involve the clarification of the terms of *software product* and *software project* along with their relevant dependencies. Based on the current literature, not many researchers have focused on the difference between the two aspects. Ebert [18] refers to a project as “a temporary endeavor, undertaken to create a product”. In accordance to this, the Project Management Institute (PMI) [49], the professional organization for project managers, regards a project as the single most important factor in the success or failure of the products.

A more representative definition between products and projects is stated by Haines [24]; “Products represent the essence of business, how it thrives, grows and brings revenue to the firm. Projects are the vehicles used to derive, deliver and support products and many other business elements related to them.” In the current paper the following definitions have been constructed and used:

- **Software Product:** A bundle of software functions accessible through a single interface and/or carrying a single name.
- **Software Product Suite:** A set of software products combined under a single name.
- **Software Project:** A release of a software product or part of a software product.

In the interest of a more detailed analysis of the terms of software product

and software project within the context of software product development, several other scientific resources have been examined. Throughout those resources several attributes have been identified that have been used in order to characterize the software product and the software project. The definition therefore of the scope of the software product and project will enable a more concrete examination of the relationships between these two terms. Scope definition is the process of breaking down the overall aims (or requirements) of the product and the project into a number of smaller, more closely defined goals [1, 48].

More specifically, it has been noticed that the software product includes processes and activities that are concerned mostly with the market trends, the customer/user needs and the internal, company affairs such as road-mapping, business value etc. In this research the product scope is defined as being concerned with the:

1. *Market Success* referring to the level of the success of the software product in the specific market segment it is launched.
2. *Customer Satisfaction* referring to the level of satisfaction the customers receive from using the product.
3. *Business Goals* referring to the level of accomplishment of the internal goals related to the product such as performance levels, projected sales etc.

Accordingly, the software project related activities are concerned with more internal oriented activities such as deliver the projects on time, being within the specified budget, quality requirements etc. Thus, in the present research the software project scope is defined as:

1. *Time* referring to the delivery time, or in other words to the extent that a software product is delivered on time or not.
2. *Quality* referring to the degree the project meets the specified quality standards, delivers workable features and covers all specified product requirements.
3. *Cost/Budget* referring to the financial cost for a product to be completed, or in other words to the degree a product is completed within the specified budget/cost.

Table 1 presents some of the resources that have been used to support the definitions of the software product and project scope. In each case, a mark [x] is used to indicate in which of the aspects of software product and software project the author(s) refer to.

Table 1: Software Product and Software Project Characteristics

| References                        | Software Product |                    |                | Software Project |         |      |
|-----------------------------------|------------------|--------------------|----------------|------------------|---------|------|
|                                   | Market Success   | Cust. Satisfaction | Business Goals | Time             | Quality | Cost |
| Boehm & Ross, 1989 [9]            | x                | x                  | x              | x                | x       | x    |
| Kilpi, 1997 [31]                  | x                | x                  | x              | x                | x       |      |
| Clements & Northrop, 1999 [11]    |                  |                    |                | x                | x       | x    |
| Tatinkonda & Rosenthal, 2000 [49] |                  |                    |                | x                | x       | x    |
| Harter et. al., 2000 [27]         |                  | x                  |                | x                | x       | x    |
| Jalote, 2002 [29]                 | x                | x                  |                | x                | x       | x    |
| Rautiainen et. al., 2003 [43]     | x                | x                  | x              | x                | x       |      |
| Aguamo, 2004 [3]                  | x                | x                  | x              | x                | x       | x    |
| Clements et. al., 2005 [12]       | x                | x                  | x              | x                | x       | x    |
| Aurum & Wohlin, 2005 [4]          | x                | x                  | x              | x                | x       | x    |
| Greene & Stellman, 2006 [23]      |                  |                    |                | x                | x       | x    |
| Lehtola & Kauppinen, 2006 [36]    | x                | x                  |                | x                | x       |      |
| Bechtold, 2007 [8]                |                  |                    |                | x                | x       | x    |
| Ebert, 2007 [17]                  | x                | x                  | x              | x                | x       | x    |
| Barney et. al., 2008 [6]          | x                | x                  | x              | x                |         | x    |
| Bashroush et. al., 2008 [7]       |                  | x                  | x              | x                | x       | x    |
| Lehtola et. al., 2009 [37]        | x                | x                  | x              | x                | x       | x    |
| Ebert, 2009 [18]                  | x                |                    |                | x                | x       | x    |
| Haines, 2009 [25]                 | x                | x                  | x              | x                | x       | x    |

### 3.3 Product Managers and Project Managers

Organizations differ one from another in all sorts of ways, and there is very little that one can say or do about how well they work or how to structure them unless they all have something in common [5]. Following this pattern, the common aspect between software product companies is the fact that they all work on the basis of a software product to be offered. Together, the people and the rules that connect their decisions create an organizational structure, which determines what is to be done, how to do it, and eventually do it [5]. There comes the importance of the relationship between the product manager and the project manager.

An aspect that still remains ambiguous is the definition of the role of the software product manager and project manager [18]. As a general definition, regardless the type of company a product manager is typically a middle manager responsible for the management and marketing of the existing products (or new products) for a given product line, brand, or service [21].

Although, no universal and ideal profile of a successful product manager can be defined, there is an essential trait that many researches agree upon [12],

[17], [21], [32]; the broad knowledge of all aspects of a company along with a very focused knowledge of the specific product(s) or product lines and its customers. As Ebert [17] states, the product manager can be considered the “mini CEO” of the organization.

Furthermore, every project needs a leader [3]. A project manager needs to understand every facet of software development in order to make good judgements [23]. In another research [9] a software project manager is characterized as a negotiator between his various constituencies and the person responsible for monitoring the progress towards the project goals. In addition to this, a software project manager is defined as the one responsible for coordinating and integrating activities across multiple, functional lines [30].

In this research, we argue that since the role of a product manager focuses on the concept of a software product and accordingly the role of a project manager focuses on the concept of a software project, the following definitions can be derived:

- **Software Product Manager** is the manager responsible for a) the fit of the product with the market, b) the customer satisfaction and c) the internal business goals related to the product.
- **Software Project Manager** is the manager responsible for a) delivering the product in time, b) meeting product quality and c) developing the product within budget.

In order to examine the relationship between product and project managers several aspects that influence their communication and therefore their collaboration should also be taken into consideration. Organizational communication is fundamental not only for the organization as a unity, but also for the different leaders that operate within it [26]. A research conducted by [53] identifies the importance of the organizational structure as well as the influence of different organizational factors on communication effectiveness. Furthermore, Rosengren [19] argues that individual incumbents of given organizational positions are affected by the opportunities offered by that position, but also by the demands and restrictions.

Organizational conflict is evaluated based on the kind of outcomes they occur from it; functional or dysfunctional [42]. Functional outcomes include stimulating innovation and improve decision making whereas dysfunctional outcomes can cause mistrust and problems in commitment and relationships.

Lam & Chin [34] argue when diverse perspectives come together, conflicts might be created but in the end these conflicts will promote good decision making and creative solutions. Finally, in another research [20], it has been found that unresolved conflict has a strong negative impact on the overall software product development, success and customer satisfaction.

Inspired by the aforementioned aspects that are related to the collaboration and communication within the structures of an organization, in this research the relationship between product and project managers is evaluated based on two main factors. The first one is the **Role specific qualification** which refer to the role specific skills that a product and project manager should possess and the kinds of decision making that each one of them is enrolled to. The second one is the **Role Positioning** which refers to the departmental and hierarchical positioning of the product and project managers within the software product companies.

### 3.3.1 Role specific qualifications

In this part of the research, we identified two role specific qualifications; The type of knowledge that product and project managers possess and the kind of decision-making that are enrolled to.

The kind of knowledge that someone must have in order to successfully fulfill the job description can be derived by examining the functions that are involved in each one of the two job positions. There are many references that someone can turn to for a job description of a product manager and a project manager; here some general activities are summarized. For the case of product manager position basic role functions include [22]:

- Drive business results
- Ensure market-driven direction
- Guide product fit and function
- Manage multiple priorities

For the project manager's position, Kerzner [30] argues that a project manager needs strong communicative and interpersonal skills, but a better command of technology is more important than a general understanding. Some of the main activities of a project manager that Kerzner defines are:

- Establish plans
- Organize resources
- Set up controls
- Apply innovation for alternative actions

Based on these activities and according to the job responsibilities and accountabilities that can be found in almost any reference, the role specific characteristics can be defined. In this paper, a generalization is being made using two basic categories of skills; *Business oriented* and *Technical oriented*. The business skills are defined as the communication, analytical and more managerial skills. The technical skills indicate a more detailed knowledge on software development such as coding/programming and software architecture knowledge.

Furthermore, Haines [25] notices that product managers, no matter what their job level in the company, need to recognize that there are always decisions to be made because there are always problems to be solved. Aurum and Wohlin [4] have examined the decision-making on the Strategic, Tactical and Operational managerial levels in the Requirements Engineering field. Finally Rosca et. al. [44] emphasize the need for business and technical managers to have a very good understanding of the business objectives and ensure that their decisions meet these objectives.

In this paper, the decision making aspect is examined based on the *Strategic*, *Tactical* and *Operational* levels. Strategic decisions, which affect the long-term direction of the entire company, tactical decisions, which focus on more intermediate-term issues and operational decisions focus on day-to-day activities within the company [10]. The purpose is to investigate in what kind of decision making, product and project managers are involved and how they differ from each other.

### 3.3.2 Role Positioning

Kerzner [30] refers to the organizations as groups of people who must coordinate their activities in order to meet organizational objectives. He goes on, emphasizing the fact that “there is no such thing as a good or bad organizational structure; there are only appropriate or inappropriate ones”. Following this idea, the first aspect that is studied here, is the positioning of

the two roles within the organizational structure of an independent software vendor. More specifically, we examine the way companies position the role of product manager in relation to the role of project manager. Two factors have been identified; the hierarchical relationship and the departmental positioning.

The hierarchical structures are imposed in order to understand how the organizational system behaves and then being able to manage it [46]. In the context of communication, the hierarchical relationships are characterized by the way the communication flows among the organizational levels [26]. The downward communication (from the top levels to the lower ones) reinforces the hierarchical nature of the organizations. Communication from the lower levels to the upper levels is upward and one of the main barriers of this type of communication is the distortion of trust. Cross functional and interdepartmental cooperation are examples of horizontal communication which allows people to communicate at the same level increasing the ability to resolve potential conflicts.

We come to see that hierarchical structures can influence the communication and therefore the collaboration between two positions within an organizational structure. This research examines the hierarchical relationship aspect, between product and project managers, on the basis of two alternatives; whether the two roles are hierarchically equal, or not.

The second aspect is concerned with the departmental positioning of the two roles and more specifically with whether they are operating under the same department or not. The importance of the positioning of the roles of the product manager, is also discussed by Kittlaus and Clough [32]. Integration into Development often seems more plausible, driven by the idea that project and product managers can best collaborate from a technical point of view [32].

