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Performance management system for the new services process of Philips HealthTech

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Performance Management System for the new services process of Philips HealthTech

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Abstract

This master thesis describes the development of three performance management systems for the new services processes of Philips HealthTech Customer Service Imaging Systems. The performance management systems cover the tactical development process of new services, new services which are in the pre-launch and new services that are in the post-launch phase. The performance management systems consist of a comprehensive set of critical success factors and key performance indicators which are derived from the former.

Management Summary

The research for this master thesis is executed at the Imaging Customer Service department of Philips HealthTech. The focus of the research is the new services process, for which Philips is interested in a systematic performance management approach in order to allow for the continuous improvement of relevant processes. A literature review was performed, which indicated that a performance management system is the most suitable method for such an approach. A performance measurement system is defined as "the set of metrics used to quantify both the efficiency and effectiveness of actions" (Neely, Gregory & Platts, 1995, p. 81). Based on this need the following research statement was formulated:

> *Design a methodology that allows new services development to design, implement, use and update a performance management system that captures the performance of the new service Alpha and is suitable for other new services*

The new services process can be described from two view points. On the one hand there are three functional processes. These processes are end-to-end, meaning that they cover the entire life cycle of the service and are considered on a tactical level. The first of these is the development processes (Innovation to Market, I2M). The Innovation to Market processes cover both the marketing and development activities. These processes are performed centrally in the organisation. Secondly, the sales processes (Market to Order) ensure that leads are generated, qualified as opportunities and converted into orders. Lastly, the delivery processes (Order to Cash, O2C) cover the installation, support, contract management, ordering and billing processes. On the other hand, the new services can be distinguished as pre-launch or post-launch. On the one hand services that are in the development stage and are not yet sold to the customers. These are called pre-launch services. When these are developed and sold to the customers they are called post-launch services. The three functional processes function together in each type of service in a matrix type of organisation. The following approach was used. On a tactical level, a performance management system will be developed to manage the overall development process performance. Next to that, for both the pre-launch and the post-launch type of services a performance management system will be developed.

Methodology

A performance management system is developed according to four main phases (Bourne, Mills, Wilcox, Neely & Platts, 2000, Mettänen, 2005):

1. The design process;
2. The implementation process;
3. The use process;
4. The updating process;

For the design, implementation, use and updating of the performance management systems methods from multiple literature sources were used.

Design

In this thesis project, the design process follows a hybrid approach, based on several frameworks from literature: the sub-processes of Leinonen's model (in Mettänen, 2005), Bourne, Neely, Mills & Platts (2003) and Kaplan & Norton (1996) for the Balanced Scorecard perspectives and the number of workshops and meetings and Flapper, Fortuin & Stoop (1996), Neely, Richards, Mills, Platts & Bourne (1997) and Neely et al. (2002) for the measure development. These methods share many similarities, where Leinonen's model uses the most explicit typology for the different stages. Therefore Leinonen's model provides the basis of the design process. In more detail, Leinonen's model (in Mettänen, 2005), see also fig. 1, consists of seven phases:
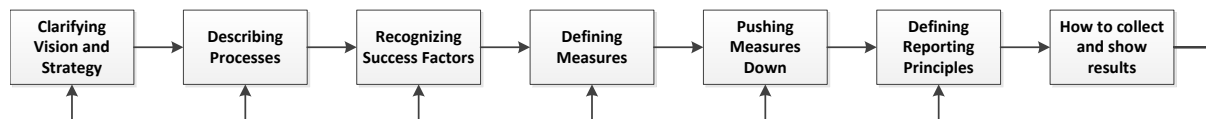
Figure 1: Leinonen's model (in Mettänen, 2005)

1. Clarifying vision and strategy;
2. Describing processes;
3. Recognizing success factors;
4. Defining (and evaluating) measures;
5. Pushing measures down from top management to lower levels;
6. Defining reporting principles;
7. Determining how to collect information and how to report results.

Critical success factors have a direct and high impact on the effectiveness, efficiency and viability of a service offering. Activities associated with critical success factors must be performed at the highest possible level of excellence in order to achieve organisational success (Mahmood & Sajid, 2012). Key performance indicators are defined in order to accomplish a critical success factor. For the actual design of the key performance indicators themselves, the performance measures record sheet provided by (Neely et al., 1997, p. 1151) is used, see table 3.1. This record sheet requires all necessary input for the implementation, use and updating processes. It also requires explicitly made statements about the measures, which increases critical thinking about the measures. This record sheet is also in line with existing performance measurement methodologies within Philips.

Implementation

The implementation process follows the three main steps proposed by Bourne et al. (2000) and Mettänen (2005).

1. Establishment of procedures for measurement;
2. Development of infrastructure for data collection, analysis and reporting;
3. Organisation accepts and starts to use the performance measurement system.

The implementation process is concerned with the practical application of the PMS design. Procedures for data collection, analysis and reporting were established and the necessary infrastructure is put in place in order to allow for these procedures.

Use

Three main characteristics of this phase can be identified. First, team members should be aligned on the purpose of the PMS. Secondly, how and when the reporting is performed and the team receives feedback from the PMS. Lastly, it must be clear what actions are taken based upon the output of the PMS.

Updating

The updating process consist of three steps (Bourne et al., 2000).

1. The updating of targets and current measures;
2. New measure development;
3. Challenge strategic assumptions in order to improve the PMS.

Only the design and implementation of a performance management system are in scope of this graduate thesis. For the other two processes a methodology is presented.

Tactical Performance Management System

For the tactical performance management system eight critical success factors were developed. In order to measure and manage these eight success factors, twelve key performance indicators were designed.

1. Decrease costs - Decrease all relevant cost for the development of new services;
2. Improve customer awareness - Improve the awareness of customer with respect to new services;
3. Improve portfolio management - Improve the selection and prioritisation of potential future projects;
4. Improve project management - Improve the management of existing projects;
5. Improve ecosystem collaboration - Improve the collaboration with other Philips entities;
6. Improve industrialization - Improve the extent to which new services can be sold and delivered to a wide array of customers;
7. Improve employee expertise - Improve the expertise and competencies of development employee;
8. Leverage partnerships - Improve the performance of suppliers.

The tactical performance management system was not implemented in this thesis.

Pre-launch Performance Management System

For the pre-launch performance management system six critical success factors were developed. In order to measure and manage these eight success factors, eight key performance indicators were designed.

1. Decrease costs - Decrease all relevant cost for the development of a new services;
2. Improve customer awareness - Improve the awareness of customer with respect to a new services;
3. Improve project management - Improve the management of a new services' development;
4. Improve ecosystem collaboration - Improve the collaboration with other Philips entities;
5. Improve industrialization - Improve the extent to which a new services can be sold and delivered to a wide array of customers;
6. Leverage partnerships - Improve the performance of suppliers with respect to a new services.

The pre-launch performance management system was not implemented in this thesis.

Post-launch Performance Management System

The post-launch performance management system contains more critical success factors and key performance indicators than the previous two systems, due to its operational nature. It therefore mostly involves sales and delivery processes. Ten critical success factors were derived and twenty associated key performance indicators were designed in order to measure and manage the success factors.

1. Decrease costs - Decrease the relevant development, deployment and support costs;
2. Increase profitability - Increase the profitability of the new service;
3. Increase revenues - Increase the revenues generated from the new service;
4. Improve customer awareness - Improve the awareness of customer with respect to the new service;
5. Improve customer experience - Improve the customers' experiences in working with the new service;
6. Improve customer retention - Improve the re-subscription of customers;
7. Improve life cycle management - Improve the relationship with the customer;
8. Improve sales efficiency - Improve the efficiency of the sales processes;
9. Improve delivery efficiency - Improve the efficiency of the delivery processes;
10. Leverage partnerships - Improve the performance of suppliers.

For the new service Alpha, implementation of the post-launch performance management has started. Here the focus was on the key performance indicators that were suitable for automation. This would allow for an easier implementation of the initial measures and also showcase the benefits of the performance management system more.

Conclusions and Recommendations

As the initial project description, provided by Philips, stated, the goal of the project was to create a performance management approach for new services. This thesis investigated how to measure and manage the performance of new services within Philips Imaging Customer Service. As described in the deliverables, this project provided three PMS. The literature review focused on the development of a performance management system. Within literature, as well as the methodologies used in this thesis, there was no indication that the development of a performance management system for new services differed from the development of a PMS of the traditional Philips businesses. Although critical success factors and key performance indicators might differ between the two, the methodology for the design, implementation, use and updating will not.

First of all, it is recommended to complete the implementation of the post-launch PMS for new service Alpha further. After which the implementation of the pre-launch and tactical PMS should be completed. After the implementation, the organisation should start to use the three PMS. Important here is to use the PMS as a tool for the previously stated goal: continuous improvement of processes. The PMS should not become a goal on their own, but should be used as a means to an end. Furthermore, the updating process of the measures is critical to the success of the PMS. Regularly checking whether targets are up-to-date, whether the set of critical success factors and key performance indicators is still reflecting the processes in scope and whether the key performance indicators are still used to accomplish the organisational objectives are vital elements of the use and updating processes. Without critical thinking about the critical success factors and key performance indicators in the PMS after the initial implementation, the use of the PMS will most likely not achieve it continuous process improvement goal.

Preface

This report presents the graduation project executed at Royal Philips N.V. in Best. The project took place within the Imaging Customer Services department of Philips HealtTech. This thesis is the final part of the requirements for the master Operations Management and Logistics at the Eindhoven University of Technology (TU/e).

The graduate thesis marks the end of my master and my student life and the start of an entirely new phase of my life. The remainder of the preface is dedicated to those who have supported and helped me in executing this thesis in specific, but also this master in general.

First of all I would like to thank my supervisors at Philips, Alexandra Cordia and Bert Mollen, for the opportunity of doing my graduate thesis at Philips. Moreover, for their contribution, continuous feedback and support during the project. In addition to them, I would like to thank the development team for their contribution and challenging questions during the development of the performance management systems.

Next, I would like to thank Shaunak Dabadghao for his role as my first supervisor and his helpful comments and overall guidance during the project. Additionally, I would like to thank Simme Douwe Flapper, my second university supervisor, for his sharp feedback and challenging questions on my thesis.

A special thanks also need to go out to everyone with HLD Drôle and others within SSRE. I have spend most of the last seven years with them, and they have made Eindhoven my home in that period. I have learned much during this period and I will never forget what experiences we had in those years.

Finally, Servaas, Hanna & Eelco, Marian, Xander & Manou, Ivon & Andreas, Wynand, Mark & Marijke, Kim & Hans, and especially Opa Jan and Marion, thank you for your never ending support, love and friendship. Ilse, you have been able to put up with me for all this time, sometimes I really do not know how. Last year has been extraordinary to say the least and all I can say is thank you very much.

Marco van Eijsden
Eindhoven, July 2016

List of Abbreviations

Table 1: List of Abbreviations

Abbreviation	Meaning
AOP	Annual Operating Plan
BDMS	Business Document Management System
BIU	Business Unit
BPO	Business Process Owner, responsible for the I2M, M2O & O2C processes
BSC	Balanced Score Card
CPMS	Contemporary Performance Management System (synonym of PMS)
CSF	Critical Success Factor
EMEA	European, Middle East and Africa Markets
I2M	Innovation to Market (Philips Development & Marketing Process)
Im CS	Philips Imaging Customer Service
KPI	Key Performance Indicator
M2O	Market to Order (Philips Sales Process)
NPD	New Product Development
NPP	New Product Process
NPDL-(4S)	New Product Development and Launch (for Services)
NSD	New Service Development
NSP	New Service Process
O2C	Order to Cash (Philips Delivery & Invoicing Process)
PM	Performance Measurement or Performance Management
PMS	Performance Measurement System(s) or Performance Management System(s)

List of Operational Definitions

Table 2: List of Operational Definitions I

Concept	Definition
AOP	Annual Operating Plan, the yearly budget of a department
BDMS	Business Document Management System, system that stores approved project management documentation
BPO	Central team that develops capabilities, tools and processes, for the development, sales and delivery processes
Case creation time	Time at which a customer case has been opened
Development cost centre	Internal account on which development costs per service are book
Deployment cost centre	Internal account on which deployment costs per service are book
Entitlement	Activity that Philips agreed to carry out at a customer detailed in the contract
FTE	Full Time Equivalent
GSRS	Global Supplier Rating Score, questionnaire used in order to assess suppliers and provide points for improvement
Interim capability	Process or tool that is implemented for a short period or time before being replaced with a permanent process or tool
Market	Philips has 17 local markets that are responsible for the sales of equipment and services
Medical Device Installation Time	Time at which a Medical Device has been installed. This is confirmed by the customer. Hereafter invoicing can commence
Order intake	Total value of purchase orders
PLC	Product Launch Committed, gate at which the product detailed technical design and tool specifications are finished. Product launch dates are committed to the Markets.
Project requirement	Business or Commercial requirement for a project defined at the PDC gate
Purchase order	Order which has been confirmed by the customer detailing the number of connections and number of locations the new service needs to be installed at
Recognised sales revenue	Year to Date sales orders that have been recognised by and are invoiced to the customer
Recognised sales revenue per customer	Year to Date sales orders that have been recognised by and are invoiced to the customer for an individual customer
Reference site	Reference sites are hospitals which showcase Philips products and services. They can be commercial, which are mainly used for tours and demonstrations or technical, where scientific research is performed in order to validate the service

Table 3: List of Operational Definitions II

Concept	Definition
RfA	Release for Acquisition, first point customers can be sold a service. Sales people are trained and allowed to make quotations for end customers in specific market(s) which have received the necessary regulatory approvals
RfD	Release for Delivery, sales and delivery of a service commences. It is proven that the product can repetitively be produced according to the specifications in a scalable fashion
Sales order creation time	Time at which the sales order, agreed by the customer, has been entered into the sales system
Service work order	Report on which a clinical application specialist details how long he was at a customer and what for
Support cost centre	Internal account on which support costs per service are book
Support tier	Customer support is organised in between technical (software and hardware related) and application (content) related support and in three tiers of specialisation.
Technical completion time	Time at which a customer case has been closed

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1. Introduction

This chapter will provide the context in which this thesis project was executed. Firstly, it will briefly discuss the company in which it took place, Philips HealthTech (formerly Philips Medical Systems or Philips Healthcare), part of Royal Philips NV. Secondly, it details the new service called new service Alpha for confidentially reasons. Lastly, the chapter outlines the remainder of this report.

1.1 Company Description: Philips HealthTech

Most manufacturing industries have become, at least to some extent, service providers. This transition has forced them to change strategies and come up with new ways of doing business (Lay, Schroeter & Biege, 2009). Most firms still develop both products and services (Kindström & Kowalkowski, 2009), thus have developed hybrid business models (Hypko, Tilebein & Gleich, 2010). This transition indicates that manufacturing companies not only offer a so-called 'break-fix', or maintenance, type of service for their products, other services are developed as well (Lay et al., 2009). These additional services can leverage the firms' extensive knowledge of their products and how their customer operate (Kindström & Kowalkowski, 2009). Also, due to the growing share of services, a broader scope of service offerings is needed for long-term competitiveness of organisations. Other benefits of a broader service portfolio include the enhancement of profitability of existing offerings, attracting new customers, improving loyalty to the firm and opening new markets (Menor, Tatikonda & Sampson, 2002). Now they are gradually making the transition to become (hybrid) service providers. As is the case for Philips HealthTech. Philips' Healthcare division is one of the leading manufacturers of medical systems in the world, and quite recently the company has created a formal new services development unit in its Imaging Customer Service organisation.

Philips is organised through Business-Market-Combinations. At one side, there are eleven different business units (BIU). These BIUs are responsible for the development of new products and related services. At the other side, there are seventeen market organisations that sell products and services to local markets. Imaging Customer Services is a global entity focusing among others on the Customer Services development portfolio for the ultrasound, image guided therapy and diagnostic imaging businesses. Different staff departments, including marketing and development support the development of a shared imaging customer services portfolio across these three business areas. In the future, this portfolio will contain a broad set of different service offerings for the healthcare industry, aimed at providing operational improvement for hospitals. The portfolio intends to complement traditional equipment business units' portfolio in order to provide a complete offering to the customer. The development team in Imaging Customer Services (ImCS), together with marketing drives this transition.

1.2 Service Description: New Service Alpha

Alpha aims to support to support the customer with patient care and operational performance improvements in a specific area, through data collection, reporting and consulting.

1.3 New Service Development

Since the 2014 transition of Philips Imaging Customer Service (ImCS) towards new services, a new service development team recently has been created, officially per January of 2016. The new services development team is responsible for the development functional process for new services. This team focuses on eight different types of projects for new service development (NSD). These projects follow formalised processes, mostly taken from new product development (NPD). Within Philips, for new products, for the development, sales and delivery processes, there are performance measurement and performance management (PM) methods in place. These methods also exist for the traditional maintenance services. However, these appear to be lacking for new services. Due to the lack of formalised performance measurement and performance management methods there is a need for similar methods for new services.

1.4 Outline

This thesis is structured as follows. First, the research design is presented in chapter 2, which is followed by a literature review of performance management systems in chapter 3. Next a current situation analysis is presented in chapter 4. Then a detailed description of the methodology is presented to the design and implementation of the performance management systems. Afterwards, three performance management systems which were designed are presented in chapter 6, chapter 7 and chapter 8. Next the performance management system use and updating processes are discussed in chapter 9. The report is concluded with conclusions and recommendations in chapter 10.

2. Research Design

This chapter describes the problem statement and consequently the research questions. Furthermore, the research methodology, scoping, assumptions and deliverables are discussed in the remainder of the chapter.

2.1 Problem Description

The initial project was described by Philips by the following statement:

> *Creation of an effective operational performance management approach for "new services" introduced by Imaging Customer Services, focusing on the newly formed "New Service Alpha" business. With a global scope, covering new business models which are introduced to create, sell and deliver new services and in order to capture organisational learning and build feedback loops.*

This problem statement was refined to enlarge the initial scope, to not only include an operational performance management approach for the Alpha offerings and future new services, but also include the new service development process. Thus it will include the entire new services development team. The reasoning for this research is threefold. Firstly, the NSD department has a broader scope than a single specific service, such as Alpha. The team handles eight different project types, only the New Product Development and Launch for Services (NPDL-4S) can be directly related to the sales and delivery processes of new services. Secondly, the incorporation of all project types and projects into a single performance management system allows for an overview of the entire NSD process and NSD team. This in turn would allow for more cooperation and knowledge sharing between projects and continuous improvement of processes. Lastly, discussions with multiple stakeholders revealed that some of the key indicators of the NSD process might be out of reach of projects individually, but instead can be targeted only on a team level.

Therefore, the following approach was used. On a tactical level, a performance management system will be developed to manage the overall development performance. Next to that, a distinction is made between services that are in the development stage, thus before they are sold and delivered, and services that are sold and delivered to customers. The former are classified as pre-launch, whereas the latter are called post-launch. For both types of services a performance management system will be developed.

Summarised, the current problem is the lack of a formal way of measuring and managing performance and improving operational excellence based on data. In order ot account for this problem, three different performance management systems were developed.

2.2 Research Questions

The problem description posed in the previous section lead to the main research question of this thesis:

Design a methodology that allows new services development to design, implement, use and update a performance management system that captures the performance of the New Service Alpha and is suitable for other new services

We aim to answer the main research question with the following questions:

1. How can the new services process at Philips Imaging Customer Service be described?
2. What methodology is suitable for the design, implement, and use and update of a performance management system for the development process on a tactical level?
3. What methodology is suitable for the design, implement, and use and update of a performance management system for a pre-launch new service?
4. What methodology is suitable for the design, implement, and use and update of a performance management system for a post-launch new service?
5. What infrastructure is needed to facilitate performance management systems in a new services environment?

These questions serve as a guide to answer what an overall procedure for the design, implementation, and use and updating of a PMS would look like. For instance, what stakeholders need to be involved, how much time and effort should be taken into account and identifying what additional barriers and facilitators are. The following section contains the proposed way of solving the research questions.

2.3 Methodology

This research encompasses the first four phases of the regulative cycle (van Strien, 1997). These phases are the problem mess, problem definition, analysis and diagnoses and action plan. In the first phase there are unstructured interviews with the new services development manager, the marketing manager and the service operations manager in order to derive a contextual background and provide avenues for further investigation. Unstructured interviews were chosen here in order to receive as much input as possible and in order to get a broad context of the current situation. This phase serves also as a scoping mechanism and should derive the eventual scope of the graduate project. In this project this involved a one hour exploratory interview with the manager of the development team, who is the initiator of the project. During this meeting a general problem has been derived based on which a literature study was performed. Based on the insights gained for the literature study the first round of exploratory interviews with the key stakeholders of the development, sales, delivery and the IT infrastructure organisations was performed. These all took about one hour and were semi-structured. The template for the interviews are shown in table A1 in the appendix. Semi-structured interviews were chosen, because they are a useful tool for uncovering underlying problems in organisations (Blumberg, Cooper & Schindler, 2008), and questions mostly deal with the new services process or are related to the measurement of performance. After these discussions, a good overview of the entire process existed.

Nine employees for these interviews have been identified based on their expertise and to cover a broad array of backgrounds, see table 2.1. Specifically, the new services operation manager was chosen for her knowledge of Alpha and the interactions between the development, sales and delivery processes. Secondly, the business and product managers were selected because of their

expertise in the sales processes. The head of business analytics was chosen, because his team is responsible for performance management within ImCS. His team was also responsible for the implementation of the PMS.The head of new services marketing was included to account for the interactions between the development and marketing teams. The program managers were selected, due to their intimate knowledge of the development process.

Table 2.1: Key stakeholders selected for interviews

Function
New Services Operations Manager and Alpha Operations Manager
North America Business Manager Alpha
New Services Marketing & Alpha Product Manager
Head of the Business Analytics Team, responsible for IT support
Head New Services Marketing
Business Information Performance Manager
R&D Program Manager and Project Manager Alpha and Service Development
Program Manager Patient & Service Development

Furthermore, the methodology used for the performance management system is based on methods from scientific literature. These methodologies consist of three main processes (Bourne et al., 2003): design, implementation, and use and updating of the performance management system.

2.4 Scope and Assumptions

The scope of this research will be the new services processes within Philips ImCS. These are the development, sales and delivery functional processes. Within Philips these are called Innovation to Market (I2M), Market to Order (M2O) and Order to Cash (O2C) respectively. Also the markets and other supporting entities for the new service sales and delivery are in scope. As well as the development process for new services on a tactical level, in order to better incorporate organisational learning.

