

# A Method for Alignment Evaluation of Product Strategies among Stakeholders (MASS) in Software Intensive Product Development

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## ABSTRACT

*Current practices in industry are moving towards the market-driven development of software intensive products compared to customer-specific system development. Consequently, product management is faced with several challenges that have to be addressed as a part of the market-driven requirements engineering (MDRE) process. One of the important challenges is how to select the right mix of requirements, balancing short-term and long-term gains. One way to address this challenge is to utilize product strategies for selecting requirements. However, in order to do this the internal success-critical stakeholders (SCS) involved in strategies creation and requirements selection need to be aligned with respect to a product's strategic goals and objectives. This paper presents a method to enable the evaluation of degree of alignment between SCS with respect to the understanding and interpretation of a product's strategy. Further, the method not only enables the evaluation of alignment, but also specifically shows misalignment, and enables the identification of leading causes. The method has been developed in collaboration with industry and the application of it is shown through a case study at Ericsson AB.*

## Keywords

Product value, strategy alignment, product strategy, strategic product management, technical product management, market-driven software intensive product development

## 1. INTRODUCTION

With the emergence of markets for off-the-shelf/package and embedded software [1, 2], market-driven development of software and software intensive products is gaining increased interest/attention compared to customer-specific system development [3, 4]. Consequently, a shift in focus is occurring, affecting software development in general and requirements engineering and product management in particular [4].

In a market-driven environment the development organization takes all the risk as development is not contractually bound; rather customers are whole markets and there is a large number of *potential* customers [5]. In addition, the requirements coming in are from a wide variety of sources, both external such as market surveys and key customers, and internal sources like developers, sales, marketing, support, competitor analysis, and management [6]. This presents several challenges to the product

management organization, which has to be handled as a part of the market-driven requirements engineering process (MDRE):

- First, large quantities of requirements, sometimes numbering in the thousands or even tens of thousands, risk to overload the development organization [3], thus initial triage of requirements is necessary [4, 7].
- Second, the analysis and trade-off between requirements dictates long-term vs. short-term product development, as well as the ability to balance functional requirements with non-functional aspects such as architectural longevity and maintainability.
- Third, once analyzed and weighed, the ultimate selection of what requirements to realize, and which to postpone and dismiss, are central to both short-term and long-term success of a product [8].

In this environment key-customer requirements, securing short-term revenues, are often premiered over long-term requirements, which are generally associated with higher risk. The same goes for key-customer requirements in comparison with non-functional aspects such as architectural coherence and maintainability, even though the non-functional aspects in the long run might enable savings equal or greater to the short-term revenues. The ability to balance short-term and long-term requirement selection is paramount, but time-to-market pressure, dominant in market-driven development, and pressure for quarterly revenues, often results in prioritizing key-customer short-term requirements.

In a market-driven situation, product strategies are the main tool for planning and realizing the goals and objectives of a product [4, 7, 9, 10]. Thus, from a value creation perspective it is important for product management to evaluate and select requirements that not only create value for key-customers, but also value for the product and the company by using product strategies [7, 10, 11]. This implies that product strategies need to be formulated to enable product management to perform requirements triage, trade-offs, and ultimately requirements selection [7]. Equally important is the alignment between the company's upper management, the product management and the project (realization) organization, which implies that the overall strategies need to be understood homogenously, and the same strategies need to be the basis for both the planning and the development of a product [7]. This is especially important in relation to the product management organization, as the professionals working within are, through the selection of one requirement over another, the executive arm of upper management, realizing product strategy during the market-driven requirements engineering activities. Thus, it is vital to evaluate the degree of alignment between all involved internal success-critical stakeholders (SCS) [12], which include upper management, product management, and the realizers in the project organization. A homogenous understanding as well as agreement in relation to prioritization between SCSs should be achieved to guarantee one vision through product strategies which is very important from value-based decision making perspective even at the software development level [13].

This paper presents a Method for Alignment Evaluation of Product Strategies among Stakeholders (MASS), which was developed in collaboration with industry, and is further illustrated through a case-study at Ericsson AB. MASS enables the evaluation of the degree of alignment between SCS with respect to the understanding and interpretation of a product's strategy. Further, it not only enables the evaluation of alignment, but also specifically shows misalignment, and enables the identification of leading causes.

The paper is structured as follows. Section 2 presents related work and a brief review of relevant literature. Section 2.2 outlines the research objectives and corresponding research questions. Section 3

presents the steps involved in MASS. The execution of MASS in an industry case study at Ericsson AB is presented in Section 4, and finally, Section 5 concludes the paper.

## 2. BACKGROUND AND RELATED WORK

Strategic alignment has many pseudonyms. It is also termed fit integration [14], [15], bridge [16], harmony [17], fusion [18] and linkage [19]. However, in every case, it is about the integration of business related strategies with their information technology (IT)/information systems (IS) strategies [20]. Assessing, achieving and maintaining strategic alignment in this context have been discussed in a number of studies [20-25]. Table 1 compares MASS with other methods/frameworks by identifying the aims and objectives of each, the focus area (information systems or software product), type of strategy used to evaluate alignment (business strategy or product strategy) and perspective used to evaluate alignment (projects, business and IT or software product). Looking at Table 1, it can be seen that the focus (column three) of most methods/frameworks is on the alignment of IS to the business strategies of the organization using the IS. MASS, on the other hand, focuses on the software product and the product strategy created by the development company and not the user's (or in the market-driven perspective, the customers) business strategy. Further, looking at the perspective (column five) the focus of MASS is on the product level, not on the limited project perspective, or on any one customer's business perspective.

A market-driven product development company has to look beyond the view of any one customer, but also beyond the internal project perspective, and focus on product and company perspectives [10], assuring alignment, i.e. a common understanding of the company's goals and objectives for a particular product. It is important to state that MASS does not propose antecedents of market-orientation as suggested by Ajay and Jaworski [26] rather it is a method to assess, achieve and maintain strategic alignment within a market-driven software product development organization. To the best of our knowledge no other method has been presented with this objective and context.

Table 1 – Comparisons of Alignment Evaluation Methods/Frameworks

### 2.1 Product Strategy

The issue of strategy, and in particular the different elements of a product strategy, have been visited by a number of authors. Oliver [21] broadly defined business strategy as, *“the understanding of an industry structure and dynamics, determining the organization's relative position in that industry and taking action either to change the industry's structure or the organization's position to improve organizational results”*. This is quite close to the definition of product strategy given by McGarh: *“Product strategy begins with a strategic vision that states where a company wants to go, how it will get there, and why it will be successful.”* [27].