Positioning two roles, than need to work closely, in different departments can potentially lead to communication problems [28]. Evidence also suggests that there is a positive relationship between effective interdepartmental communications and the success of product development [41], [39]. Therefore departmentalization should also be considered as an influential factor for the relationship of product and project managers. In this research the focus is on whether companies choose eventually to position the two roles under the same department, or not. Since the role of software project manager is concentrated in the software development, the research is based on whether product managers are working under the R&D department or not.



### 3.4 Refining the Conceptual Model

After having introduced the main parts that this research is interested to, the conceptual model is refined. Figure 3 presents a more detailed version of the conceptual model of section 2.2, including all the aspects that are subject to further analysis.

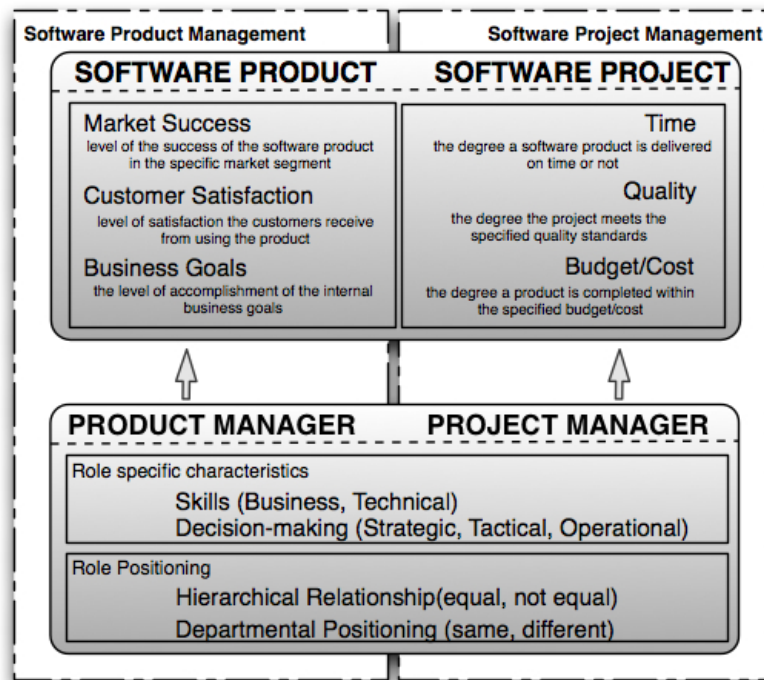


Figure 3: Software Product Management and Software Project Management Conceptual Model - Refined

## 4 Theory Building - Qualitative analysis

The second part of the theory building research includes the construction of some initial theory propositions that describe the relationship of Software Product Management and Software Project Management. It is based on focused, semi-structured interviews that were conducted among six software product companies, all of them operating in the Dutch market. According to [54], in a focused interview the respondent is interviewed for a short period of time (about an hour) and although the questions can still remain open-ended and assume a conversational manner, it is more likely to follow a certain set of questions derived from a protocol. Finally, a structured interview entails a predefined set of questions, more close to what the style of a survey.

The interviews in the present research had the average duration of approximately an hour each. During the interview a protocol was followed which can be found in Appendix A.1. Based on the protocol, the questions are divided into four categories; Contextual questions which include general questions about the company such as the size, the number of employees etc. *Product and Project* questions which includes multiple choice questions with regard the product and project scope but at the same time leaving room for further discussions and comments. *Product and Project manager* questions which deals with the positioning of the two roles within the organizational structure of the company. And Final questions were the respondent was free to comment on the overall research, make an evaluation and further suggestions for improvement.

A brief profile of each one of the companies that participated in this part of the theory building research, is presented in the next section.

### 4.1 Company Profiles

#### 4.1.1 GX

GX is a software vendor of an enterprise web content management system. They currently employ around 130 people in three different locations in the Netherlands (Nijmegen, Amsterdam, Eindhoven) and they serve more than 150 customers in several countries. The main product is the GX WebManager which provides solutions to their customers from informative web sites

to the management of multiple content repositories throughout a company or network of companies.

The Product management activities within GX are defined as more marketing oriented and therefore, the product manager is part of the Marketing department of the company. Project management is distinguished into the software project development and the customer services project. Project development is part of part of the R&D department and the role of the project manager is a more dedicated position that does not involve any other managerial activities (line or departmental).

#### **4.1.2 iBanx**

iBanx provides complete software packages for the performance improvement of companies within the industrial sector. A small sized company, serving around 50 customers, iBanx is organized into two teams; the first one is iBanx HSE which focuses on the implementation of best practices in Health, Safety & Environmental (HSE) processes through the training, implementation and use of software tools. The second team is the iBanx Zimble which is the consultancy part of the company.

iBanx used to employ the role of a product manager under the sales and marketing department. Recently they changed, and although they still use and improve their product management, they regard it as a series of processes and activities, distributed among the departments of development and implementation and & support.

#### **4.1.3 Pallas Athena**

Pallas Athena is a Business Process Management (BPM) software vendor. They provide BPM software, solution and services to more than 1800 customers in over 30 countries around the world. The company offers two main software products: BPM—one and Modus—one. BPM—one is a complete BPM Suite that offers a range of functions for mapping out, modeling, managing, simulating, executing, monitoring and analyzing business processes and workflows within a company. Modus—one is a centralized solution for all outgoing communication of an organization. It provides a single interface for all communication devices and a range of different printing solutions.

Pallas Athena operates a Product Management department under the Product Development division, part of the Pallas Athena International. From the project management part, Pallas Athena distinguishes between research projects and development projects. In both cases product management closely cooperates with the development department.

#### **4.1.4 SDL Tridion**

SDL Tridion offers enterprise web content management software solutions, serving more than 600 customers. The company's headquarters are located in Amsterdam, the Netherlands and they operate offices in ten more countries around the world. SDL Tridion product portfolio is an online unified marketing suite. It includes among other things features and functionalities such as audience management, email marketing, BluePrinting technology, integration with offline channels and improved customer interaction. SDL Tridion is part of the SDL group (LSE:SDL), leader in Global Information Management and the largest translation agency in the world.

SDL Tridion in Amsterdam operates a Product & Solutions (P&S) department which includes the product management, product marketing and business development groups. Their research and development department works under SCRUM and therefore they are not purely dedicated roles of project managers. They drive and manage releases with the use of shared product owners teams between the departments of R&D and P&S.

#### **4.1.5 Planon**

Planon is a real estate facility management software provider of Integrated Workplace Management Solutions (IWMS). They currently serve more than 1300 customers in 16 countries across a broad range of industries. The company's solutions include Facility and Space management, operations and maintenance management, project management and real estate portfolio management. Under these solutions, the company has three main categories of products namely the Technical products, the Front-end/Web application products and the Integration products category.

Product Management in Planon is a dedicated function on the dutch part only, although they do employ some product managers in India as well.

Development is performed both in the Netherlands and in India and because of the use of SCRUM and they do not have strict project management positions. They include roles such as the SCRUM masters, the development managers and the development directors. Product Management is part of the Solutions management division and it is always in close cooperation with the development part, although it is, at the same time, highly interconnected with the Sales and Marketing department.

#### **4.1.6 BusinessBase**

BusinessBase is a specialized Microsoft CRM solutions partner, providing web based software to more than 600 middle sized and corporate organizations. Their new product platform is the BB.Net. It is a web based application which increases the applicability of Microsoft Dynamics CRM. Under this software solution several add-ons are included.

BusinessBase is a small sized company and the BB.Net product is a relatively new product. They have therefore, recently changed their organizational structure in order to enhance the role of product manager and product management processes. The product manager is part of the Consultancy department. In the development part because, the use of SCRUM methodology replaces the role of the software project manager by the SCRUM masters. The roles are not strictly defined, meaning that activities and responsibilities vary depending the person, the situation and the kind of decisions or actions that need to be taken.

## 4.2 Software Product and Software Project

In order to evaluate the relationship between software product and software project, qualitative data has been gathered from the six independent cases (4.1). The respondents were asked to qualify the effect of each one of the three project related (dependent) variables to each one of the three product (independent) variables. The actual results are shown in Table 2.

Table 2: Software product and software project dependencies

| The Market Success Variable        |             |                |             |
|------------------------------------|-------------|----------------|-------------|
|                                    | <b>Time</b> | <b>Quality</b> | <b>Cost</b> |
| Case 1                             | Low         | Low            | Low         |
| Case 2                             | Medium      | Medium         | Medium      |
| Case 3                             | High        | High           | Low         |
| Case 4                             | High        | Low            | Medium      |
| Case 5                             | Medium      | Low            | Low         |
| Case 6                             | Medium      | High           | Low         |
| The Customer Satisfaction Variable |             |                |             |
|                                    | <b>Time</b> | <b>Quality</b> | <b>Cost</b> |
| Case 1                             | Medium      | High           | Low         |
| Case 2                             | Low         | High           | Medium      |
| Case 3                             | Low         | High           | Low         |
| Case 4                             | Medium      | High           | Low         |
| Case 5                             | High        | High           | Low         |
| Case 6                             | Low         | Medium         | Low         |
| The Business Goals Variable        |             |                |             |
|                                    | <b>Time</b> | <b>Quality</b> | <b>Cost</b> |
| Case 1                             | Low         | High           | High        |
| Case 2                             | Medium      | Medium         | High        |
| Case 3                             | Medium      | Low            | Medium      |
| Case 4                             | Medium      | Medium         | High        |
| Case 5                             | Medium      | High           | Low         |
| Case 6                             | High        | Medium         | High        |

The evaluation was based on the ordinal scale of *High*, *Medium*, *Low*. In order to examine the results, numerical values have been applied, accordingly; High: 3, Medium: 2, Low: 1.

#### 4.2.1 The Market Success Variable

As described earlier the product's market success has been referenced in various studies, as one of the significant aspect that can characterize the scope of the software product. In this research, we have examined how this aspect is influenced by the independent set of variables that refer to the software project scope. The results are illustrated in Figure 4.

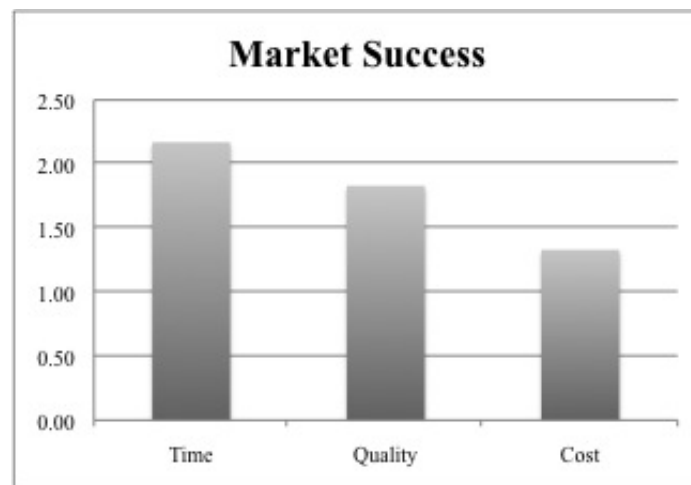


Figure 4: Product Market Success Variable

According to these results, the product's market success appears to be more influenced by the delivery time. The product quality comes second and the cost of the product development has the least influence. This leads to the following proposition:

**Proposition 1a:** The product's market success is considered to be more influenced by the delivery time and less by the quality and the cost.