Due to resource restrictions of the organisation responsible for the implementation and time indications provided by literature a post-launch design and a partial implementation of a single service was possible. For the tactical and pre-launch PMS, only the design was completed. For these a detailed description was provided how to complete the implementation.

Out of scope were external benchmarking and the organisational strategic objectives for Alpha and the development team.

2.5 Deliverables

This thesis aims to deliver a methodology for the design, implementation, and use and updating of a performance management system for the post-launch new service offering, Alpha. Secondly, the main deliverable is a methodology for the design, implementation, and use and updating of a performance management system for the development process on a tactical level and for pre-launch services. From these three systems a general procedure for the PMS process for new services will be realised. The thesis will also result in a confidential Master's thesis report for use within Philips HealthTech and a public version of this report for publication by Eindhoven University of Technology followed by a public oral defence at Eindhoven University of Technology. All of these deliverables should be agreed upon both by Philips as well as the Eindhoven University of Technology.

3. Performance Management Systems

This chapter is focused on the literature background of performance management system (PMS)[1]. Firstly, key concepts are discussed, where after the methodologies for the design, implementation, use and updating processes are discussed.

3.1 Key Concepts

A performance measurement system is defined as "the set of metrics used to quantify both the efficiency and effectiveness of actions" (Neely, Gregory & Platts, 1995, p. 81). Hall (2008) defines "PMS as a system that translates business strategies into deliverable results [...] combining financial, strategic and operating business measures to gauge how well a company meets its targets". Therefore we can derive that PMS are put in place in order to measure and provide feedback, but must have links with overall corporate strategy (Storey & Kelly, 2001). A PMS allows for organisational learning, continuous improvement, feedback, performance control and performance management. Literature generally sees organisational learning and continuous improvement as the most important of the PMS goals. It is also noted that when a PMS is developed merely to control, resistance towards the PMS generally increases drastically (de Waal & Counet, 2009). There is a wide array of PMS approaches, where the Balanced Score Card (Kaplan & Norton, 1996), is mostly used in service operations, and will therefore serve as the blueprint in this development process. There are also differences with regard to the PMS process (Lönnqvist, 2004). The most predominant view is that the PMS process is an iterative process consisting of three main processes: design, implementation, and use and updating (Mettänen, 2005). It is iterative, thus all processes will be revisited multiple times. Barriers that are associated with the entire PMS process related predominantly to change management (de Waal & Counet, 2009). If management commitment towards the PMS is lacking, resistance to change and resistance towards the PMS will increase drastically. This might lead to counteractive or gaming behaviour of employees. Open communication, employee and other stakeholders' involvement throughout the entire process is vital in lowering overall resistance. Other barriers relate to a lack of a performance measurement culture, data and infrastructure problems and PMS focus (de Waal & Counet, 2009).

3.2 Design Process Methodology

The design process according to Leinonen (in Mettänen, 2005) consists of seven sub processes, most importantly defining perspectives, recognizing success factors and defining measures. Firstly, taken from the Balanced Score Card approach, standard perspectives are the financial, customer-related, internal processes, and learning and growth perspectives (Kaplan & Norton, 1996). Additional perspectives can also be added. Next, success factors are drivers of organisational success that fit within one of the perspectives (Neely et al., 2002). Critical success factors (CSFs) have a direct and high impact on the effectiveness, efficiency and viability

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[1]Within literature PMS is used for both the singular and the plural form.

of a service offering. Activities associated with a CSF must be performed at the highest possible level of excellence in order to achieve organisational success (Mahmood & Sajid, 2012). Lastly, measures should be proper proxies of success factors. This is also where the focus barrier is most vital. If the organisation does not have a clear vision and strategy, it is hard to properly define success factors and measures, due to their close links. This might stimulate suboptimal behaviour of employees, which will lead to suboptimal organisational success. It is also important that the chosen measures are sound and that the set of measures covers the entire set of success factors (Globerson, 1985, Maskell, 1991, Neely et al., 2002). In the design stage it is also vital to involve all stakeholders in order to decrease resistance towards the PMS. Lastly, in order to decrease time needed in the implementation process, early involvement of IT specialists is key. Mettänen (2005) suggests involving IT when designing measures, in order to identify barriers earlier and speed up organisational learning.

In this thesis project, the design process follows a hybrid approach, based on several frameworks from literature: the sub-processes of Leinonen's model (in Mettänen, 2005), Bourne et al. (2003) and Kaplan & Norton (1996) for the Balanced Scorecard perspectives and the number of workshops and meetings and Flapper et al. (1996), Neely et al. (1997) and Neely et al. (2002) for the measure development. These methods share many similarities, where Leinonen's model uses the most explicit typology for the different stages. In the other two approaches (and for instance Franceschini et al., 2007) these steps are made more implicitly. For the actual design of the measures themselves, the performance measures record sheet provided by (Neely, Richards, Mills, Platts & Bourne, 1997, p. 1151) is used, see table 3.1. This record sheet requires all necessary input for the implementation, use and updating processes. It also requires explicitly made statements about the measures, which increases critical thinking about the measures. This record sheet is also in line with existing performance measurement methodologies within Philips.

In more detail, Leinonen's model (in Mettänen, 2005), see also fig. 3.1, consists of seven phases: (i) clarifying vision and strategy, (ii) describing processes, (iii) recognizing success factors, (iv) defining (and evaluating) measures, (v) pushing measures down from top management to lower levels, (vi) defining reporting principles, (vii) determining how to collect information and how to report results. Since this method shares similarities with the method by Kaplan & Norton (1996), we have adopted their meeting schedule, which details when to conduct interviews and team workshops. It should also be noted that it will most certainly happen that some stages are revisited over the course of the design process. This process is again circular and should be treated as such (Lönnqvist, 2004). The template used in the workshops is shown in table A2 in the appendix. Now each of the seven stages are discussed.
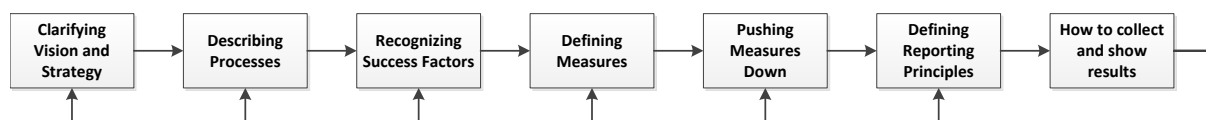
Figure 3.1: Leinonen's model (in Mettänen, 2005)

3.2.1 Clarifying the vision and the strategy

In this phase vision and strategy for new services within the organisation must be defined with its implications for the organisational units in focus. This also helps communicating a clear management strategy to all employees. This step could also determine to whom information is reported.

3.2.2 Describing the processes

Franceschini et al. (2007) describes processes as the implementation of strategic targets. It is therefore necessary to identify the (sub) processes of interest in the organisational units. This step should identify those processes that influence success factors (Franceschini et al., 2007). Identifying (important) processes will be done via initial semi-structured interviews by the lead researcher. There already is quite a formal description of most processes. The research is mostly interested in challenges and not formally described processes here.

3.2.3 Recognising the success factors

In this phase the organisational unit should determine factors that drive organisational success. Critical success factors (CSFs) are characteristics that have a direct and high impact on the effectiveness, efficiency and viability of the service offerings. Activities associated with a CSF must be performed at the highest possible level of excellence in order to achieve organizational success. CSFs also strongly relate to strategic organisational objectives (Mahmood & Sajid, 2012).

3.2.4 Defining the measures

This phase is used for the development and operationalising of measures. The first five steps of (Flapper et al., 1996, p. 32) are used to define measures:

1. Brainstorming;
2. Clustering;
3. Priority setting;
4. Selection;
5. Definition;
6. Measurement.

The measures will be developed using a record sheet (Neely et al., 1997), see table 3.1, which is a combination of steps four and five. The record sheet requires specific, unambiguous answers and force the team to critically assess the measure and what actions follow from what result. In addition, measures should also be sound, following the questions by Neely et al. (2002). These questions are listed in table 3.2. The authors developed ten rather logical questions to assess each measure. It reveals neatly what the shortcomings of each measure are and allow for their revision or if necessary deletion. Not only the individual measures should be sound, but the set of measures should be a sound entity as well, meaning that is should cover all the success factors and have little to no overlap if possible.

Teams should define relevant measures for each success factor. There should be a good balance between internal and external measures as well as financial and non-financial measures. After measures are defined they are validated, where possible by the lead researcher in between the workshops. It is important that the unit that will be working with the measures is satisfied with them, therefore measures are included or excluded via consensus. Lastly, involvement of the IT teams, responsible for the implementation should start here (Bourne et al., 2003), such that the implementation process can be accelerated.

3.2.5 Pushing measures down from top management to lower levels

This phase ensures that not only top management is focused on and involved with the PMS, but also the organisational units that are the focus of such a system. This phase is mostly relevant when an entire business unit is the focus of a PMS. This phase is not that relevant,

Table 3.1: Measure Record Chart adapted from Neely, Richards, Mills, Platts & Bourne (1997)

Measure Design Template	
Title of the measure	Is the title self-explanatory?
	Does the title explain why the measure is important?
Purpose	What is the aim of this measure?
	Why is it important to include?
	What behaviour does this measure stimulate?
Target	What level of performance is desirable?
	What time would it take to reach this level of performance
	What is a market benchmark?
Formula	How can this measure be measured?
	Is the formula clear?
	Is it clear what data is required?
	What behaviour does this calculation stimulate?
	How accurate is the data that is needed?
	How much important information is lost when using this calculation?
Frequency of measurement	How often should data be collected?
	How often should the measure be reported?
Who measures	Who is responsible for data collection and reporting?
Source of data	Where is the data collected from?
Who owns the measure	Who is responsible to make sure that the measure improves?
What do they do	What are the actions they take to make sure it improves?
Who acts on the measure	Who leads the management process?
What do they do	What is the general management process based on the outcomes of the measures
Frequency of review	How often is the measure reviewed
Notes and comments	Any additional notes and comments

since this PMS focuses on a very specific organisational entity. Managers of each organisational unit together with the lead researcher will be responsible for this process.

3.2.6 Defining reporting principles

The next phase deals with practicalities of reporting such as: (i) how often to report, (ii) who is responsible for reporting the results, (iii) where to get the data for the measures, (iv) what is the target value of the measures (Bourne et al., 2000). From an IT perspective this might be another important phase. If some measures are not accessible or are much too costly to continuously monitor, they might need to be deleted or altered. This is one of the reasons the IT team should be included early on, such that they can spot these issues early one.

3.2.7 Determining how to collect information and how to report result

In this phase the infrastructure of data collection, storage and representation should be determined. Bourne et al. (2000) and Mettänen (2005) also suggests to use tools that are already in use, as to improve the cost-benefit balance of measures.

Table 3.2: Soundness tests by Neely, Adams & Kennerley (2002)

Test name	It tests
The truth test	if the measure measures what it should measure
The focus test	if only a specific target is being measured
The relevance test	if the measure is measuring the right target
The consistency test	if the measures can be measured consistently
The access test	if the information is accessible
The clarity test	whether there is ambiguity in interpreting the measures
The timeliness test	whether the data can be gathered and analysed in a timely fashion
The so-what test	if the measures are used effectively
The cost test	what are the costs of gathering this measures
The gaming test	whether the measures could stimulate undesirable behaviour

3.3 Implementation process

The implementation process follows the three main steps proposed by Bourne et al. (2000) and Mettänen (2005).

1. Establishment of procedures for measurement;
2. Development of infrastructure for data collection, analysis and reporting;
3. Organisation accepts and starts to use the performance measurement system.

The implementation process is concerned with the practical application of the PMS design. Procedures for data collection, analysis and reporting were established and the necessary infrastructure is put in place in order to allow for these procedures. Hereafter the PMS use by the organisation starts (Bourne et al., 2003). Hacker & Brotherton (1998) propose three guidelines for success in the implementation phase. Firstly, the organisational unit in scope must start use the PMS, this can be ensured by management involvement. Secondly, data and integration related issues should not be the reason behind delays. If problems occur regarding these issues, alternatives should be sought out. Lastly, reporting should follow standard formats for ease of use. Little additional guidance is provided by literature beyond these guidelines and steps.

Bourne et al. (2000) states that the implementation should be managed in a mechanistic way using classic project management tools, whereas change management approaches are preferred by Leinonen (2001). Bourne et al. (2000) notes that management might be distracted between the design and implementation phases, which causes problems with the adoption of the PMS by employees. For a successful implementation, the challenge is how to properly measure and maintain the system's relevance. For some measures it might be possible to implement them as early as the start of the design phase. Leveraging advantages is crucial (Bourne et al., 2000). However, the main bulk of issues are data and infrastructure related. Mettänen (2005) states difficulties with collecting data and difficulties with calculating data. She also mentioned that sometimes definitions of measures were impossible to work with or data was simply impossible to gather. Also some data might already be available to the organisational unit, but it can still a lot of effort to make the data suitable for the PMS (Mettänen, 2005). Also, some measures were measured using surveys, during her research, some of these surveys did not yield any collectable results yet (Mettänen, 2005). So, collection time is a factor to consider. Infrastructure should also be in place and it should be adequate for the PMS purpose (Lönnqvist, 2004). It appears that financial measures are rather easy to collect and report (Lönnqvist, 2004, Mettänen, 2005).

Intangible measures implementation appears similar to financial measures (Bourne et al., 2000), however in literature there is a lack of understanding what problems present themselves here. Problems appear to be mainly due to measurement and infrastructure. Infrastructure is really the backbone of the PMS. If the proper infrastructure is not in place, the PMS will not be able to function (Lönnqvist, 2004). Some early testing, perhaps using a couple measures where needed, like Bourne et al. (2000) suggested, might be useful to detect problems early on. This is also why project planning is vital for a successful PMS implementation (Cheng et al., 2006).

3.4 Use process

In the use phase the PMS is actually used, data is collected and measures are reported. In literature little guidance is given on what this phase entails further (Mettänen, 2005). The updating process allows for the introduction of new measures and the removal of obsolete ones. If the organisation finds that new measures need to be added to the PMS, a short version of both the design and implementation processes need to be revisited. It is the updating process that keeps the PMS relevant to the organisation and a useful tool for continuous improvement. Barriers in general relate to the continuity of the PMS process. Management should use the PMS for feedback and should not make using the PMS a goal on its own. PMS also change over time and change when organisations change. If organisations fail to delete old measures the PMS might become too complex or it could stimulate inappropriate behaviour. The development of the structure for the use and updating processes is within scope, the actual use and updating processes themselves are not. Bourne et al. (2000) suggests that reporting occurs monthly, preferably during already existing team meetings. A large part of the measures should then be reported and actions to be taken should be discussed. PMS might also become a main topic within yearly review meetings with upper management.

The updating process consists of three main steps (Bourne et al., 2000).

3.5 Updating process

1. The updating of targets and current measures;
2. New measure development;
3. Challenge strategic assumptions in order to improve the PMS.

In the design process appropriate targets are set for each measure (Neely et al., 1997), the first stage of the updating process is to check whether these targets are still adequate. This could also mean that measures are deleted. If new measures are deemed necessary by the team, a procedure for the development process is needed. This process is a more condensed version of the process described in the previous section. Lastly, the PMS can be used to detect behaviour which the PMS stimulates that is not aligned with corporate strategy. If this is the case, either the PMS should be altered or strategy revised. A procedure should state at what frequency this should be checked. The procedures for these processes will be drafted during the workshops meetings in order to incorporate feedback from those sessions.

4. Process Descriptions

In this chapter an overview of the new services process at Philips is presented. This consist of one tactical view and two operational views, the pre-launch and post-launch views on new services. Firstly, the tactical development process is discussed. This is followed by a pre-launch development description. The chapter is concluded with a description of the a post-launch service, new service Alpha.

4.1 Tactical New Services Development Process at Philips

The new services process within Philips occur according to three main tactical processes. Firstly a development (Innovation to Market, I2M) process which includes marketing and development. Secondly a sales (Market to Order, M2O) process and finally the delivery process (Order to Cash, O2C). These are the main processes and further divided into sub processes which are not detailed further in this section. The sales and delivery processes differ per service and per market. These organisations are not centralised like the development team. Therefore they will not be discussed on an overall level, but only in relation to Alpha specifically. Thus, this thesis focuses mainly on the development processes.

The development processes consist of two main activity domains, development on one hand and marketing on the other. Within Imaging Customer Service, the marketing team, together with clinical scientists, is responsible for the marketing. The marketing activities are out scope of this research. Philips has distinguished seven different development activities. Projects are started and terminated using a portfolio management process, based on their potential. This process is out of scope of the thesis. All projects typically follow documented project management processes. The development team is responsible for the project management of these projects. In this role, new offerings are developed, such that they are profitable, and actually can be sold, delivered and supported.

On a tactical level three main processes can be distinguished: the development processes (I2M), the sales processes (M2O) and the delivery processes (O2C). Within Philips, these three processes are called the end-to-end processes. Next to that, two types of services can be distinguished. On the one hand services that are in the development stage and are not yet sold to the customers. These are called pre-launch services. When these are developed and sold to the customers they are called post-launch services. The transition between these services starts at the Release for Acquisition gate (RfA) and is finalised at the Release for Delivery gate (RfD). Combined, the main tactical processes and phases of a new service form a matrix type of situation shown in fig. 4.1. In this figure the main tactical process areas are shown horizontally. They cover services in the pre-launch phase, the transition phase and the post-launch phase, which are shown vertically. Eventually, the new services portfolio will contain services that are in the pre-launch phase, services that are in the post-launch phase and some services that are in the transition from the first to the latter. In fig. 4.1 this is shown schematically.
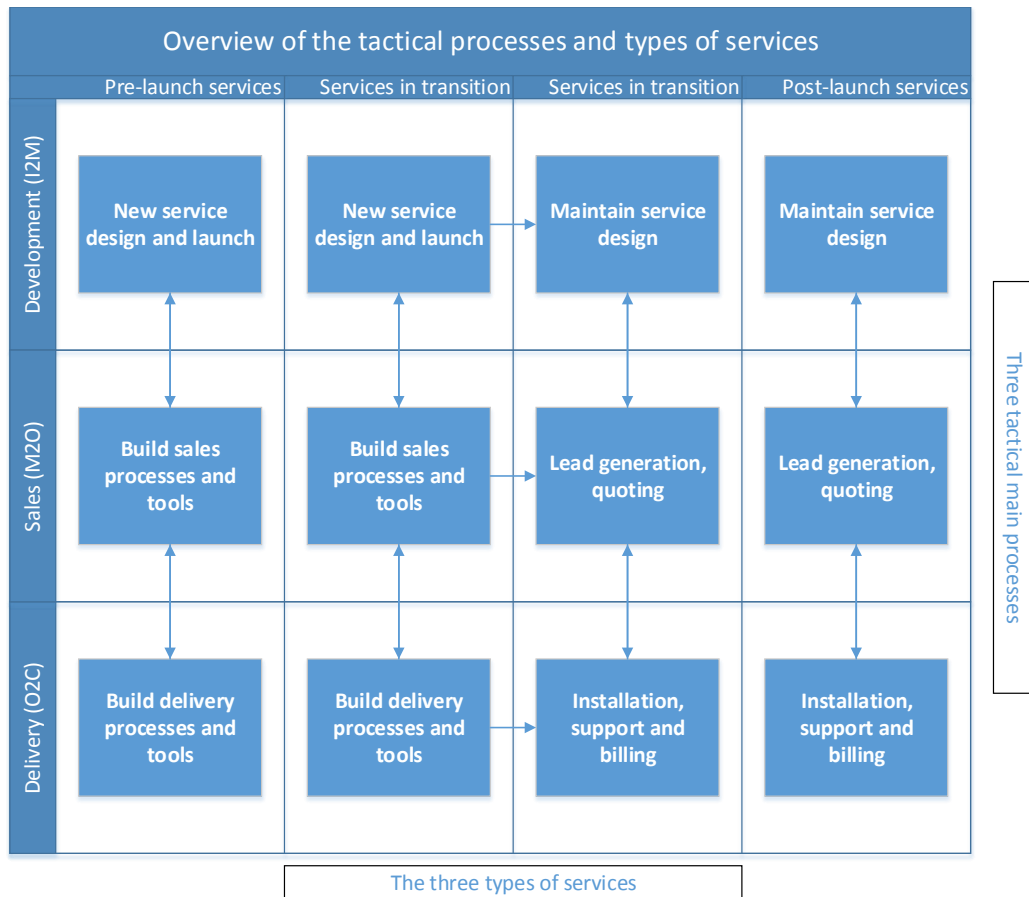
Figure 4.1: Overview of the matrix organisation with regard to the functional process areas

4.2 Pre-Launch Services

Pre-launch services are primarily managed by existing project management processes and controls. There are eight types of projects.

1. Value proposition creation;
2. Exploration;
3. Advanced development;
4. Reference architecture creation;
5. Architecture and platform creation;
6. New product development and launch (for services);
7. Maintain product design.

The first three deal with fundamental research and exploration of potential business models and products or services. The next two concern the development of supporting IT infrastructure or capabilities that will be used by other services or products. The new product development and launch for services (NPDL-4S) project type is the main project type that results in a service that can be sold to customers. This project type has the focus of the development team in this thesis. Finally, the maintain product design type of projects deal with the "maintenance" of the services that have been launched to the markets and customers.