In order to formulate a product strategy there are a number of questions that need to be answered. The first question, **“where do we want to go?”** requires finding out the right balance between the long term opportunities [27] or goals [28] and short term objectives [27]. The basic aim of the goals is to set the general directions of movement, whereas objectives state the specific measures of accomplishment [28]. The goals refer to *profit, growth, and market share*, which potentially can be conflicting. Therefore, the product strategy normally focuses on only one of the goals at a time. As Lehmann and Winer [29] point out, if the goal/objective is to achieve a simultaneous increase in growth and profits, it is unrealistic. To attain reasonable growth requires either an increase in expenditures or decrease in

profit margins [29]. Therefore, depending on the products' life cycle stages, one of the goals would have priority.

The answer to the second question, “**how will we get there?**” formulates the core of the product strategy [30]. It addresses aspects such as *customer targets*, *competitive targets*, and *differential advantage*. The choice of *customer targets* depends on the nature of the goals and objectives selected when answering “where an organization wants to go”. For example, if the goal is to increase profits, the customer targets are the existing customer groups [29]. However, as Krishnan and Karl [31] point out, if the goal is to increase the market growth/size, the targeted customers will have to come from a new segment of population. Market segmentation with respect to *product's usage rates*, *customer/user capabilities*, *technology preferences*, *demographics*, and *purchasing power* are examples of important aspects to be considered when selecting customer targets. The choice of customer targets plays an important role in the requirements selection as the chosen customer targets set the boundaries of a product strategy, and thus sets up the rules for requirements triage, trade-off, and selection.

In order to answer “how will we get there”, it is important to select *primary competitive targets*, thus prioritizing competitors [29, 32]. For determining a product's position in the market it has to be differentiated based on cost, price or value of product offering with a compromise on the remaining two. This means that the product has to be either low priced backed by low costs or better than competitors' products as seen by customer.

According to Lehmann and Winer [29] question three, “**what to do?**” addresses specific programs, “rules of the road,” or tactics to be used to achieve goals and objectives established in the light of “how will we get there”. This deals with the *product*, *pricing*, *promotion*, *distribution*, and *service* [29]. This can also be in the form of specific considerations posed by upper management. The answer to the question also decides the selection of *strategic drivers*, from amongst the *technology-push*, or *market-pull* or both.

McGarth considers question four, “**why would we be successful?**”, to be the most pertinent question to be answered to produce a competitive product strategy [27]. The answer to this question is basically related to the differential advantage aspect of the product positioning. A solid product strategy needs to provide concrete arguments for the reason of its success in the light of customers' preferences and competitive targets. For example, if the strategy is low price, this has to be proven to be an adequate differential advantage with regards to competitors.

Finally, question five, “**when will we get there?**” can be answered by roadmaps as suggested by Kappel [30]. He points out that a roadmap is a relatively common way of representing targets based on development in the context of time and releases [30].

Looking at the five questions none of them answers what important technical aspects of a software product should be considered in a product's strategy. This can be handled by MERTS [7], thus MASS also utilizes MERTS. MERTS serves two main purposes. First, it acts as a stepwise guide to creating product strategies taking both strategic and technical views into account. Secondly, the strategies resulting from MERTS can be used by product managers to perform requirements triage, in essence selecting the “right” requirements for realization [7].

To summarize, the five central questions are an intricate part of the creation of a product strategy, but the understanding and the interpretation of the answers to them are at the core of product strategy alignment. Any framework for assessing, achieving, and maintaining alignment has to utilize this fact, which will become evident in the following sections as MASS is presented and validated in the case study.

## 2.2 MERTS

MERTS is centered on ensuring that the five strategic questions for a product are answered explicitly [7]. Fig. 1 gives an overview of MERTS and the three main parts of the method. The goal of MERTS is to offer a clear method detailing how to reach consensus and a homogenous understanding of a product strategy. The product managers using the method are required to follow these three parts. Each part has several steps (see Figure 1).

*2.2.1 Part One – Early Requirements Triage.* This part provides steps to create an initial product strategy for use in requirements triage.

A. Specify. In order to explicitly state the goals and objectives of a product, it is important to specify the directions of movement for the product deduced from the organization's mission statement. Thus it is important to answer the three strategic questions ((1) Where we want to go?, (2) How to get there?, (3) What will be done?) for each product.

The output of this step is an explicit understanding of goals and objectives associated with a specific product which can be used to perform requirements triage and selection for individual products.

To answer (A.1) "Where to go" the organization's directions of movement have to be clearly stated. An organization can have one or many directions of movement. For example, shareholders' revenue, profit, growth, and market share [7]. The answer to this question depends on identified directions of movement and their relative importance.

The answer to (A.2) "How to get there" will bind the strategy in terms of customer segments and competition targeted and differential advantage of the individual product providing a unique selling point.

For the answer to (A.3) "What to do" a more management centered perspective can be used, focusing on product pricing, promotion, distribution, and service. However, since MERTS is targeted towards early requirements triage and selection, answers to this question will focus on the abstract technical considerations of a requirement. Some of the possible considerations rated highest by the technical experts during the interviews have been taken as example here, i.e. innovation, core assets, architecture stability, market-pull, technology-push, customization flexibility, and use of COTS [7]. Priorities can be assigned to each of these factors showing their relative importance with respect to each other.

**Figure 1 – MERTS Steps**

B. Assign Weights. The answers from Step 1 are assigned weights. The rule is to assign weights to each of the factors based on their relative importance in a way that total weight remains 100. This way has been reported to be one of easiest and quickest prioritization methods.

C. Compare Requirements. The total weights of all the requirements are compared against a threshold to select or reject each of the requirements.

The first three steps of MERTS should be performed at product management level supporting the triage of requirements (aiding in the selection). The purpose of step 2 (Assign weights) is not requirements prioritization which is usually associated with early project activities during release planning. The points assigned to each requirement, against each factor or sub-classification, show the level of strategic alignment.

*2.2.2 Part Two – Requirements Selection for Release.* After a set of requirements (deemed to be aligned with the strategy) have been selected, the question in focus is “when to get there”. To answer this following two steps are required.

A. Specify product-technology roadmap. It has been emphasized in literature [30] to chalk out a product-technology roadmap to get an overview of the relationship between product releases (product evolvment) and successive technology generations. This means specifying what a product tends to achieve along the time axis in term of its evolvment and technology trends. This enables placement of requirements in appropriate intervals planned in a roadmap. For example, if a requirement requires expertise in some new technology to be explored in the future and this has been planned in the roadmap, the requirement can be postponed or depending on the urgency of the requirement, the roadmap can be altered.

B. Estimate resources. In order to determine the feasibility of the requirements, the organization needs to explicitly state financial and effort allowances against each interval in the roadmap. Several methods can be used to estimate cost, effort and time, e.g. feature points, function points, lines of code, and methods like e.g. COCOMO [33] can be used to support the efforts. An alternative could be to perform estimates based on previous development efforts. Additionally, requirements prioritization techniques [34] can be used to plan releases for the product.