Despite the overall results that showed a higher influence of time in market success, there were also some contradictory ideas. One of the respondents stated that the company is able to sell a product even if it is not ready yet through demo versions, presentations and consultancy and therefore time is not influencing market success. There is also the case that the product is actually ready on time but due to problems in sales, it has no success on the market. Finally, another case was based on the contractual relationships that the company has with its customers; the respondent argued that they use fixed-time contracts, hence the product is released always on time.

#### 4.2.2 The Customer Satisfaction Variable

The second product related variable that has been examined, is the customer satisfaction. One of the main objectives of Software Product Management and therefore, one of the characteristics of the software product scope is the focus on customers and the satisfaction of their needs and requests [17]. Here it is examined how this aspect is influenced by the independent set of variables that refer to the software project scope, Figure 5.



Figure 5: Customer Satisfaction Variable

According to these results, the customers satisfaction variable appears to be more influenced by the quality variable. Consequently, the delivery time and the cost have a smaller influence on customer satisfaction. This concludes to the following proposition:

**Proposition 1b:** The customer satisfaction is considered to be more influenced by the product quality and less by the delivery time and the product's cost.

The respondents all agreed on the importance of quality for achieving customer satisfaction. No further comments were added on this part of the interview and there were any exceptions that contradicted this idea.



### 4.2.3 The Business Variable

The last product related variable that is studied here, is the business goals. As stated before in Table 1, many experts agree that the focus on the business perspective consists an essential element of the Software Product Management . Ebert [17] argues that the success of a product manager and his team, stems from the success of the business. As described in 3.2, the business goals refer to the level of accomplishment of the internal key performance indicators related to the software product. Figure 6 illustrates how this aspect is affected by the independent set of variables of the software project scope.



Figure 6: Business Goals Variable

Based on the results, the business goals variable seems to be more influenced by the project's cost aspect. The delivery time and the product's quality have consequently a smaller effect. What is noticeable here, is that the difference between the level of influence does not appear to be that large compared to the previous comparisons. The following proposition can be concluded:

**Proposition 1c:** The Business Goals variable is considered to be more influenced by the product's cost and less by the delivery time and the quality.

### 4.3 Product Managers and Project Managers

Data for the roles of product and project manager has also been gathered. The questions that have been posed to the respondents and the discussion around this topic was focused on the organizational structure of the company, the activities that product and project managers were involved into, the amount of time they spend on decision-making and in general remarks on the collaboration between the two roles. In most of the cases the respondents were product managers or former product managers due to organizational changes. In only one case both a product and a project manager were present.

Another point that has been noticed is the definition of the software project managers. A differentiation occurs for companies that follow SCRUM as the development methodology. In those cases there is no strict definition of a project manager because of the interference with the role of the SCRUM masters. The SCRUM Master is responsible for the SCRUM processes and implementing SCRUM so that it fits within the organization's culture [47]. At the same time the SCRUM master is also responsible for the success of the project. That means that Scrum diverges from the approach to traditional Project Management.

In reality not all companies strictly follow the definition of the SCRUM Master. In order to find the closest definitions between the SCRUM master and the project manager for the purposes of this research, a common understanding was made with the respondents. Two cases were identified; the first is that the SCRUM Master and the project manager is the same person. That means that all the responsibilities and activities that a software project manager has, were attributed to the SCRUM Master of the project.

The second case is that the SCRUM Master is a dedicated position and the role of the project manager is accounted to different people. The position of a software project manager is not used within the company, but instead the activities of Software Project Management that need to be done, are done by several other roles, depending the situation or the job that needs to be fulfilled.

Depending the company and they way the work and they are organized one of the two definitions, described above, were used for the role of software project manager. This enabled a better understanding between the interviewer and the interviewees, for the cases were SCRUM is deployed and

hence roles, activities and responsibilities differentiate.

#### 4.3.1 Role specific qualifications

In this part, the first aspect to examine is the role specific skills that product and project managers should possess. As mentioned in section 3.3, a generalization between *Technical Skills* and *Business Skills* is made. The results from the interviews were derived based on the questions upon the different kind of activities that product and project managers are involved into. Furthermore a conversation between the interviewees and the interviewer has occurred as to whether a product/project manager is more technical or business oriented.

In all cases the general conclusions that have been made can be summarized as:

- software product managers are more concerned with activities such as portfolio management, product roadmapping and requirements management and therefore product managers are more business oriented.
- software project managers are more involved into activities such as release planning, risk management and quality management and therefore project managers are more technical oriented.
- Both product and project managers had common activities such as requirements gathering and identification, components integration, launch preparation and scope change management

Based on the data and the opinions gathered during the interviews and in combination with the information from various academic sources (Section 3.3) the following proposition is supported:

**Proposition 2a:** A product manager requires more business and less technical skills, whereas a project manager should have more technical and less business skills.

The above proposition accounts the product manager with a more managerial/business qualification and the project manager with a more functional/technical qualification. But in all cases, it is strongly supported that

Table 3: Types of Decision Making for the two roles

|        |                 | Strategic | Tactical | Operational |
|--------|-----------------|-----------|----------|-------------|
| Case 1 | Product Manager | x         | xx       | x           |
|        | Project Manager |           | xx       | x           |
| Case 2 | Product Manager | x         | xx       |             |
|        | Project Manager |           | x        | xx          |
| Case 3 | Product Manager | x         | xx       | x           |
|        | Project Manager |           | x        | xx          |
| Case 4 | Product Manager | xx        | x        |             |
|        | Project Manager |           | xx       | xx          |
| Case 5 | Product Manager | x         | xx       | x           |
|        | Project Manager | x         | xx       | xx          |
| Case 6 | Product Manager |           | xx       | x           |
|        | Project Manager | xx        | xx       | x           |

product and project managers should possess both business and technical skills in order to achieve the desired levels of communication and success in their collaboration.

The second aspect in role specific qualifications is the types of decision making (Strategic, Tactical and Operational) in which a product manager and a project manager are enrolled. The respondents were asked to evaluate for which types of decision making product and project managers spend most of their time. The results are illustrated in Table 3 where “xx” is used to depict a greater involvement in the related type of decision making and “x” for a less involvement.

From the derived results, we can observe that most attention is concentrated on the tactical level of decision making, from both parties. But there is a general inclination for product managers towards the Strategic levels of decision making, whereas project managers focus more on the Operational levels. The opinions among the respondents are in general in cohesion, indicating a common agreement on this aspect.

Combining this information and the data from 3.3 the following propositions can be concluded:

**Proposition 2b:** Product Managers should focus more on the Strategic and Tactical levels of decision making. Project Managers should focus more on the Tactical and Operational levels of decision making.

### 4.3.2 Role Positioning

During the interviews the positioning matter has been examined<sup>1</sup>. The results are depicted in Table 4.

Table 4: Departmental positioning and Hierarchical Relationships

|        | Department | Hierarchical relationship |
|--------|------------|---------------------------|
| Case 1 | other      | equal                     |
| Case 5 | same       | equal                     |
| Case 3 | other      | equal                     |
| Case 2 | same       | equal                     |
| Case 4 | other      | equal                     |
| Case 6 | other      | equal                     |

One of the first things to be noticed is that there is a variety of responses concerning the product manager's positioning. Among the six cases that have been studied, two of them choose to place the product manager under the same division with the project manager. The rest of the cases, position the product manager in other departments such as the Marketing and the Services/Consultancy. Only one case has been found that operates a dedicated division of Product Management. Furthermore, in all the cases product and project managers appear to be at the same hierarchical level. A general conclusion can be derived;

**Proposition 2c:** Independent Software Vendors tend to position the product and project managers in different departments and at the same hierarchical level.

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<sup>1</sup>Since the term of software project management here, is solely referred to the management of the software development, the positioning of the project manager is considered under the Development division of every company.

## 5 Theory Testing Research

The objective of this section, as part of the overall theory-oriented research, is to test the propositions that have been formed during the theory building research 4. Since the propositions have not been tested before, initial testings are required to confirm that there is at least one situation in which these propositions hold true [15]. After the test has been conducted the results of theory-testing research are used for (re)formulating propositions, particularly in cases where a proposition is not supported by the test [15].

The theory testing part is based on an online survey which lasted approximately four weeks and it was created using the Limesurvey <sup>2</sup> tool. The overall questionnaire included both multiple choice and open questions (Appendix A.2). In cases where the questions involved a rating method, the Likert scale of 1-5 was used. Furthermore, the questions were grouped into two main categories based on the problem domain of the research; Software Product & Software Project questions and Product Managers & Project Managers questions. The first group of questions was concentrated on the relationship of software product and software project based on their scope 3.2. The second group of questions was referred to the relationship of product and project managers, based on the factors that have been identified on section 3.3.

In addition, the questionnaire was divided among the two groups of participants that were expected to be interested on this survey; company respondents that is product and project managers working in companies and Software Product Management (SPM) experts that is product management professionals such as consultants, academics etc. The responses of these two groups are treated in a separate manner throughout the analysis. The group of company respondents is considered as the main response group, or in other words what goes on in the market. The second group of SPM experts is used as a support group, representing what experts believe as the ideal situation in each case.

Finally, in order to find respondents for the survey, the questionnaire was distributed among different sources. Overall four LinkedIn Groups were used, one mailing list on Software Product Management and several other independent invitations were sent to people involved in the specific field. The survey was concluded with the total number of 39 of respondents, among which 25 were company respondents and 14 were SPM experts.

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<sup>2</sup>[www.limesurvey.org](http://www.limesurvey.org)

## 5.1 Software Product and Software Project

The dependencies between the software product and the software project, in the context of a software product company, is examined based on their scope respectively. Taking into consideration that software projects are used to create the software product, in this research the interest is to examine how software projects scope affects the software products scope. The following distinction of **Dependent** and **Independent** variables is made;

*Dependent variables Set/Product related = Market Success, Customer Satisfaction, Business Goals*

*Independent variables Set/Project related = Time, Quality, Cost*

In the theory building part the scope of software product and software project has been defined. Through this process and with the results derived from the case studies, several propositions have been formed that describe the relationship between these two terms. In this section, the propositions will be translated into hypotheses in order to quantitatively test them.

**H1:** The product's market success is more influenced from the delivery time and less from the quality and the cost.

**H2:** The customer satisfaction is more influenced from the product quality and less from the delivery time and the product's cost.

**H3:** The Business Goals variable is more influenced from the product's cost and less from the delivery time and the quality.

The questions related to this part of the research were common for both groups of participants, therefore the results are based on the overall statistics from both groups together. The overall means are summarized in Table 5:

Table 5: Software Product and Software Project

| Respondents         | Market Success |         |      | Customer Satisfaction |         |      | Business Goals |         |      |
|---------------------|----------------|---------|------|-----------------------|---------|------|----------------|---------|------|
|                     | Time           | Quality | Cost | Time                  | Quality | Cost | Time           | Quality | Cost |
| Company Respondents | 3.68           | 4.32    | 3.40 | 3.52                  | 4.64    | 2.96 | 3.76           | 3.52    | 3.72 |
| SPM Experts         | 3.93           | 3.93    | 3.36 | 3.43                  | 4.50    | 3.21 | 3.86           | 3.64    | 3.71 |
| Total               | 3.77           | 4.18    | 3.38 | 3.49                  | 4.59    | 3.05 | 3.79           | 3.56    | 3.72 |

Quality appears to be the most influential factor for both market success

and customer satisfaction variables. In the case of business goals, the time variable scores a higher mean than cost and quality. To test the significance of those differences on the mean scores, the Paired Samples Test is used.