4.3 Post-Launch Services: New Service Alpha

Currently, there is a single service that is in the transition from the pre-launch to the post-launch stage and is starting to be sold to the customers. There are no services fully in the post-launch stage. The matrix structure of fig. 4.1 is given for the Alpha service. It depicts one column of fig. 4.1 and is shown in fig. 4.2. The last two columns of this figure relate to the
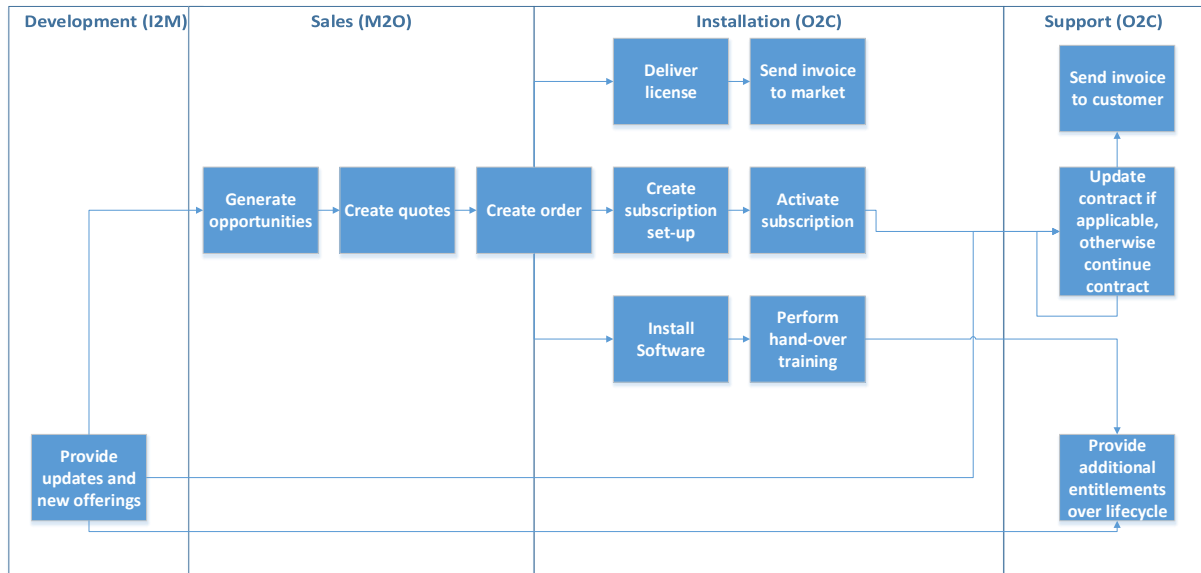
Figure 4.2: Alpha's processes

On the left side of the figure, the development process provides updates and upgrades when they have bee planned. Also new offerings might be brought onto the market. These new offerings will follow a NPDL-4S process themselves as well. Next, the sales processes are responsible for the generation of leads and opportunities, after which they offer a quote to the customer. This quote can either be accepted and turns into an order or is rejected. Also, when a contract expires, the sales process is engaged in order to attain a re-subscription. The delivery process is split into two separate actions, the installation and the support during the contract period. The former includes the software installation and the handover training. The latter includes customer support and providing updates to the customers. Also, the yearly entitlements as discussed in chapter 1 fall within the scope of the support processes. These processes are discussed further below.

Alpha Development

The Alpha service can be categorised as a new product development and launch for services (NPDL-4S) project. The goal of these projects is to create new services that can be sold to customers. After the new service has been launched in the markets which are in scope, the responsibility for sales and delivery lies within the markets, through local sales and delivery teams. The launch includes the implementation of the service with the first customers. When they need assistance, the markets involve the development team as needed for technical and clinical application support. Currently, the development team has finished with the initial offering, called AlphaPortal, and they are working on integral offering 1 (**??**), generically called Alpha, which should replace the AlphaPortal by August 2016. The focus of the development team is now on further scalability and on the development of a second integral offering to include a staff oriented services and two additional process optimisation offerings. The scalability aspect

refs to the standardisation of delivery capabilities for this service across markets. The delivery of the offerings requires a hand-over training and various other customer interactions which need to be supported by an IT infrastructure and require trained employees. Once a project is ready to be quoted and sold to customers in the market, development is responsible for entitlement changes and software upgrades and updates. Also, they are the last tier of support in case of complex customer issues.

Alpha Sales

The sales process is driven and managed by the Alpha business manager. Currently, there are two, one for North America and one for Europe, the Middle East and Africa (EMEA). Each of the local markets in scope is responsible for selling Alpha and they are managed by the business managers. The business managers together with sales specialists are specialised in explaining the value of the new service and are responsible for:

1. Giving sales presentations;
2. Allocating and supporting try and buy demonstrations and installations;
3. Driving cross-channel sales;
4. Channelling customer feedback;
5. Managing the post-sale commercial relationship.

The sales process serves to generate leads and convert these into orders.

Alpha Installation

Service delivery is where the service adds value to the customer, and where products and services differ most. Arguably, this is therefore the most important process. The new services delivery process consists of two parts. First the initial installation and secondly post-installation entitlements and customer support. The first part installation includes the remote software installation, the hand-over training and the initial goal setting with the customer.

Alpha Support

The second part of the service delivery consists of:

1. Periodic entitlements and, software updates and software upgrades;
2. Manage post-sale commercial, technical and application-related relationship;
3. Customer case resolution.

Both parts of the service delivery are handled by the market clinical application specialists who are trained in the technical content. They are responsible for the hand-over training, which includes initial goal setting and periodic entitlements, such as the semi-annual progress review meetings. A dedicated software support team is responsible for the remote software installation and post-installation customer support. The central development team is responsible for supporting the market clinical application specialist and the software team if they need support in resolving customer cases. The central development team is the third tier of technical and application customer support and are called upon when needed.

4.3.1 Alpha Challenges

In the previous section, the different elements of the new services process were discussed. However, since this is the first service there are a number of challenges the teams are faced with. This thesis aims to address these challenges. In order to analyse these, Kindström & Kowalkowski

(2014) suggest to review the resources and capabilities of an organisation. Resources are assets available to the organisation and capabilities can be defined as what organisations are able to do (Kindström & Kowalkowski, 2014). Kindström & Kowalkowski (2014) define resources and capabilities across eight business model elements: (i) offering, (ii) revenue model, (iii) development process, (iv) sales process, (v) delivery process, (vi) customer relationships, (vii) value network, (viii) culture. All eight elements combined form a proper business model and can therefore aid in the identification of vital gaps in resources and capabilities.

General challenges

An existing customer base is an important enabler of a service offering and therefore sales. However, Philips is a late mover into the specific market and therefore lacks such a customer base, although it is active with products in this area (vi & vii). More importantly, Philips still is a product-centric organisation and most administrative processes have a product-focus and do not fully allow for services sales beyond classic maintenance services (iii, iv, v & viii). For instance, licences for software and hardware prove problematic. An example of that is that the standard approach for cost allocation is not yet fully suited for these services. This is largely a result of the fact that developing and selling services are not a fully standardised processes at the moment (iii, iv & v). Additionally, the organisation in some main markets is still rather fragmented in terms of sales IT enabling tools and how compensation is managed (v). This poses barriers for using multiple sales channels per service offering, which has resulted in unreliable sales funnel data and contributed to lower than targeted order intake (iv). Lastly, there is limited consultative selling capacity in markets, so there is a limited customer needs interpretation capability (iv & vi). Next, with regard to the seamless offering in the revenue model, the standard (equipment) quoting process is not adapted to service offerings and these offerings therefore cannot be easily integrated with regular equipment quotes (iv). Limited knowledge on actual benefits and impact is currently presenting itself, which complicates the pricing and value visualisation capabilities of the organisation (ii).

Development processes

Also, since the organisation is quite young, there is a lack of well-defined processes and a lack of standardisation of processes (iii). For instance, there is no formally defined difference yet between radical and incremental innovation (iii). The development project managers also use a new project management process called new product development and launch for services (NPDL-4S). This process will streamline project development, however it is still in a pilot phase. Because it is still in its pilot phase and knowledge is scattered, a certain level of knowledge and knowledge sharing is lacking (iii & viii). For example, because there is a lack of data for internal benchmarking, estimations of effort and time spend on the development of features could be greatly improved upon. This directly translates into various issues with scalability. In the development process, there are also issues with validation and verification. Since impact is hard to measure, validation and verification is challenging and sometimes happens too late in the process (i).

Sales processes

Considering the sales process, there are two main challenges. Most importantly, most sales personnel is product-oriented (viii). Although there are special service-oriented sales teams,

they are not the only source of new leads. Equipment sales teams actually generate most leads. Currently, the latter's monetary incentive is greater for equipment and maintenance sales compared to the relatively small ticket sales in new services. Therefore their focus is on equipment sales. Secondly, there is a lack of dedicated manpower (iv). The new services team is relatively small and business managers actually also perform the roles of sales specialist and application specialist. This leads to insufficient capacity for all tasks. These issues result in a slow start and delayed conversion of leads to orders.

In the Europe, Middle East and Africa (EMEA) markets there is a significant trade-off between different language needs and associated cost with potential revenues (ii). Moreover, with respect to the organisational culture, Philips is still a product-centric organisation, with a strong focus on equipment and maintenance sales instead of new services sales (viii). This also results in a lower extent of service culture within the organisation and most of the sales force. The change towards a more service-centric organisation is gaining momentum, but it has not reached the entire organisation yet, which is currently seen as a challenge.

4.3.2 Delivery processes

Moreover, due to the fact that the first installations of the software took far longer than was estimated, revenues were delayed (v). There is a need for more communication with the customer about their role in the installation. In the first installations this was lacking. Challenges with respect to customer relationships are not recognised yet. A lack of challenges in this area might result from the fact that sales have only quite recently begun.

Finally, some participants argued that currently, there is no clear commercial owner for the new service offerings (viii), which could result in a lack of leadership and decision-making capabilities when stalemates between teams occur.

Summarising, there a number of challenges that occur currently. However, since the service has only started recently, there will be more challenges ahead. According to the employees involved with the Alpha service, most deal with the lack of structured processes for selling and delivering new services (iv & v). According to them other important important challenges are regarding the relationship with the customer (vi), the lack of actual benefit visualisation capabilities (i), process maturity issues. It might be that these challenges are not specific for this service offering and will therefore also present themselves with other services when they are launched, but this is unsure at this point in time.

5. Methodology for the Development of the Performance Management System

This chapter describes the actual procedures used and decisions taken in this project for the design, implementation, and use and updating of the three performance management systems. These procedures are based on the literature presented in chapter 3 and this chapter serves to detail how these theoretical processes were applied in the thesis.

First of all, based on literature a methodology was derived, as discussed in the previous chapter. Secondly, interviews with key stakeholders were held. Thereafter the design of the PMS started. Three workshops were held in the design phase for the tactical and post-launch. The first workshop served as a brainstorm on CSFs and KPIs. In he second workshop CSFs were confirmed and KPIs were discussed further. The pre-launch PMS was derived from the tactical PMS and the third workshops served as confirmation discussions on all KPIs for the three PMS. In between the three workshops meetings with participants were held. After the first KPIs were confirmed, the implementation of the post-launch PMS started. These steps are discussed in more detail in this chapter.

5.1 Design

Initially, the focus of the thesis were the tactical and post-launch PMS only. However, during the course of the project, the need for an additional view of the organisation was needed, in the form of the pre-launch phase of new services. The design and implementation of this PMS coincided with the tactical PMS. This approach was chosen because of three reasons. Firstly, the development team's organisation is rather flat, thus the team members who are acting and have accountability on the tactical level also act and have accountability on the pre-launch level. Also, initially employees were selected to participate in the design of the tactical PMS. These were all employees who also were involved in pre-launch projects. Therefore they were also suitable participants for the pre-launch PMS. Lastly, during the first two workshops the tactical PMS design the participants felt that some measures were relevant, but did not belong on a tactical level and were more suitable on a individual service level.

The next subsections deal with the approach to the seven phases as described in section 3.2. The design was centred around one round of interviews and three workshop sessions. For the tactical and pre-launch PMS the people in table 5.1 were selected. The participants of post-launch PMS are shown in table 5.2. These participants were selected to cover all relevant areas of the processes in scope.

5.1.1 Clarifying the vision and strategy

For the first phase of fig. 3.1, all three systems the organisation had developed a formalised strategy. These strategies were confirmed by management in interviews prior to the design. These are also the individuals to whom information will be reported, therefore they will also

Table 5.1: Key stakeholders selected for tactical and pre-launch PMS

Function
New Services Operations Manager and Alpha Operations Manager
Project Manager Asset Management Service Development
Service Delivery and Operations
Project Manager and Project Support
Head of the Analytics Team, responsible for IT support
R&D Program Manager and Project Manager Alpha and Service Development Manager

Table 5.2: Key stakeholders selected for post-launch PMS

Function
New Services Operations Manager and Alpha Operations Manager
North America Business Manager Alpha
New Services Marketing & Alpha Product Manager
Head of the Analytics Team, responsible for IT support
Customer Experience representative
R&D Program Manager and Project Manager Alpha and Service Development Manager

be responsible for propagating the vision and strategy and all other communication. Next, the four Balanced Scorecard perspectives, financial, customer-related, internal processes, and learning and growth were chosen, because they were easy to understand for the team. These perspectives (Kaplan & Norton, 1996) were agreed upon by management. Lastly, the strategy was also validated with the participants in the first workshop. This approach was chosen since the PMS is based on the strategy and the participants eventually need to work with the PMS.

5.1.2 Describing the processes

Describing the processes is the phase where the systems' relevant processes were described. The PMS aims to improve the performance of these processes. The processes were mapped by the lead researcher during the interviews and were validated by the participants of the workshops in the first workshop session.

5.1.3 Recognising the success factors

The third phase was the main focus of the first and second round workshops with team members. The set up was as follows. The lead researcher detailed the outline of the three workshop sessions, where the focus of the first one was on the first three steps of Leinonen's model. An definition of a critical success factor (CSF) two examples of a set of CSFs were provided. Then, the lead researcher presented a list of possible CSFs, based on literature, for each PMS as a starting point for discussions. For the tactical PMS this list is included below. Operational definitions are given in Appendix V.

1. Increase profitability (Gomes & Yasin, 2013, Mettänen, 2005, Storey & Kelly, 2001);
2. Sales growth (Gomes & Yasin, 2013, Mettänen, 2005, Storey & Kelly, 2001);
3. Return on Investment (Gomes & Yasin, 2013, Storey & Kelly, 2001);
4. Market Share (Gomes & Yasin, 2013, Storey & Kelly, 2001);

5. Cost (all types of cost) (Gomes & Yasin, 2013, Mettänen, 2005, Storey & Kelly, 2001);
6. Customer satisfaction (Lönnqvist, 2004, Mettänen, 2005, Storey & Kelly, 2001);
7. Customer loyalty (Lönnqvist, 2004);
8. Customer learning during project (Lönnqvist, 2004);
9. Internationalisation (Mettänen, 2005);
10. Quality (Bryde, 2005, Lönnqvist, 2004);
11. Joint projects (Mettänen, 2005);
12. Efficiency (Lönnqvist, 2004, Storey & Kelly, 2001);
13. Effectiveness (Bryde, 2005, Mettänen, 2005);
14. Lead times (Gomes & Yasin, 2013);
15. Increase employee competences (Bryde, 2005, Gomes & Yasin, 2013, Lönnqvist, 2004);
16. Improvement of knowledge sharing (Mettänen, 2005);
17. Improvement of organisational capabilities (Bryde, 2005).

The CSF "quality" was interpreted in a variety of ways and since it is so generic per industry different meanings are associated with this CSF. "Joint projects" was defined as the number of projects that two departments share and is closely related to the degree of "knowledge sharing between different departments". Both try to approximate whether knowledge is centred in one specific area of the organisation or spread out over more places. "Internationalisation" deals with the reach of the organisation in terms of resources, but also customer base. Note that the decision for a pre-launch PMS was made shortly after the second workshop. The participants of the tactical workshop agreed that for the most part, the pre-launch PMS would be derived from the tactical one. Also, the participants identified multiple CSFs that were potentially more suitable for the pre-launch PMS than for the tactical one. Therefore it was decided to not repeat the initial brainstorming session for pre-launch PMS. The procedure thus became: agreeing on strategy, finalising CSFs and moving on to KPIs.

For the post-launch PMS, CSFs that were used as a starting point are presented below. Defiitions are given in Appendix V.

1. Increase profitability (Gomes & Yasin, 2013, Mettänen, 2005, Storey & Kelly, 2001);
2. Sales growth (Gomes & Yasin, 2013, Mettänen, 2005, Storey & Kelly, 2001);
3. Cost (Gomes & Yasin, 2013, Mettänen, 2005, Storey & Kelly, 2001);
4. Customer satisfaction (Lönnqvist, 2004, Mettänen, 2005, Storey & Kelly, 2001);
5. Customer loyalty (Lönnqvist, 2004);
6. Customer learning during project (Lönnqvist, 2004);
7. Customer retention (Storey & Kelly, 2001);
8. Efficiency (Lönnqvist, 2004, Storey & Kelly, 2001);
9. Effectiveness (Bryde, 2005, Mettänen, 2005);
10. Lead times (Gomes & Yasin, 2013);
11. Increase employee competences (Bryde, 2005, Gomes & Yasin, 2013, Lönnqvist, 2004);
12. Improvement in organisational capabilities (Bryde, 2005).

Some CSFs require some additional explanation. For instance, "customer's learning during the project" described the effect of the project on the customer, which is an important factor according to Lönnqvist (2004). Efficiency and effectiveness deal mostly with all kinds of different processes, the authors do not make clear distinctions here.

During the workshops however, it proved to be easier to brainstorm on KPIs instead of critical success factors. Therefore the brainstorm phase was used mostly for a brainstorm on KPIs, after which these were clustered to form CSFs by the lead researcher in between the first two

workshops. This approach was chosen, since KPIs proved to be more tangible and the participants could relate better to brainstorming KPIs. This approach follows two of the steps proposed by Flapper et al. (1996), brainstorming and clustering. Between the two workshops, the lead researcher had individual meetings with all participants in order to nuance in input of participants, which lead to new insights. Based on these meetings a potential set of CSFs with casual links across the four Balanced Scorecard perspectives was developed. The casual links were included since they helped participants to visualise the relation between the CSFs. Consensus was chosen as a basis of inclusion, since nobody had any objections to the CSF. CSFs were decided upon based on consensus in the second workshops.

5.1.4 Defining the measures

Based on the CSFs defined agreed upon in the second workshop, it continued to develop key performance indicators (KPIs) to accomplish each CSF. This is the fourth phase of fig. 3.1. Each CSF has at least one, but possibly more KPIs. However, each KPI should only reflect one CSF.

After the first tactical workshop 65 potential ideas for KPIs were identified. These included among others "relevance of the new service offering to the market", "intellectual property generation trademarks" and "adherence of portfolio to strategic objectives". In the second workshop two types of KPIs were distinguished. On one hand KPIs that could be used directly and on the other hand KPIs that were more suitable to use after processes become more mature and more well-defined. The latter type of KPIs involve mostly interactions with other functional areas such as marketing. This resulted in seventeen potential KPIs that could be used directly, versus three interesting ones for the future. These will be discussed in the recommendations.

The post-launch brainstorm lead to an initial list of 65 KPIs, ranging from "marketing of the Alpha brand" to "Incremental sales growth" and "accomplishment of customer KPIs". KPIs were initially quite vague and not precise. For some of the KPIs the participants were more interested in the measure itself than considering them to be actual KPIs. The list of KPIs was clustered according to preliminary CSFs and was compared with a Philips wide list of KPIs in order to detect similarities and duplicates. After the initial clustering of CSFs and KPIs the participants provided feedback on both the CSFs and KPIs in terms of potential relevance, potential challenges and other ambiguities. These comments were discussed in the second workshop. For a list of deleted measures, see appendix VI.

After the clustering and selection, the measures were further discussed in detail. The record sheet by Neely et al. (1997) was selected from literature, because it forced participants to be very precise in the design of each KPI. However, the record sheet proved to lack some essential information. Therefore two additional questions were added. Firstly, the record sheet now only includes one target. However, the participants preferred worst, normal and best case target setting in order to put the target into perspective. Therefore two additional targets were included. The participants of the workshops determined the targets themselves through consensus. Secondly, the type of KPI was added, possible values here are input, process, output and outcome. Where input concerns resources, process deals mostly with process variability, output deals with what is "produced by the process" and outcome concerns the impact of the process. This was included in order to comply with Philips' internal standards with regard to KPIs. For each KPI, all fields were answered, based on consensus between participants. This took the second and third workshops to conclude. Part of the KPI selection was the soundness testing (Neely et al., 2002). This is discussed further in the next three chapters.

5.1.5 Push the measures down from top management to lower levels

The fifth phase is the push the measures down. This phase included the propagation of the KPIs to the team members that were not present in the workshops. These meetings took place in between the second and third workshop. Here most KPIs were quite definitive such that the other employees could review the measures thoroughly, while their input could still be taken into account.

5.1.6 Defining reporting principles

This phase details four of the questions already posed in the record sheet. They deal with who measures, when measurement takes place, what the target values are and when reporting takes place. Since these questions are already covered in the record sheet, their approach is not covered again.

5.1.7 Determining how to collect information and how to report results

The last phase dealt with the technical implementation of the PMS. The decision on how to collect the data differed greatly per KPI. Where possible automated data collection was highly preferred. First of all, automated collection makes using the PMS easier. Secondly, it is less prone to errors. However, not all KPIs were possible to automate and information needed to be gathered manually or via a data extraction from another database. The person who was responsible for measurement will take these actions in that case.

A number of different options were considered for the reporting. One option was using a simple excel sheet. A benefit of this method was its simplicity. However, this was not preferred within the teams, because in their experience errors were very likely to occur. A second option was building an application within the development team itself. This would be time and resource consuming and was therefore discarded. The third option was using an application called QlickView. This application was already widely used with the business analytics team. It also was relatively easy to incorporate automated and manual data, it can use raw data and is very customisable. Most Philips databases can be connected to QlickView. Also, it allows for extensive filtering, per year, market, customer and order type. Based on this, the QlickView application was selected to be the platform for the reporting. Multiple views of the data are possible. For instance, the "gross margin" KPI can be reviewed from start to the current date, Year to Date (YtD) meaning from January 1st to the current date or per quarter. For the three PMS that were developed, all targets assume a YtD calculation. Within QlickView, different authorisations can be assigned, such that some employees can view the PMS, but do not have further access.

5.2 Implementation

The second performance management system process is the implementation process. As described in section 3.3, this process consists of three steps Mettänen (2005).

1. Establishment of procedures for measurement;
2. Development of infrastructure for data collection, analysis and reporting;
3. Organisation accepts and starts to use the performance measurement system.

5.2.1 Establishment of procedures for measurement

These procedures were already covered in sections 5.1.6 and 5.1.7 and will not be covered again.

5.2.2 Development of infrastructure

The data collection was automated when possible. When automation was not possible, the team chose for data collection using Microsoft Excel on a Sharepoint. The lead researcher provided this worksheet in collaboration with the team member from business analytics.