Part Three – Strategy Rationale. Once the strategic questions have been answered, it is important to document the reasoning behind the decisions. This way if the decisions (and indirectly the answers) result in success (of a product) replication can be achieved, and the organization has good examples to follow for future efforts.

In addition, the strategy formulated through MERTS should be used to share product and organizational visions across the organization. In its simplest form it can mean writing a paragraph explaining the reason behind the answers, keeping in view the organization’s long term goals, financial plans, technology trends and marketing trends.

### **2.3 VMOST Analysis**

VMOST, an organizational strategy analysis technique, is widely used to deconstruct business/product strategy and understand strategic aspects from different groups’ perspectives. It is considered to be the most comprehensive technique for capturing and confirming the current strategy of a product [20]. It helps in understanding how a product’s vision, mission, goals, strategies, objectives, and tactics relate to, align with, and provide support for each other by an analyst’s response to a number of key questions (see Section 3.1).

### **2.4 Research Questions**

The research questions posed as a part of this paper can be seen as both traditional research questions in light of the research being conducted and as the core of what is answered in the use of MASS at any company producing software intensive products. Table 2 gives an overview of the research questions that are used in the subsequent sections.

Table 2- Objectives of the case study and corresponding research questions

## **3. MASS**

Figure 2 gives an overview of MASS and its five main steps. The goal of MASS is to specify concrete steps to be followed in order to evaluate alignment between the SCSs with respect to product strategies, and in case of misalignment, identify possible causes. Each step is described in detail below.

Figure 1 – MASS Steps

### 3.1 Step 1 – Design Evaluation Framework

The first step is to design the alignment evaluation framework making it possible to seek answers to RQ1 (*How do the SCSs understand and interpret different aspects of a product's strategy?*) and RQ2 (*What is the degree of alignment between and among the two groups with respect to the product strategy?*). This is demonstrated in detail in Figure 3, which shows the evaluation framework used in MASS and includes both qualitative interviews and a quantitative questionnaire. RQ1 is sought through qualitative interviews utilizing the VMOST [35] technique, MERTS method and roadmapping literature.

Figure 3 – Seeking answers to RQ1 and RQ2

MERTS suggests that good product strategies should contain answers to the questions stated in Section 2.1 and Section 2.2. However, the questions in VMOST mostly focus on traditional product management (business and market), whereas the technical aspects important for software product management are missing [4, 36]. Therefore, questions related to technology, architecture, and software quality need to be added as suggested in MERTS. A detailed account of the qualitative interview questions (i.e. Part 1 in Figure 3) used in MASS evaluation can be seen in Table 3, where the combination of VMOST and MERTS is evident.

Table 3 – Qualitative interview questions

In order to cover the second main part (i.e. Part 2 in Figure 3), and answer RQ2, documentation tied to the targeted products needs to be studied. To determine if SCSs are aligned with respect to a product's strategy it is required to identify the most important product strategy goals (in a product's strategy), which are subsequently used in the questionnaire to be prioritized by the SCSs. It is important to ensure that all the goals identified are at the same level of abstraction (i.e. strategic); otherwise it becomes difficult to compare them. For example, in a product's strategy, some goals could be at tactical level e.g., increasing strategic alliance, while others might be more abstract (strategic) e.g., increasing market share.

In the questionnaire, the SCSs should be allowed to add more goals if they consider it necessary. Definition of each of the goals needs to be provided in the questionnaire to avoid ambiguity. In order to answer RQ2, MASS requires participants to:

- a. Indicate the use of each strategic goal or objective with the values: 0 not used at all, 1: occasionally used, 2: almost always used, 3: a must (to answer RQ2.1 and RQ2.2).
- b. Utilize 100-dollar method to indicate (1) how important each strategic goal or objective currently in the specific product strategy (to answer RQ2.3 and RQ2.4) and (2) how important each strategic goals or objective ideally (to answer RQ2.5 and RQ2.6). The purpose is to elicit the perception of the participants about the importance of each goal.

The 100-dollar method asks participants to spend 100 points across all of the goals given, to represent their relative influence. For example, if a participant thought a goal e.g. low production cost does not matter at all currently and achieving better quality was twice as important as increasing market share they might award these goals zero, 20 and 40 respectively. The questionnaire template is shown in Table 4.

**Table 4 – Questionnaire template**

If any SCS adds a new goal and other stakeholders do not add, it will result in weaker correlation between the stakeholders. However, addition of any new goal will not change consecutive MASS steps.

### **3.2 Step 2– Identify SCS**

In order to evaluate alignment, the SCS need to be identified and selected for participation. The SCS are broken down into three main groups: *strategy formulators*, *strategy realizers*, and *strategy implementers* (see Figure 4). The managers involved in the formulation of the product portfolio and individual product strategies are identified as strategy formulators. Product management, which ensures that all decisions related to development are in line with a product's strategy, and communicates these decisions to the development teams, are identified as strategy realizers. Finally, since the developments in a product should be aligned with the specific product's strategy the development teams are identified as strategy implementers.

**Figure 4 - Strategic Pyramid from Formulation to Implementation**

MASS is focused on studying the alignment between the SCS involved in strategic management and product management (see Figure 4). The understanding and interpretation of a specific product's strategic goals and objectives are studied, and the alignment of views between strategy formulators and strategy realizers are investigated. There are sub-groups even within the strategic formulators and strategy realizers groups. However, we considered the two groups as whole so that we could perform comparison between products since all groups do not have same sub-groups. In addition to the alignment of views between the two groups, internal agreement (between strategy realizers) is evaluated to ensure that information is not lost.

### **3.3 Step 3 – Perform Evaluation**

After the evaluation framework is prepared and the SCSs are identified, the next step is to perform the evaluation itself. It is important to reserve at least one hour with each of the SCSs to perform both the qualitative interviews and get the questionnaire completed. Before starting the evaluation, it is important to explain the purpose of the evaluation to gain trust of the SCS. Since it is very sensitive and confidential information, they need to be ensured of confidentiality and anonymity.

While performing evaluations, it might be revealed that the sample of chosen stakeholders is not enough and there is a need to perform these evaluation sessions with more SCSs. In that case re-sampling should be done to ensure as complete coverage of the SCSs as possible.

### **3.4 Step 4 – Perform Analysis**

The purpose of this step is to analyze the data collected through the qualitative interviews and the quantitative questionnaire. The qualitative interview answers of each interviewee are coded using the

Matthew/Huberman methodology [37]. The responses can be categorized as shown in Table 5, with respect to the five strategic questions and the important technical aspects previously shown in Table 3.