### 5.1.1 The Market Success Variable

In the case of Market Success it has already been noticed that quality seems to be the more influential factor and therefore, hypothesis **H1** is rejected. What is of importance is to test if quality is significantly higher than cost and time. The paired samples test is used to compare the means between quality and time and between quality and cost. The results are depicted in Table 6

Table 6: Paired Samples Test for the Market Success

|                           | Paired Differences |               |                 |       |    |                |
|---------------------------|--------------------|---------------|-----------------|-------|----|----------------|
|                           | Mean               | Std.Deviation | Std. Error Mean | t     | df | Sig.(2-tailed) |
| Pair 1 - MSQuality-MSTime | 0.410              | 1.428         | 0.229           | 1.795 | 38 | 0.081          |
| Pair 2 - MSQuality-MSCost | 0.795              | 1.321         | 0.212           | 3.756 | 38 | 0.001          |

From the statistical results, quality appears to be significantly higher from cost with  $p < 0.05$ . The difference between quality and time is significant at  $p = 0.081$ . To further analyze the latter case, the results from the company respondents and the SPM experts groups are considered separately. The descriptive statistics in Table 5 reveal that SPM experts value quality and cost with the same mean of 3.93. On the other hand, company respondents show a significant difference between these two variables at  $p = 0.013$ . It is hence concluded that quality is perceived as the most influential factor for the product's market success.

### 5.1.2 The Customer Satisfaction Variable

From the table of the overall means, quality seems to have a higher influence on customer satisfaction, than time and cost have and this is in accordance with the hypothesis **H2**. In order to see if the difference is significant the same test is followed and the results are summarized in Table 7.

The differences in the means between the pairs Quality-Time and Quality-Cost for the customers satisfaction are significant with  $p < 0.05$  and therefore hypothesis **H2** is accepted. It is concluded that quality is perceived as the most influential factor for the customers satisfaction.



Table 7: Paired Samples Test for the Customer Satisfaction

|                           | Paired Differences |               |                 |       |    |                |
|---------------------------|--------------------|---------------|-----------------|-------|----|----------------|
|                           | Mean               | Std.Deviation | Std. Error Mean | t     | df | Sig.(2-tailed) |
| Pair 1 - CSQuality-CSTime | 1.103              | 1.501         | 0.240           | 4.588 | 38 | 0.000          |
| Pair 2 - CSQuality-CSCost | 1.538              | 1.484         | 0.238           | 6.474 | 38 | 0.000          |

### 5.1.3 The Business Variable

Finally, in the case of the business goals variable, time appears to be more influential than quality and cost. Nevertheless, the paired sample test between the mean scores of Time-Quality, Time-Cost proved a non-significant difference with a  $p > 0.05$ .

Table 8: Paired Samples Test for the Business Goals

|                           | Paired Differences |               |                 |       |    |                |
|---------------------------|--------------------|---------------|-----------------|-------|----|----------------|
|                           | Mean               | Std.Deviation | Std. Error Mean | t     | df | Sig.(2-tailed) |
| Pair 1 - BGTime-BGQuality | 0.231              | 1.423         | 0.228           | 1.013 | 38 | 0.318          |
| Pair 2 - BGTime-BGCost    | 0.077              | 1.061         | 0.170           | 0.453 | 38 | 0.653          |

Although no significant difference was proven between the software project variables, the assumption that cost should be more influential for the business goals is not supported from the descriptive results and hypothesis **H3** is rejected.

To further analyze this part and examine some other factors that might have influenced the insignificant results, a distinction between the company respondents is made, based on their job title. This distinction is of interest because the survey was addressed to both product and project managers and it is expected to some extent, that each one of them has a different point of view. Consequently, the data from the company respondents are divided among those who were product managers and those who were project managers. The responses are analyzed based on this grouping and the results are depicted in Table 9.

Table 9: Business Goals for Group1: Company Respondents

|                         | Time | Quality | Cost |
|-------------------------|------|---------|------|
| Product Managers (n=17) | 3.65 | 3.47    | 4.00 |
| Project Managers (n=8)  | 4.00 | 3.62    | 3.12 |

It is interesting to notice that among product managers, cost appears to be a more influential factor with a mean of 4.00 which also agrees with hypotheses **H3**. For the project managers, cost variable is considered the less influential factor with a scored mean of 3.12. The independent samples

test showed a difference between these two scores at  $p=0.043$ . The reason this test is used is because of the difference in the sample sizes; product managers are 17 in total, whereas project managers are only eight.

The theory propositions, in the theory building section, were based on the opinions gathered among product managers that participated in the case studies. The product managers agreed that cost is a more influential factor for meeting the business goals. In the theory testing part now, the group of product managers also agrees with this opinion.

Despite the above observation, in the case of meeting the product-related business goals, the overall results showed no significant difference between the project variables.

#### **5.1.4 Wrapping up the results**

The sub research questions (section 2.1), referred to the relationship between software product and software project, can now be answered. The sub questions were:

1. What is the relationship between software product and software project?
  - (a) What is a software product?
  - (b) What is a software project?
  - (c) What are the dependencies between the software product and software project?

The scope of both terms has been identified and the dependencies between the product and project variables have been tested. Summarizing, the scope of a software product is centered around the market success, the customer satisfaction and the business goals. On the other hand, the software project scope is concerned with the delivery time, the quality and the development cost.

As far as the dependencies between them are concerned, the results showed that for the external attributes of the software product, that is the market success and the customer satisfaction, project quality matters the most. For

the internal aspect of meeting the business goals, the delivery time scored a higher influence but without any significant difference.

Concluding this part of the research new propositions are formed based on the final results [15]. From the propositions suggested during the theory building research only Proposition 1b proved to hold true. For the cases of market success and business goals, new propositions are derived;

**Proposition 1a:** The product's market success is considered as significantly more influenced by project's quality.

**Proposition 1c:** There is no significant influence between the project's scope and the business goals.

## 5.2 Product Managers and Project Managers

The relationship between product and project managers is also validated through the data derived from the online survey. The interest here is to examine which role specific qualifications and what kind of positioning is used in the software product companies, for the roles of product and project managers. The dependent and independent variables are defined accordingly;

*Independent Variable = Managerial Role (Product manager, Project manager)*

*Dependent Variable = Role Specific Skills (Business, Technical)*

*Dependent Variable = Role Specific Decisions (Strategic, Tactical, Operational)*

*Dependent Variable = Hierarchical Relationship (equal, not equal)*

*Dependent Variable = Departmental Positioning (same department, different department)*

The propositions as were formed in 3.3, are then translated into hypotheses:

**H4a** Product managers need more business skills than project managers do.

**H4b** Project managers need more technical skills than product managers do.

**H5a** Product managers spend more time on strategic decisions than project managers do.

**H5b** Product manager spend less time on operational decisions than project managers do.

**H5c** Both product and project managers spend approximately the same amount of time on tactical decision-making.

**H6** Product and project managers tend to be positioned in different departments but in the same hierarchical level.

### 5.2.1 Role specific qualifications

For the role specific qualifications, the hypotheses **H4** and **H5** are tested. The questions that were included in the survey were divided between the two different groups of respondents. Therefore, the analysis of that data will be separate for company respondents and SPM experts. The reason the data is treated separate here is because the questions were also formed in a different way. As explained in the beginning of this chapter, the company respondents were asked to answer the questions based on how things work on the company they are working for. On the other hand, SPM Experts were asked to answer the questions based on what they believe is “best” in each case.

Starting with the first hypotheses related to the skills that a product and a project manager should have, Table 10 summarizes the overall means from the data. The results were measured in percentages.

Table 10: Role Specific Skills - Descriptive statistics

|                  | Company Respondents (n=25) |          | SPM Experts (n=14) |          |
|------------------|----------------------------|----------|--------------------|----------|
|                  | Technical                  | Business | Technical          | Business |
| Product Managers | 42.08                      | 57.20    | 35.71              | 64.29    |
| Project Managers | 57.24                      | 42.76    | 45.71              | 54.29    |

From the overall results it is observed that both groups value greater business skills for product managers compared to project managers and more technical skills to project managers than product managers. Comparing the difference in the skills within the roles, the results show that company respondents assign product managers with more business skills and less technical. On the other hand, from the SPM experts data, project managers have scored higher business (54.29) than technical skills (45.71).

In order to test the hypotheses **H4a** and **H4b** the Independent Samples Test is used (Table 11).

Table 11: Role Specific Skills - Independent Samples Test

|                  | Company Respondents (n=25) |                 | SPM Experts (n=14) |                 |
|------------------|----------------------------|-----------------|--------------------|-----------------|
|                  | t-value                    | Sig. (2-tailed) | t-value            | Sig. (2-tailed) |
| Technical Skills | -2.281                     | 0.028           | -1.389             | 0.177           |
| Business Skills  | 2.281                      | 0.028           | 1.389              | 0.177           |

For the company respondents, the difference between the business and technical skills, as they have been assigned to product and project managers is significant ( $p < 0.05$ ). Hypotheses **H4a** and **H4b** are accepted indicating that product managers are considered to be more business oriented than project managers and project managers are considered to be more technical oriented than product managers.

The results from the data of the SPM experts show a non significant difference of  $p = 0.177$ . This might occur because the sample size from SPM experts is smaller and thus no significant results can be derived. Another interpretation might suggest that in general SPM experts support a more balanced difference between the skills of product and project managers, in comparison to what actually happens (company respondents case).

The second role-specific characteristic is the types of decision-making product and project managers are enrolled to. Hypotheses **H5a**, **H5b** and **H5c** are tested. Table 12 summarizes the overall means from the data. The results were measured in percentages.

Table 12: Types of Decision Making - Descriptive statistics

|                  | Company Respondents (n=25) |          |             | SPM Experts (n=14) |          |             |
|------------------|----------------------------|----------|-------------|--------------------|----------|-------------|
|                  | Strategic                  | Tactical | Operational | Strategic          | Tactical | Operational |
| Product Managers | 25.32                      | 34.40    | 37.90       | 39.56              | 40.36    | 25.71       |
| Project Managers | 10.76                      | 30.52    | 58.72       | 17.14              | 39.29    | 43.57       |

At a first glance, it is apparent that product managers spend more time

in strategic decisions than project managers. Project managers spend more time in operational decisions than product managers. In the case of Tactical decisions, product managers score higher than project managers. In order to test the differences, the Independent Samples Test is used (Table 13).