All measures were defined using the record sheet by Neely et al. (1997). Therefore the source of data and the manner of collection was already considered before the actual implementation. Also, in line with advice from literature (de Waal & Counet, 2009, Mettänen, 2005), one of the participants in the workshop was a business analytics team member, which greatly enhanced the speed of implementation. The implementation started with a focus on the post-launch (Alpha) PMS, because the management team and the participants assigned this the highest priority of the three PMS. Also, it was most likely that this PMS would contain the most data for which collection could be automated, which would showcase the possible benefits for a PMS most. Therefore a prioritisation was made which KPIs were to be implemented first, based on their potential to be automated. Lastly, QlickView will be used to report data, as discussed in 5.1.7 thus, there was no development need for reporting infrastructure.

5.2.3 Acceptance and start of utilisation

The last stage of the PMS as defined by Mettänen (2005) is acceptance of the PMS by the organisation and use should start. Actual use has not started yet during the start of the thesis project.

6. The Tactical Development Process Performance Management System

This chapter describes the results of the Tactical Performance Management System (PMS). Following the approach discussed in the previous chapter, a strategy was confirmed. Also, critical success factors (CSFs) and associated KPIs were developed. Lastly, implementation of the PMS will be discussed.

6.1 Design

In this section, the design of the tactical level PMS for the development process is discussed. It follows the steps described in section 3.2. However, the "describing processes" step was already performed in chapter 4 and will therefore not be repeated here. Also, the last three steps of the PMS design are already captured in the record sheet and will be discussed in the subsection "defining measures".

6.1.1 Clarifying Vision and Strategy

The development team's 2016 strategy for this part. The following strategic objectives were formulated by Philips management for the development process:

- Grow the new services portfolio;
- Innovate existing maintenance services;
- Develop new services capabilities.

These strategic objectives were re discussed by the participants of the workshops, who agreed with the objectives.

6.1.2 Critical Success Factors

Based on the first workshop, 12 possible CSFs were identified. The participants deemed these too vague and therefore the list of CSFs was extended to 16 CSFs such that participants could comment on a CSF with less ambiguity. Of these "increase profit" and "increase revenue" were initially deleted, because the development team could not strongly influence these directly. However, especially the latter should be included when existing processes become more mature. Within the customer-related CSFs, "improve customer experience" and "improve customer retention" were deleted, since the team could not develop any KPIs that were suitable for these CSFs in the development phase. With respect to the internal processes CSFs "improve capabilities design" and "improve life cycle management" were removed, since related KPIs were more suitable under another CSF. Lastly, in the learning and growth perspective, "improve Philips integration" was removed since it was too ambiguous and "improve processes" was removed, since its KPIs could be placed under other CSFs as well. This resulted in a final list of CSFs,

see fig. 6.1.

1. Decrease costs - Decrease all relevant cost for the development of new services;
2. Improve customer awareness - Improve the awareness of customer with respect to new services;
3. Improve portfolio management - Improve the selection and prioritisation of potential future projects;
4. Improve project management - Improve the management of existing projects;
5. Improve ecosystem collaboration - Improve the collaboration with other Philips entities;
6. Improve industrialization - Improve the extent to which new services can be sold and delivered to a wide array of customers;
7. Improve employee expertise - Improve the expertise and competencies of development employee;
8. Leverage partnerships - Improve the performance of suppliers.

Figure 6.1: Tactical Development Process Strategy map: Critical Success Factors with relational links

With regard to the financial CSFs, only cost was chosen, due to the fact that development is only able to influence cost directly, whereas sales for instance is out of their direct reach. It was indicated however, that this should be included in the future to assess the profitability of the development processes. Secondly, with regard to customer-related measures, only customer awareness was chosen, because it would indicate whether the new services are actually reaching the customer. Customer experience for instance was considered, but dropped, because it would have too little meaning on a tactical level. With regard to the tactical level processes, portfolio management focuses on which services to develop and project management focuses on how these are then developed. They were thus chosen as CSFs in order to improve both processes. The ecosystem in this sense represents the advanced development, marketing, sales and delivery functions within Philips. A main wish is to improve upon the collaboration with especially the latter two, and was therefore included as a CSF. Next, "improve industrialisation" was selected, because the participants felt that it is a prerequisite for new services to function properly. Lastly, "improve employee expertise" and "leverage partnerships" were included, because with better people and better partners the organisation would be able to perform the internal processes better. The visual representation of the CSFs is shown in fig. 6.1. This also includes the casual links between the CSFs. The links were selected to visualise the most important casual links between CSFs. It might therefore be that other links also exist.

On the last row of fig. 6.1 the learning and growth CSFs "improve employee expertise" and "leverage strategic partnerships" are represented. An improvement in employee expertise would lead to better project management skills, thus better project management. Also, an improved portfolio management process would result in a better selection and prioritisation of future initiatives and better defined projects, enabling adequate resourcing and planning those projects. Whereas better improved partnerships would lead to a higher ability to industrialise and a better ability to collaborate with the entire ecosystem. A higher degree of industrialisation combined with more collaboration with for instance marketing and sales would lead to an improved customer awareness. Also, improved project management skills and improved industrialisation would lead to better financial performance in terms of cost.

6.1.3 Key Performance Indicators

After the development of the CSFs the associated KPIs were designed. The KPIs that were interesting for future use will be further discussed in chapter chapter 10.

Soundness of the Key Performance Indicators

The third workshop session focused on the KPIs that could be used directly. In this session these were reduced to the eventual 12 KPIs, see table 6.1. Before they were finalised, the soundness tests of Neely et al. (2002) were performed. They found that there was some potential for manipulation. Although it did underline that most data will be collected manually here and is quite subjective. Both issues reduce the quality of the data and therefore the PMS itself. However, since the associated processes are still evolving, no attempts to automate measurements were taken. Most prominently, the scalability KPI (9) and the supplier assessment (12) require a somewhat subjective scoring. This might be problematic when the team is not aligned on how to score a project. Also, the portfolio discussion KPI is slightly out of reach of some of the team members. Portfolio management improvement is expected to be combined with development department resource planning in order to avoid the perception that projects are forced upon members of the team. The soundness tests also included tests on the mutual exclusiveness of the KPIs, such as the focus and truth test, see table 3.2. All CSFs and the KPIs derived from the CSFs cover different areas of the new services process. Therefore it can be concluded that the KPIs are mutually exclusive.

The KPIs will now be discussed in more detail and the are shown in relation to the CSFs in table 6.1. Note that all the information per KPI from the record sheet, see table 3.1, are shown in the section II of the appendix.

Table 6.1: Tactical Development Key Performance Indicators

	Critical Success Factor		Key Performance Indicator	Dimension
	Financial			
1	Decrease cost	1	Total development cost as a percentage of AOP	Percentage
	Customer-related			
2	Improve customer awareness	2	Number of unique hits on the product page website for new services	Number
	Internal processes			
3	Improve portfolio management	4	Number of activities started without a portfolio discussion.	Number
4	Improve project management	5	Percentage of fulfilled requirements	Percentage
		6	Percentage of project deadlines within time	Percentage
5	Improve ecosystem collaboration	6	Percentage of sales capabilities deployed	Percentage
		7	Percentage of delivery capabilities deployed	Percentage
		8	Percentage of interim process and IT capabilities in place introduced by the project team without sales or delivery functional support	Percentage
6	Improve industrialisation	9	Scalability of services	Number
	Learning and growth			
7	Improve employee expertise	10	Project managers adherence to project management training	Percentage
		11	Employee adherence mandatory to training	Percentage
8	Leverage strategic partnerships	12	Supplier rating score	Number

1. Total development cost as a percentage of the Annual Operating Plan (AOP)

From a tactical development process perspective, controlling cost is critical. Control for cost in order to maintain margin. Participants agreed that there was no need to further divide different types of development cost. Development costs entails outsourcing costs, employment costs and other development costs. The development cost will be measured versus the yearly approved budget (annual operating plan). The KPI is formulated by:

$$\text{Tactical KPI 1} = \frac{\text{Employee cost} + \text{Development cost center cost}}{\text{Budget according to Annual Operating Plan}}$$

All costs below target were considered a best case performance, whereas the normal target was set between 100% and 110% and a result >110% for the first year was considered a worst case performance. These targets were agreed upon by all project managers as feasible. This is based on the assumption that the AOP budget is a good forecast of cost. The KPI is considered a process KPI since it concerns how the process is performed. The frequency of measurement is quarterly, because data will not be available on a shorter time span. The KPI will be reviewed on a quarterly basis as well in order to adjust targets when necessary. The team's controller will be responsible that AOP data is provided to the system, because he has easiest access. Other data collection can be automated. The development team's manager was chosen as the owner of the KPI, whereas it was determined every individual project manager's responsibility to keep his own development cost in check and act when necessary.

2. Number of unique hits on the product page website for new services

As a measure of how relevant a new service is to the customer and whether the customer is aware of the new service before the service can be bought, the participants together with represents

from the marketing function agreed that the number of unique hits on the product page on the website would be best suited. For this KPI the combined total of hits on all products is used. Thus:

Tactical KPI 2 = Sum of the unique hits per new service on their product page per quarter

The frequency of measurement and review were both set to quarterly, because this would provide information to the project managers without making the flow of information too frequent. The data can be partially automated, since the report requests can be automated, but the data needs to be manually put into a Sharepoint folder. The marketing representative who is assigned to each project is responsible that the measure improves and the marketing effectiveness employee is assigned accountability for the KPI's improvement. Currently, there is little known on how many unique hits there might be. Therefore initial targets are, < 2.500 (worst case), 2.501-9.999 (normal case) and > 10.000 as a best case target. The targets will be updated when the first reports are received and a more realistic targets will be set.

3. Number of activities started without a portfolio discussion

Managing the inflow of projects is crucial for a well functioning new service development process. Currently, there are activities, i.e. projects, that are executed, but have not formally been agreed to by the portfolio management process through the portfolio discussion. The portfolio management process is still very immature. Therefore instead of measuring how well this process functions, the participants agreed to measure the output of this process. They formulated the KPI to measure the adherence to the portfolio process as the number of projects that require at least 0,25 FTE of effort of the team during a period of six months or more. The participants agreed that 0,25 FTE would be sufficient in order to detect the largest deviations from the process. The participants did agree that eventually, a different measure for the portfolio process would be more suitable. The KPI should lower the number of activities that require such effort.

Tactical KPI 3 = Number of activities not formally agreed to by the portfolio management process that require at least a total of 0.25 FTE effort during a period of six months or more

It was decided that this measure would be measured and reviewed semi-annually, since there will not be that many activities that require such an effort. Also, given the 0.25 FTE threshold, it will take more time to certainly know whether how much effort an activity requires. When the KPI is lagging, actions can be taken such as escalating to the development manager and simply refusing the activity. Based on the current situation and number of activities the targets were set at four or more as a worse case, three as a target and two or less as a best case.

4. Percentage of fulfilled project requirements

Project management performance can be roughly divided into three areas. Firstly in financial performance, which is covered in the KPI 1. Secondly, in quality, which will be measured by the percentage of which pre determined business and commercial requirements have been met at the moment the service is brought to the market. Thirdly, time variance will be measured as a percentage of formal project stage-gates that are met in time, which is the subject of KPI 5. The goal of this KPI, 4, is to ensure that the developed services fulfil the quality requirements to be able to deliver value to the customer. The formula is as follows:

$$\text{Tactical KPI 4} = \frac{\text{Total number of fulfilled requirements at RfD}}{\text{Total number of requirements defined at PDC}}$$

It shows the fraction of the total number of business and commercial requirements which were formulated at the Product Delivery Committed (PDC) gate against those that are actually fulfilled at the Release for Delivery (RfD). According to the project managers, suitable targets here are $< 80\%$ as a worst case, 81% to 94% as normal case and $>95\%$ as a best case target. Frequency of measurement and review were set at quarterly, because of the length of average products a higher frequency would be redundant, whereas a lower frequency would provide too little information to act upon. The source of data here is the Business Document Management System (BDMS), where official documents, such as the list of requirements are stored in. The project manager is the owner of the measure and it was agreed that he should keep regular track of progress and intervene when necessary. Individual project managers will act upon the measure. Their actions were too service-specific to determine on beforehand.

5. Percentage of project deadlines within time

The third project management KPI deals with time variance. It is included in order to ensure that projects are delivered in a timely fashion. Each service has four gates between the Product Launch Committed (PLC) gate and the eventual Release for Delivery (RfD), which are documented in the Business Document Management System (BDMS). The participants of the workshops agreed that an extension of two weeks per deadline was reasonable. The KPI will be calculated by:

$$\text{Tactical KPI 5} = \frac{\text{Total number of gates met within two weeks of deadline referenced at the PLC gate}}{\text{Total number of gates with deadlines for projects that have passed PLC gate}}$$

] The participants concluded similar targets as for KPI 4. Thus, targets here are $< 80\%$ as a worst case, 81% to 94% as normal case and $>95\%$ as a best case target. Also, the owner of the KPI is again the development manager and each individual project manager takes action when needed on his own project. The source of the data is again the BDMS.

6. and 7. Percentage of committed sales and delivery capabilities

For new services, development integration with the sales and delivery BPOs (business process owner teams for commercial and operational delivery processes) is vital for new services success. These teams are responsible for the development and implementation of tooling and processes needed for their respective process. Therefore three KPIs were designed to this end. On the longer horizon, development together with both sales and delivery agree to capabilities that are needed in one to three years time. The extent to which the capabilities development needs or wants are actually committed to and deployed can be seen as the performance of the development team in this interaction. This leads to KPIs 6 and 7:

$$\text{Tactical KPI 6} = \frac{\text{Total number sales process \& system capabilities agreed to by sales BPO}}{\text{Total number of sales process \& system capabilities required by development}}$$

$$\text{Tactical KPI 7} = \frac{\text{Total number delivery process \& system capabilities agreed to by delivery BPO}}{\text{Total number of delivery process \& system capabilities required by development}}$$

These capabilities are determined via a gap analysis during the development process. They are gathered in a gap analysis document. Following the initial analysis development and the two BPOs meet to discuss which capabilities are needed. When the sales and delivery BPOs

actually commit to the development and implementation of a new capability, it will be included in their roadmap. This indicates that they intend to develop the capabilities. The capability gap analysis assessment documents per new service development project and the sales and delivery BPO capability development and implementation roadmap provide the data for these KPIs. The operations manager, who is responsible for the gap analyses, suggested targets of, $< 50\%$, 51% to 89% and $> 90\%$ and all participants agreed with this. If the measure is lagging, the team should start renegotiations with the other two BPOs. If this is still unsuccessful, they could escalate the issue to the development manager, who is also the owner of the measure. The KPIs are measured and reviewed quarterly, due to the limited number of meetings between the BPOs.

8. Percentage of interim process and IT capabilities in place introduced by the project team without sales are delivery functional support

On the short term, capabilities are also needed that new services currently do not have. In this case, the development team might need to introduce interim processes and tools. Possibly without support of the sales and delivery BPOs, thus not fully utilizing their expertise. This might have multiple reasons, but it is clear that this process is not efficient. These interim processes or tools might even be in place for a longer period of time, such as two years, before they are replaced. Therefore the last KPI measures the extent to which these interim processes or tools are put in place without their support.

$$\text{Tactical KPI 8} = \frac{\text{Total number interim capabilities in place without BPO support}}{\text{Total number of capabilities in place}}$$

Again the interim capabilities are registered in the gap analysis, as are the total number of capabilities in place. Here the participants agreed that a worse case is everything over 30%, where a normal case lies between 29% - 11% and a best case is lower than 10%. These percentages are quite high, because the process as described in the previous KPIs (road mapping) is still quite immature. Therefore it is likely that these interim capabilities will be present during the next few years. If the KPI is lagging, the owner of the KPI, the development manager, could escalate the issue to the other BPO owners. The team member who acts on the data should try to leverage existing capabilities and processes to look for commonalities. Again, the participants chose a quarterly measurement and review cycle.

9. Average scalability of services

The participants agreed to a measure of industrialisation should be incorporated. However, currently there is no consensus on how to measure the scalability of a new service yet. Therefore the KPI that is presented here could serve as a starting point for a future, more accurate KPI for the scalability of a new service. The participants agreed that in order that for a new service to be scalable it should at least use standard tooling and standard processes. Next, they argued that a service that is extended to multiple markets is more scalable that one that is not. Also the new service would be easier to industrialise if multiple customers can be serviced during the same period of time. The same logic follows for the ability to perform the new service from a location that is not on the customers' premise. These five characteristics form the KPI. These questions were the product of an extensive discussion on how to incorporate all types of services. These five were chosen, because they are generic enough to fit any service, which makes them most suitable for this PMS.

- The service has a multi-market introduction plan;
- The service allows for working on different customers in parallel;
- The service can be performed remotely;

- The service uses standard tools;
- The service uses standard processes.

Each question is scored with a 1 if applicable and a 0 if not and score for each service is equal to the total sum of the five questions. This is similar to the KPI which is presented in the pre-launch PMS. The score on the KPI here is the average of those. The participants agreed on a worst case target of < 1, normal case of 2 - 3 and a best case of > 4. The KPI is calculated:

$$\text{Tactical KPI } 9 = \text{Average}\,(\text{Total score of service scalability})$$

Each individual project manager is responsible for the scalability of his service, however, the scalability is also restricted by the scope of the project itself. The measure will be measured and review quarterly, because of the average cycle time of a project. The KPI's formula should be updated when there is a more coherent view on industrialisation within ImCS.

10. Project management adherence to project management training

In order to improve the project management skills of the project managers, the participants agreed on a KPI to measure their competencies. Initially this will be done with the Foundational Project Management training within the Philips University. The participants agreed that in the coming time this bar might be enlarged such that the project managers keep improving.

$$\text{Tactical KPI } 10 = \frac{\text{Total number of project managers with foundation training}}{\text{Total number of project managers}}$$

Since the project management team is currently ten people strong, it is possible that a few project managers do not have the training. Therefore the initial targets are: $< 80\%$, 81% - 99% and 100%. The measure will be measured and reviewed again quarterly, since it would thus coincide with all other measures. Also, a higher frequency of measurement would provide little extra information. The development process manager owns the measure and should make sure that all project managers do the training.

11. Employee adherence to mandatory training

Analogue, the team found that it it important that all development process employees perform their mandatory trainings. These entail the LEAN, Global Business Principles and the Quality trainings.

$$\text{Tactical KPI } 10 = \frac{\text{Total number of employees with all mandatory trainings}}{\text{Total number of employees}}$$

The initial targets were set slightly higher: $< 90\%$, 91% - 99% and 100%. The measure will be measured and reviewed again quarterly, since it would thus coincide with all other measures. Also, a higher frequency of measurement would provide little more information. All these trainings are registered in a system that can be easily connected to the reporting application. The development process manager owns the measure and should make sure that all employees do the training. In the future, this measure might reflect the employees' competences rather than these trainings.

12. Supplier rating score

Lastly, the participants agreed that on a development level a suppliers' performance should be monitored and improved if needed. Thus the last KPI will be the supplier rating score. The rating will be calculated via a questionnaire, which is to be filled in all relevant employees who deal with the supplier. The questionnaire, the Global Supplier Rating System (GSRS) is

easily available to the development employees. The participants agreed that next to tracking all suppliers on an individual basis, it is meaningful to track the aggregate of suppliers such that it provides a view of all the relevant suppliers.

$$\text{Tactical KPI 12} = \text{Average} \left(\frac{\text{Supplier's assessment score}}{100} \right)$$

The KPI takes the average of all suppliers that were screened. The targets are taken from the GSRS itself, $<70\%$ as a worst case, 71% - 89% as a normal case and $>90\%$ as a best case. Again the KPI is measured quarterly and reviewed quarterly as well. The improvement process based on the outcome of the GSRS will be performed together with a procurement team together with one of the project managers. They will formulate a supplier specific improvement plan.

6.2   Implementation

The implementation of the PMS is handled by a member of the business analytics team, who specialises in this kind of data collection and representation. However, the implementation of the tactical PMS will not be in scope of this thesis, due to resource constraints of the business analytics team. In order to facilitate this, they were provided with a detailed account of the KPIs and the implementation of the tactical KPIs will commence after this project has ended. The implementationould follow the procedures as described in chapter 5. Based on the current status of the implementation of the post-launch PMS, it is estimated by business analytics that the implementation of this PMS should take one month.

7. The pre-launch Performance Management System

This chapter describes the results of the second Performance Management System (PMS), the pre-launch system. Following the approach discussed in the fifth chapter, a strategy was confirmed. Also, critical success factors (CSFs) and associated KPIs were developed. Lastly, the implementation of the PMS will be discussed.

7.1 Design

In this section, the design of the pre-launch level PMS for the development process is discussed. It follows the same steps as described in the previous chapter.

It should again be noted that the pre-launch PMS is derived largely from the tactical PMS. The participants of the tactical workshops argued that tactical and post-launch systems would not provide a holistic view of the entire development process. Thus a pre-launch PMS was also developed. The boundary between the pre-launch and post-launch services is the point where the service is Released for Delivery (RfD).

7.1.1 Clarifying Vision and Strategy

The strategy formulated by new services management behind individual new services is to develop services that:

- Are customer centric;
- Improve the relationship with the customer over the life cycle;
- Are scalable.

These three ideas are central to each new service. Furthermore, each service should contribute to the strategic objectives stated in the previous section. All participants agreed to these three items.

7.1.2 Defining Critical Success Factors

Since this PMS is derived from the tactical one, the initial discussion on CSFs is naturally the same. However, two CSFs were deleted, because they were not applicable on a project level. The CSF "improve portfolio management" and "improve employee expertise" were removed since they overlap all projects and would be unsuitable for management on a service level. "Leverage partnerships" was still included in the PMS, because the participants argued that good suppliers are still vital for most services' success. Therefore, optimising suppliers is a key factor in the new services process. Next, "improving project management" was a natural CSF for development projects and was also included. Again, the ecosystem in this sense represents the advanced development, marketing, sales and delivery functions within Philips. For individual

services it is also important to align with the other functional areas and was therefore included in the PMS. Also, single services also need to be industrialised to an industrial scale in order to enable sales and delivery to a large number of customers. This is in agreement with upper management and all participants. Thus the CSF was included as well. The participants felt that awareness of the service among customers is highly important and was therefore included. Lastly, a large part of project management in development projects is keeping costs in line with the budget. Therefore decreasing cost was included as the final CSF. This brings the total CSFs to six in the pre-launch PMS.