With respect to each category similarity/dissimilarity is coded as “similar”, “almost similar”, and “not similar” (see the last row). In order to demonstrate this Table 5 is populated by a hypothetical example.

**Table 5 – Categorizing qualitative interviews data**

To what degree the groups are aligned is calculated pair-wise using a Spearman rank correlation matrix for the responses collected through the questionnaire. The correlation values will help in identifying the degree of alignment/misalignment which can be used further to elicit the possible root causes of major misalignments.

### **3.5 Step 5 – Conduct Follow-up Workshop**

The rationale behind potential misalignments, needed to explain and elaborate on the reasons leading to the root cause, needs to be collected post-analysis. This is the purpose of Step 5. In Step 5 the results of the interviews and the quantitative questionnaire are presented to the SCSs in a workshop setting, allowing for discussion and the collection of rationale. One of the main reasons for the workshop is to discuss misalignments, as a first step to gain deeper understanding of the root cause(s), and to begin to homogenize interpretations, as well as change the formulations of a product’s goals and strategies when relevant.

As a part of this workshop a follow-up questionnaire is used. An example follow-up questionnaire template is shown in Table 6 and Table 7. As exemplified in Table 5, first row, the “not similar” views found after categorization of the qualitative interview data are listed in the “Results” column, and corresponding questions that can be posed are shown in the second “Question” column. This can be done for all the perspectives for which the SCSs’ answers are found to be “not similar”.

**Table 6 – Follow-up questionnaire template for qualitative interview results**

**Table 7 – Follow-up questionnaire template for questionnaire results**

Table 7 shows the correlation results of the quantitative data (from the quantitative questionnaire) and the corresponding questions that can be posed in the workshop follow-up questionnaire to investigate the root cause for any misalignments.

### *3.5.1 Misalignment Analysis*

There can be several interdependent reasons for misalignment. To aid participants in Step 5, the following reasons can be presented (as shown in Table 7) to initiate a discussion. These reasons can be [20-25, 38]:

1. **Product size and communication quality:** Effective exchange of ideas and a clear understanding of what it takes to ensure successful strategies are high on the list of enablers and inhibitors to alignment [38]. Since for larger products more people are involved to manage the product, which could be a reason for further impairment of communication quality.
2. **Lack of measurable objectives:** Another reason for misalignment could be the lack of consensus as to how a strategy should be implemented, and how to measure that the strategy goals are being met. Absence of measurable objectives at the product management was confirmed by the participants. It is understandable that business and technology metrics differ because they are different in nature [38], however it is important to translate business strategy not only into business measurable objectives (i.e., financial) but also into technical measurable objectives.
3. **Missing feedback cycle:** It is not enough to have measurable objectives, it is equally important to use the metrics and collected data to provide feedback on the strategy and make changes accordingly. The misalignment between the ideal priorities of strategic goals could potentially be due to the fact that there is no mechanism to adjust strategies in future based on previous experiences.
4. **Lack of technical perspective:** One of the reasons for misalignment between SCSs with respect to the technical goals could be the fact that technical aspects are not brought to the table when product strategies are formulated. As a result, goals related to the technical aspects e.g. software quality, innovation, architectural considerations and technology roadmapping are not explicitly represented and prioritized.
5. **Lack of understanding of a company's strategy:** If a company's vision and mission statements in the company's strategy are not understood at each strategic level (strategy formulation level and strategy realization level), chances are great that product strategies do not reflect company's direction of movement which can further misalign strategy formulators and strategy realizers with respect to a product's specific goals and objectives.

Participants are allowed to add any additional factors that are not covered in the list. Depending on how extensive the follow-up is, the prioritized goals with respect to relative current importance can be arranged in descending order as shown in last two rows of Table 7.

Corresponding follow-up questions can be posed if the participants agree or disagree with this prioritization and motivations are caught. Similarly, this can be done for the prioritized goals with respect to their relative importance in a “wish” or “ideal” case proposed by the participants.

The difference and distance between the judged current priorities (“what priority do you perceive today”), and the ideal priorities (“how do you think it should be”) can also be investigated. Analysis of the priorities and the stated rationale can help to identify the root cause for misalignment, as well as jump start activities for homogenization.

After the follow-up the data collected through the questionnaire can be used to identify the common causes of misalignments and the dependency between them to further identify the root causes. This has been demonstrated in the case study (see Section 4.1.5).

#### **4. MASS AT ERICSSON – A CASE STUDY**

The case study was conducted during the autumn of 2008 involving three Ericsson products (designated Product X, Y, and Z due to reasons of confidentiality). The purpose of this case study is to demonstrate practical application of MASS for alignment assessment and root cause identification.

Ericsson is a world leader in the telecommunications sector, providing a wide range of products and solutions. Products are developed and sold as generic solutions offered to an open market, although customized versions of the products are also developed for key customers. The products’ characteristics are given in Table 8. It is important to note that the findings through MASS application are specific to the products considered and thus cannot be generalized for all Ericsson’s products.

**Table 8 –Products’ Characteristics**

#### **4.1 Execution**

The subsections below mirror the description of MASS step-by-step as given in Section 3.

##### *4.1.1 MASS: Step 1 – Design Evaluation Framework*

An evaluation framework was designed using the method proposed in Section 3.1. The qualitative questions stated in Table 3 were used. Five strategic goals for the quantitative questionnaire were identified using product strategy literature and Ericsson’s strategy documentation for the three case products X, Y and Z. The objective was to catch these types of misalignments in perceiving the importance of each goal without any pre-set categorization of critical and not so critical goals. The documentation analysis and design of evaluation framework took 30 hours in total for the primary author i.e. roughly 4 person-days. Since the documentation of three products was read and analyzed, it can be said that it took 10 hours per product. Moreover, the evaluation framework was designed in a way to elicit maximum information from the participants without expending expensive industry resources.

While doing documentation analysis, one could be easily caught into “analysis paralysis”, therefore it is important to take help of the experts within the product to identify relevant documentation. Otherwise too much time can be spent on a lot of documentation which might be even relevant. Initially the authors were overwhelmed by the amount of documentation available however, then they sought help from the experts to identify the relevant documentation only.

### *4.1.2 MASS : Step 2 – Identification of SCS*

Members of the strategic product management organization at Ericsson supported in the identification of the roles for the two internal groups for this case study: strategy formulators and strategy realizers. These roles were identified through brainstorming sessions with experts at Ericsson. For each product there was an Upper Product Manager (UPM) who is responsible for the overall strategies i.e. strategy formulation. In addition there were 1-4 Strategic Product Managers (SPM), dealing with product release, product market and general functionality. A total of ten potential participants were identified, three UPMs, one for each product, and seven SPMs (three SPMs for Product X and two SPMs each for Product Y and Product Z). The brainstorming session took an hour to identify roles and persons to be interviewed within those roles.

### *4.1.3 MASS : Step 3 – Perform Evaluation*

A round of semi-structured interviews was conducted with three UPMs and three SPMs. It was not possible to interview all the SPMs for the three products due to their busy schedules. Since the idea behind the qualitative interviews is to investigate how strategy formulators and strategy realizers understand and interpret a product's strategy, it was considered appropriate to interview at least one strategy formulator and one strategy realizer for each product, this was achieved. The interviews were initiated with the qualitative questions (see Table 3), and subsequently the questionnaire to prioritize the goals and objectives was provided (see Table 4). All of the UPMs and SPMs (even the ones not being interviewed) completed the questionnaire with the prioritizations.

The interviews were designed to take one hour per interviewee thus in total it took six hours for the primary author to conduct all the interviews.

### *4.1.4 MASS : Step 4 – Perform Analysis*

#### *4.1.4.1 Answering RQ1*

The results of the categorization and similarity analysis are shown in Table 9. Each category of responses is discussed to evaluate alignment in relation to the defined categories. The specific strategic details are not reported in the paper due to reasons of confidentiality; rather the similarities and differences are discussed in a general manner.

**Table 9 - Categorizing qualitative interviews data**

Looking at column two, three and four in Table 9 agreement between the UPMs (UPM: upper product manager) and SPMs (SPM: strategic product manager) can be observed. This is true for each product with respect to the product's vision and mission ("Where"), competitive strategy ("How") and how the strategy for each product is documented ("Why"). They also agreed on the measurable goals and objectives ("How") aspect, stating that they lack measurable objectives explicitly linked to the product's strategic goals. This is discussed later in Section 4.1.5 where possible root causes for misalignments are elaborated upon.

Considering the architectural aspect in column eight ("What"), they all agreed that they do take the existing architecture of the product into account; however, they do it informally through meetings. However, they stated that they have realized the need for more explicit architecture documentation that can serve as an input to the formulation of the product strategy, avoiding surprises in the longer run.

From the innovation perspective in column six (“What”), it can be seen that the UPMs and SPMs were not completely aligned. The opinions differed on whether the innovation aspect was explicitly considered in a product’s strategy. While the UPMs were of the opinion that technology innovation is explicitly considered, the SPMs were either not sure that it was explicitly considered, or stated that it is not considered. In response to the question if technology innovation is taken into consideration for a product strategy, the UPMs mentioned that for their respective products they are relatively slow in adopting new technologies, and one of the UPMs explained: *“Innovations are mostly driven by analysts’ reports, which discuss the emerging technologies and trends with respect to their potential market share”*.

The SPMs were of the view that sources of innovation are: the analysts’ reports, Ericsson’s internal research projects and ideas from the development team. However, one of the SPMs mentioned: *“An important criteria for success is to gain market share and if this can be done without being innovative then there is no need for innovation”*. Moreover, SPMs also agreed that innovative features are not considered as high value, at least not to the degree of being prioritized over present customer’s functional requirements.

Regarding the software quality goals in a product’s strategy (“What”), the UPMs and SPMs had divergent views as is evident from Table 9. The UPMs for Product X and Product Y stated: *“the quality aspect is considered only when there are quality issues, otherwise basic qualities are assumed to be taken care of as a matter of practice”*. The UPM of Product Z mentioned: *“we had a number of quality requirements stated in the product’s strategy”*. While the SPMs agreed that quality is not considered explicitly within a product’s strategy, they mentioned/agreed that it should be explicitly stated in the product’s strategy. This, they stated, can increase the perceived value and priority of quality requirements, which are usually not considered as high value in comparison with functional requirements stemming from customers.

With respect to roadmapping (last column of Table 9), i.e., the “When” part of the strategy, the UPMs and SPMs were aligned. They stated that they had product roadmap documents that were quite detailed, but they did not know of explicit technology roadmaps. However, they acknowledged the importance of it.

Summarizing the qualitative data analysis, it can be concluded that the UPMs and SPMs have a common understanding and interpretation with respect to the “Where”, “How” and “When” parts of the strategy, but their understanding differs with respect to the “What” part which involves the technical considerations of a product.

#### 4.1.4.2 Answering RQ2

Since the product strategies are specific to products, the correlation analysis of the degree of alignment between the usage and priorities of strategy factors was carried out for each product separately.

**Use of Product’s Strategic Goals and Objectives.** With respect to the use of goals for Product X, it can be seen from the first row of Table 10 that the degree of alignment between UPMs (UPM: upper product manager) and the SPMs (SPM: strategic product manager) is less than 70% in all of the cases. None of the correlations are significant, therefore, it can be concluded that the degree of alignment is relatively weak. However, it is better in the cases of the UPM and SPM1 (66.7%) and the UPM and SPM3 (64.5%). The degree of alignment amongst the SPMs who are realizers of the strategy was very low.

Table 10 shows a similar analysis for Product Y. It shows that the UPM and SPM groups are quite aligned (between the UPM and SPM1= 81.1% and correlation between UPM1 and SPM2 = 89.5%). For

product Z, the correlation between UPM and one SPM1 is strikingly perfect (100%). Similarly, the degree of alignment between SPMs is strong (76.1%).

Based on the correlations, it can be concluded that degree of alignment between UPMs and SPMs in how they perceive the usage of strategic goals for the three products (X, Y and Z) is strong (between 66% and 100%), though not very strong in every case. The degree of alignment among the SPMs (the realizers of strategy) varies between 0% to 97% which shows that in some cases it is very strong (Product Y), while for others it is very weak (Product X).

**Table 10 – Correlation matrix showing the degree of alignment between the groups and among SPMs in relation to how they perceive the use of strategy goals currently for Product X, Y and Z**

**Priority of Product’s Strategic Goals and Objectives Currently.** Table 11 shows that the degree of alignment between the UPMs and SPMs, as to how they perceive the priority of strategic goals and objectives currently for the three products (X, Y and Z), is not so strong (between 63% and 74%). The UPMs and SPMs seem to agree on the use of the strategy goals, but not on their relative importance.

**Table 11 - Correlation matrix showing the degree to which the groups are aligned in how they perceive the priority of strategy goals currently for Product X, Y, Z**

The degree of alignment among the SPMs (the realizers of strategy) varies between 13% to 95%, which shows that in some cases it is very strong (Product Y), while for others it is weaker (Product X).

**Ideal Priority of the Product’s Strategic Goals and Objectives.** Finally, Table 12 shows the degree of alignment between the UPMs (UPM: upper product manager) and SPMs (SPM: strategic product manager), in relation to their perception of the ideal priority of strategic goals for the three products. Here the agreement is rather weak (between -90% and 78%). For Product X, the correlation between UPM and SPM1 is negative, implying that they are negatively aligned in their perspectives as what should ideally be the priority of strategic goals. Among the SPMs, the degree of alignment varies between -100% to 95% which shows that in some cases it is very strong (e.g. Product Y) while for others it is negative (Products X and Z).

**Table 12 - Correlation matrix showing the degree to which the groups are aligned in how they perceive the ideal priority of strategy goals for Product X, Y, Z**

Based on the qualitative and quantitative data analysis it is concluded that when it comes to slogans of the strategy and general statements, the UPM and SPMs generally agree. However, when the strategy is broken down to concrete goals and they are the SCSs are asked to indicate use and priorities of strategic factors (both current and ideal) the misalignment is evident and in some cases severe.

#### *4.1.5 MASS: Step 5 – Conduct Follow-up Workshop*

As suggested in Step 5 of MASS, to conduct the workshop a follow-up questionnaire was prepared based on the example follow-up questionnaire template (see Table 6 and Table 7).

Two UPMs and three SPMs were presented with the results for their respective products and they were asked to identify and discuss potential root causes for the misalignments. Due to confidentiality reasons, the exact questionnaire containing the results cannot be presented. However, common root causes

identified during these feedback sessions are given below. The first and fifth root causes were not given in the original follow-up questionnaire but were added by the participants during the follow-up workshop as additional important causes for misalignment. Using the feedback from participants potential dependencies between the root causes are also discussed below.

- C-1. Lack of incentives: According to two SPMs: “*no incentives for being proactive and innovative are given*”. Currently, Ericsson’s approach is reactive and not proactive: for an approach to be proactive more time and effort is required, however, no time and effort is budgeted for proactive and innovative planning.
- C-2. Lack of relevant communication: According to an SPM: “*there is a lot of daily discussion around the events happening on daily or weekly basis but no discussions about long term strategy between SPMs*”. All the participants agreed to this reason.
- C-3. Lack of explicit explanation of strategic factors and their importance in documented product’s strategy: As the SPMs get statements from the UPMs, every SPM understands and acts according to his/her own interpretation of the statements.
- C-4. Incorrect use of product/project experiences to update strategy: Mostly working product strategies are written down as an account of history, and not as something to be used as a planning tool. This is primarily due to the SPMs point of view that there is no incentive to work on strategies (C-1 leads to C-4). Moreover, in the absence of explicit description of strategic factors and their relative importance updating a strategy after learning from experiences does not make any sense (C-3 leads to C-4).
- C-5. Event driven decisions: There are two types of strategies: documented product strategy (explicit) and working product strategy (implicit). The UPMs give equal importance to all the strategic factors in the documented product strategies, whereas, depending on the current events in the market such as competition and customers requirements, each SPM (the strategy realizer) reacts to the situation and chooses which strategic factors are important at a certain point of time (C-2 and C-3 lead to C-5)
- C-6. Lack of measurable objectives: Everybody agreed that they do not have any measurable objectives that translate strategy into action. Rather there are key progress indicators that determine personal progress and salary. It can be deduced that in the absence of explicit explanation of strategic factors and their importance in documented strategies related to products, it is almost impossible to state measurable objectives (C-3 leads to C-6).

Figure 5 shows the dependency diagram of the identified causes. From the diagram, it can be deduced that C-1, C-2 and C-3 are the root causes that need to be dealt with in order to solve the issue of misalignment.

**Figure 5 – Dependency Diagram**

The follow-up workshop took two hours. It is very important to present all the results clearly and precisely in order to conduct an effective and efficient follow-up session. It was personally experienced that since the results were clear and explicit the participants quickly got into the discussions about the root causes. The participants highly valued the follow-up to dig deep down into the root causes. They saw it as a better starting point for identifying issues compared to direct jump to the solutions based on the results only.

## 4.2 Validity Threats

In this section, we discuss the threats to the validation of MASS. We base this on the discussion of validity and threats as presented in Wohlin et al. [39]. The validity threats considered are conclusion, construct, internal and external validity threats respectively.

### 4.2.1 Conclusion Validity

The sampling techniques used for identifying the SCSs can pose a threat to the validity of the evaluation. The subjects selected may not be totally representative for the role they should represent at Ericsson for the three case products. The main assurance that this misrepresentation is minimal is the fact that the subjects were selected in cooperation with two senior managers with extensive knowledge and experience concerning the development processes and the personnel at Ericsson.

### 4.2.2 Construct Validity

Evaluation apprehension can affect the way participants responded to the alignment evaluation. In order to mitigate this threat, authors made it explicit to the participants that there are no wrong and right answers but rather the purpose is to elicit their understanding, opinions and views regarding product strategies formulation in general and results in particular.

### 4.2.3 Internal Validity

As the evaluation and feedback sessions of MASS were performed with the different interview subjects, they were called upon to voice their opinions and views regarding e.g. product strategies formulation in general and results in particular. As their answers were registered by the researcher this could have constrained people in their answers. This potential problem was alleviated by the guarantee of anonymity as to all information divulged during the evaluation and feedback sessions, and that recorded answers was only to be used by the researcher, i.e. not showed or used by any other party.

### 4.2.4 External Validity

The external validity is concerned with the ability to generalize the results, i.e. in this case the applicability of MASS in industry outside the case company.

MASS can be applied in any company as it is not a one-size fits all method. It details the steps to be performed for evaluation of alignment. The evaluation framework used in MASS can be tailored based on different product strategies and similarly SCSs can be identified based on who performs the roles specified by MASS.

## 4.3 Case Study Conclusions

Through the application of MASS at Ericsson, the qualitative interviews data analysis shows that the two SCS groups related to strategy formulation and strategy realization are aligned with respect to vision and mission statements. However, they have divergent views when it comes to the technical product aspects (innovation and quality requirements). Some think that technical aspects should be explicitly considered in a product strategy while some are of the opinion that they should not be. The analysis of the quantitative data further revealed:

1. The degree of alignment between the UPMs (UPM: upper product manager) and SPMs (SPM: strategic product manager) in how they perceived the usage of strategic goals for the three products (X, Y and Z) was strong (between 66% and 100%), though not very strong in every

case. The degree of alignment among the SPMs (the realizers of strategy) varied between 0% to 97% which shows that in some cases it was very strong (Product Y), while for others it was very weak (Product X).

2. The degree of alignment between the UPMs and SPMs as to how they perceive the priority of strategic goals and objectives for the three products (X, Y and Z) was not so strong (between 63% and 74%). The degree of alignment among the SPMs (the realizers of strategy) varied between 13% to 95% which shows that in some cases it was very strong (Product Y), while for others it was very weak (Product X).
3. The degree of alignment between the UPMs and SPMs in how they perceived the ideal priority of strategic goals for the three products (X, Y and Z) was rather weak (between -90% and 78%). Among the SPMs, the degree of alignment varied between -100% - 95% which shows that in some cases it was very strong (e.g. Product Y) while for others it was negative (Products X and Z).

When these results were presented to the participants according to Step 5 of MASS, following possible root causes of misalignment were identified:

- C-1. Lack of incentives.
- C-2. Lack of relevant communication.
- C-3. Lack of explicit explanation of strategic factors and their importance in documented product's strategy.

The MASS evaluation has helped Ericsson in identification of misalignments as well as the root causes. Ericsson understood if there are misalignments among involved SCS with respect to the main tool (i.e. product strategies) for taking product development and management decisions, challenges like initial triage of requirements, balancing the long-term with short-term goals, balancing functional requirements with non-functional aspects cannot be addressed until the identified root causes are dealt with. While for large companies like Ericsson these misalignments are bound to exist (due to large products), mature companies like Ericsson can use MASS evaluations as a continuous effort for improving alignment, homogenizing understanding and agreeing on future prioritization of factors.

As a result of this evaluation, Ericsson has already started research initiatives as how to solve the root cause C3: lack of explicit explanation of strategic factors and their importance in documented product's strategy. Currently at the time of writing this paper, Ericsson along with the authors is exploring the possibilities for explicit and common vocabulary of strategic factors. They plan to work further on the lines as how to make strategic decision-making explicit once the strategic factors are made explicit.

## 5. CONCLUSIONS AND FUTURE RESEARCH

In market-driven software development, product management is faced with several challenges. Requirements overload, selection of a right mix of requirements for balancing a product's short and long terms goals, and time-to-market pressure, to name a few, all are paramount for product success. Utilizing product strategies to perform requirements triage, trade-offs, and ultimately requirements selection has proven successful [7, 10, 11]. However, to ensure that the overall strategies are understood

and prioritized homogenously, and the same strategies are used as the basis for both the planning and the development of a product, alignment between the SCS needs to be assured. MASS was developed in collaboration with industry, which is illustrated through a case-study at Ericsson AB, to enable the evaluation of degree of alignment between upper management (strategy creators) and the product management (strategy realizers) with respect to the understanding and interpretation of a product's strategy. MASS shows misalignment, and enables the identification of leading causes.

MASS contains five steps that build on established technologies such as VMOST and MERTS, which were combined to cover several perspectives including the management, marketing and technical views. In addition, MASS is the first method of its kind covering the strategy evaluation and refinement for development organizations in a market-driven product development context. It focuses on the software product and the product strategy of a market-driven software development company, unlike the previous studies [20-25] which were limited to the project perspective for achievement, assessment and maintenance of strategic alignment, and in addition focused on the business strategies of the customer organization.

During the development of MASS we did not adopt a one-size-fit-all philosophy with regards to strategies, but rather by choosing the specific product's strategic goals and objectives, a tailoring towards a product (or organization) can be achieved prior to use in order to adapt to organizational and product specific goals and objectives. This makes it possible for any organization to use MASS to the degree needed, making it suitable for larger companies as well as small and medium sized enterprises.

At present MASS has been developed in collaboration, and used in one company through a case study where three product organizations were evaluated. Future work involves application of MASS in other organizations in industry. During the execution of MASS in the case company, however, we realized that the goals stated in the questionnaire, for assigning point to, were on an abstract level and as a refinement of MASS, the questionnaire could be divided into a hierarchy of strategic, tactical and operation goals. This can help the SCS to understand the goals even more clearly. In addition, future research involves looking into possible solutions for the identified root causes of misalignments. Moreover, currently MASS only focuses on evaluation of alignment and the identification of root causes for misalignment, steps needed to maintain alignment still needs to be incorporated in MASS.

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**Table 1 – Comparisons of Alignment Evaluation Methods/Frameworks**

<b>Study</b>	<b>Aim/Objective</b>	<b>Focus</b>	<b>Type of strategy</b>	<b>Perspective</b>
[19]	Determine alignment levels by means of SA practice	IS	Business	Projects
[20]	Measure existing use of IT in organizations	IS	Business	Business and IT
[21]	Measure alignment for small firms and investigate factors that influence alignment	IS	Business	Business and IT
[22]	Identify recommendations for improving alignment based on the organization's maturity	IS	Business	Business and IT
[23]	Identify specific recommendations for improving alignment	IS	Business	Business and IT
[24]	Measuring the social dimension of alignment	IS	Business	Business and IT
MASS	Determine degree of alignment between SCS for creating product value aligned with a product's strategy	Software product	Product Strategy	Software product

**Table 2 - Objectives of the case study and corresponding research questions**

Objectives	Research Questions (and MASS evaluation questions)
Investigate if the SCSs understand and agree on a product's strategic goals and objectives.	RQ1: How do the SCSs understand and interpret different aspects of a product's strategy?
<p>Determine the degree of alignment in the priority given to the goals and objectives of a product strategy between SCSs. This is assessed in three parts as follows:</p> <ol style="list-style-type: none"> <li>1. First to understand to what degree the two groups are aligned in how they perceive the use of the strategic goals and objectives today (referred as current from now onwards). And to what degree are the SCSs within a group aligned in how they currently perceive the use of the software product's strategic goals and objectives.</li> <li>2. Secondly, to understand to what degree the two groups are aligned in how they perceive the priority of the current strategic goals and objectives; and to what degree are the SCSs within a group aligned in how they currently perceive the priorities on the software product's strategic goals and objectives</li> <li>3. Lastly, to what degree are the SCSs between the two groups and among the product realization group aligned with respect to ideal priorities of a product's strategic goals and objectives?</li> </ol>	RQ2: What is the degree of alignment between and among the two groups with respect to the product strategy?
	<p>RQ2.1: To what degree are the two groups aligned in how they perceive the use of the software product's strategic goals and objectives?</p> <p>RQ2.2: To what degree are the SCSs within a group aligned in how they perceive the use of the software product's strategic goals and objectives?</p>
	<p>RQ2.3: To what degree are the two groups aligned in how they currently perceive the priorities on the software product's strategic goals and objectives?</p> <p>RQ2.4: To what degree are the SCSs within a group aligned in how they currently perceive the priorities on the software product's strategic goals and objectives?</p>
	<p>RQ2.5: What degree are the groups aligned with respect to ideal priorities of a product's strategic goals and objectives?</p> <p>RQ2.6: What degree are the SCSs within a group aligned with respect to ideal priorities of a product's strategic goals and objectives?</p>

**Table 3 – Qualitative interview questions**

Method/ Technique	Corresponding Questions	To Answer	
VMOST	1. What is the ideal end-state towards which the organization strives through the product in question (vision)? 2. What is the primary activity that the organization performs to achieve the end-state?	Where	
	3. How are the responses to questions 1 and 2 (vision and mission) appropriate and relevant to the environment (of industry and market)? 4. What are the basic activities and their rationale by which organization competes with industry rivals?	How	
	5. Are the responses to questions 1 and 2 (vision and mission) explicit or implicit? How?	Where	
	6. What goals does the organization set to determine if it is competing successfully? 7. What activities does the organization perform to achieve the goals in 6? 8. How do the goals in 6 support the responses to 1? 9. What are the measurable objectives that indicate achievement of goals identified in and what activities does the organization perform to achieve those objectives? 10. How do the objectives identified in 9 support the goals identified in 6?	How	
	MERTS	11. Is technology innovation taken into consideration for a product strategy?	How and What
		12. How is technology innovation taken into consideration for a product strategy?	
13. Is the existing architecture taken into consideration for a product strategy? 14. How is the existing architecture taken into consideration for a product strategy? For example, through, formal architectural documentation, informal discussions, and/or discussions in meetings?		What	
15. What types of roadmaps are created for a product? 16. Do you have technology roadmaps in some format?		When	

**Table 4 – Questionnaire template**

**Which of the following goals are used most when creating/realizing a product's value and what is their relative importance?**

<b>Value dimension</b>	<b>Usage Today</b> 0 = not used, 1 = used occasionally, 2 = almost always used, 3 = is a must.	<b>Today</b>	<b>Points</b>	<b>Ideal</b>	<b>Points</b>
1. Goal 1					
2. Goal 2					
3. Goal 3					
4. Goal 4					
5. Goal 5					
<b>Point remaining:</b>			<b>100</b>	<b>Point remaining: 100</b>	

**Table 5 – Categorizing qualitative interviews data**

<b>SCSs</b>	<b>Vision and mission (Where)</b>	<b>Competitive strategy (How)</b>	<b>Documentation (Why)</b>	<b>Measurable goals and objectives (How and what)</b>	<b>Innovation (How and What)</b>	<b>Software quality (How and What)</b>	<b>Architecture (What)</b>	<b>Roadmapping (When)</b>
SCS1	To be the leader	Focus on secondary competitor	Product strategy document contains statements about vision and mission	We do not measure progress towards the goals	Innovation should be explicitly considered	Should not be considered in a product's strategy rather it is the responsibility of development department	Is informally considered	There are product roadmaps that are followed
SCS2	To be the leader	Focus on secondary competitor	Product strategy document contains statements about vision and mission	We do not measure progress towards the goals	We do not focus on innovation thus it should not be explicitly considered	Should be stated explicitly in a product's strategy	Not considered at all	Roadmaps are followed to a certain extent
<b>Views</b>	<i>Similar</i>	<i>Similar</i>	<i>Similar</i>	<i>Similar</i>	<i>Not similar</i>	<i>Not similar</i>	<i>Not similar</i>	<i>Almost similar</i>

**Table 6 – Follow-up questionnaire template for qualitative interview results**

<b>Results</b>	<b>Questions</b>
It has been observed in the study results that on innovation perspective, the SCSs did not agree (taken from hypothetical example shown in Table 5)	Should innovation be explicitly considered or not in the product strategy? Yes/No
Some think it should be considered explicitly and some think it should not be	Why do you think it should/should not be considered in the products strategy?
	What in your view is the reason for this misalignment?

**Table 7 – Follow-up questionnaire template for questionnaire results**

Results	Questions																																																																											
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<b>Results</b>		<b>Questions</b>
2. Factor C		Do you agree E should be the least important factor?
3. Factor D		Yes
4. Factor A		No
5. Factor E		Why?

**Table 8 –Products’ Characteristics**

<b>Products</b>	<b>Size</b>	<b>Maturity (in terms of years)</b>	<b>Total releases</b>	<b>Release frequency</b>
X	Large	9	7	1 per year
Y	Small	4	1	1 per 4 years
Z	Medium	9	4	1 per 2 years

**Table 9 - Categorizing qualitative interviews data**

<b>Products</b>	<b>Vision and mission (Where)</b>	<b>Competitive strategy (How)</b>	<b>Documentation (Why)</b>	<b>Measurable goals and objectives (How and what)</b>	<b>Innovation (How and What)</b>	<b>Software quality (How and What)</b>	<b>Architecture (What)</b>	<b>Roadmapping (When)</b>
X	Similar views	Similar view	Similar view	Similar view	Not similar view	Not similar view	Similar view	Similar view
Y	Similar view	Similar view	Similar view	Similar view	Almost Similar view	Not similar view	Similar view	Similar view
Z	Similar view	Similar view	Similar view	Similar view	Almost Similar view	Not similar view	Not similar view	Similar view



**Table 10 – Correlation matrix showing the degree of alignment between the groups and among SPMs in relation to how they perceive the use of strategy goals currently for Product X, Y and Z**

<b>Products</b>	<b>Stakeholders</b>	<b>UPM</b>	<b>SPM1</b>	<b>SPM2</b>	<b>SPM3</b>
<b>Product X</b>	UPM		66.7	15.2	64.5
	SPM1			30.4	64.5
	SPM2				0
	SPM3				
<b>Product Y</b>	UPM		81.1	89.5	
	SPM1			97.3	
	SPM2				
<b>Product Z</b>	UPM		100	76.1	
	SPM1			76.1	
	SPM2				

**Table 11 - Correlation matrix showing the degree to which the groups are aligned in how they perceive the priority of strategy goals currently for Product X, Y, Z**

<b>Products</b>	<b>Stakeholders</b>	<b>UPM</b>	<b>SPM1</b>	<b>SPM2</b>	<b>SPM3</b>
<b>Product X</b>	UPM		63.2	13.5	70.3
	SPM1			41.0	56.4
	SPM2				76.3
	SPM3				
<b>Product Y</b>	UPM		73.8	60.0	
	SPM1			94.9	
	SPM2				
<b>Product Z</b>	UPM		63.2	80.6	
	SPM1			58.0	
	SPM2				

**Table 12 - Correlation matrix showing the degree to which the groups are aligned in how they perceive the ideal priority of strategy goals for Product X, Y, Z**

<b>Products</b>	<b>Stakeholders</b>	<b>UPM</b>	<b>SPM1</b>	<b>SPM2</b>	<b>SPM3</b>
<b>Product X</b>	UPM		-90.0	-10.3	100.0
	SPM1			35.9	30.0
	SPM2				56.4
	SPM3				
<b>Product Y</b>	UPM		77.8	73.8	
	SPM1			94.9	
	SPM2				
<b>Product Z</b>	UPM		15.4	-60.0	
	SPM1			5.1	
	SPM2				