Table 13: Types of Decision Making - Test

|                       | Company Respondents |                 | SPM Experts |                 |
|-----------------------|---------------------|-----------------|-------------|-----------------|
|                       | t-value             | Sig. (2-tailed) | t-value     | Sig. (2-tailed) |
| Strategic Decisions   | 2.602               | 0.012           | 2.727       | 0.012           |
| Tactical Decisions    | 0.596               | 0.554           | 0.174       | 0.863           |
| Operational Decisions | -2.570              | 0.013           | -2.552      | 0.018           |

From the statistical results, it is apparent that product managers spend significantly more time on strategic decisions than project managers, while project managers spend significantly more time on operational decisions than product managers ( $p < 0.05$ ). The small difference both roles encountered in the tactical decisions, from the descriptive statistics proved to be non significant ( $p > 0.05$ ). This can also be translated that both of them spend approximately the same time in tactical decisions. Therefore, hypotheses **H5a**, **H5b** and **H5c** are accepted and this holds true for both groups.

We can conclude that in this part of the analysis theory supports reality. More specifically, not only companies attribute product managers higher levels of decision-making and lower levels in project managers, but this is a strategy that is also supported from the SPM experts. Concluding this part, the proposition that was proposed in the theory-building section are proved to hold true.

## 5.2.2 Role Positioning

In this part, the role positioning of product and project managers, within the organizational structure of Independent Software Vendors is examined. Hypothesis **H6** is tested, using the contingency table as shown in Table 14

Table 14: Role Positioning - Contingency table

| Company Respondents |           |           |           |       | SPM Experts |           |           |           |       |
|---------------------|-----------|-----------|-----------|-------|-------------|-----------|-----------|-----------|-------|
|                     |           | Hierarchy |           |       |             |           | Hierarchy |           |       |
|                     |           | Equal     | Not Equal | Total |             |           | Equal     | Not Equal | Total |
| Department          | Same      | 2         | 2         | 4     | Department  | Same      | 1         | 1         | 2     |
|                     | Different | 17        | 7         | 21    |             | Different | 6         | 6         | 12    |
| Total               |           | 16        | 9         | 25    | Total       |           | 7         | 7         | 14    |

From the company respondents data, we observe that 64% (16 out of 25 responses) of the cases, position the product and project managers in a different department and at the same hierarchical level. In the case of SPM Experts majority of the majority of the scores (12 out 14 which is 86%) are equally distributed between the lower part of the contingency table.

The statistical test of Fisher's Exact<sup>3</sup>, showed that there is no significant relationship between the two variables ( $p>0.05$ ), for both respondents group. Therefore hypothesis **H6**, cannot statistically be proven and it is rejected.

Given that hypothesis **H6** is rejected, the proposition that was suggested in the theory building part does not hold true and therefore a new one is derived;

**Proposition 2c:** There is no significant relationship between the departmental positioning and the hierarchical relationship of product and project managers within the organizational structure of an Independent Software Vendor.

Before conclude this part of the analysis, it is interesting to make a further comment on the departmental positioning. From the results of the survey it was noticed that 64% of the SPM experts argue that there should be a separate Product Management department. In reality, only 20% of the company respondents, indicated that a PM department exists in their company. Moreover, 14% of the SPM experts argue that product manager should be positioned under the Marketing department, compared to the 24% of the cases from the company respondents, that reported their product manager operates under Marketing.

### 5.2.3 Wrapping up the results

Finalizing the analysis of the relationship between product and project managers, the related sub-questions (Section 2.1) can now be answered.

1. What is the relationship between software product managers and soft-

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<sup>3</sup>The Fisher exact test of significance may be used in place of the chi-square test in 2-by-2 tables, particularly for small samples. Fisher exact test of significance, tests the probability of getting a table as strong as or stronger than the observed, simply due to the chance of sampling, where "strong" is defined by the proportion of cases on the diagonal with the most cases [2].

ware project managers in Independent Software Vendors ?

- (a) What are the role characteristics of a product manager and what are those of a project manager?
- (b) How are the roles of the product manager and project manager organized in Independent Software Vendors ?

The relationship between product and project managers is characterized by the difference between their technical and business skills, the difference between the types of decisions they have to make, and the way they are positioned within the organizational structure of the company. Product managers are more business oriented and they are more involved into strategic decision-making. Project managers, in turn, are more technical oriented than product managers, and they are involved more in the operational decisions than product managers. Finally, within the organizational structure of an ISV the role positioning matter has been identified as the hierarchical relationships and departmental positioning. The two roles show a tendency to be positioned in different departments and at the same hierarchical level, but no significant relationships have been found in this part.



## 6 Discussion & Conclusion

### 6.1 Discussion

The analysis of this research begun with the composition of six theory propositions. These propositions were translated into hypotheses which became subject of a set of various statistical analyses and resulted in the acceptance or rejection of the initial ideas. Some of them were proven statistically insignificant and consequently new theory propositions were formed.

In the rest of this section, the final results are summarized and further implications and remarks are discussed.

#### 6.1.1 Propositions 1a and 1b - Market Success and Customer Satisfaction

**P1a: The product's market success is considered to be more influenced by the project's delivered quality P2b: The customer satisfaction is considered to be significantly more influenced by project's quality**

With the above proposition, software product managers and software project managers, agree that quality is what matters the most for the market success of the software product and the customer satisfaction. These factors can also be described as the external aspects of the software product and in general there seems to be a tendency in software product companies, to attribute more value on the delivered quality.

For the market success variable, although the opinions of both product and project managers from the online survey agreed on the greatest importance of the quality compared to time and cost, the results were not in accordance with the first estimations from the interviews. Based on the data that was derived from the qualitative analysis, the product managers that participated on the interviews, valued the time aspect as most important for the product's market success. The non agreement of the results cannot be considered as important as in the first case only six interviews were used for the qualitative results whereas the testing was performed based on 39 responses from the online survey. In any case, the purpose of the second

part of the research, the theory testing, was intended for the assessment and finally, the acceptance or rejection of the initial theory estimation that have been concluded from the interviews.

For the results in customer satisfaction variable, there is no room for doubt that quality is perceived as the most influential factor. Both interview respondents from the theory building research and the respondents of the online survey, company respondents and SPM experts, agreed on the aspect of quality.

### **6.1.2 Proposition 1c - Business Goals**

#### **P1c: No significant relationship between the project's scope and the product's business goals were found**

During the interviews that have been conducted, on the basis of the qualitative research of this project, it was identified that product managers generally believe that the cost incurred from product development is the most influential factor for achieving the internal business goals. This theory was not supported by the overall results of the online survey.

What is to be noticed is the great difference that was observed between the responses of product managers and project managers, from the company respondents group. More specifically, product managers showed that significantly value the cost as the most influential variable for the business goals aspect while project managers scored higher but non significant for the time variable. The theory propositions, in the theory building section, were based on the opinions gathered among product managers that participated on the interviews. The product managers agreed that cost is a more influential factor for meeting the business goals. In the theory testing part, the group of product managers also agreed with this opinion.

Despite the above observation, in the case of meeting the product-related business goals, the overall results showed no significant relationship between the project variables.

### 6.1.3 Proposition 2a - Role Specific Skills

**P2a: A product manager requires more business and less technical skills, whereas a project manager should have more technical and less business skills.**

In reference to the literature research that has been conducted on the first part of the qualitative analysis, the skills orientation of the product and project managers within a software product company is related not only to the qualifications that characterize each one of the two roles but also to the communication between them. Based on the results of both the interviews and the online survey, there is a tendency for product managers to be more business oriented and for project managers to be more technical oriented. Business skills have been defined as the more managerial skills, communications and leadership qualifications and technical skills have been defined as a more in depth knowledge of software engineering and software programming.

Despite the general inclination of product managers towards a more business oriented career and those of project managers towards a more technical one, both roles need to understand each other in order to communicate and work together with the most efficient way. That means that both product and project managers need to possess both business and technical skills. The results have also shown that the greater the gap between the business and technical skills of the two roles the less successful the communication between them within the company. Finally, this is also supported from the online survey, where the SPM experts did not show any significant difference between the skills orientation of product and project managers. An interpretation of this result might suggest that in general SPM experts support a more balanced difference between the skills of product and project managers, in comparison to what actually happens (company respondents case).

### 6.1.4 Proposition 2b - Types of decision-making

**P2b: Product Managers focus more on the Strategic and Tactical levels of decision making. Project Managers focus more on the Tactical and Operational levels of decision making.**

The types of the decision-making that each one of the two roles are enrolled has also been examined in a twofold way; first as a perceived qualification of the roles of product and project managers and second as an influential factor of the communication and collaboration between the them. The results have showed that product managers are involved with higher levels of decision-making (Strategic) whereas the project managers are more into the every day, and short term decisions (Operational). Working together, both product and project managers are involved into the tactical decisions which concern a more mid-level spectrum of the organizational goals.

This pattern seems to be perceived as a successful solution which enables a better collaboration between product and project managers. It is supported not only by the company respondents from the interviews and the online survey but it also comes in accordance with the SPM experts' viewpoint. This result suggests that within software product vendors, product managers are responsible for the long term decisions that concern the software product. Project managers are involved more on the short term decisions, but they both work together on a tactical level. Company respondents that were closely in their responses to this pattern have also indicated a more successful collaboration between product and project management in general.

#### **6.1.5 Proposition 2c - Role Positioning**

**P2c: There is no significant relationship between the departmental positioning and the hierarchical relationship of product and project managers within the organizational structure of an Independent Software Vendor.**

For the role positioning of the product and project manager, no significant relationship was proven. The departmental positioning and the hierarchical relationship was examined not only as a organizational matter but also as a factor that can influence the relationship between product and project managers. It was suggested that further apart the roles are positioned, that is the more levels in between both horizontally and vertically in the organizational structure, the greater the communication gap between them. That suggestion as derived from the literature research, was the trigger for the present project to investigate the product and project manager's positioning.

From the results of the interviews a tendency was identified towards po-

sitioning the product managers in a different department than the project managers but at the same hierarchical level. This tendency was found also through the responses from the product and project managers within from the online survey. But they were no statistical significances to be proven and therefore no determined conclusions can be made.

## 6.2 Conclusion

Concluding, the main research question need to be answered;

*What is the relationship between Software Product Management and Software Project Management within the context of an Independent Software Vendor?*

The answer is based on two parts; the relationship between software product and software project and the relationship between product and project managers. For the first part, this research concluded that the project's quality seems to matter the most for the product's market success and the customer satisfaction. For the achievement of internal business goals, time and cost seem to be more influential but no significant relationship was proven.

For the second part, the relationship between product and project managers was described based on two aspects; the specific role qualifications and the role positioning. As far as the first aspect is concerned, product managers were proved to be more business oriented and less technical and at the same time they are more involved into strategic and tactical decision-making. Software project managers, on the other hand, are more technical oriented and less business and they are more involved into the operational and strategic decision-making. Finally, this research was unable to show any significant relationship between the departmental positioning and the hierarchical relationship between the two roles. Despite the statistical insignificance, the descriptive results showed a tendency within the Independent Software Vendors to position product and project managers in different departments while at the same time both roles are hierarchically equal.

### 6.3 Research Limitations

Throughout the research, certain limitations were encountered that need to be mentioned. These limitations were partly because of the immature nature of the research topic and partly because of the researcher's inexperience. Hence, some of the results that were found and concluded were influenced by certain obstructions.