1. Decrease costs - Decrease all relevant cost for the development of a new services;
2. Improve customer awareness - Improve the awareness of customer with respect to a new services;
3. Improve project management - Improve the management of a new services' development;
4. Improve ecosystem collaboration - Improve the collaboration with other Philips entities;
5. Improve industrialization - Improve the extent to which a new services can be sold and delivered to a wide array of customers;
6. Leverage partnerships - Improve the performance of suppliers with respect to a new services.

CSFs with links, called the pre-launch strategy map, are shown in fig. 7.1. The strategy map shows the casual relations between the CSFs. On the bottom of the figure, it shows the CSF "leverage strategic partnerships" which positively influences the ecosystem collaboration and the industrialisation of the service. A main wish is to improve upon the collaboration with especially the latter two, and was therefore included as a CSF. Improving project management would mainly influence the development cost and the ecosystem collaboration. Next, both the ecosystem and industrialisation influence customer awareness where an improved industrialisation also influences the costs of the service.

7.1.3 Defining Key Performance Indicators

The development of KPIs was analogue to the tactical PMS development. The main distinction between the tactical and service specific PMS is an additional KPI concerning claims.

Soundness of the Key Performance Indicators

Also here the ten soundness tests (Neely et al., 1997) were performed. Issues were found with the subjective scoring of the supplier assessment and the industrialisation score. Also, industrialisation scoring of a project might be a prone to gaming behaviour and could therefore potentially be unsuitable as a KPI. However, the participants argued that industrialisation is still a vital part of services, which should be carefully managed, and thus should be included as a KPI as well. Therefore, clear agreements should be made on what constitutes a positive or negative answer on that KPI. Also, the ecosystem collaboration KPI only measures a very small part of the entire interaction. However it is a vital output of that interaction an was therefore still included. The number of objective claims was most uncertain in the tests, since it deals with a process that is very new. Thus there was little knowledge on what potential concerns could be here.

The soundness tests also included tests on the mutual exclusiveness of the KPIs, such as the focus and truth test, see table 3.2. All CSFs and the KPIs derived from the CSFs cover different areas of the new services process. Therefore it can be concluded that the KPIs are mutually exclusive. The KPIs are now discussed in detail. A list of filled in record sheets per KPI can be found in appendix III.
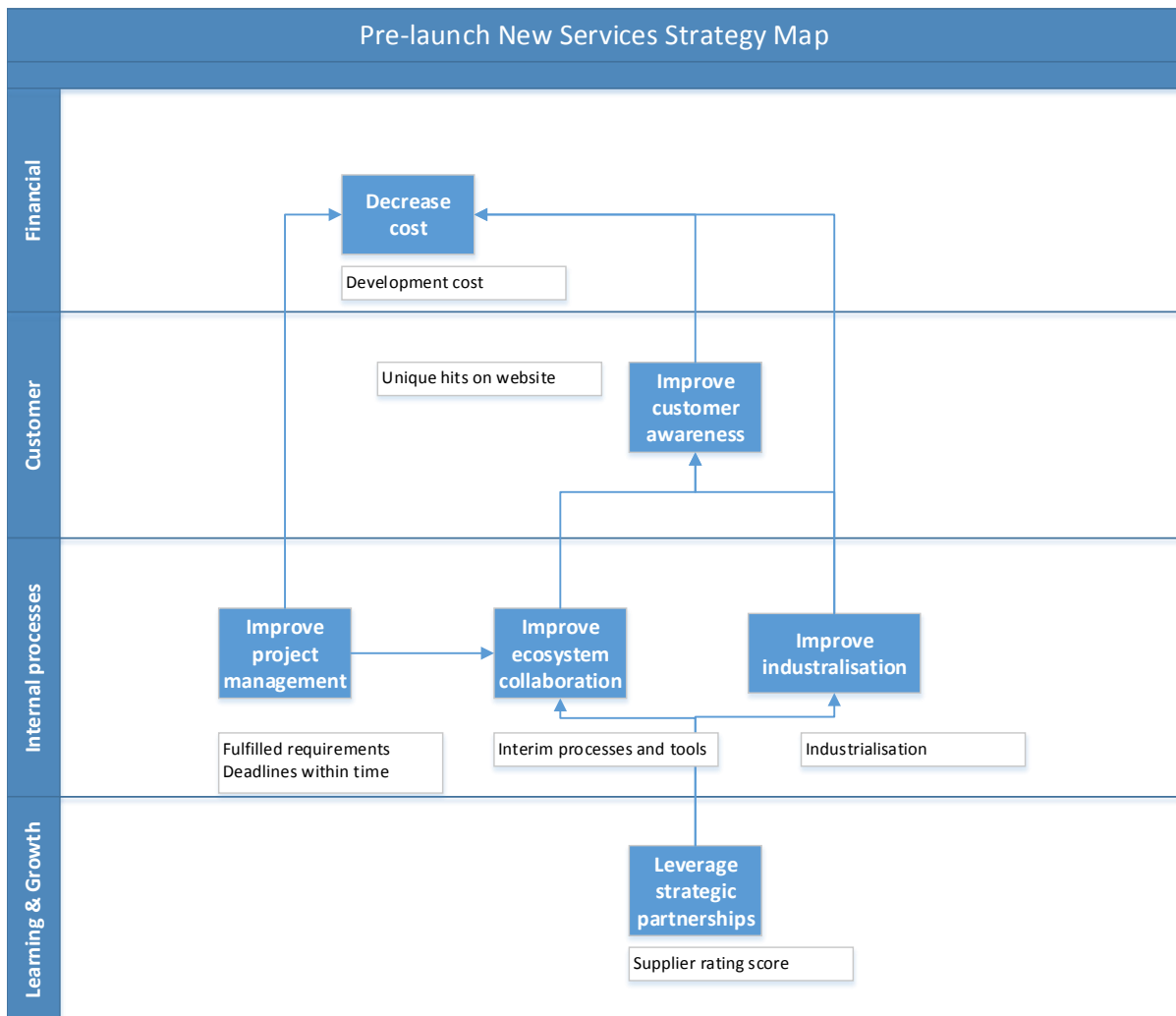
Figure 7.1: Pre-launch Development Process Strategy map: Critical Success Factors with casual links

1. Total development cost as a percentage of the Business Case

From a project management perspective, controlling cost is critical. Control for cost in order to maintain margin and allow for a positive business case. Participants agreed that there was no need to further divide different types of development cost. Development cost entail outsourcing costs, employment cost and other development cost. The development cost will be measured versus the business case of the service. The KPI is formulated by:

$$\text{pre-launch KPI 1} = \frac{\text{Actual employee cost of the project and development cost center cost}}{\text{Business case employee cost of the project and development cost center cost}}$$

All costs below target were considered a best case performance, whereas the normal target was set between 100% and 110% and a result >110% for the first year was considered a worst case performance. These targets were agreed upon by all project managers as feasible. This is based on the assumption that the business case budget is a good forecast of cost. The KPI is considered a process KPI since it concerns how the process is performed. The frequency of measurement is quarterly, because data will not be available on a shorter time span. The KPI will be reviewed on a quarterly basis as well in order to adjust targets when necessary. The project manager will

Table 7.1: Pre-launch New Services Key Performance Indicators

	Critical Success Factor		Key Performance Indicator	Dimension
	Financial			
1	Decrease cost	1	Total development cost as a percentage of business case	Percentage
	Customer-related			
2	Improve customer awareness	2	Number of unique hits on the philips.com website for new services	Number
		3	Number of objective claims	Number
	Internal processes			
3	Improve project management	4	Percentage of fulfilled requirements	Percentage
		5	Percentage of stage-gates met within time	Percentage
4	Improve ecosystem collaboration	6	Percentage of interim process and IT capabilities in place introduced by the project team without sales or delivery functional support	Percentage
5	Improve industrialisation	7	Scalability of the service offering	Number
	Learning and growth			
6	Leverage strategic partnerships	8	Supplier rating	Number

be responsible that business case data is provided to the system, because he has easiest access. Other data collection can be automated. The development team's manager was chosen as the owner of the KPI, whereas it was determined every individual project manager's responsibility to keep his own development cost in check and act when necessary.

2. Number of unique hits on the product page website for a new services

As a measure of how relevant a new service is to the customer and whether the customer is aware of the new service before the service can be bought, the participants together with represents from the marketing function agreed that the number of unique hits on the product page on the website would be best suited. Pre-launch projects only have a presence on the website after some time in development. Therefore, this KPI will not be relevant for the entire lifespan of the project. For this KPI the number of hits per service was agreed upon. Thus:

pre-launch KPI 2 = Number of the unique hits per new service on the product page per quarter

The frequency of measurement and review were both set to quarterly, because this would provide information to the project managers without making the flow of information too frequent. The data can be partially automated, since the report requests can be automated, but the data needs to be manually put into a Sharepoint folder. The marketing representative who is assigned to each project is responsible that the measure improves and the marketing effectiveness employee is assigned accountability for the KPI's improvement. Currently, there is little known on how many unique hits there might be. Therefore initial targets are, < 1.000 (worst case), 1.001-3.999 (normal case) and > 4.000 as a best case target. These will be updated when the first reports are received.

3. Number of objective claims for a new services

In this context, a claim is a proposition that marketing or sales employees can claim that their service (or product) can do or which a competitor's service (or product) cannot while theirs can. For instance, a cabriolet can take its roof off the car, whilst a normal car cannot. Similar, in diesel engines fuel injection motors were a huge advantage over a carburettor initially, whilst they are the standard now. Thus, a claim is what differentiates between two products or two services. A claim is even stronger when it is supported by objective and quantifiable evidence. Claims need to be constantly updated, because a claim needs to be a differentiating

factor. Generally, two types of claims can be distinguished. Superiority claims address how an attribute of a service provides the customer with a strategic advantage, while conversion claim reduces the customer barriers from buying-in on the service. The participants argued that there was a need for this type of logic integrated in the design process. This KPI was not included in the tactical PMS, since per service it would differ greatly how many and what type of claims are needed. Therefore "the number of objective claims" was added as a customer awareness KPI. This KPI is also especially suited to tackle the lack of actual benefit visualisation detailed in chapter 4. The KPI is thus calculated as:

pre-launch KPI 3 = Number of claims that can be objectively collaborated per new service

The KPI is included in order to increase the number of claims marketing can make about the service in order to have a stronger value proposition for the customer. An initial estimate of the number of claims was given by the project managers: < 3 as a worse case, 4 - 5 as a normal case and > 6 as a best case. The measure will be measured and reviewed quarterly in order to have an up-to-date view on the claims. The owners of the KPI were chosen to be both the project manager and the marketing representative, since a claim is the result of their collaboration. They are also the people who act when the measure is lagging.

4. Percentage of fulfilled project requirements

In terms of quality, the services can be measured by the extent to which pre determined business and commercial requirements have been met at the moment the service is brought to the market. The goal of this KPI is to ensure that the developed services fulfil enough of the quality requirements are able to deliver value to the customer. The formula is as follows:

$$\text{pre-launch KPI 4} = \frac{\text{Total number of fulfilled requirements at RfD}}{\text{Total number of requirements defined at PDC}}$$

It shows the fraction of the total number of business and commercial requirements which were formulated at the Product Delivery Committed (PDC) gate against those that are actually fulfilled at the Release for Delivery (RfD). According to the project managers, suitable targets here are $< 80\%$ as a worst case, 81% to 94% as normal case target. While $>95\%$ was chosen as a best case target. Frequency of measurement and review were set at quarterly, because of the length of average products a higher frequency would be redundant, whereas a lower frequency would provide too little information to act upon. The source of data here is the Business Document Management System (BDMS), where official documents, such as the list of requirements are stored in. The development process manager is the owner of the measure and it was agreed that he should keep regular track of progress and intervene when necessary. Individual project managers will act upon the measure. Their actions were too service-specific to determine on beforehand.

5. Percentage of project deadlines within time

The third project management KPI deals with time variance. It is included in order to ensure that projects are delivered in a timely fashion. The KPI will be calculated by:

$$\text{pre-launch KPI 5} = \frac{\text{Total number gates met within two weeks of deadline in BDMS}}{\text{Total number of gates with deadlines according to plan in PLC}}$$

Each service has four gates between the Product Launch Committed (PLC) gate and the eventual Release for Delivery (RfD). The participants of the workshops agreed that an extension of two weeks per deadline was reasonable. They concluded equal targets as for KPI 4. Thus, targets here are $< 80\%$ as a worst case, 81% to 94% as normal case and $>95\%$ as a best case

target. Also, the owner of the KPI is again the development manager and each individual project manager takes action when needed on his own project. The source of the data is again the BDMS.

6. Percentage of interim process and IT capabilities in place introduced by the project team without sales are delivery functional support

When processes and IT tooling are needed on the short term, but do not exist they can be created on an interim basis. Possibly without support of the two other functional areas, thus not utilizing their expertise. This might have multiple reasons, but it is clear that this process is not efficient. Therefore the last KPI measures the extent to which these interim processes or tools are put in place without their support.

$$\text{pre-launch KPI 6} = \frac{\text{Total number interim capabilities in place without BPO support}}{\text{Total number of capabilities in place}}$$

The interim capabilities are registered in the gap analysis, as are the total number of capabilities in place. Here the participants agreed that a worse case is everything over 30%, where a normal case lies between 29% - 11% and a best case is lower than 10%. These percentages are quite high, because the underlying process of road mapping is still quite immature. Therefore it is likely that these interim capabilities will be present often. If the KPI is lagging, the owner of the KPI, the development process manager, could escalate the issue to the other BPO owners. The team member who acts on the data should try to leverage existing capabilities and processes to look for commonalities. Again, the participants chose a quarterly measurement and review cycle.

7. Average scalability of services

The participants agreed to a measure of industrialisation should be incorporated. However, currently there is no consensus on how to measure the scalability of a new service yet. Therefore the KPI that is presented here could serve as a starting point for a future, more accurate KPI for the scalability of a new service. The participants agreed that in order that for a new service to be scalable it should at least use standard tooling and standard processes. Next, they argued that a service that is extended to multiple markets is more scalable that one that is not. Also the new service would be easier to industrialise if multiple customers can be serviced during the same period of time. The same logic follows for the ability to perform the new service from a location that is not on the customers' premise. These five characteristics form the KPI. These questions were the product of an extensive discussion on how to incorporate all types of services. These five were chosen, because they are generic enough to fit any service, which makes them most suitable for this PMS.

- The service has a multi-market introduction plan;
- The service allows for working on different customers in parallel;
- The service can be performed remotely;
- The service uses standard tools;
- The service uses standard processes.

Each question is scored with a 1 if applicable and a 0 if not and score for each service is equal to the total sum of the five questions. The participants agreed on a worst case target of < 1, normal case of 2 - 3 and a best case of > 4. The KPI is calculated:

$$\text{pre-launch KPI 7} = \text{Total score of service scalability}$$

Each individual project manager is responsible for the scalability of his service, however, the scalability is also restricted by the scope of the project itself. The measure will be measured and review quarterly, because of the average cycle time of a project. The KPI's formula should be updated when there is a more coherent view on industrialisation within ImCS.

8. Supplier rating score

Lastly, the participants agreed that on a development level a suppliers' performance should be monitored and improved if needed. Thus the last KPI will be the supplier rating score. The rating will be calculated via a questionnaire, which is to be filled in all relevant employees who deal with the supplier. The questionnaire, the Global Supplier Rating System (GSRS) is easily available to the development employees. The participants agreed that next to tracking all suppliers on an individual basis, it is meaningful to track the aggregate of suppliers such that it provides a view of all the relevant suppliers.

$$\text{pre-launch KPI 8} = \text{Average} \left(\frac{\text{Supplier's assessment score}}{100} \right)$$

The KPI takes the average of all suppliers that were screened. The targets are taken from the GSRS itself, <70% as a worst case, 71% - 89% as a normal case and >90% as a best case. Again the KPI is measured quarterly and reviewed quarterly as well. The improvement process based on the outcome of the GSRS will be performed together with a procurement team together with one of the project managers. They will formulate a supplier specific improvement plan.

7.2 Implementation

Identical to the tactical PMS implementation, the pre-launch PMS implementation falls out of scope of the current project due to resource constraints. In order to facilitate the implementation, the business analytics team was provided with a detailed account of the KPIs. The implementation of the pre-launch KPIs will commence after this project has ended. The implementation should follow the procedures as described in chapter 5. Based on the current status of the implementation of the post-launch PMS, it is estimated by business analytics that the implementation of this PMS should take one month.

8. The post-launch Performance Management System

This chapter describes the design of the Performance Management System for Alpha. The design follows the steps described in chapter 5. Therefore the design starts with defining strategic objectives, followed by the critical success factors (CSFs). These are designed in relation to each other. After this, the different key performance indicators (KPIs) are defined and checked on their soundness. Finally, an overview of all KPIs is presented.

8.1 Design

This section deals with the operational post-launch design of an individual service, specifically the Alpha service. This PMS design will be the blueprint for each service that is sold to Philips' customers in the near future. This final PMS will follow the same set up as the two previous chapters.

8.1.1 Clarifying Vision and Strategy

For the Alpha offerings, the following strategic objectives were defined by development and marketing managers:

- Launch a new service to the market and become one of the top 3 players in the market by 2016;
- Launch a further portfolio of new services in the market and coordinate a cross-Philips business strategy. Philips should have the broadest portfolio in the market by 2016;
- (Re)launch and manage the Philips Alpha brand and Philips is to become recognized as key stakeholder as leader in the market by 2016.

These strategic objectives were agreed upon as the basis for the PMS set up by the Alpha team in the workshop sessions.

8.1.2 Defining Critical Success Factors

An initial brainstorm in the first workshop provided a potential list of CSFs. The CSFs were validated in meetings with all participants in between the first and second workshop and were finalised at the second workshop. The following list of CSFs were not included in the system.

1. Decrease lead times;
2. Improve development process efficiency;
3. Improve Philips integration;
4. Improve process maturity.

"Decrease lead times" was deleted, because related KPIs were better suited under the two efficiency CSFs. The "improve development process efficiency" CSF was deleted, because the participants could not come up with potential KPIs and related KPIs were already captured in the "life cycle management" CSF. Thirdly, the "Philips integration" CSF proved too hard to make tangible and derive suitable KPIs. Lastly, "improve process maturity" was deleted, because potential KPIs were captured by the other CSFs. This lead to the following list of CSFs. They will be discussed below.

1. Decrease costs - Decrease the relevant development, deployment and support costs;
2. Increase profitability - Increase the profitability of the new service;
3. Increase revenues - Increase the revenues generated from the new service;
4. Improve customer awareness - Improve the awareness of customer with respect to the new service;
5. Improve customer experience - Improve the customers' experiences in working with the new service;
6. Improve customer retention - Improve the re-subscription of customers;
7. Improve life cycle management - Improve the relationship with the customer;
8. Improve sales efficiency - Improve the efficiency of the sales processes;
9. Improve delivery efficiency - Improve the efficiency of the delivery processes;
10. Leverage partnerships - Improve the performance of suppliers.

On a financial level, the participants agreed that both cost and sales should be managed separately in order to be able to improve them more easily. Also, cost mostly concern the development and delivery processes whereas revenues is associated with the sales function. In order to create a holistic view of the service it was also agreed that "increase profitability" should be included. In line with Philips' customer journey process a customer is aware of the service, next he experiences the service due to his buying and using the service. Finally after the contract period he may or may not renew his subscription. In order to reflect these steps three CSFs were designed: customer awareness, customer experience and customer retention. According to the participants these CSFs should cover all customer contact during the service operation. Three main internal processes were recognised. First, the sales process efficiency details how efficient the sales process is executed. Its effectiveness was already captured in the "increase revenue" CSF. Secondly, the delivery process efficiency, which includes the initial deployment and customer support during the contract period. Lastly, the participants agreed that it is important to manage the growth in the relationship between Philips and its customers. Therefore the CSF "improve life cycle management" was created. Finally, similar to the previous two PMS, the importance of suppliers was recognised in terms of "leverage partnerships".

When adding casual links between these CSFs the structure of fig. 8.1 results. This set of CSFs, was validated with ImCS marketing and development managers. They agreed that the set was a comprehensive list of CSFs and covered the entire span of the service. Another validation step was taken for the set of CSFs. The set was compared with two other services which are in the pre-launch stage. For these two services, the CSFs were highly applicable and no additional CSFs appeared to be missing. Also, for their responsible project managers, the causal links were logical steps and easy to understand. Furthermore, the managers argued that the set of CSFs is easy to use, because of its simplicity. These discussions confirmed the importance of each individual CSF, but more importantly, also confirmed the strategy map and the associated causal links. It was agreed by the entire team that this strategy map would be used for the performance management systems of all new services because of its simplicity and comprehensiveness. Starting bottom up in fig. 8.1, "leverage partnerships" improves "the service delivery processes efficiency" and "life cycle management". The delivery and sales pro-
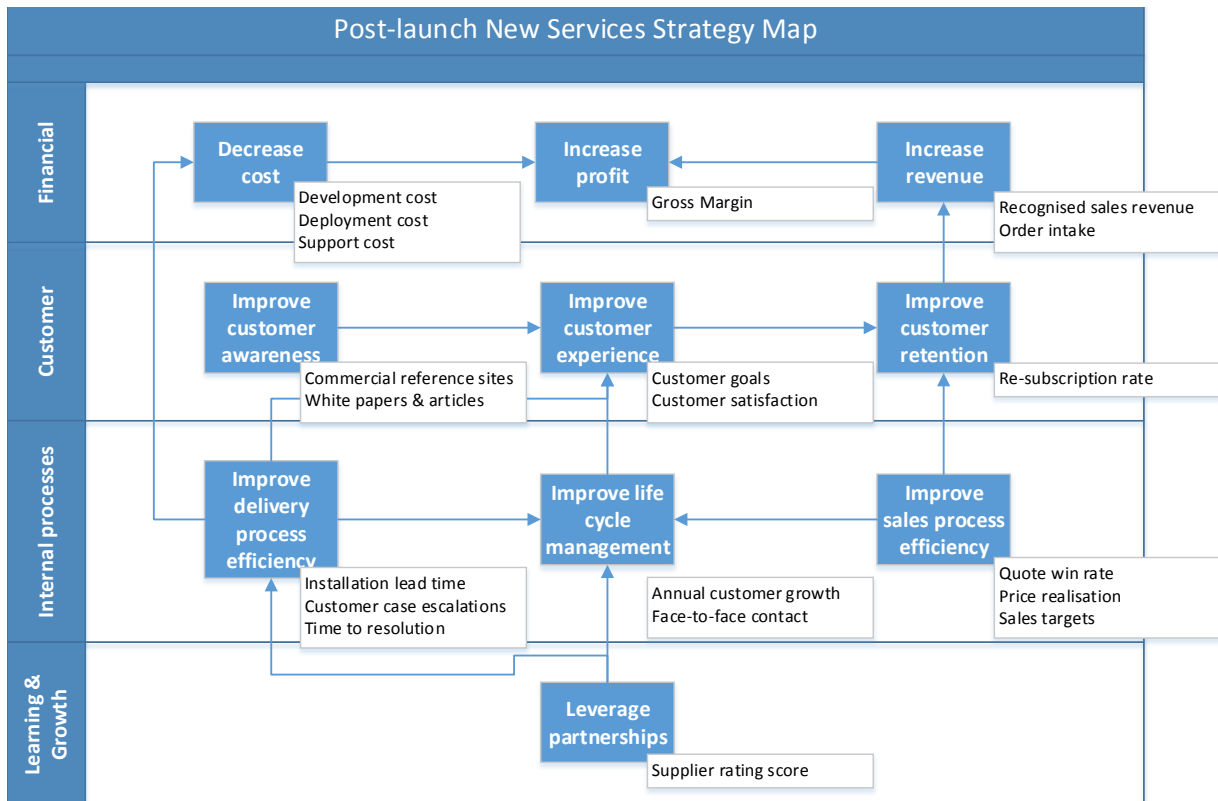
Figure 8.1: Post-launch Strategy map: Critical Success Factors with casual links

cess efficiency CSFs positively influence the life cycle management CSF. The delivery efficiency and life cycle management CSFs improve the customers' experience, where the delivery process efficiency also links to a decrease in costs. The sales process efficiency and customer experience are linked to customer retention, which is linked to improvement of revenues. Finally, costs and revenues are linked to profitability. These links are causal relationships, but serve mostly to visualise the interdependency between the CSFs and these links represent the most critical links between the CSFs. The links were discussed in the workshops by the participants. Although other casual links were possible as well, they agreed that the links presented in the figure are the most vital.

8.1.3 Defining Key Performance Indicators

After the development of the CSFs the associated KPIs were designed. Before the are discussed, they soundness tests of Neely et al. (2002) are discussed below.

Soundness of the Key Performance Indicators

The ten soundness tests proposed by Neely et al. (2002) were carried out by the lead researcher and confirmed by the new service operations manager. She has most overall knowledge of the service. Of these ten soundness tests, three tests appeared to be the most important for the post-launch PMS. First of all, the truth test, focus test and the gaming test were most influential in the decision for keeping, revising or deleting a measure. Especially the gaming test, whether or not a measure made deliberate manipulation easier, was critical. This process resulted in the deletion of an additional eight KPIs, because they were not sound. For instance, the KPI "funnel size" was deleted, because the information here was largely covered by "quote win rate" and "order intake" which were also included as KPIs. Also, "the amount of sales incentives

paid out" was deleted, because if this KPI was included, paying incentives could have become a goal on its own. Also, it was only a proxy of order intake, which was already included as well. "Number of customers" was a KPI of "customer awareness" and was deleted, since it did not actually measure awareness, nor anything else. Also, no distinction was made between the size of customers. The gaming test primarily helped to revise the formula of measures, such that they were more objective and less prone to interpretation. This was for instance the case in the "improve industrialisation KPI", which is now generic but clear to the team members. The team members who validated the soundness tests found that the tests, although sometimes subjective, are very common sense related and therefore very useful and accessible. The soundness tests also included tests on the mutual exclusiveness of the KPIs, such as the focus and truth test, see table 3.2. All CSFs and the KPIs derived from the CSFs cover different areas of the new services process. Therefore it can be concluded that the KPIs are mutually exclusive.

The result is a set of twenty KPIs, which is on the upper bound of what most literature suggests. However, these KPIs are spread out over the sales and delivery functional processes, greatly reducing the number of relevant KPIs to each team member. The list of the set of KPI is presented in table 8.1. The KPIs will now be discussed. The list of records sheets per KPI can be found in appendix IV. Some commercial KPIs will not be shown here for confidentially reasons.

Table 8.1: Post-launch New Services Key Performance Indicators

	Critical Success Factor		Key Performance Indicator	Dimension
	Financial			
1	Decrease cost	1	Development cost (as a percentage of budget)	Percentage
		2	Deployment cost (as a percentage of sales)	Percentage
		3	Support cost (as a percentage of sales)	Percentage
2	Increase profit	4	Gross margin	Percentage
3	Increase revenue	5	Recognised sales revenue	Euros
		6	Order intake	Euros
	Customer-related			
4	Improve customer awareness	7	Number of commercial reference sites per market	Number
		8	Number of white papers & scientific articles	Number
5	Improve customer experience	9	Accomplishment of customer goals	Percentage
		10	Customer satisfaction	Percentage
6	Improve customer retention	11	Re-subscription rate	Percentage
	Internal processes			
7	Improve delivery process efficiency	12	Installation lead time	Hours
		13	Customer case escalations per support tier	Number
		14	Time to resolution per support tier	Hours
8	Improve life cycle management	15	Annual Alpha revenue growth per customer	Percentage
		16	Face-to-face contact with a single customer versus planned	Percentage
9	Improve sales process efficiency	17	Quote win rate	Percentage
		18	Price realization	Percentage
		19	Number of markets with a committed sales target	Number
	Learning and growth			
10	Leverage partnerships	20	Supplier rating score	Number

Financial Key Performance Indicators

Three types of costs were identified. First, development cost, due to the fact that there is a dedicated development team and an associated cost centre. Then, the participants agreed that a distinction should be made between the deployment cost (installation) and the support cost (customer support and annual entitlements), due to their different nature. The marketing and communication and sales costs are not taken into account here, because most of these costs are

not differentiated per project. Therefore, the post-launch team will have limited influence on these costs. Thus the participants chose not to include those costs.

1. Development cost as a percentage of budget

Development cost which will be measured versus the business case. This includes the employee costs of the employees who are assigned to the services and other costs. The participants preferred to measure the development costs against sales. This would yield a better view of the impact of the development costs. However, in the early stages of the service the measure would then be influenced highly be fluctuations in sales. Therefore the participants agreed that initially, the development cost would be weighted against the business case. Later, the KPI would be changed in order to be measured against sales.

$$\text{post-launch KPI 1} = \frac{\text{Actual employee cost of the project and development cost center cost}}{\text{Business case employee cost of the project and development cost center cost}}$$

All development costs below target were considered a best case performance, whereas the normal target was set between 100% and 110% and a result >110% for the first year was considered a worst case performance. The frequency of measurement is quarterly, because data will not be available on a shorter time span. The KPI will be reviewed on a quarterly basis as well in order to adjust targets when necessary. The responsible controller will deliver the business case data which is provided to the system, because he has easiest access. Actual data collection can be automated. The development project manager was selected to be the measures owner and the one who should act upon the KPI. He should keep track of the budget and make prioritisations when needed.

2. Deployment cost as a percentage of sales

The delivery cost will be measured versus sales, since these cost should be strongly related to sales. These cost include the employee costs of the implementation. The participants argued that when more connections are sold, also more deployment costs will be incurred. As a basis the order intake based on the full contract period of a customer is taken and also the employee costs of that customer, since these are linked together.

$$\text{post-launch KPI 2} =$$
$$\text{Average} \left(\frac{\text{Outsourced implementation cost and project employee cost per customer}}{\text{Order intake for the full contract period per customer}} \right)$$

The initial target setting is based on the business case and might be revised after the first reports or installations provide actionable information on target setting. The initial targets are: >X% worse case, Y% normal case and a < Z% best case. Again, data is only available quarterly, thus measurement will also happen quarterly. The internal service provider who handles the installation acts upon the KPI, whereas the new service operations manager in the development team is the owner. She monitors the internal service provider's performance and intervenes when appropriate.

3. Support cost as a percentage of sales

Support cost cover periodic customer visits, customer support and other customer interactions over the lifetime of the contract and will also be measured as a percentage of sales. The scope of the measure includes all customers with active contracts within the measurement period.

$$\text{post-launch KPI 3} = \frac{\text{Total employee support costs}}{\text{Order intake for the full contract period for all active customers}}$$

Based on the business case, the initial targets are: $> X\%$ worse case, $Y\%$ normal case and a $< Z\%$ best case. These targets might be revised when actual data is collected. Again, data is only available quarterly, thus measurement will also happen quarterly. Similar to the previous KPI, the internal service provider is responsible for customer support acts upon the KPI. The service operations manager in the development team is the owner. She monitors the internal service provider's performance and intervenes when appropriate.

4. Gross margin

In order to manage profitability, gross margin was agreed upon, which is widely used within Philips. Within Philips, it is more appropriate for the measurement than EBIT(A), because most overhead costs, such as marketing and communication cost, are aggregated on a higher level.

$$\text{post-launch KPI 4} = \frac{\text{Recongised sales revenue - Recognised cost of goods sold}}{\text{Recognised sales revenue}}$$

The Head of ImCS was chosen as owner of the KPI and the marketing director was chosen to lead the actions based on a below expectations performance. They should allocate resources when appropriate. The targets for the gross margin are $< X\%$ as worse case, $Y\%$ as a mid case and $> Z\%$ as a best case target. The ImCS controller is responsible for data collection, however this process is fully automated.

5. Recognised sales revenue

Recognised sales revenue was agreed to in order to review the service's sales. Sales revenue and order intake are already managed by the central marketing team. Therefore, their target setting and measurements were used in order to take a uniform approach. Even though these two KPIs are managed already, the participants argued that they are still vital for the entire service and should be taken into account as well in the PMS.

post-launch KPI 5 =
Total Year to Date value of recognised sales orders for Alpha subscriptions

As discussed in chapter 5 the KPI targeted Year to Date, meaning from January 1st to the current date. However, other views, such as monthly sales, are also possible within the application. The targets for 2016 are as follows: $< X$ as worse case, normal case Y and finally $> Z$ as a best case. These targets were a result of earlier discussion among the local sales entities and the business managers. The local markets act on the data based on the input from the business managers and the marketing director.

6. Order intake

As a measure of future revenue streams, order intake was chosen.

post-launch KPI 6 = Total Year to Date value of orders

Target setting here was already done previously analogue to sales targets. These targets are: worse case $< X$, mid case Y and best case $> Z$. With respect to the order intake, here the business managers are the ones who act. They keep close contact with the local markets and intervene when necessary. Order intake will be measured on a monthly basis, in order to allow for quicker responses and communication toward the local markets.

Customer-related Key Performance Indicators

Philips distinguishes customer awareness, customer experience and eventual customer retention. Five KPIs were developed to measure these phases. In the post-launch PMS, the hits on the websites KPI was removed, because the participants agreed on more suitable KPIs specific to Alpha. The KPI about claims, which was included in the pre-launch PMS, was not included here, because they are not yet used for Alpha.

There is a rather large difference between the pre-launch and post-launch systems in terms of KPIs. For instance, the "number of objective claims" is now only used in the pre-launch PMS, where it would also be suitable in the post-launch PMS. This is due to the immaturity of processes within the new services process. When the process of creating and back up claims is developed further, it would be very beneficial to also include it in the post-launch PMS. This would create more continuity among the three PMS. The same goes for the other "improve customer awareness" KPIs. The approaches differ greatly and would benefit from a common

7. Number of commercial reference sites per market

Customer awareness proved most difficult to agree upon, due to its external nature. Firstly, the number of commercial reference sites was chosen. A commercial reference site is a hospital using the service and is used by sales employees to give product demonstrations and tours for prospected customers. The assumption now is that a commercial reference site has a marketing value and that this value is equal for all sites. Eventually, the output or outcome of having a commercial reference site should be measured. This might be the number of leads due to a reference site or the order intake due to visits to a reference site. However currently the reference sites are not managed as such. Therefore, this measure will be updated when the corresponding processes are in place as well.

> post-launch KPI 7 = Number of reference sites per market

The KPI will be measured, since local markets prefer to have a dedicated reference site. The targets currently are < 1 per market, 1.1 to 1.9 per market and > 2 sites per market. The clinical scientists are responsible for these sites and act also when the measures are lagging. They approach additional hospitals in key areas when the measure is lagging. The KPI will be measured quarterly. This would provide enough information according to the participants of the workshops.

8. Number of white papers and scientific articles

In the radiology community in which Alpha operates, white and scientific papers are widely accepted in order to demonstrate a product's or a service's effectiveness. These papers are developed by clinical application specialists of Philips in cooperation with scientific reference sites. The clinical scientists are responsible for and act on the KPI.

> post-launch KPI 7 = Number of white papers and scientific articles

The initial targets, which might be revised depending on the future situation are: < 3 papers, 4 - 5 papers and > 7 papers as a best case target. The KPI is measured quarterly. The responsible employees are constantly up-to-date with the measure. However, reporting the measure more often would not reveal interesting insights. Therefore, the decision for quarterly measurement was made.

9. Accomplishment of customer goals

Customer experience will be measured via a dual approach. Together with a clinical consultant, the customer will set goals before they start working with the service. Periodically, a Philips clinical consultant will visit the customer and among other things, the customer goals will be evaluated. The accomplishment of the customer's goal is an important measure of the service's effectiveness and was therefore included. However, this is still to be implemented in the actual service. Therefore it was agreed that the measures will be included as soon as possible.

10. Customer satisfaction

Given the current knowledge about the service design, at each key touch point with Philips the customer will be asked to fill in a satisfaction survey. This will result in an overall customer satisfaction. However, this is still in development and to be included in the service design. Therefore it was agreed that the measures will be included as soon as possible.

11. Re-subscription rate

Knowing how many customers renew their contracts was deemed critical. Therefore the re-subscription rate of customers was also included in the PMS.

$$\text{post-launch KPI 11} = \frac{\text{Number of renewed subscriptions Year to Date}}{\text{Number of renewed and expired contracts Year to Date}}$$

The KPI is calculated by taken to total number of re-subscriptions within a year divided by the total number of renewed and expired contracts in a given period. The local markets receive an automated reminder when a contract is about to expire from a CRM tool, which is connected to the main SAP database. Local markets are responsible for the renewal of the order. They will also review why customer chose not to renew their contract. This information will be looped back into the development process in order to improve the service. The targets that the participants set based on educated guesses are: $<X\%$ worse case, $Y\%$ mid case and $> Z\%$ best case.

Internal Processes Key Performance Indicators

Three main CSFs were derived that deal with internal processes. Firstly the service delivery consists of two main phases, installation and support. The first part is captured via the installation lead time. The second part is captured via two KPIs. Also, the participants agreed that the growth in the relationship with the customer is critical and should be managed. Two KPIs were developed for this purpose.

12. Installation lead time

Participants agreed that the installation lead time is a critical step in the transition from an order to when the customer can use the service and the invoicing process can start. It also involves the customer highly, making it even more important.

post-launch KPI 12 = Average (Medical device installation record date − Sales order creation date)

The KPI is calculated by averaging the number of days between the sales order creation date and the point in date when the medical device, e.g. the software, is installed. Due to regulatory issues, these are both registered precisely. The MDIR date is also used as the moment when billing can start, thus is accurate, since the customer must agree to the date. The internal service provider acts on the data, since they are handling the actual installation. The new service operations manager from the development team keeps close contact with the internal

service provider in order to resolve issues when the occur. Based on the first installation, three targets were set. A worse case target was $> X$ months, the mid case target is between Y months, whereas the best case target is $< Z$ months.

13. Customer cases per customer per support tier

When a customer calls Philips because he requires support a customer case is initiated. The cases are differentiated between application support, dealing with content and technical support, dealing mostly with issues with the software. There are three support tiers in place. The internal service provider is responsible for both first tiers of (generic) support and the second tier of technical support. The central development team, which includes clinical scientists and development engineers, is responsible for tier 3 technical and tier 3 application support. The market clinical application support and the central clinical scientists handle the tier 2 application support.

$$\text{post-launch KPI 13} = \text{Average number of cases per customer per support tier per year}$$

Not the absolute number of calls will be measured. The participants chose the call rate instead, because it was a more relative measure. Also the distinction between all tiers of support was made in order to gain insight in the type of customer cases such that the service can be improved upon. Many cases are considered a bad scenario, because apparently an element of the service design was not functioning properly. Targets were based on experience with other call rates and are set at > 10 calls as worse case, $4 - 9$ calls as a normal case and < 3 calls as best case. These targets will be revised when more accurate data is collected.

14. Time to resolution per case escalation per support tier

In order to provide an entire view of the support processes not only the number of cases were taken into account, but also the average time to resolution of a case per support tier.

$$\text{post-launch KPI 14} = \text{Average(Technical case completion date} - \text{Case creation date) (per support tier)}$$

A differentiation is made here again, because third tier cases would probably take more time. The initial targets do not reflect this, because no educated estimates could be made. Therefore these targets will be updated when more data is collected. Currently the targets are set at > 48 hours worse case, $13 - 47$ hours normal and < 12 hours best case.

15. Annual Alpha revenue growth per customer

The life cycle management details how the long-term relationship between Philips and its customers is managed. Two measures were agreed upon. Firstly, the revenue growth per customer shows whether the customer extends the service to additional equipment and sites and whether other related services are purchased, which indicates a growing relationship.

$$\text{post-launch KPI 15} = \text{Average}\left(\frac{\text{Customer revenue year(t)} - \text{Customer revenue year (t-1)}}{\text{Customer revenue year (t-1)}}\right)$$

The measure is closely linked to the recognised sale revenue KPI, where this KPI takes it data from. The measure starts after the first full year of a customer subscription and uses a 12 month rolling period after that. It is therefore also measured quarterly. Based on this KPI, the service might need redesign or further improvements. Initial targets are set at $> X\%$ worse case, $Y\%$ normal case and $> Z\%$ best case annual revenue growth.

16. Face-to-face contact with a single customer versus planned

The participants stated that most of the added value of the service is delivered with face-to-face customer contact. Therefore measuring whether these touch points are actually delivered is vital for the service operation.

$$\text{post-launch KPI 16} = \text{Average}\left(\frac{\text{Number of hours booked per customer on service work order}}{\text{Number of hours planned per customer}}\right)$$

Targets here as set such that more hours per customer is not necessarily good, but less also indicates low performance. Therefore the worse case targets are both $< 89\%$ and $> 111\%$, while the normal targets are 90% - 94% and 10% - 110%. The best case target is 95% - 105%. The clinical application specialists in the market are responsible for the KPI.

17. Quote win rate

The sales process efficiency is captured by the win rate of quotes, e.g. how many offers are accepted by the customers.

$$\text{post-launch KPI 17} = \frac{\text{Value of order intake}}{\text{Value of orders of deals not further pursued or lost and value of order intake}}$$

The local markets are responsible for the measure, where the business managers are the owners of the measure. They measure all markets in order to improve the measure. Targets are set by them on $< 80\%$ as a worse case, 81% to 94% normal case and $> 95\%$ as best case. The data can only be measured quarterly, because it is only generated on that time span in the appropriate systems.

18. Price realisation

Price realisation is defined as the percentage of the target price has been met in the actual sales. The price for a Alpha subscription is based on two components, a number of locations and a number of connections. The target price is calculated by taken the number of connections and multiplying it by the price of a connection plus the number of locations multiplied by the price per location. The price realisation is thus calculated:

$$\text{post-launch KPI 18} = \frac{\text{Value of order intake}}{(\text{\# connections * Target price} + \text{\# locations * Target price}) * \text{subscription duration}}$$

The prices for locations and connections are visible in the market's ERP system and per country target prices exist. This method of calculation was chosen in order to get an average price realisation, which was preferred over averaging the price realisation per customer. Targets are based on discount authorisations, which indicate what the maximal percentage discount a person is authorised to issue. The targets are $< 80\%$ worse case, 81% - 94% normal case and $> 95\%$ best case. The participants expect that the targets could be increased when there is more experience once there are more proof points that target prices reflect the market's perception of the added value. Similar to the previous KPI, the business managers own the measure and act on them together with the markets.

19. Number of markets with a committed sales target

The last sales efficiency KPI deals with the number of markets who have committed a sales and order intake target. The measure indicates how well the development project manager and the

business managers are able to convince markets to start participating in and support the sales of the service. If enough markets have joined, the participants agreed that the KPI should be changed in order to reflect whether they have met their sales targets.

$$\text{post-launch KPI 19} = \text{Number of markets with a committed sales and order intake target}$$

Targets are set by the business managers at < 4 markets worse case, 5 - 9 markets normal and > 10 markets as a best case performance. The business managers also act on the measure.

20. Supplier rating score

Lastly, he participants agreed that on a development level a suppliers' performance should be monitored and improved if needed. Thus the last KPI will be the supplier rating score. The rating will be calculated via a questionnaire, which is to be filled in all relevant employees who deal with the supplier. The questionnaire, the Global Supplier Rating System (GSRS) is easily available to the development employees. The participants agreed that next to tracking all suppliers on an individual basis, it is meaningful to track the aggregate of suppliers such that it provides a view of all the relevant suppliers.

$$\text{post-launch KPI 20} = \text{Average} \left(\frac{\text{Supplier's assessment score}}{100} \right)$$

The KPI takes the average of all suppliers that were screened. The targets are taken from the GSRS itself, $<70\%$ as a worst case, $71\% - 89\%$ as a normal case and $>90\%$ as a best case. Again the KPI is measured quarterly and reviewed quarterly as well. The improvement process based on the outcome of the GSRS will be performed together with a procurement team together with one of the project managers and / or the new service operations manager. They will formulate a supplier specific improvement plan.

8.2 Implementation

The implementation started with a focus on the Alpha operational PMS, because the management team and the participants assigned this the highest priority of the three PMS. Also, it was most likely that this PMS would contain the most data for which collection could be automated, which would showcase the possible benefits for a PMS most. Therefore a prioritisation was made. The first KPIs to be implemented were:

- Deployment cost;
- Support cost;
- Monthly recognized revenue;
- Order intake;
- Installation lead time;
- Customer case escalations per support tier;
- Time to resolution per support tier;
- Annual Alpha revenue growth per customer;
- Price realization.

These KPIs were easiest to implement in the application and could be fully automated. Secondly, the implementation focused on:

- Gross margin;
- Re-subscription rate;
- Face-to-face contact with a single customer versus planned;

- Quote win rate.

These KPIs require more effort to implement in a way they can be automated. A slight degree of manual input was needed for these calculations. Currently, the implementation is still focused on these KPIs. Next, the KPIs that cannot be fully automated were in focus. These are:

- Development cost;
- Number of commercial reference sites per market;
- Number of white papers & scientific articles;
- Number of markets with a committed sales target;
- Supplier rating score.

Lastly, the "accomplishment of customer KPIs goals" and "customer satisfaction" will not be implemented, until these are fully integrated in the service design and aligned with the markets' approach for customer satisfaction measurement. After these three stages of implementation are completed, the implementation will focus on the other two PMS. Since the pre-launch PMS is largely the underlying PMS of the tactical level PMS, these KPIs will have the highest priority.

9. Use and Updating of the Performance Management System

This chapter describes the use and updating process of the performance management systems. Since in this project these stages have not yet occurred, this chapter will discuss the procedures that were developed in order to use and update the PMS. In the first section of this chapter the use of the PMS will be discussed, followed by procedures on the updating process in the second section.

9.1 Use

The use phase is the least studied phase of the PMS processes (Bourne et al., 2000, Mettänen, 2005). However, three main characteristics of this phase can be identified. First, team members should be aligned on the purpose of the PMS. Secondly, how and when the reporting is performed and the team receives feedback from the PMS. Lastly, it must be clear what actions are taken based upon the output of the PMS. All these characteristics were already discussed in the design process and are therefore not an issue here. Note that all of these characteristics needed to be explicitly defined when applying the record sheet (Neely et al., 1997).
Within this project, the goal of each of the PMS is to allow for and stimulate continuous improvement, indicating that the processes in scope should be improved upon continuously. All organisation members agree on this. It has also been made specifically clear to all members that the PMS is not mean for controlling or tracking individual performance. This would greatly reduce resistance towards the PMS (de Waal & Counet, 2009), and so far there was none. The PMS is solely used to highlight areas which require improvement and facilitate improvement on an organisational level. Cheng et al. (2006) also points out that when improvement is the PMS' goal, employees are much likelier to support the PMS and its effectiveness is potentially higher. Lastly, within Philips, the LEAN based DMAIC cycle (Define, Measure, Analyse, Improve, Control) is widely used.Therefore, this PMS fits very well into this cycle and thus existing performance improvement practices.

In accordance with Bourne et al. (2000), team members were aligned on the purpose of the PMS, which was made clear during the workshops and was thereafter propagated to the other employees. Secondly, periodic team meetings should be held the results can be discussed. The development team already has a monthly team meeting, thus the tactical and pre-launch KPIs can be integrated with these meetings with ease. Alpha also employs regular team meetings, however due to the sheer number of KPIs only a selection of KPIs should be discussed at these meetings. The specific functional areas then could discuss the results amongst themselves. Frequency of measurement and reporting will be exactly the same. Thirdly, during the design of the three PMS, suggestion for actions were developed if a KPI was below target. These are detailed for each KPI and could be updated and detailed further when the organisation is more familiar with using the PMS.

Initially, during the design process, for each KPI specific actions were defined and assigned to individual employees when a KPI was lacking. This ensures that when performance is not up to target, additional analyses and actions are taken in order to improve performance. It is advised to the teams to discuss the taken actions in the team meetings, such that the entire team is aware of progress on that specific area. A distinction was made between who is responsible for the measure and who takes action in order to improve the measure, since these two can be two different people. Both their actions are documented per KPI.

9.2   Updating

Updating the PMS is one of the most important steps in the entire PMS process. As described in section 3.3 the updating process consist of three steps.

1. The updating of targets and current measures;
2. New measure development;
3. Challenge strategic assumptions in order to improve the PMS.

The first item is the review of targets. In this step it is checked whether the targets still represent the current situation and if they need to be adjusted accordingly. As stated in the three dedicated chapters, for most KPIs this will need to happen regularly in the early stages of the PMS. This will happen according to the frequency of review, as can be found in the appendices for each KPI. If targets were not met, or easily met, they might be revised by the team to support a more appropriate goal setting.

Secondly, the PMS should support the actual situation. Therefore at each periodic review point it should also be thoroughly checked by the team if all measures, formulas and data sources are still accurate and if they still serve the business goal. Therefore it is very likely that some measures need to be altered or completely deleted. Currently, the participants agree that the developed CSFs will always be accurate, which would mean that only KPIs might need to be revised, but the revision might extend to CSFs as well. New measures can be developed using the record sheet, specifically taking into account the use of data sources, since now the business analytics will be less involved.

Finally, the organisation should constantly check whether the PMS is still addressing the strategic challenges. It does this by continuously asking itself whether the KPIs that are in the PMS are still relevant and represent the actual situation. If the organisation's main challenges lie outside of the scope of the PMS, it should be updated in order to also cover these challenges. This process should further allow for continuous improvement. The explicit use of challenge mapping should allow easily for this.

10. Conclusion and Recommendations

This chapter discusses the results and conclusions, recommendations for Philips Imaging Customer Services, the limitations and contribution to literature of this thesis.

10.1 Conclusion

As the initial project description, provided by Philips, stated, the goal of the project was to create a performance management approach for new services. This thesis investigated how to measure and manage the performance of new services within Philips Imaging Customer Service. As described in the deliverables, this project provided three PMS. The literature review focused on the development of a PMS. Within literature, as well as the methodologies used in this thesis, there was no indication that the development of a PMS for new services differed from the development of a PMS of the traditional Philips businesses. Although CSFs and KPIs might differ between the two, the methodology for the design, implementation, use and updating will not.

The new services process can be described from two view points. On the one hand there are three functional processes. These processes are end-to-end, meaning that they cover the entire life cycle of the service and are considered on a tactical level. The first of these is the development processes (Innovation to Market, I2M). The development processes cover both the marketing and development activities. These processes are performed centrally in the organisation. Secondly, the sales processes (Market to Order) ensure that leads are generated and converted into orders. Lastly, the delivery processes (Order to Cash, O2C) cover the installation, support and billing processes. On the other hand, the new services can be distinguished as pre-launch or post-launch. On the one hand services that are in the development stage and are not yet sold to the customers. These are called pre-launch services. When these are developed and sold to the customers they are called post-launch services. The three functional processes function together in each type of service in a matrix type of organisation.

Based on these perspectives three performance management systems (PMS) were developed. The first focused on the tactical development processes, the second on the pre-launch services and the last on the post-launch services. They all used a shared approach to the design, implementation, use and updating of the PMS. First, the design process followed seven step, shown in
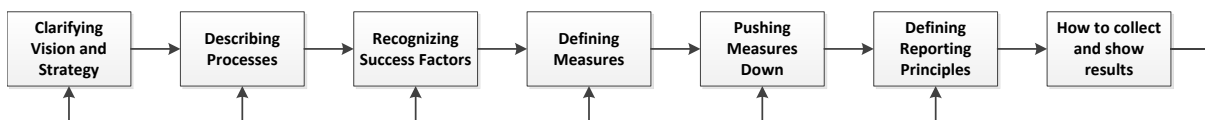
Figure 10.1: Leinonen's model (in Mettänen, 2005)

fig. 10.1. First, vision and strategy should be agreed upon. Then the organisational unit should agree on what processes are in scope. Next it should derive critical success factors (CSFs) which represent the former two. Based on the CSFs, they develop a strategy map with causal links

between the CSFs depicting their interdependencies. Next, key performance indicators (KPIs) are developed for each CSF. The record sheet provided by Neely et al. (1997) was used to define the KPIs precisely. The record sheet was extended to include a worst, normal and best case target and to include the type of the KPI. After the design, the implementation of the PMS followed, but was largely out of scope due to resource restrictions in implementing the PMS. Three PMS were developed in order to represent the new services processes: a tactical development PMS, a pre-launch service PMS and a post-launch PMS. The latter was specifically designed for the service Alpha. The three PMS resulted in a set of CSFs that the organisation regarded as easy to use yet also comprehensive. They were visualised in a strategy map where the CSFs were connected using causal links. Each CSF was operationalised by at least one KPI. The three PMS were developed in order to provide input for the improvement of processes. The main difference between the tactical PMS on the one hand and the pre-launch and post-launch on the other is the level of detail. The latter two provide input that is much easier to translate into the improvement of relevant processes within a single service. The tactical PMS is more suitable in order to detect issues that occur across all services. Both viewpoints are important for the new services development processes and the post-launch services.

The set of CSFs and KPIs represents the processes in scope. Moreover they also address the problems that are currently occurring within the organisation. According to the employees involved, most challenges deal with (a) the lack of structured, seamless processes for selling and delivering new services, (b) the relationship with the customer, (c) the lack of actual benefit visualisation capabilities, (d) process maturity issues. The PMS address these challenges by including KPIs on (a) committed sales and delivery capabilities, (b) improving life cycle management and producing scientific articles, (c) managing customer's goal setting, (d) improve portfolio and project management processes.

In this project no supporting infrastructure was created and only existing IT infrastructure was used. This helped speed up the implementation process. There is however a difference between the infrastructure to collect data and to report data. In this case, the application that was selected allowed for a combination of both. This is a great benefit for the future ease of use of the PMS.

A limitation of this study deals with the implementation of the three PMS. Due to resource constraints, only a partial implementation of the post-launch PMS could be achieved. Future work in Philips should focus on completing the implementations. As a result of the partial implementation, also no results of the PMS can be shown here.

10.2   Recommendations

The following recommendations are given to the Imaging Customer Services:

First of all, it is recommended to complete the implementation the post-launch PMS for Alpha further. After which the implementation of the pre-launch and tactical PMS should be completed. After the implementation, the organisation should start to use the three PMS. Important here is to use the PMS as a tool for the previously stated goal: continuous improvement of processes. The PMS should not become a goal on their own, but should be used as a means to an end. Furthermore, the updating process of the measures is critical to the success of the PMS. Regularly checking whether targets are up-to-date, whether the set of CSFs and KPIs is still reflecting the processes in scope and whether the KPIs are still used to accomplish the organisational objectives are vital elements of the use and updating processes. Without critical thinking about the CSFs and KPIs in the PMS after the initial implementation, the use of

the PMS will most likely end in failure. When a new services has been developed far enough, it is recommended that the development team follows the same methodology as described in chapters 5 and 8 in order to develop a PMS for that new services.

Also, it is recommended to use a methodological approach to the development of new PMS and KPIs when needed as described in this thesis. Especially the use of the record sheet (Neely et al., 1997) was very helpful. It is recommended that the worst case and best case targets are added, along with the KPI type question. The development of new KPIs should also always be accompanied by the ten soundness tests (Neely et al., 2002). These tests are excellent tools for the detection of issues with KPIs and allow the organisation to create better KPIs. It is also recommended that when current processes are more mature, KPIs are standardised more between the different PMS. Moreover, it is recommended to look critically in the future to the KPIs that were thought of as interesting during the design process of the tactical PMS. These KPIs are "recognised revenue of new services launched in the last five years", "dispersion of claims between ambition, superiority and conversion claims" and "number of offerings integrated with other services", if developed well, might increase the cohesion between the three PMS.

Lastly, it is recommended that the new services marketing team also develops a tactical PMS for their function. This would improve the involvement of marketing with the development PMS, would stimulate further process improvement and allows for a common approach to performance management within new services.

10.3   Future Work

This graduate thesis has applied several approaches to performance management systems to two levels of an organisation: the tactical and operational levels. Most performance management literature focuses on the strategic level however, and thus traditionally, much attention has been given to the propagation of KPIs to lower levels. This was not the case in this research. Here multiple methodologies (Bourne et al., 2000, Kaplan & Norton, 1996, Mettänen, 2005) were used to come to a single comprehensive approach to PMS design. The advantage of this approach is that it uses the best parts of each methodology and many similarities between the different methodologies were detected.

Within the field of performance management, there has been little attention for actual KPIs that can be used in an organisation. The most common argument is that the context of each organisation differs to much. To some extent this thesis supports this, as it is recommended to revise the KPIs whenever the situation calls for it and to not treat the PMS as a static tool. The latter remark could be made clearer in literature and could be interesting to research further. To what extent do PMS change over time and was this the correct decision?

The three PMS developed for Philips were aimed at accomplishing strategic objectives, by developing CSFs that were mutually exclusive and designing KPIs that only loaded a single CSF and did not overlap with each other. This was extensively tested using the ten soundness tests by Neely et al. (2002). However, in this research there was no check of an overall performance towards the strategic objectives. For example, if a triathlon athlete would like to achieve a total time of 7 hours, while he sets a target for the swimming part of 1,5 hours, a cycling target of 3 hours and a running target of 3 hours he would not complete his overall performance target. It would be beneficial for Philips to incorporate such an overall performance target in the three PMS. This could for instance serve to better allocate resources to areas in need of improvement. The incorporation of an overall performance measure would be interesting to further develop within Philips.

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Appendix I: Templates

<p align="center">**Table A1:** Template Interviews</p>

Main Questions	Follow-up Questions
What is the role of your team in the new services process?	What does the new services process look like for your team? How does your team interact with others during the new services process? What resources and capabilities are needed there? What are challenges in this process? What can be improved upon?
How could performance be measured in your area?	How is performance captured currently? What are performance drivers in the new services process? How can drivers be influenced? Are these drivers required for a certain level of performance? Or are these drivers enablers for a higher level of performance? What about financial versus non-financial measures? What about customer related measures? How could you capture learning?
What are links between areas?	What are causal links between performance drivers? How does another team's performance impact your team's performance? How does your performance influence the performance of other teams?

<p align="center">**Table A2:** Procedure Workshop Sessions</p>

Workshop Template	
Duration	3 hours
Purpose Workshop	Explain the purpose of workshops: Design of PMS 1. Define processes, perspectives, critical success factors, first measures 2. Recap on CSFs and further define measures 3. Finish measures and discuss further issues
Procedure	1. Agree on process 2. Agree on perspectives and strategy 3. Show examples of CSFs, brainstorm provided starting point 4. Define CSFs and measures using template (Neely et al., 1997) 5. Check soundness of measures using tests (Neely et al., 2002)

Table A3: Measure Record Chart adapted from Neely, Richards, Mills, Platts & Bourne (1997)

Measure Design Template	
Title of the measure	Is the title self-explanatory?
	Does the title explain why the measure is important?
Purpose	What is the aim of this measure?
	Why is it important to include?
	What behaviour does this measure stimulate?
Target	What level of performance is desirable?
	What time would it take to reach this level of performance
	What is a market benchmark?
Formula	How can this measure be measured?
	Is the formula clear?
	Is it clear what data is required?
	What behaviour does this calculation stimulate?
	How accurate is the data that is needed?
	How much important information is lost when using this calculation?
Frequency of measurement	How often should data be collected?
	How often should the measure be reported?
Who measures	Who is responsible for data collection and reporting?
Source of data	Where is the data collected from?
Who owns the measure	Who is responsible to make sure that the measure improves?
What do they do	What are the actions they take to make sure it improves?
Who acts on the measure	Who leads the management process?
What do they do	What is the general management process based on the outcomes of the measures
Frequency of review	How often is the measure reviewed
Notes and comments	Any additional notes and comments

Appendix II: Tactical Key Performance Indicators

Table A4: Tactical Key Performance Indicators 1 & 2

Name	Total development cost as a percentage of AOP	Number of unique hits on the philips.com website for new services
Number	1	2
Critical Success Factor	Decrease cost	Improve customer awareness
Business goal	Control for cost in order to maintain margin	Ensure that the development process creates services that customers are aware of
Formula	$\frac{\text{Employee cost} + \text{Development cost center cost}}{\text{Budget according to Annual Operating Plan}}$	Sum of the unique hits per new service on their product page per quarter
Worst Target	> 110% in 2016	< 2.500 in 2016
Normal Target	101% - 109%	2.501 - 9.999 in 2016
Best Target	< 100% in 2016	> 10.000 in 2016
Related to?	n/a	3, 4, 5
Type?	Process	Output
Frequency of measurement	Quarterly	Quarterly
Frequency of review	Semi-annually	Semi-annually
Source of data	AOP Controller and SAP MP1 data	Digital Analytics Team
Who measures	Reed Boeing	Dimph Snoeren
Who owns the measure	Bert Mollen	Vincent Sieben
What do they do	Keep track of progress, escalate when appropriate	Launch marketing effectiveness improvements
Who acts on the data	Individual project manager	Marketing representative per project
What do they do	Manage project budget on a day-to-day basis	Employ marketing campaigns according to marketing plan
Notes and comments	n/a	n/a

Table A5: Tactical Key Performance Indicators 3 & 4

Name	Percentage of projects fulfilled requirements	Percentage of projects within time
Number	3	4
Critical Success Factor	Improve project management	Improve project management
Business goal	Ensure that the developed services fulfil enough of the quality requirements are able to deliver value to the customer.	Ensure that projects are delivered in a timely fashion.
Formula	$\frac{\text{Total number of fulfilled requirements at RfD}}{\text{Total number of requirements defined at PDC}}$	$\frac{\text{Total number of gates met within two weeks of deadline referenced at the PLC gate}}{\text{Total number of gates with deadlines for projects that have passed PLC gate}}$
Worst Target	<80%	<80%
Normal Target	81% - 94%	81% - 94%
Best Target	> 95%	> 95%
Related to?	5	4
Type?	Output	Process
Frequency of measurement	Quarterly	Quarterly
Frequency of review	Quarterly	Quarterly
Source of data	Manual & BDMS Validation document	Manual & BDMS Validation document
What do they do	Keep track of progress, escalate when appropriate	Keep track of progress, escalate when appropriate
What do they do	Differs to greatly per project	Differs to greatly per project
Notes and comments	n/a	n/a

Table A6: Tactical Key Performance Indicators 5 & 6

Name	Number of activities started without a portfolio discussion.	Percentage of O2C capabilities deployed on time
Number	5	6
Critical Success Factor	Improve portfolio management	Improve ecosystem collaboration
Business goal	Develop a well functioning portfolio process and ensure that employees do not spend time on unauthorized projects.	Develop service capabilities together with the other functional area in order to develop, sell and deliver new services.
Formula	Number of activities not formally agreed to by the portfolio management process that require at least a total of 0.25 FTE effort during a period of six months or more	$\frac{\text{Total number sales process \& system capabilities agreed to by sales BPO}}{\text{Total number of sales process \& system capabilities required by development}}$
Worst Target	> 4	< 50 %
Normal Target	3	51 % - 89%
Best Target	0 - 2	> 90%
Related to?	n/a	8, 9
Type?	Input	Output
Frequency of measurement	Semi-annually	Quarterly
Frequency of review	Semi-annually	Quarterly
Source of data	Manual / Capability Gap Analysis	Manual / Capability gap analysis
What do they do	Keep track of progress, escalate when appropriate	Escalate to higher management
What do they do	Formalise process	Leverage capabilities and knowledge over services and processes
Notes and comments	Replace by other measure when this process functions properly.	n/a

Table A7: Tactical Key Performance Indicators 7 & 8

Name	Percentage of M2O capabilities deployed on time	Percentage of interim process and IT capabilities in place introduced by the project team without BPO support
Number	7	8
Critical Success Factor	Improve ecosystem collaboration	Improve ecosystem collaboration
Business goal	Develop service capabilities together with the other functional area in order to develop, sell and deliver new services.	Reduce the number of interim processes and tools.
Formula	$\frac{\text{Total number delivery process \& system capabilities agreed to by delivery BPO}}{\text{Total number of delivery process \& system capabilities required by development}}$	$\frac{\text{Total number interim capabilities in place without BPO support}}{\text{Total number of capabilities in place}}$
Worst Target	< 50 %	> 30%
Normal Target	51 % - 89%	29% - 11%
Best Target	> 90%	< 10%
Related to?	7, 9	7, 8
Type?	Output	Output
Frequency of measurement	Quarterly	Quarterly
Frequency of review	Quarterly	Quarterly
Source of data	Manual / Capability gap analysis	Manual / Capability gap analysis
What do they do	Escalate to higher management	Escalate to higher management
What do they do	Leverage capabilities and knowledge over services and processes	Leverage capabilities and knowledge over services and processes
Notes and comments	n/a	n/a

Table A8: Tactical Key Performance Indicators 9 & 10

Name	Scalability of projects	Project managers adherence to project management training
Number	9	10
Critical Success Factor	Improve industrialisation	Improve employee expertise
Business goal	Develop services that are scalable to a large number of customers in a sustainable way.	Develop better services through employees with more expertise.
Formula	Average (Total score of service scalability) 1. Have a multi-market introduction plan 2. Ability to work on different customers parallel 3. Ability to perform service remotely 4. Use of standard processes 5. Use of standard tools	$\frac{\text{Total number of project managers with foundation training}}{\text{Total number of project managers}}$
Worst Target	< 1	< 80%
Normal Target	2 - 3	81% - 99%
Best Target	> 4	100%
Related to?	7, 8, 9	12
Type?	Outcome	Input
Frequency of measurement	Quarterly	Quarterly
Frequency of review	Quarterly	Quarterly
Source of data	Excel File	Philips University
What do they do	Keep track of progress, escalate when appropriate	Keep track of progress, escalate when appropriate
What do they do	Differs to greatly per project	Do training
Notes and comments	n/a	n/a

Table A9: Tactical Key Performance Indicators 11 & 12

Name	Employee adherence mandatory to training	Supplier assessment
Number	11	12
Critical Success Factor	Improve employee expertise	Leverage strategic partnerships
Business goal	Develop better services through employees with more expertise.	Ensure supplier efficiency and effectiveness.
Formula	$\frac{\text{Total number of employees with all mandatory trainings}}{\text{Total number of employees}}$	Average $\left(\frac{\text{Supplier's assessment score}}{100} \right)$
Worst Target	< 90%	< 70%
Normal Target	91 % - 99%	71% - 89%
Best Target	100%	> 90%
Related to?	11	n/a
Type?	Input	Outcome
Frequency of measurement	Quarterly	Semi-annually
Frequency of review	Quarterly	Semi-annually
Source of data	Philips University	GSRS
What do they do	Keep track of progress, escalate when appropriate	Ensure that the improvement process is started with suppliers with procurement in the lead.
What do they do	Do training	Ensure that surveys are filled in and improvement process is started with suppliers with procurement in the lead.
Notes and comments	n/a	Supplier performance is main responsibility of Philips Procurement

Appendix III: Pre-launch Key Performance Indicators

Table A10: Pre-launch Key Performance Indicators 1 & 2

Name	Total development cost as a percentage of AOP	Number of hits on the philips.com website for new services
Number	1	2
Critical Success Factor	Decrease cost	Improve customer awareness
Business goal	Control for cost in order to maintain margin.	Ensure that the development process creates services that customers are aware of.
Formula	$\frac{\text{Actual employee cost of the project and development cost center cost}}{\text{Business case employee cost of the project and development cost center cost}}$	Number of the unique hits per new service on the product page per quarter
Worst Target	> 110%	< 1.000
Normal Target	101% - 109%	1.001 - 3.999
Best Target	< 100%	> 4.000
Related to?	n/a	3
Type?	Process	Output
Frequency of measurement	Quarterly	Quarterly
Frequency of review	Quarterly	Quarterly
Source of data	AOP Reed / SAP MP1	Digital Analytics
What do they do	Portfolio management across projects	Launch marketing effectiveness improvements
What do they do	Manage project budget. Also in pre-launch project dashboard	Increase service awareness, launch campaigns
Notes and comments	n/a	n/a

Table A11: Pre-launch Key Performance Indicators 3 & 4

Name	Number of objective claims	Percentage of projects fulfilled requirements
Number	3	4
Critical Success Factor	Improve customer awareness	Improve project management
Business goal	Increase the number of claims marketing can claim about the service in order to have a stronger value proposition for the customer.	Ensure that the developed services fulfil enough of the quality requirements are able to deliver value to the customer.
Formula	Number of claims that can be objectively collaborated per new service	$\frac{\text{Total number of fulfilled requirements at RfD}}{\text{Total number of requirements defined at PDC}}$
Worst Target	< 3	<80%
Normal Target	4 - 5	81% - 94%
Best Target	> 6	> 95%
Related to?	2, 4	3, 5
Type?	Process	Output
Frequency of measurement	Quarterly	Quarterly
Frequency of review	Quarterly	Quarterly
Source of data	Excel File	Manual & BDMS Validation document
What do they do	Create claim and alter service design in order to back up claims	Keep track of progress, escalate when appropriate
What do they do	Create claim and alter service design in order to back up claims	Differs too greatly per project
Notes and comments	n/a	n/a

Table A12: Pre-launch Key Performance Indicators 5 & 6

Name	Percentage of projects within time	Percentage of interim process and IT capabilities in place introduced by the project team without BPO support
Number	5	6
Critical Success Factor	Improve project management	Improve ecosystem collaboration
Business goal	Ensure that projects are delivered in a timely fashion.	Reduce the number of interim processes and tools.
Formula	$\frac{\text{Total number gates met within two weeks of deadline in BDMS}}{\text{Total number of gates with deadlines according to plan in PLC}}$	$\frac{\text{Total number interim capabilities in place without BPO support}}{\text{Total number of capabilities in place}}$
Worst Target	<80%	> 30%
Normal Target	81% - 94%	29% - 11%
Best Target	> 95%	< 10%
Related to?	4	n/a
Type?	Process	Output
Frequency of measurement	Quarterly	Quarterly
Frequency of review	Quarterly	Quarterly
Source of data	Manual & BDMS Validation document	Manual / Capability gap analysis
What do they do	Keep track of progress, escalate when appropriate	Escalate to higher management
What do they do	Differs too greatly per project	Leverage capabilities and knowledge over services and processes
Notes and comments	n/a	n/a

Table A13: Pre-launch Key Performance Indicators 7 & 8

Name	Scalability of projects	Supplier assessment
Number	7	8
Critical Success Factor	Improve industrialisation	Leverage strategic partnerships
Business goal	Develop services that are scalable to multiple customers in multiple markets.	Ensure supplier efficiency and effectiveness.
Formula	Total score of service scalability by: 1. Have a multi-market introduction plan 2. Ability to work on different customers parallel 3. Ability to perform service remotely 4. Use of standard processes 5. Use of standard tools	$\text{Average}\left(\frac{\text{Supplier's assessment score}}{100}\right)$
Worst Target	< 1	< 70%
Normal Target	2 - 3	71% - 89%
Best Target	> 4	> 90%
Related to?	3, 4	n/a
Type?	Outcome	Outcome
Frequency of measurement	Quarterly	Semi-annually
Frequency of review	Quarterly	Semi-annually
Source of data	Excel File	GSRS
What do they do	Keep track of progress, escalate when appropriate	Ensure that the improvement process is started with suppliers with procurement in the lead.
What do they do	Differs too greatly per project	Ensure that surveys are filled in and improvement process is started with suppliers with procurement in the lead.
Notes and comments	n/a	Supplier performance is main responsibility of Philips Procurement

Appendix IV: Post-launch Key Performance Indicators

Table A14: Post-launch Key Performance Indicators 1 & 2

Name	Development cost (as a percentage of budget)	Deployment cost (as a percentage of sales)
Number	1	2
Critical Success Factor	Decrease cost	Decrease cost
Business goal	In order to maintain or increase margin	In order to maintain or increase margin
Formula	$\frac{\text{Actual employee cost of the project and development cost center cost}}{\text{Business case employee cost of the project and development cost center cost}}$	$\text{Average} \left(\frac{\text{Outsourced implementation cost and project employee cost per customer}}{\text{Order intake for the full contract period per customer}} \right)$
Worst target	> 110%	> 60%
Normal Target	101 % - 109%	59% - 41%
Best Target	< 100%	< 40%
Related to?	2, 3, 13	3, 14
Type?	Process	Process
Frequency of measurement	Quarterly	Quarterly
Frequency of review	Annually	Annually
Source of data	Mike's invoices + FTEs * Hourly wage	Hours for implementation: Clarity&SWO
What do they do	Keep track of budget and time spend on projects and outsourced team	Contact internal service provider where cost improvements can be made.
What do they do	Evaluate performance of outsourced development and adjust development priorities	Keep close contact with installation party and redesign installation process and improve the ability for remote installation.
Notes and comments	Initially versus budget, but evolving to be measured as a percentage of sales	Revise targets at each measurement point

Table A15: Post-launch Key Performance Indicators 3 & 4

Name	Support cost (as a percentage of sales)	Gross margin
Number	3	4
Critical Success Factor	Decrease cost	Increase profit
Business goal	In order to maintain or increase margin	Increase profitability of the service offering
Formula	$\frac{\text{Total employee support costs}}{\text{Order intake for the full contract period for all active customers}}$	$\frac{\text{Recognised sales revenue - Recognised cost of goods sold}}{\text{Recognised sales revenue}}$
Worst target	> 40%	< 49%
Normal Target	39% - 21%	50% - 59%
Best Target	< 20%	> 60%
Related to?	2, 15, 16	all
Type?	Process	Outcome
Frequency of measurement	Quarterly	Quarterly
Frequency of review	Annually	Annually
Source of data	Hours for implementation: Clarity&SWO	VIPP
What do they do	Keep track of yearly spend	Define overall strategy Imaging Customer Service based on margins
What do they do	Redesign information handouts if easily solved complaints are abundant and redesign process in order to decrease number of complaints.	Allocate resource to and from project where needed.
Notes and comments	Revise targets at each measurement point	Until moved to structural process, system data might be misleading

Table A16: Post-launch Key Performance Indicators 5 & 6

Name	Recognised sales revenue	Order intake
Number	5	6
Critical Success Factor	Increase revenue	Increase revenue
Business goal	Increase revenue	Increase revenue
Formula	Total Year to Date value of recognised sales orders for the service subscriptions	Total Year to Date value of orders
Worst target	< €4.200.000	< €8.000.000
Normal Target	€4.200.001 - € 5.099.999	€8.000.001 - € 9.499.999
Best Target	> €5.100.000	> €9.500.000
Related to?	6, 17, 18 ,19	5, 17, 18 ,19
Type?	Outcome	Outcome
Frequency of measurement	Quarterly	Monthly
Frequency of review	Annually	Annually
Source of data	VIPP per customer also?	MP1
What do they do	Manage marketing and local markets.	Keep close contact with business managers and marketing.
What do they do	Adjust marketing campaign and steer to improve service design.	Manage local markets and their committed sales targets.
Notes and comments	n/a	n/a

Table A17: Post-launch Key Performance Indicators 7 & 8

Name	Number of commercial reference sites per market	Number of white papers and scientific articles
Number	7	8
Critical Success Factor	Improve customer awareness	Improve customer awareness
Business goal	Create awareness of Philips' services and act as a showcase for other hospitals	Create awareness of Philips' services
Formula	Number of commercial reference sites per market	Number of white papers and scientific articles
Worst target	< 1 sites per market	< 3 papers
Normal Target	1.1 - 1.9 sites per market	4 - 5 papers
Best Target	> 2 sites per market	> 6 papers
Related to?	8	7
Type?	Output	Output
Frequency of measurement	Quarterly	Quarterly
Frequency of review	Quarterly	Quarterly
Source of data	Sjirk Boon & Chris Martel	Sjirk Boon & Chris Martel
What do they do	Keep track of progress, adjust written plan if lacking	Keep track of progress, adjust written plan if lacking
What do they do	Approach scientific community about opportunities according to written plan	Approach scientific community about opportunities according to written plan
Notes and comments	Review to output of reference sites	n/a

Table A18: Post-launch Key Performance Indicators 9 & 10

Name	Accomplishment of customer KPIs	Customer satisfaction
Number	9	10
Critical Success Factor	Improve customer experience	Improve customer experience
Business goal	Improve the customer's goals such that value for the customer is created. Also allows for the transition towards performance-based payment	To attain a highest possible satisfaction rate such that customer retention will increase
Formula	To be implemented in the service	To be determined
Worst target	To be implemented in the service	To be implemented in the service
Normal Target	To be implemented in the service	To be implemented in the service
Best Target	To be implemented in the service	To be implemented in the service
Related to?	10	9
Type?	Outcome	Outcome
Frequency of measurement	Annually (depends on service design)	Annually (depends on service design)
Frequency of review	Annually	Annually
Source of data	To be implemented in service	To be implemented in service
What do they do	Manage clinical application specialists and collaborate with development for service design improvement	Keep close contact with clinical application specialists for customer input and with development for service design improvement
What do they do	Set goals with the customer and provide some consultancy in order to achieve those goals	Keep close contact with clinical application specialists for customer input and with development for service design improvement.
Notes and comments	n/a	n/a

Table A19: Post-launch Key Performance Indicators 11 & 12

Name	Re-subscription rate	Installation lead time
Number	11	12
Critical Success Factor	Improve customer retention	Improve delivery process efficiency
Business goal	Obtain repeat business to grow the customer share of wallet for Philips and grow more partnership-like long-term relationships with customers	Decrease the installation lead time such that customers can be billed earlier and can use the service earlier
Formula	$\frac{\text{Number of renewed subscriptions Year to Date}}{\text{Number of renewed and expired contracts Year to Date}}$	Average (Medical device installation record date − Sales order creation date)
Worst target	<60%	> 3 months
Normal Target	61% - 79%	1.5 - 3 months
Best Target	> 80%	< 1.5 months
Related to?	9, 10, 17	2
Type?	Output	Process
Frequency of measurement	Quarterly	Quarterly
Frequency of review	Annually	Annually
Source of data	Salesforce.com? Renewal opportunity.	Order Desks
What do they do	Keep close contact with clinical application specialists for customer input and with development for service design improvement.	Manage internal service provider and responsible field service engineers.
What do they do	Keep close contact with clinical application specialists for customer input and with development for service design improvement. Also with local markets / marketing for new leads.	Redesign service and installation using LEAN where possible or necessary
Notes and comments	n/a	n/a

Table A20: Post-launch Key Performance Indicators 13 & 14

Name	Customer call rate per customer per support tier	Time to resolution per support tier
Number	13	14
Critical Success Factor	Improve delivery process efficiency	Improve delivery process efficiency
Business goal	Improve service design in order to decrease the number of complaints per support tier (especially 3rd tier)	Improve service design in order to decrease the time that customers need to wait for a resolution for their issue.
Formula	Average (Number of cases per customer per support tier per year)	Average (Date of case closed − Date of case creation) per tier per area
Worst target	> 10 calls	> 48 hours
Normal Target	4 - 9 calls	13 - 47 hours
Best Target	< 3 calls	< 12 hours
Related to?	3, 14	3, 13
Type?	Process	Process
Frequency of measurement	Quarterly	Quarterly
Frequency of review	Annually	Annually
Source of data	ONeEMS / Field Data View	ONeEMS / Field Data View
What do they do	Manage internal service provider and responsible people in development.	Manage internal servcie provider and responsible people in development.
What do they do	Redesign information handouts if easily solved complaints are abundant and redesign process in order to decrease number of complaints.	Redesign information handouts if easily solved complaints are abundant and redesign process in order to decrease number of complaints.
Notes and comments	n/a	n/a

Table A21: Post-launch Key Performance Indicators 15 & 16

Name	Annual revenue growth per customer	Hours face-to-face contact with a single customer versus planned
Number	15	16
Critical Success Factor	Improve life cycle management	Improve life cycle management
Business goal	Obtain repeat business to grow the customer share of wallet for Philips and grow more partnership-like long-term relationships with customers	Increase the number of value adding interactions with the customer in order to grow long-term relationships with customers
Formula	$\text{Average}\left(\frac{\text{Customer revenue year(t)} - \text{Customer revenue year (t-1)}}{\text{Customer revenue year (t-1)}}\right)$	$\text{Average}\left(\frac{\text{Number of hours booked per customer on service work order}}{\text{Number of hours planned per customer}}\right)$
Worst target	> 1%	Both < 89% and > 111%
Normal Target	2% - 6%	Both 90% - 94% and 106% - 110%
Best Target	> 7%	95% - 105%
Related to?	11, 17, 18	9, 10
Type?	Output	Outcome
Frequency of measurement	Quarterly	Quarterly
Frequency of review	Annually	Annually
Source of data	Profit center per customer per time period / VIPP. profitability tool.	Service Work Orders: SAP MP1
What do they do	Keep close contact with clinical application specialists for customer input and with development for service design improvement.	Manage clinical application specialists.
What do they do	Keep close contact with clinical application specialists for customer input and with development for service design improvement.	Manage clinical application specialists.
Notes and comments	n/a	n/a

Table A22: Post-launch Key Performance Indicators 17 & 18

Name	Quote win rate	Price realisation
Number	17	18
Critical Success Factor	Improve sales process efficiency	Improve sales process efficiency
Business goal	Get an indication of how many proposals are won and what root causes are of proposals that were not won.	Increase revenue from contracts
Formula	$\frac{\text{Value of order intake}}{\text{Value of orders of deals not further pursued or lost and value of order intake}}$	$\frac{\text{Value of order intake}}{(\text{\# connections * Target price} + \text{\# locations * Target price}) \text{ * subscription duration}}$
Worst target	< 25%	< 80%
Normal Target	26% - 39%	81% - 94%
Best Target	> 40%	> 95%
Related to?	6, 18	6, 17
Type?	Output	Outcome
Frequency of measurement	Quarterly	If automated Monthly, otherwise quarterly
Frequency of review	Annually	Annually
Source of data	salesforce.com	MP1
What do they do	Manage local markets and contact with marketing.	Keep pricing up to date and manage promotions.
What do they do	Manage local markets and contact with marketing.	Keep pricing up to date and manage promotions.
Notes and comments	n/a	n/a

Table A23: Post-launch Key Performance Indicators 19 & 20

Name	Number of markets with a committed sales target	Supplier rating score
Number	19	20
Critical Success Factor	Improve sales process efficiency	Leverage partnerships
Business goal	Ensure that local markets are committed to selling the service.	To have an objective scoring of the performance of the supplier towards Philips, safe guard to meet agreed levels of performance and stimulate further improvement of the relationship
Formula	Number of markets with a committed sales and order intake target	$\text{Average}\left(\frac{\text{Supplier's assessment score}}{100}\right)$
Worst target	< 4 markets	< 70%
Normal Target	5 - 9 markets	71% - 89%
Best Target	> 10 markets	> 90%
Related to?	n/a	n/a
Type?	Output	Output
Frequency of measurement	Quarterly	Semi-annually
Frequency of review	Annually	Annually
Source of data	Manual: Rolf & Barb	Who will fill out the survey, GSRS standard format survey
What do they do	Manage local markets and contact with marketing.	Ensure that surveys are filled in and improvement process is started with suppliers with procurement in the lead.
What do they do	Manage local markets and contact with marketing.	Ensure that surveys are filled in and improvement process is started with suppliers with procurement in the lead.
Notes and comments	To be deleted when enough markets have committed sales targets.	n/a

Appendix V: Initial Critical Success Factors

Table A24: Operational Definitions of initial Critical Success Factors

Critical success factor	Operational Definition
Increase profitability	Degree to which an organisation is profitable
Sales growth	Growth in recognised sales
Return on investment	Benefit to an investor resulting from an investment of some resource
Market share	Percentage of the total market value
Costs	Costs of processes, employees etc.
Customer satisfaction	Measure of how products and services supplied by a company meet or surpass customer expectation
Customer loyalty	Degree to which customers remain at a certain provider
Customer learning during project	Degree to which a customers' knowledge is enlarged during a project
Customer retention	Degree to which customers renew their subscriptions
Internationalisation	Degree to which an organisation operations internationally
Quality	Degree to which the service or product is perceived as superior
Joint projects	Projects within an organisation that are shared between departments
Efficiency	Measure of how economically the organisation's resources are utilised
Effectiveness	Extent to which customer requirements are met
Lead times	Time of the execution of a process
Increase employee competences	Growth of relevant competences of individual employees
Improvement of knowledge sharing	Degree to which knowledge is shared throughout the organisation
Improvement of capabilities	Growth of the abilities of an organisation

Appendix VI: Excluded Key Performance Indicators

Table A25: Deleted Tactical Key Performance Indicators I

Tactical Deleted Key Performance Indicator	Rationale
Accuracy of entitlements data per customer	Not relevant enough
Actual department project commitments vs strategically agreed spend by innovation pillar	Interesting for future inclusion
Added value for customer / keeping flow of entitlements running	Not relevant enough
Adherence to QMS	Not relevant enough
Adherence of portfolio to strategic objectives	Too hard to measure correctly
Average value of customer total POs	Would not make sense as a KPI
Budgeting process maturity	Underlying processes are too immature
Completeness of hand-over information	Too hard to measure correctly
Compliance to committed adherence targets / yearly audits (internal)	Underlying processes are too immature
Co-ownership of projects (first of its kind)	Not relevant enough
Cycle times between project/service/offering	Interesting for future inclusion
Dispersion of claims	Interesting for future inclusion
EBITA	Cannot be measured correctly
Growth of number of offerings due to relation to all services	Underlying processes are too immature
Growth of offering due to their relation to services	Underlying processes are too immature
Incorporation of marketing feedback (percentage of challenges to their ideas)	Interesting for future inclusion
Incremental sales growth	Interesting for future inclusion
Intellectual property generation	Not relevant enough
Management inflow of projects	Not relevant enough
New service order intake growth?	Interesting for future inclusion

Table A26: Deleted Tactical Key Performance Indicators II

Tactical Deleted Key Performance Indicator	Rationale
Number of different quoting / commercial deal types	Not relevant enough
Number of ideas taken from other Philips projects	Not relevant enough
Number of newsletter per project mgr regarding their projects	Not relevant enough
Number of offerings integrated with other Philips projects	Not relevant enough
Number of offerings or services per customer	Not relevant enough
Number of offerings released for talk at event/trade show per year	Not relevant enough
Number of on time monthly project reports	Not relevant enough
Number of projects implemented in XX% of the markets	Captured in another KPI
Number of structural evaluation meetings, root cause discussions	Not relevant enough
Number of sufficiently developed business cases that can be decided upon	Not relevant enough
Number/Percentage of projects killed during development	Underlying processes are too immature
Percentage of capabilities deployed of total capabilities developed	Not a KPI
Percentage of capabilities is a final way of working as a percentage of all capabilities	Not a KPI
Pre-release projects agreed for preview at Class A trade shows (pre-define as, e.g. RSNA, ECR, HIMSS, etc)	Not relevant enough
Recognized revenue of services brought to the market in the last 5 years	Interesting for future inclusion
Relevance of offerings for market	Too hard to measure correctly
Success rate business case versus actual	Underlying processes are too immature
Time spend on projects (time tracking) of project managers/team members	Not appropriate as a KPI
Timelyness of hand-overs	Not relevant enough

Table A27: Deleted post-launch Key Performance Indicators I

Post-launch Deleted Key Performance Indicator	Rationale for deletion
Adherence to service delivery SLA	Already covered in other KPIs
Amount of sales incentives paid per year	Would only be a proxy of other measures which were included
Average number of subscriptions/offerings sold to the customer	Not relevant enough
Business units alignment to service	Not relevant enough and very hard to make tangible
Capacity planning forecast accuracy	Not relevant enough
Conversion of leads to quotes to orders	Would be more relevant for daily management
Cost of customer	Not relevant enough
Customer effort in working with the solution	Captured via accomplishment of goals and satisfaction
Customer support (during / after installation)	Captured via customer satisfaction
Diversity of service offerings	Not relevant enough
Funnel size	Would be more relevant for daily management
Growth in install base	Would be more relevant in the future
Growth in market share / Install base	Not relevant enough
Incremental sales growth	Not relevant enough
Incremental sales growth in new service offerings	Not relevant enough
Marketing cost (as a percentage of sales)	No way of correct measurement
Marketing of service brand	No way of correct measurement
New service offering lead time	Not relevant enough
Number of contract terminations	Captured via other KPIs and not relevant enough for PMS
Number of customers	Not relevant enough

Table A28: Deleted post-launch Key Performance Indicators II

Post-launch Deleted Key Performance Indicator	Rationale for deletion
Number of Champions (per market)	Not relevant enough
Number of employees trained to sell the service	Not relevant enough
Number of entitlements disagreements	Not relevant enough
Number of Key opinion leaders (KOLs)	Not relevant enough
Number of new service offerings	Not relevant enough
Number of project scope changes with regard to PDC	Not a performance indicator
Number of trained installation employees	Not relevant enough
Number of trained support employees	Not relevant enough
Origin point of sales	Not a performance indicator
Percentage of FTEs dedicated to	Not a performance indicator
Performance measurement tool maturity	Not relevant enough
Professionalism of service delivery	Covered via other KPIs
Profit	Covered via Gross Margin
Quality	Too vague, covered in other KPIs
Quoting / sales lead time	Not relevant enough
Sales forecast accuracy	Would be more relevant for daily management
Sales per employee	Would be more relevant for daily management
Structural bottleneck meetings	Would be more relevant for daily management
Targeting stakeholders in the market	Would be more relevant for daily management
Total number of service offerings available to the customer	Not relevant enough