The first drawback that was identified is the small size sample that was subject to the statistical analysis. In total, data of 39 respondents were gathered, but only the 25 company respondents were used as the benchmarking data. As it was already mentioned in the beginning of the theory-testing part (Section 5), the company respondents represent the Reality, meaning the benchmarking data that will indicate the current market's trends. The data from the SPM Experts were used as a support data set, in order to examine the opinion of the domain experts on the "best practices".

A second constraint that was observed, was on the aspect of role positioning. In the present research the two variables used (departmental positioning and hierarchical relationship) are examined in a generic way. More specifically, according to the feedback we received from the author of the book "Software Product Management and Pricing" [32], Hans-Bernard Kittlaus, hierarchical relationship may or may not enhance a reporting line relationship. This research failed to include this aspect which, in some extent, might justify the insignificance of the derived results. Furthermore, the topic of role positioning falls into the broader category of organizational theory and communication. From this point of view, departmental positioning and hierarchical relationships not only constitute a small fragment of this theory but they also involve several other aspects that can be further investigated. Due to the limited scope of the present research, this further analysis was not performed.

Finally, in many companies the product and the project manager can be the same person. This is the case especially in small sized companies but also quite often in companies that use SCRUM as the development methodology. This issue was also analyzed in section 4. During the interviews this matter was resolved between the interviewer and the respondents but not in the online survey. The fact that the two roles can be represented by the same person might have resulted in inconsistencies when trying to identify the relationships between them.

## 6.4 Recommendations for Future Research

This paper has presented a preliminary analysis on the relationships between Software Product Management and Software Project Management . Taking into consideration not only the results that have been concluded with this research, but also the limitations that were encountered and explained, some recommendations for future researches can be made.

One of the most interesting points that can be a trigger for further research, is the investigation of the two fields based on the shared activities and processes. A more detailed examination on the way Independent Software Vendors organize the internal and external activities that link their Software Product Management and Software Project Management processes together can be an interesting continuation of this research.

Another suggestion for future research on this topic includes the identification of the critical success factors that influence the relationship between Software Product Management and Software Project Management. A thorough factor analysis will contribute to the extension of this research, including not only the factors that have been described here, but also others.

Finally, the link between organizational theory and communication and software product development and management can be further researched. The positioning of the product and project managers as well as the communication between them is a major aspect within ISVs. Additional elements, other than the ones that were examined here, can be the subject for complementary analysis, such as the human factor (e.g. personality traits) and the organization structure of the company.

## References

- [1] *A guide to the project management body of knowledge*. Project Management Institute, Inc., 2006.
- [2] Alan Agresti. A survey of exact inference for contingency tables. *Statistical Science*, 7(1):131–153, February 1992.
- [3] Kevin Aguanno, editor. *Managing Agile Projects*. Multi-Media Publications Inc., first edition, 2004.
- [4] Aybüke Aurum and Claes Wohlin. Aligning requirements with business objectives: a framework for requirements engineering decisions. In *Workshop on Requirements Engineering Decision Support*, RE-DECS'05, Paris, France, August–September 2005.
- [5] Helmy H. Baligh. *Organization Structures: Theory and Design, Analysis and Prescriptions*. Springer Science Business Media, Inc., 2006.
- [6] Sebastian Barney, Aybke Aurum, and Claes Wohlin. A product management challenge: Creating software product value through requirements selection. *Journal of Systems Architecture*, 54(6):576 – 593, 2008. Selection of best papers from the 32nd EUROMICRO Conference on [‘]Software Engineering and Advanced Applications’ (SEAA 2006).
- [7] R. Bashroush, I. Spence, P. Kilpatrick, T.J. Brown, and C. Gillan. A multiple views model for variability management in software product lines. In *Second International Workshop on Variability Modelling of Software-intensive Systems*, pages 101–110, 2008.
- [8] Richard Bechtold. *Essentials of Software Project Management*. Management Concepts, second edition, 2007.
- [9] Barry W. Boehm and Rony Ross. Theory-w software project management: Principles theory-w software project management: Principles and examples. *IEEE Transactions on Software Engineering.*, 15(7), 1989.
- [10] Gale Cengage. *Encyclopedia of business and finance*, 2001.
- [11] Paul Clements and Linda M. Northrop. A framework for software product line practice. *SEI Interactive*, 1999.
- [12] Paul C. Clements, Lawrence G. Jones, Linda M. Northrop, and John D. Mc Gregor. Project management in software product line organization. *IEEE Software*, 22(5):54–62, 2005.



- [13] Michael Cusumano. Finding your balance in the products and services debate. *Commun. ACM*, 46(3):15 – 17, March 2003.
- [14] Michael Cusumano. *The Business of Software*. The Free Press, New York, NY, USA, 2004.
- [15] Jan Dul and Tony Hak. *Case Study Methodology in Business Research*. Elsevier Ltd., 2007.
- [16] Christof Ebert. Requirements before the requirements: Understanding the upstream impact. In *RE '05: Proceedings of the 13th IEEE International Conference on Requirements Engineering*, pages 117–124, Washington, DC, USA, 2005. IEEE Computer Society.
- [17] Christof Ebert. The impacts of software product management. *The Journal of Systems and Software*, 80:850–861, 2007.
- [18] Christof Ebert. Software product management. *CrossTalk: The Journal of Defense Software Engineering*, January, 2009.
- [19] Karl erik Rosengren. *Communication: An Introduction*. SAGE Publications, 2000.
- [20] David H. Gobeli, Harold F. Koenig, and Iris Bechinger. Managing conflict in software development teams: A multilevel analysis. *Journal of Product Innovation Management*, 15(5):423 – 435, October 2003.
- [21] Linda Gorchels. *The Product Manager's Handbook: The Complete Product Management Resource*. McGraw-Hill, seconde edition, 2000.
- [22] Linda Gorchels. *The Product Manager's Field Guide: Practical Tools, Exercises and Resources for Improved Product Management*. McGraw-Hill, 2003.
- [23] Jennifer Greene and Andrew Stellman. *Applied Software Project Management*. O'Reilly, November 2006.
- [24] Steven Haines. Product management and project management: Two functions, two vital roles.
- [25] Steven Haines. *The Product Manager's Desk Reference*. Mc Graw Hill, 2009.
- [26] Thomas E. Harris. *Applied Organizational Communication: Principles and pragmatics for future Practice*. Lawrence Erlbaum Associates, seconde edition, 2002.

- [27] Donald E. Harter, Mayuram S. Krishnan, and Sandra A. Slaughter. Effects of process maturity on quality, cycle time, and effort in software product development. *Management Science*, 46(4):451 – 466, April 2000.
- [28] Bob Hughes and Mike Cotterell. *Software Project Management*. Mc Graw Hill, second edition, 1999.
- [29] Pankaj Jalote. *Software project management in practice*. Addison-Wesley, 2002.
- [30] Harold Kerzner. *Project Management: A systems approach to Planning, Scheduling and Controlling*. John Wiley Sons Inc., 2001.
- [31] Tapani Kilpi. Product management challenge to software change process: Preliminary results from three smes experiment. *SOFTWARE PROCESS—Improvement and Practice*, 3:165–175, 1997.
- [32] Hans-Bernd Kittlaus and Peter N. Clough. *Software Product Management and Pricing: Key Success Factors for Software Organizations*. Springer, 2009.
- [33] Marko Komssi, Marjo Kauppinen, Juho Heiskari, and Matti Ropponen. Transforming a software product company into a service business: Case study at f-secure. *Computer Software and Applications Conference, Annual International*, 1:61–66, 2009.
- [34] Ping-Kit Lam and Kwai-Sang Chin. Identifying and prioritizing critical success factors for conflict management in collaborative new product development. *Industrial Marketing Management*, 34(28):761–772, 2005.
- [35] Geoff Lancaster. *Research Methods in Management*. Elsevier Ltd., 2005.
- [36] Laura Lehtola and Marjo Kauppinen. Suitability of requirements prioritization methods for market-driven software product development. *Software Process Improvement and Practice*, 11(1):7 – 19, March 2006.
- [37] Laura Lehtola, Marjo Kauppinen, Jarno Vähäniitty, and Marko Komssi. Linking business and requirements engineering: is solution planning a missing activity in software product companies? *Requirements Engineering*, 14(2):113–128, June 2009.
- [38] Matt Light and Marc Halpern. Understanding product vs. project portfolio understanding product vs. project portfolio management. Technical report, Gartner, 2006.
- [39] Ajay Menon, Bernard J. Jaworski, and Ajay K. Kohli. Product quality: Impact of interdepartmental interactions. *Journal of the Academy of Marketing Science*, 25(3):187–200, 1997.

- [40] David G. Messerschmitt and Clemens Szyperski. *Software Ecosystems: Understanding an Indispensable Technology and Industry*. The MIT Press, Massachusetts, 2003.
- [41] Edwin J. Nijssen and Ruud T. Frambach. Determinants of the adoption of new product development tools by industrial firms. *Industrial Marketing Management*, 29(2):121–131, March 2000.
- [42] M. Afzalur Rahim. *Managing conflict in Organizations*. Quorum Books, 3rd edition, 2001.
- [43] Kristian Rautiainen, Lauri Vuornos, and Casper Lassenius. An experience in combining flexibility and control in a small company’s software product development process. In *ISESE '03: Proceedings of the 2003 International Symposium on Empirical Software Engineering*, page 28, Washington, DC, USA, 2003. IEEE Computer Society.
- [44] D. Rosca, S. GreenSpan, M. Feblowitz, and C. Wild. A decision making methodology in support of the business rules lifecycle. In *IEEE RE Conf*, pages 236–246, 1997.
- [45] Steve Sawyer. Packaged software: Implications of the differences from custom approaches to software development. *European Journal of Information Systems*, 9(1):47–58, March 2000.
- [46] Christoph Schneewei. Hierarchical structures in organisations: A conceptual framework hierarchical structures in organisations: A conceptual framework hierarchical structures in organizations: A conceptual framework. *European Journal of Operational Research*, 86(1):4–31, October 1995.
- [47] Ken Schwaber. *Agile Project Management with SCRUM*. Microsoft Press, 2004.
- [48] George Stepanek. *Software Project Secrets: Why Software Projects Fail*. Springer-Verlag, New York, 2005.
- [49] Mohan V. Tatikonda and Stephen R. Rosenthal. Successful execution of product development projects: Balancing firmness and flexibility in the innovation process. *Journal of Operations Management*, 18:401–425, 2000.
- [50] Inge van de Weerd, Sjaak Brinkkemper, Richard Nieuwenhuis, Johan Versendaal, and Lex Bijlsma. Towards a reference framework for software product management. *Requirements Engineering, IEEE International Conference on*, 0:319–322, 2006.

- [51] Robert K. Wysocki. *Effective Software Project Management*. Wiley Publishing, 2006.
- [52] Lai Xu and Sjaak Brinkkemper. Concepts of product software: Paving the road for urgently needed research. *European Journal of Information Systems*, 16:531–541, 2007.
- [53] Hulya Julie Yazici. The role of communication in organizational change: The role of communication in organizational change: an empirical investigation. *Information Management*, 29(7):539–552, July 2002.
- [54] Robert K. Yin. *Case Study Research: Design and Methods*, volume 5. SAGE Publications, 3rd edition, 2003.

## **A Appendices**

### **A.1 Interview Questionnaire**

#### **Context Questions**

1. What is the company's size?
2. How many products does the company develop?
3. How many Product managers does the company employ?
4. How many Project managers does the company employ?
5. How many customers does the company serve?

#### **Software Product and Software Project**

1. How would you define a software product?
2. How would you define a software project?
3. Define the degree (High, Medium, Low) to which the ready-on-time projects influence:
  - (a) the product's market success
  - (b) the customers satisfaction
  - (c) meeting the business goals
4. Define the degree (High, Medium, Low) to which the product quality (in terms of projects meeting the specified product quality) influence:
  - (a) the product's market success
  - (b) the customers satisfaction
  - (c) meeting the business goals
5. Define the degree (High, Medium, Low) to which the budget/cost of projects influence:
  - (a) the product's market success
  - (b) the customers satisfaction

- (c) meeting the business goals

### **Product managers and Project managers**

1. Does the company separate Software Product Management and Software Project Management activities and processes?
2. What is the company's organizational structure? (Functional, Divisional, Matrix)
3. Discussion on the organizational structure.
4. For each one of the below activities<sup>4</sup>, discuss:
  - Who does the activity
  - Who is managing the activity
  - Add any other activities that product and project managers are involved.

*Note: the list is not strict, it is just the backbone to frame the discussion*

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<sup>4</sup>adopted from [50]

|  |
|--|
| <b>Corporate Strategy - Portfolio Management</b>         |
| Market Trend Identification (Market Strategy)            |
| Product Line Identification                              |
| Partnering and Contracting                               |
| Product Life cycle Management                            |
| <b>Product Roadmapping</b>                               |
| Components Identification                                |
| Localizations and Customizations                         |
| Core Asset Coordination                                  |
| Roadmap Construction                                     |
| <b>Requirements Management</b>                           |
| Requirements Gathering (product/component/customer)      |
| Requirements Identification (product/component/customer) |
| Requirements Organization (product/component/customer)   |
| <b>Release Planning - Development</b>                    |
| Requirements Prioritization                              |
| Requirements Selection                                   |
| Components Integration                                   |
| Version Control  |
| Quality Assurance  |
| Launch Preparation (Go-noGo Decision making)             |
| Scope Change Management                                  |

5. Does the success of the project managers affect the success of the product managers (and vice versa)?
6. Which decision making level fits the role of the product manager and which the role of the project manager (Strategic, Tactical, Operational)

### General Discussion

1. Discussion on some recent examples of the collaboration between product and project managers
2. Discuss any missing points of the research and/or issues, comments
3. Final notes and conclusion

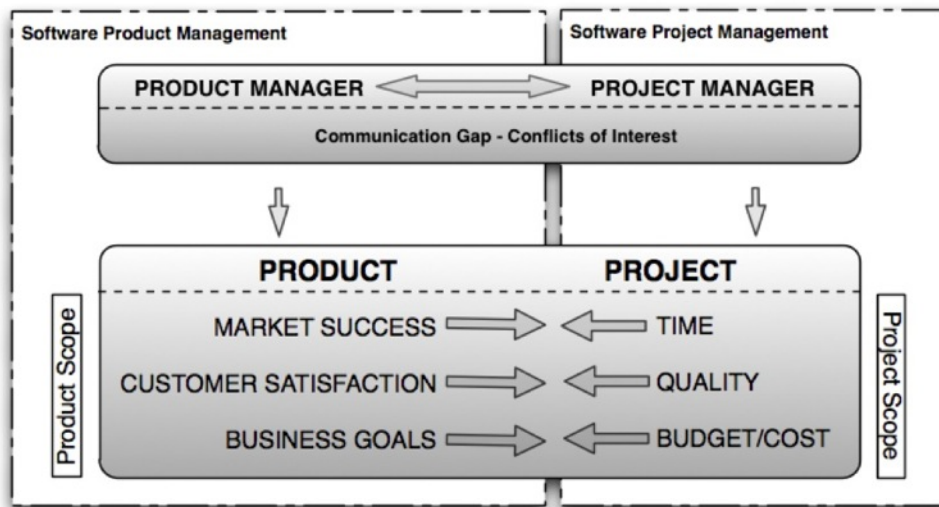




## A.2 Online Survey Questionnaire

### Software Product Management vs Software Project Management

This survey is conducted on the basis of a final Master thesis research from Utrecht University. The topic is concentrated on the relationships and inter-dependencies between Software Product Management and Software Project Management within the context of an Independent Software Vendor. The survey is created based on the following conceptual model



Please take the following definitions into consideration before you start:

| Concept                                | Definition   |
|--|--|
| Software Product                       | A bundle of software functions accessible through a single interface and/or carrying a single name   |
| Software Project                       | A release of a software product or part of a software product  |
| Software Product Manager               | The manager responsible for a) the fit of the product with the market, b) the customer satisfaction and c) overall business goals related to the product |
| Software (Development) Project Manager | The manager responsible for a) delivering the product in time, b) meeting product quality and c) developing the product within budget                    |

There are 42 questions in this survey

#### Respondents info

**1 [r1]Please indicate your professional status \***

Please choose **only one** of the following:

- I am a product manager or a project manager working in a company
- I am a product management professional (consultant, academic etc.)

## Context Questions

### 2 [c1]What is the size of your company? \*

Only answer this question if the following conditions are met:

° Answer was 'I am a product manager or a project manager working in a company' at question '1 [r1]' (Please indicate your professional status)

Please choose **only one** of the following:

- Small (1-99 employees)
- Medium (100-499 employees)
- Large (>500 employees)

### 3 [c2]For which sector does your organization develop software product(s)? \*

Only answer this question if the following conditions are met:

° Answer was 'I am a product manager or a project manager working in a company' at question '1 [r1]' (Please indicate your professional status)

Please choose **only one** of the following:

- Constructions/Manufacturing
- Education
- Finance/Banking/Insurance
- Government/Public sector
- Healthcare
- Information Technology/Web development
- Telecoms
- Utilities/Consumer Goods
- Other

### 4 [c3]How many customers does your company serve?

Only answer this question if the following conditions are met:

° Answer was 'I am a product manager or a project manager working in a company' at question '1 [r1]' (Please indicate your professional status)

Please write your answer here:

### 5 [c4]What is your job title? \*

Only answer this question if the following conditions are met:

° Answer was 'I am a product manager or a project manager working in a company' at question '1 [r1]' (Please indicate your professional status)

Please write your answer here:

**6 [c5]How many products does your company develop?**

**Only answer this question if the following conditions are met:**

° Answer was 'I am a product manager or a project manager working in a company' at question '1 [r1]' (Please indicate your professional status)

Please write your answer here:

**7 [c6]Which development methodology does your company use?**

**Only answer this question if the following conditions are met:**

° Answer was 'I am a product manager or a project manager working in a company' at question '1 [r1]' (Please indicate your professional status)

Please choose all that apply and provide a comment:

|                                      |                      |
|--------------------------------------|----------------------|
| <input type="checkbox"/> Waterfall   | <input type="text"/> |
| <input type="checkbox"/> Iterative   | <input type="text"/> |
| <input type="checkbox"/> SCRUM       | <input type="text"/> |
| <input type="checkbox"/> Other Agile | <input type="text"/> |
| Other: <input type="text"/>          | <input type="text"/> |

**8 [c7]What is your company's organizational structure? \***

**Only answer this question if the following conditions are met:**

° Answer was 'I am a product manager or a project manager working in a company' at question '1 [r1]' (Please indicate your professional status)

Please choose **only one** of the following:

Functional

Divisional (Product divisional)

Matrix

Other

- In a functional structure, the division of labor in an organization is grouped by the main activities or functions that need to be performed within the organization—sales, marketing, human resources.
- The divisional structure groups each organizational function into a divisions. Each division would have its own sales, engineering and marketing departments.
- Matrix structure groups employees by both function and product.

## Software product vs Software project

### 9 [pp1] Please, define the degree to which you think the product's market success is influenced by: \*

Please choose the appropriate response for each item:

|  | 1- Low influence      | 2                     | 3                     | 4                     | 5- High influence     |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| The project's delivery time (in terms of projects being completed on time and therefore the product is ready on time as well)                                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| The project's quality (in terms of projects meeting the specified product quality, deliver workable features and that they are no failures during the testing) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| The project's cost (in terms of projects working within the specified financial budget, or not)  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

### 10 [pp2] Please, define the degree to which you think the customer satisfaction is influenced by \*

Please choose the appropriate response for each item:

|  | 1- Low influence      | 2                     | 3                     | 4                     | 5- High influence     |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| The project's delivery time (in terms of projects being completed on time and therefore the product is ready on time as well)                                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| The project's quality (in terms of projects meeting the specified product quality, deliver workable features and that they are no failures during the testing) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| The project's cost (in terms of projects working within the specified financial budget, or not)  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

|                 |                  |   |   |   |                   |
|-----------------|------------------|---|---|---|-------------------|
|                 | 1- Low influence | 2 | 3 | 4 | 5- High influence |
| budget, or not) |                  |   |   |   |                   |

**11 [pp3]Please, define the degree to which you think that meeting the internal business goals (e.g. actual sales are equal the projected sales) is influenced by:**  
\*

Please choose the appropriate response for each item:

|  | 1- Low influence      | 2                     | 3                     | 4                     | 5- High influence     |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| The project's delivery time (in terms of projects being completed on time and therefore the product is ready on time as well)                                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| The project's quality (in terms of projects meeting the specified product quality, deliver workable features and that they are no failures during the testing) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| The project's cost ( in terms of projects working within the specified financial budget, or not)   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

## Product Manager vs Project Manager (1)

### 12 [mc1]What is the hierarchical relationship between the product manager and the project manager in your company? \*

Only answer this question if the following conditions are met:

° Answer was 'I am a product manager or a project manager working in a company' at question '1 [r1]' (Please indicate your professional status)

Please choose **only one** of the following:

- Product manager is hierarchically higher than the project manager
- Project manager is hierarchically higher than the product manager
- They are both at the same hierarchical level

### 13 [mc2]Can you give an estimation of how much time (in a percentage rate) does a product manager spend, in your company, for each one of the decision-making responsibilities levels? \*

Only answer this question if the following conditions are met:

° Answer was 'I am a product manager or a project manager working in a company' at question '1 [r1]' (Please indicate your professional status)

Please write your answer(s) here:

Strategic decisions

Tactical decisions

Operational decisions

- Strategic decisions affect the long-term direction of the entire company.
- Tactical decisions focus more on intermediate-term issues
- Operational decisions focus on day-to-day activities.

### 14 [mc3]Can you give an estimation of how much time (in a percentage rate) does a project manager spend, in your company, for each one of the decision-making responsibilities levels? \*

Only answer this question if the following conditions are met:

° Answer was 'I am a product manager or a project manager working in a company' at question '1 [r1]' (Please indicate your professional status)

Please write your answer(s) here:

Strategic decisions

Tactical decisions

Operational decisions

**15 [mc4] In a percentage rate how would you rate the skills of the product manager in your organization? \***

**Only answer this question if the following conditions are met:**

° Answer was 'I am a product manager or a project manager working in a company' at question '1 [r1]' (Please indicate your professional status)

Please write your answer(s) here:

Technical skills

Business skills

**16 [mc5] In a percentage rate how would you rate the skills of the project manager in your organization? \***

**Only answer this question if the following conditions are met:**

° Answer was 'I am a product manager or a project manager working in a company' at question '1 [r1]' (Please indicate your professional status)

Please write your answer(s) here:

Technical skills

Business skills

**17 [mc6] Under which department does the product management operate? \***

**Only answer this question if the following conditions are met:**

° Answer was 'I am a product manager or a project manager working in a company' at question '1 [r1]' (Please indicate your professional status)

Please choose **only one** of the following:

- Marketing/Sales
- Product management division
- Research & Development
- Other

**18 [mc7] State 3-4 activities/tasks under which the product manager and the project manager work together**

**Only answer this question if the following conditions are met:**

° Answer was 'I am a product manager or a project manager working in a company' at question '1 [r1]' (Please indicate your professional status)

Please write your answer(s) here:

|  |
|--|
|  |
|  |
|  |

**19 [mc8]To which degree does a good (or bad) decision/action of the project manager affect the success of the product manager in your company? \***

**Only answer this question if the following conditions are met:**

° Answer was 'I am a product manager or a project manager working in a company' at question '1 [r1]' (Please indicate your professional status)

Please choose **only one** of the following:

- 1 - Low influence
- 2
- 3
- 4
- 5 - High influence

**20 [mc9]Regardless your previous answer, what do you think in general? A good (or bad) decision/action of a project manager affects the success of a product manager: \***

**Only answer this question if the following conditions are met:**

° Answer was 'I am a product manager or a project manager working in a company' at question '1 [r1]' (Please indicate your professional status)

Please choose **only one** of the following:

- In the short run (from a couple of months to a year)
- In the long run (over a year)



**21 [mc10] To which degree does a good (or bad) decision/action of the product manager affect the success of the project manager in your company? \***

**Only answer this question if the following conditions are met:**

° Answer was 'I am a product manager or a project manager working in a company' at question '1 [r1]' (Please indicate your professional status)

Please choose **only one** of the following:

- 1 - Low influence
- 2
- 3
- 4
- 5 - High influence

**22 [mc11] Regardless your previous answer, what do you think in general? A good (or bad) decision/action of a product manager affects the success of a project manager: \***

**Only answer this question if the following conditions are met:**

° Answer was 'I am a product manager or a project manager working in a company' at question '1 [r1]' (Please indicate your professional status)

Please choose **only one** of the following:

- In the short run (from a couple of months to a year)
- In the long run (over a year)

**23 [mc12] Please, rate the degree to which, each one of the factors below, influence the relationship (positively or negatively) between product managers and project managers \***

**Only answer this question if the following conditions are met:**

° Answer was 'I am a product manager or a project manager working in a company' at question '1 [r1]' (Please indicate your professional status)

Please choose the appropriate response for each item:

|   | 1- Low influence      | 2                     | 3                     | 4                     | 5- High influence     |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Whether they work under the same department, or not                   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Whether they are hierarchically equal, or not                         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Whether they have the same business/technical oriented skills, or not | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Whether they are enrolled to the same type of decision-               | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

|   | 1- Low influence      | 2                     | 3                     | 4                     | 5- High influence     |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| making, or not  |                       |                       |                       |                       |                       |
| The fact that product managers focus on product scope whereas project managers on project scope | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

**24 [mc13] Feel free to mention any other factors which influence the collaboration between product managers and project managers and that you consider as important**

Only answer this question if the following conditions are met:  
 ° Answer was 'I am a product manager or a project manager working in a company' at question '1 [r1]' (Please indicate your professional status)

Please write your answer(s) here:

|  |
|--|
|  |
|  |
|  |
|  |

Please indicate any factors missing from the previous question and that you would rate with an importance of 4 or 5.

## Final/General (1)

### 25 [fc1]How would you describe the collaboration between product management and project management within your company? \*

Only answer this question if the following conditions are met:

\* Answer was 'I am a product manager or a project manager working in a company' at question '1 [r1]' (Please indicate your professional status)

Please choose **only one** of the following:

- Successful
- Adequate
- Needs improvement

### 26 [fc2]How would you rate the overall compatibility of this questionnaire to your company's working strategy (was it easy enough to answer the questions based on your reality)? \*

Only answer this question if the following conditions are met:

\* Answer was 'I am a product manager or a project manager working in a company' at question '1 [r1]' (Please indicate your professional status)

Please choose **only one** of the following:

- 1 - Low compatibility
- 2
- 3
- 4
- 5 - High compatibility

### 27 [fc3]Feel free to add any other comment or remarks

Only answer this question if the following conditions are met:

\* Answer was 'I am a product manager or a project manager working in a company' at question '1 [r1]' (Please indicate your professional status)

Please write your answer here:

## Product Manager vs Project Manager (2)

**28 [mp1]What do you consider as a better hierarchical relationship between a product manager and a project manager? \***

**Only answer this question if the following conditions are met:**

° Answer was 'I am a product management professional (consultant, academic etc.)' at question '1 [r1]' (Please indicate your professional status)

Please choose **only one** of the following:

- Product manager should be hierarchically higher than the project manager
- Project manager should be hierarchically higher than the product manager
- The should be both on the same hierarchical level

**29 [mp2]How much time (in a percentage rate) should a product manager spend for each one of the decision-making responsibilities levels? \***

**Only answer this question if the following conditions are met:**

° Answer was 'I am a product management professional (consultant, academic etc.)' at question '1 [r1]' (Please indicate your professional status)

Please write your answer(s) here:

|                       |                      |
|-----------------------|----------------------|
| Strategic decisions   | <input type="text"/> |
| Tactical decisions    | <input type="text"/> |
| Operational decisions | <input type="text"/> |

- Strategic decisions affect the long-term direction of the entire company.
- Tactical decisions focus more on intermediate-term issues
- Operational decisions focus on day-to-day activities.

**30 [mp3]How much time (n a percentage rate) should a project manager spend for each one of the decision-making responsibilities levels? \***

**Only answer this question if the following conditions are met:**

° Answer was 'I am a product management professional (consultant, academic etc.)' at question '1 [r1]' (Please indicate your professional status)

Please write your answer(s) here:

|                       |                      |
|-----------------------|----------------------|
| Strategic decisions   | <input type="text"/> |
| Tactical decisions    | <input type="text"/> |
| Operational decisions | <input type="text"/> |

**31 [mp4]In a percentage rate, how would you rate the required skills of a**

**product manager? \***

**Only answer this question if the following conditions are met:**

° Answer was 'I am a product management professional (consultant, academic etc.)' at question '1 [r1]' (Please indicate your professional status)

Please write your answer(s) here:

Technical skills

Business skills

**32 [mp5]In a percentage rate, how would you rate the required skills of a project manager? \***

**Only answer this question if the following conditions are met:**

° Answer was 'I am a product management professional (consultant, academic etc.)' at question '1 [r1]' (Please indicate your professional status)

Please write your answer(s) here:

Technical skills

Business skills

**33 [mp6]Under which department/division should the product management operate? \***

**Only answer this question if the following conditions are met:**

° Answer was 'I am a product management professional (consultant, academic etc.)' at question '1 [r1]' (Please indicate your professional status)

Please choose **only one** of the following:

- Marketing/Sales
- Product management division
- Research & Development
- Other

**34 [mp7]State 3-4 activities/tasks under which the product manager and project manager should work together.**

**Only answer this question if the following conditions are met:**

° Answer was 'I am a product management professional (consultant, academic etc.)' at question '1 [r1]' (Please indicate your professional status)

Please write your answer(s) here:

|  |
|--|
|  |
|  |
|  |

**35 [mp8]To which degree you think that a good (or bad) decision/action of a project manager affects the success of a product manager? \***

**Only answer this question if the following conditions are met:**

° Answer was 'I am a product management professional (consultant, academic etc.)' at question '1 [r1]' (Please indicate your professional status)

Please choose **only one** of the following:

- 1 - Low influence
- 2
- 3
- 4
- 5 - High influence

**36 [mp9]Regardless your previous answer, what do you think in general? A good (or bad) decision/action of a project manager affects the success of a product manager: \***

**Only answer this question if the following conditions are met:**

° Answer was 'I am a product management professional (consultant, academic etc.)' at question '1 [r1]' (Please indicate your professional status)

Please choose **only one** of the following:

- In the short run (from a couple of months to a year)
- In the long run (over a year)

**37 [mp10] To which degree you think a good (or bad) decision/action of a product manager affects the success of a project manager? \***

**Only answer this question if the following conditions are met:**

° Answer was 'I am a product management professional (consultant, academic etc.)' at question '1 [r1]' (Please indicate your professional status)

Please choose **only one** of the following:

- 1 - Low influence
- 2
- 3
- 4
- 5 - High influence

**38 [mp11] Regardless your previous answer, what do you think in general? A good (or bad) decision/action of a product manager affects the success of a project manager: \***

**Only answer this question if the following conditions are met:**

° Answer was 'I am a product management professional (consultant, academic etc.)' at question '1 [r1]' (Please indicate your professional status)

Please choose **only one** of the following:

- In the short run (from a couple of months to a year)
- In the long run (over a year)

**39 [mp12] Please, rate the degree to which you think that each one of the factors below, influence the relationship (positively or negatively) between product managers and project managers \***

**Only answer this question if the following conditions are met:**

° Answer was 'I am a product management professional (consultant, academic etc.)' at question '1 [r1]' (Please indicate your professional status)

Please choose the appropriate response for each item:

|   | 1- Low influence      | 2                     | 3                     | 4                     | 5- High influence     |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Whether they work under the same department, or not                   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Whether they are hierarchically equal, or not                         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Whether they have the same business/technical oriented skills, or not | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Whether they are enrolled to the same type of decision-               | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

|   | 1- Low influence      | 2                     | 3                     | 4                     | 5- High influence     |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| making, or not<br>The fact that product managers focus on product scope whereas project managers on project scope | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

**40 [mp13] Feel free to mention any other factors which influence the collaboration between product managers and project managers and that you consider as important**

**Only answer this question if the following conditions are met:**

° Answer was 'I am a product management professional (consultant, academic etc.)' at question '1 [r1]' (Please indicate your professional status)

Please write your answer(s) here:

|  |
|--|
|  |
|  |
|  |
|  |

Please indicate any factors missing from the previous question and that you would rate with an importance of 4 or 5.



## Final/General (2)

**41 [fp1] From a scale 1(Low) to 5(High) how would you rate the overall compatibility of this questionnaire to the current market's strategies (was it easy enough to answer the questions based on your reality)? \***

**Only answer this question if the following conditions are met:**

° Answer was 'I am a product management professional (consultant, academic etc.)' at question '1 [r1]' (Please indicate your professional status)

Please choose **only one** of the following:

- 1
- 2
- 3
- 4
- 5

**42 [fp2] Feel free to add any other comment or remarks**

**Only answer this question if the following conditions are met:**

° Answer was 'I am a product management professional (consultant, academic etc.)' at question '1 [r1]' (Please indicate your professional status)

Please write your answer here: