A framework for IT performance management

Enabling organizational growth with IT performance management

Authors:
S. Haanappel,
Ernst & Young: dr. R. Drost, prof. dr. F. Harmsen
Utrecht University: prof. dr. S. Brinkkemper & dr. ir. J.M Versendaal

February 2011

UU-CS-2011-00

ISSN: UU-CS-2011-**00**

Address:
Dept. of Information and Computing Sciences
Utrecht University
P.O. Box 80.089
3508 TB Utrecht
The Netherlands

A framework for IT performance management

Enabling organizational growth with IT performance management

Authors:
S. Haanappel,
Ernst & Young: dr. R. Drost, prof. dr. F. Harmsen
Utrecht University: prof. dr. S. Brinkkemper & dr. ir. J.M Versendaal

Abstract

This research provides insight into how organizations can achieve and optimize the benefits of IT performance management. The relevance of this research is the importance for organizations to achieve value from their investments and that there is little scientific literature available guiding them how to do this. To achieve value from investments a focus on IT performance management is required that takes care of the removal of non value-adding activities and processes.

IT performance management can be defined as the area of setting goals, responsibility accounting and monitoring/ analyzing/ governing and improving the performance of IT. Benefits of IT performance management are that a focus on the realization of strategic, financial and non-financial goals is applied and that KPIs are made explicit and measurable. IT performance management requires effective IT management to meet business objectives. And an IT performance measurement process needs to be selected. Performance measurement frameworks need to be balanced, multidimensional, comprehensive and integrated into the organizational performance measurement framework. Performance measurement frameworks include metrics and a budgeting approach. Performance metrics are used to govern measures and need to match the goals of the organization. When they are not well implemented the planning and control of these metrics is impeded. The goals of budgeting system development are the development and maintenance of a process for the planning and management of activities. These activities are deducted from the strategic and tactical plans and the corresponding benefits and costs are translated into a financially formulated plan.

In addition to a literature research that provided insight into what has been written about IT performance management a case study research was conducted. In this case study research organizations participated to provide insight into their IT performance management approach. Additionally their approaches were compared to determine their IT performance management maturity.

The results showed that the organizations had very different IT performance management approaches and maturity levels. The majority of organizations did not seem to use their performance results when developing IT performance management plans for the next year.

However several of the organizations tried to create commitment by making their employees responsible for key performance indicators. In general it could be said that organizations were not aware that their IT performance results could be used to improve IT performance management and/or they did not know how to do this, as it has not been done and there are no guidelines available. Based on the dataset gather during this research it can be said that the organizations are not mature enough to optimize their IT performance management benefits, as they have not yet been able to develop a loop back into the IT performance management cycle to use the results to their benefit.

Table of Contents

Chapter 1 – IT performance management

1 Introduction

For organizations it is crucial to receive value for every euro they invest on. This requires a focus on performance management and the removal of non value-adding activities and processes. As the amount of scientific literature available on IT performance management is limited, a definition of IT performance management has been developed by my supervisors for this research. Therefore the definition used during this research is:

"IT Performance Management can be defined as the area of setting goals, responsibility accounting and monitoring/ analyzing/ governing and improving the performance of IT."

IT performance management is often an aspect of achieving organizational and strategic goals and also a critical aspect of organizational controls (Kang, Bradley, 2002). However IT investments frequently result in unexpected, uncertain and undesired results (Van Grembergen, Van Bruggen, 1997; Turban, McLean, Wetherbe, 2001; Tuten, 2009, Strassman, 1997; Car, 2004). Therefore appropriate measures are required in order to identify and create metrics for measuring the contribution of IT to the organization's value chain (Lomerson and Tuten, 2005).

According to Seddon, Graeser and Willcocks (2002) the amounts spend on IT indicate that organizations are capable of identifying which forms of IT expenditure and management are most effective. De Boer (2002) adds to this notion that the management and control of IT is also critical as organizational incomes are under pressure. Evaluating IT investments enables a natural learning process for the organization (Remenyi et al., 2000). Measuring IT results for organizations is complicated as some of the benefits are intangible (Finding, 2004). However, the return on investment is more relevant than before (Dekkers, 2004). The difficulty with measuring IT performance has lead to an increase in the evaluation and assessment of IT investments (Remenyi, Money and Sherwood-Smith, 2000).

For IT to be successful in delivering against business requirements, management should put an internal control system or framework into place (IT Governance Institute, 2007). Being serious about implementing IT performance management let organizations to become proactive instead of reactive and chasing non-measurable and sometimes opportunistic IT goals (De Boer, 2002; Lagsten and Goldkuhl, 2008). It also contributes to the creation of value for the company and realizing business cases. Organizations adopt IT performance management in order to achieve specific objectives such as reducing expenses and creating a competitive advantage (Lomerson, Tuten, 2005).

The need for organizations to achieve value on their investments and to become proactive requires research in the area of IT performance management. Providing insight into how organizations can benefit from IT performance management responds to the changes organizations face. During this research the scope will be limited to the utility sector, as it has been subject to change and it may lead to interesting findings on the application of IT performance management.

The main research question of this research is:

"How do companies achieve and optimize the benefits of IT Performance Management?"

To answer the main question four additional sub-questions need to be answered:

1. Which Key Performance Indicators are used, why, and what are the results?
2. How is the IT Performance governed?
3. How are the IT costs allocated to the business?
4. What are the results (tangible/intangible) that IT Performance Management delivers to a company?

The social and scientific relevance of this research is based on the fact that the area of IT performance management is relatively unexplored. A small amount of literature is available, which makes it difficult to develop an understanding of IT performance management and how an organization can apply it to its benefit. Guidelines on how to achieve advantages of IT performance management seem to be unavailable, even though they could be of great value. The results of this research could be used by organizations who want to use their IT performance results in order to become proactive and improve their IT performance management.

2 The objectives of IT performance management

In the context of developing IT performance evaluation methods, researchers have developed a stream of tools, measures and techniques (Tuten, 2009; Renkema, 2000). But performance measures are rarely integrated or aligned with business processes, even though IT performance management requires insight in the functioning of processes and needs to use the performance results to increase performance (De Boer, 2002; Neely 1999). Achieving insight can be difficult as performance management measurements are often intertwined. Having a set of operationally-based objectives generally makes the evaluation process more straightforward (Remenyi et al., 2000). Process assessment enables the organization to determine the value of an innovation/investment (Remenyi et al., 2002; Brynjolfsson, Hitt, 1995; Barua et al, 1995, McKeen et al., 1999; Mooney et al., 1995 ; Vernet et al., 1996). By applying IT performance management, the vision and strategy of an organization are translated into concrete goals and organized based on four points of view: financial, customer, internal organization and learning, and growth abilities of the organization (De Boer, 2002). In order for an organization to gain advantage from IT performance management, it should be executed through planning and control, metrics and measurements, KPIs, financial indicators and service levels (Wiggers, De Boer-de Wit and Kok,2004). Simonson and Johnson (2006) provide additional characteristics to achieve organizational value, such as costing, directing and decision-making concerning the implementation, and use of IT resources within a firm.

Andra (2006) defines four areas for which IT performance management is needed. The first area is about connecting IT to the bottom line of the organization. The level of performance is then demonstrated by the ability to present and communicate the value that IT services bring to the company's bottom line. Second, IT performance management is needed for business IT alignment. IT needs to be involved in activities that match and support the goals from the

business plan. Third and fourth, IT performance management is needed for IT efficiency and effectiveness. Some advantages of IT performance management are (De Boer, 2002):

- ✓ Applying a focus on the realization of strategic, financial and non-financial goals
- ✓ Making KPIs explicit and measurable
- ✓ The management of prognosis and action oriented reports
- ✓ The availability of consistent management information on strategic, tactical and operational level (drill down)
- ✓ Using the results as a guideline for intra organizational communication
- ✓ Fostering a result-oriented culture/climate
- ✓ The possibility to benchmark the organization

When an organization determines to start measuring performance, it could use a Performance Management System or PMS. A PMS tracks the actual performance of an organization, helps to identify weaknesses and supports communication and decision-making processes. The most important objective of performance measurement is to replace intuition by facts. The aim of a PMS is to evaluate the success of a system's implementation and to continuously improve the performance of the system being measured (Wettstein, Kuen, 2002).

Strategy implementation

Organizations rely on IT for success, both for operational and strategic aspects (Andra, 2006). Effective IT management is required to meet business objectives, both on the operational and business side of IT. IT performance results require actions, because without appropriate response, measurement is useless (Andra, 2006). However, only a small percentage of IT projects are evaluated (Hallikainen et al., 2006). Examples of performance metrics used to determine the performance of IT and business functions are presented in figure 1 (Andra, 2006).

IT metrics	Operations/business function metrics
Capital/operations budget performance	Customer satisfaction indicators
Return on investment	Return on investment
Resource allocation/usage	Total Cost of Ownership
Response time	Service-level performance
Maintenance costs	Application performance
Number of errors	-

Figure 1 Examples of performance metrics

The performance metrics that organizations apply are based on the organization's current IT strategy and can anticipate on future goals (Andra, 2006). The type of value center, i.e. how the IT department is seen by the organization, influences the development of metrics. The term value center is introduced by Venkatraman (1997) and differentiates organizations based on their IT goals. It recognizes the role of IT as part of the business operations, the so-called value orientation for IT (Venkatraman, 1998). The concept of a value center is composed of four interdependent centers, see figure 2(Venkatraman, 1998). For a more elaborate explanation on the types of value center refer to the paper of Venkatraman "Not fixing technical bugs but creating business value" (Venkatraman, 1998).

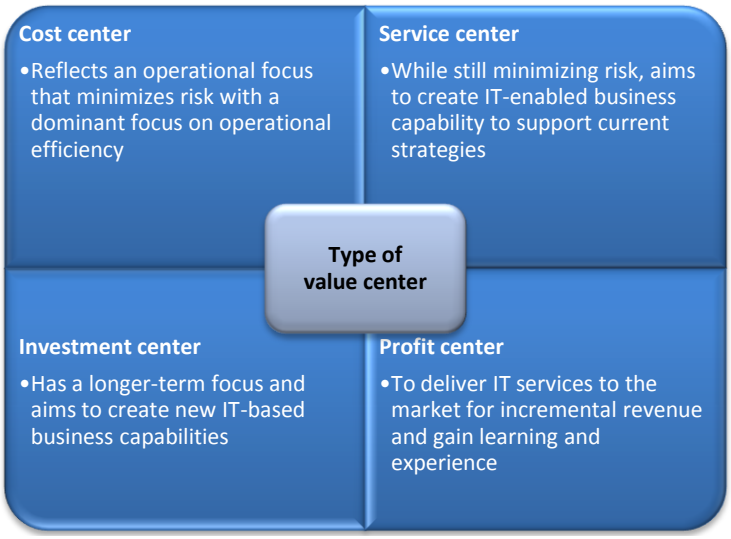


Figure 2 Types of service centers

According to Sward (2006), IT often loses its significance as a major contributing success factor to the organization's strategic objectives. This happens because it is predominantly considered as a non-integral aspect on the process of achieving business objectives. Consequently budgets are squeezed yearly, shifting IT organizations toward the cost center view and making it hard to enable a long-term competitive advantage. But IT management should not be seen in isolation, as it disallows IT to show the profitability of the company it supports. Some reasons for IT performance measurement are (Finding, 2004):

- Establish the progress toward achieving our goals
- Document organizational IT achievements
- Secure financial and other resources
- Identify internal improvement opportunities
- Improve communication with users

IT performance measurement

The selection process of a performance measure is crucial. It requires explicit communication about performance priorities and the relationships between the priorities to reveal hidden differences in the state of mind of stakeholders (Neely et al., 2000). There are several requirements to performance methods (Finding, 2004) like reliability, consistency, direct connection to important goals, understandability and that they need to be easily communicated. Measures also need to be agile and developed while being clear who is responsible for the measure and what actions are taken on the results of the measure.

Performance measurement frameworks need to be balanced, multidimensional, comprehensive and integrated into the organizational performance measurement framework (Jack, 2002). They should not exist in isolation of performance management techniques and improvement initiatives, but reflect the requirements and goals of the organization (Ballantine and Brignall, 1994 referred to by Jack, 2002). It is this interface between measurement, management and leadership that is crucial in ensuring that performance measures drive value creation (Jack, 2002). Methods for IT measurement can be categorized into two groups; the financial and the organization-based methods (Neely, 2009). Financial measures are

traditionally used to determine the value of IT investments (De Boer, 2002). However it is impossible to capture all types of added value in financial indicators (Martinsons, 2000; Coleman, 1995; Avram, 2001). Instead of just using financial data, non-financial measures consent to a wider perspective on results achieved and increase the value accuracy (Read, 2009; Eccles, 1991) Additional non-financial measures are also better when identifying upcoming trends and possible future results (Andra, 2006). Some reasons why financial measures are not the best solution anymore are:

- Financial measures encourage short-terminism, for example delay of capital investment (Banks, Wheelright, 1979; Hayes and Abernathy, 1980)
- Financial measures lack strategic focus and fail to provide data on quality, responsiveness and flexibility (Skinner, 1974)
- Financial measures encourage managers to minimize the variances from standard rather than seek to improve continually (Schmenner, 1988; Turney, Anderson, 1989)
- They fail to provide information on what customers want and how competitors are performing (Neely, 1999).

In addition, traditional financial measures provide no standards for reporting on IT costs, which decreases transparency (Read, 2009). Transparency in investments shows if goals have been met. As budgets are based on for example the previous year's percentage of sales or cost, the inability to measure IT value creates problems during the development of organizational budgets (Read, 2009). However the implementation of performance measures needs guidance and should take into consideration the potential impact and consequences (Jack, 2002). Measurement-managed organizations are described as organizations who have adopted a strategic and balanced set of KPIs which they use to plan, implement, operate and monitor the strategies, functions and processes of their organization with (ITPMG, 2006).

3 IT governance

IT governance decision-making is mostly strategic oriented, therefore tactical decisions receive less attention. Emphasis is put on understanding the situation at hand prior to decision making and solving practical issues regarding how each decision is carried out, such as assigning decision-making authority, coordinating resources and aligning IT decision-making with external factors (Simonson, Johnson, 2006). Control and governance of IT have become important subjects in organizations. However in a study performed by Son, Weitzel and Laurent (2005), more than 91% of the interviewed CEOs and CIOs were not comfortable with answering questions about governance and IT control. Which is not a good thing as IT governance is a critical element of the organization (Cili, 2003). IT governance is defined as: *The leadership and organizational structures, processes and relational mechanisms that ensure that an organization's IT sustains and extends its strategy and objectives (*De Haes and Van Grembergen, 2004; Van Grembergen, De Haes and Moons, 2005).

IT governance is about maximizing value within given constraints and contributes to the achievement of a competitive advantage for the organization (Grembergen, 2000; Krakar, Žgela and Tomić Rotim, 2008; Cili, 2003). The focus of IT governance is on realizing a link between business and IT while concentrating on performing and transforming IT to meet both the current and future business demands (De Haes, Van Grembergen, 2004; Cili, 2003). When an organization has an effective IT governance structure it is simpler to acquire value from IT (Weill, Woodham, 2003). Designing an effective IT governance structure requires

understanding the competing forces in a large organization and creating harmony among business objectives, the governance archetype and business performance goals (Weill, Woodham, 2002). Nevertheless, effective IT governance is one of the best ways to achieve superior returns (Weill, Woodham, 2003). Examples of characteristics required for effective governance are: transparency, actively design governance, when to redesign governance, educate about governance, good governance requires choices and handling exceptions (Weill, Woodham, 2002).

3.1 *Cobit*

Control Objectives for Information and Related Technology or Cobit is an IT governance framework that is widely used by managers to control if information available in the organization is being used to achieve business objectives (Heschl, 2004, Simonsson, Johnson, 2006). Successful enterprises use the benefits of IT to achieve value from IT investments when they measure and align the IT strategy to the corporate strategy. Cobit identifies which resources need to be leveraged and defines the management control objectives that have to be considered. Cobit consists of a framework and supporting tool set that support managers to bridge the gap between control requirements, technical issues and business risks and communicate that level of control to stakeholders (IT Governance Institute, 2007; Dekkers, 2004; Krakar, Žgela and Tomić Rotim, 2008; Simonsson, Johnson, 2006; Heschl, 2004). The framework covers: strategic alignment, value delivery, resource management, risk management and performance measurement (Rouyet-Ruiz, 2008). Benefits of implementing Cobit include(IT Governance Institute, 2007):

- Better alignment, based on a business focus
- Clear ownership and responsibilities, based on process orientation
- General acceptability, with third parties and regulators
- Shared understanding amongst all stakeholders, based on a common language

Cobit has four main characteristics which are: being business-focused, process-oriented, controls-based and measurement-driven on which is elaborated below. These characteristics, on which will be elaborated below, present the focus of Cobit which is required to realize high quality IT Governance.

Business focused

Cobit wants to provide a comprehensive view for management. To satisfy business objectives information is needed that confirms to requirements such as effectiveness, efficiency, confidentiality, integrity, availability, compliance and reliability. In addition, a generic method for defining business requirements is needed to compare these requirements to business objectives. To support the enterprise strategy, clear ownership and direction for the requirements is needed. The process of how enterprises should translate their strategy into objectives related to IT-enabled initiatives is shown in figure 3.

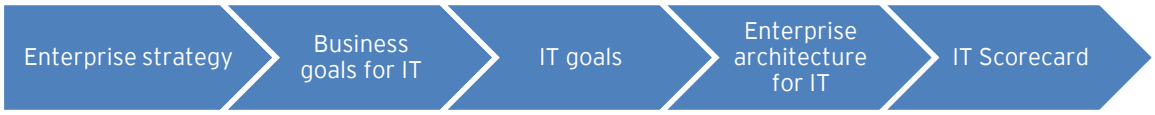


Figure 3 Business strategy translation into IT initiative objectives

The IT organization delivers against these objectives with a set of processes to run automated business applications while leveraging business information.

Process-oriented
Cobit uses a reference process model for the public analysis and management of IT activities. To manage activities and risks there are several interrelated domains: plan and organize, acquire and implement, deliver and support and monitor and evaluate. Together these domains cover the strategy and tactics needed to enable the IT contribution when achieving business objectives.

Controls-based
From the domains described above, 34 processes are retrieved to provide assurance that the business objectives will be achieved. IT control objectives provide requirements to be considered by management for effective control of each IT process. Management uses these control objectives to select objectives which relate to what has to be measured. Operational management uses processes to organize and manage ongoing IT activities.

Measurement-driven
Insight into the status of IT systems is necessary to determine what level of management and control the organization needs. Therefore Cobit has maturity models, performance goals and metrics for IT processes, and activity goals in order to provide this insight into the IT system's status. Maturity models can be used to scale organizations and related aspects can be identified when performance improvement is needed. Other benefits from using maturity scales are:
- Set of requirements and enabling aspects per maturity level
- Scale for easy difference measurement
- Possibility for pragmatic comparison
- Basis for setting as-is and to-be positions
- Support for gap analysis to determine what needs to be done to achieve a chosen level
- Taken together, a view of how IT is managed in the enterprise.

4 Balanced scorecard

The balanced scorecard is a method to determine IT performance management (Kaplan, Norton, 1996; Mulders, 2007) which contains both financial and operational measures as solely using financial measures is not enough anymore (Kaplan, Norton, 1992). The scorecard can be described as an effective tool for performance measurement, organizational assessment and operational alignment (Weinstein, 2009; Mulders, 2007). The balanced scorecard can provide organizations with a measurement and management system that supports the IT governance process through a combination of the business balanced scorecard and the IT balanced scorecard (Van Grembergen, 2000). The balanced scorecard contains financial views and is complemented by operational measures of customer satisfaction, internal processes and the organization's innovation. These operational measures are the drivers of future financial performance (Kaplan, Norton, 1992). The use of multiple perspectives is necessary because organizations require managers to control performance in different areas simultaneously (Kaplan, Norton, 1992). For each perspective key factors need to be determined which support the realization of the mission and vision of the organization (Mulders, 2007; De Boer, 2002). These factors are called the critical success factors (CSFs)

and are made measurable through key performance indicators (KPIs). KPIs express quantitatively to what extent the CSFs are achieved (Mulders, 2007;De Boer, 2002). Information overload is prevented by using a limited amount of measures (Mulders, 2007). The four different views of the balanced scorecard will be shortly explained below.

Customer perspective
When the organization depends on customer evaluations to define performance measures, it needs to view its performance through the customer's eyes (Kaplan and Norton, 1992). The balanced scorecard requires managers to translate their general mission statement on customer service into specific measures. Customer service factors can be divided into four categories: time, quality, performance and cost. The customer perspective, just as the financial perspective, has an outside-in approach (De Boer, 2002). This approach enables the timeline to grow from short term (financial perspective) to the long term (growth and learning perspective).

Internal business perspective
The customer-based measures, defined in the previous perspective, need to be translated into measures that the organization should execute to meet requirements. Managers need to focus on these critical operations and enable them to satisfy customer needs (Kaplan, Norton, 1992). The measures should be based upon the business processes that have the greatest impact on customer satisfaction, which mostly are factors like time, quality, employee skills and productivity. Kaplan and Norton (1992) state that information systems play an important role in supporting managers to separate the total overview of measures, however when unavailable, they are the soft spots of performance measurement.

Innovation and learning perspective
The customer-based and internal business process measures on the balanced scorecard identify the parameters that companies consider as the most important for competitive success. The ability of an organization to innovate, improve and learn directly influences the company's value (Kaplan, Norton, 1992).

Financial perspective
Financial performance measures provide insight into the company's strategy, implementation and execution contribution to bottom-line improvement. Typical financial goals involve profitability, growth and shareholder value. The measures that the company uses are derived from the company's view of the world and its perspective on key success factors. This view is not always correct, which means that a set of scorecard measures does not guarantee a winning strategy.

Some benefits and problems of the balanced scorecard are presented in figure 4, (Seddon, Graeser, Willcocks, 2002).

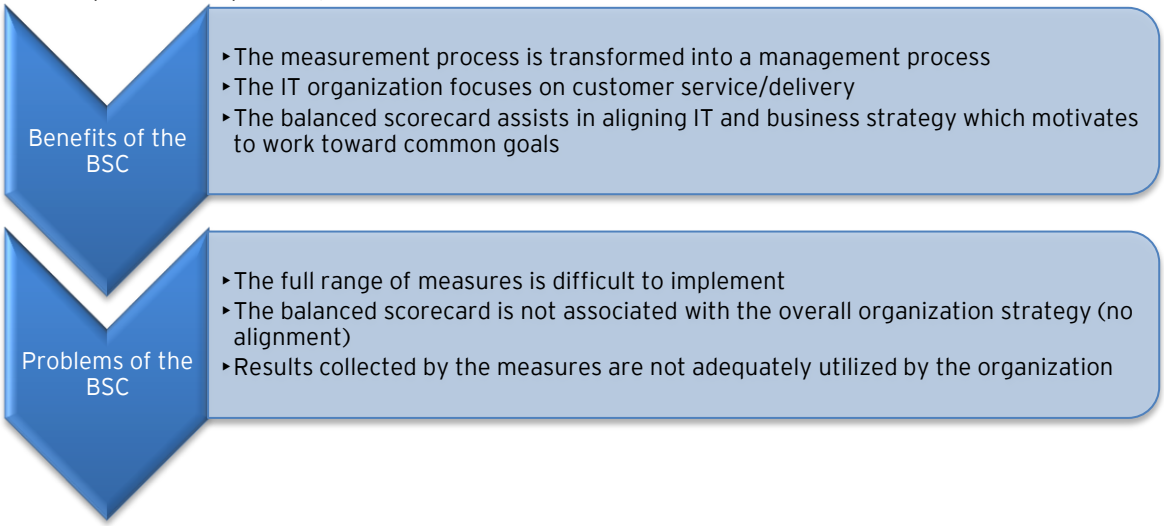


Figure 4 Benefits and problems of the Balanced scorecard

As IT has become crucial in achieving organizational and strategic goals, managers worry about IT investments and their benefits (Van Grembergen, Van Bruggen, 1998). In addition to the balanced scorecard, the IT balanced scorecard was developed that takes into account the effectiveness and efficiency of IT. The IT balanced scorecard consists of four domains which will be described below (Van Grembergen, Van Bruggen, 1998):

Measuring corporate contribution
Measuring corporate contribution is a short-term financial evaluation and a long-term orientated evaluation of IT projects and the IT function. IT projects must generate value for the company and value is a much broader concept than just benefits (Willcocks, 1994)

Measuring user orientation
When considering users, the focus in the IT balanced scorecard is on the end user which is the internal customer of the IT department. The metrics regarding user orientation can be divided into three main categories; preferred supplier for applications and operations, the partnership with the users and the user satisfaction.

Measuring internal orientation
Measuring internal orientation concerns the measurement and improvement of the development of new information systems and computer operations. IT should deliver high quality services at the lowest price possible, which can only be achieved by maximizing process management.

Measurement future orientation
Measuring the IT department's future opportunities concerns preparing the staff and the applications portfolio for the future and putting effort into researching new emerging technologies. When an organization wants to deliver high quality IT services within three to

five years preparations need to be made right away enabling IT to assess future trends and anticipate on them.

Van Grembergen (2000) defined three aspects that need to be considered when developing an IT balanced scorecard that is more than a set of isolated and eventually conflicting strategies and measures. First of all cause-and-effect relationships between the two types of measures: outsource measures and performance drivers need to be established. These relationships have to be defined throughout the scorecard to address all elements and to link with the business through the business contribution perspective. The IT balanced scorecard can also support the governance process, because it bundles the business with IT as can be seen in figure 4 (Van Grembergen, 2000; Son et al., 2005).

Figure 5 Fusion of IT balanced scorecard and the business based on Van Grembergen (2000)

The alignment of IT and business processes and the IT governance process is positioned in the IT strategic balanced scorecard and the IT development scorecard. These scorecards drive the business and IT strategies on measurement and follow up. The scorecard process necessary control measures on IT expenses, user satisfaction, efficiency of development and operation, expertise of IT staff and may use these results with benchmarking data (Van Grembergen, 2000).

5 Metrics, standards and budgeting

After the organization has decided what to measure metrics and budgets need to be defined that will be used to determine if the goals of the organization are achieved.

5.1 *Metrics & standards*

Performance indicators are used to govern measures and need to match to the organizational context (Neely et al., 1997). When performance criteria are not well defined the planning and controlling of IT performance is impeded (Globerson, 1985). The norms applied by the organization to compare the measured value with can be based upon similar norms that an organization used in the past or standards that have resulted from international standards of levels of quality achieved by other organizations (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 1999). Key Performance Indicators or KPIs are measurable characteristics of products, services, processes and operations directly related to the organizations' strategy, that give a good indication of the success (or failure) determining factors that are critical for the execution of the organizations' strategy (Chandi, 2009).They are lead indicators that define measures of how well the IT process is performing in enabling the goal to be reached (Dekkers, 2004). Figure 6 presents a visualization of the KPI development steps.

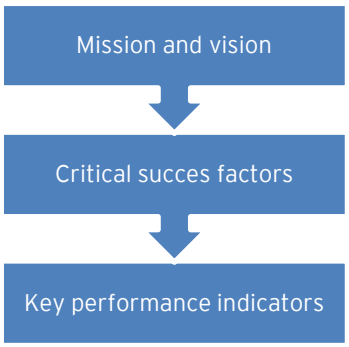


Figure 6 KPI development steps

KPIs need to have a positive impact on behavior and should be adaptable by managers. This can be achieved by defining them SMART (De Boer, 2002). Ten steps to achieve good performance measures are (Neely et al., 1997):

1. *Measure*: The title of the measure should be clear
2. *Purpose*: It has to determine if a measure has a purpose before it is introduced
3. *Relates to*: Measures should be related to business objectives before they are introduced
4. *Target:* The objectives of any business are a function of the requirements of its owners and customers
5. *Formula*: The way performance is measured
6. *Frequency*: Frequency of performance recording and reporting is based on the importance and volume of data available
7. *Who measures*: The person who is to collect and report the data should be identified
8. *Source of data*: The source of the raw data should be specified
9. *Who acts on data*: The person who is to act on the data should be identified
10. *What do they do*: Define management processes for performance results

5.2 *Budgeting*

Budgeting is the process of developing action plans based upon available strategic and tactical goals of the organization (Petri, 2008). The goals of the development of a budgeting system are the development and maintenance of a process for the planning and management of activities. These activities are deducted from the strategic and tactical plans and the corresponding benefits and costs are translated into a financially formulated plan. To create a fit between the budgeting system and the organization, there are several requirements that need to be met. These requirements are (Petri, 2008):

- Existence of a clearly formulated strategic plan
- Clear organizational structure with explicit responsibilities
- The organizational board is involved in the budgeting process and in the usage of the results
- Responsibilities for the budget system are clear
- Participation when developing the budget and acceptance of the final budget by the budget responsible
- Controlling of different budget aspects by the budget responsible
- Availability of standards for the analysis of functioning of the budget
- Manageability of the elements taken into the construction of the budget

In addition to the requirements presented above, budgeting systems can also be developed based upon the costs of activities. There are four types of budgets: cost budgets, revenue budgets, output budgets and profit budgets (Petri, 2008). Cost budgets are budgets in which costs that are allowed to be made are presented. Revenue and output budgets are budgets in which the required revenue or output is presented. Profit budgets are budgets in which the goal on the level of profit contribution is included.

6 Cost allocation and shared service centers

This chapter will discuss cost allocation and shared service centers which represent the view organizations have on the costs involved with IT and how these costs need to be allocated over the organization.

Cost allocation

The subject of allocating costs was already considered years ago (Barocci, Wever, Tessier, 1983). It was expected that market competition would require charge-out systems based on market prices. Charge-out systems are systems that determine how IT costs will be allocated to the business. Paralleling the expansion of IS applications enables a shift from a supply-driven to a demand-driven IS environment for a closer fit with the business. Barocci, Wever and Tessier (1983) wrote their paper with the changes for the IS department in mind, i.e. changing user needs and the increasing pressures for competitive IS services. Primary purpose of the charge-out systems was to control IT budgets as users would have overcome their initial resistance to computer technology and management should try to formalize and control their information systems (Barocci, Wever, Tessier, 1983). Four types of charge-out systems were proposed(Barocci, Wever, Tessier, 1983):

1. Overhead method, in which users are charged with a fixed percentage of their departmental budgets
2. Full cost recovery method, in which users are charged with certain rates per unit of usage
3. Market pricing method, where prices for the use of IT are similar to those in the market
4. Flexible pricing, where prices can be based on the market or set to cover costs, with the intention to stabilize by charging higher prices during peak periods

These different methods help accomplish different organizational goals. Reallocating costs to the organization allows IS managers to sustain high-quality service levels, while the use of IS charge-out systems does not negatively influence the internal IS department (Barocci, Wever and Tessier, 1983). In the context of budgetary controls there is also Management-by-exception (MBE) which is based on the notion that only variances, both unfavorable and favorable should get managerial attention, particularly if they were assessed as being significant (Brownell, 1983). Research by Brownell (1982) found results that heavy reliance on accounting information, and on budgets in particular, would not negatively affect performance as long as this evaluative style was accompanied by a high level of participation in budget setting.

Shared service centers

The type of service center that an organization has, influences the way it looks at charge out. Charge out is defined as "where there is a one-to-one relationship, in the mode of a seller and buyer, between IS and the user department" (Choudhury et al., 1986). Charge out does not

occur when this relationship is missing (Verner, Toraskar, Brown, 1996). Additionally employees do not feel responsible for the costs of activities of Shared Service Centers (SSC) when they perceive them as uninfluencable (Swager, 2008). Making users responsible for the costs of the IT services they use, motivates them select them with care and to develop commitment to the service (Verner, Toraskar, Brown, 1996).

A SSC is a result-oriented unit in the internal organization which delivers services of a specific specialization to other business units based on an agreement and price. The costs made by the SSCs are allocated to the units that use the services, while the elements that together make the costs are placed in a charge model. The activities of the SSCs are categorized into service lines and it is decided if they will be charged one-on-one or based on an activity driver of customer size. The prices determined during the budgeting process are adjusted at the end of the track, when it is clear if units paid too much or too little. By clustering specialists in SSCs it is possible to increase the quality level of services and achieve standardization and economies of scale (Swager, 2008).

Examples of IT charge out goals are: cost recovery, resource allocation, effective utilization of IS resources (Verner, Toraskar, Brown, 1996). Cost recovery means that a department can charge other departments who use their services to recover the investment. This approach is often applied as IT is mostly a service provider within the organization. The aim of resource allocation is to enable a fairer way of allocating services. When departments pay for their own needs, it will be the budget and not the manager that determines how much they can buy. Effective utilization of IS resources prevents the usage of unnecessary IT services and forces users to make effective use of IS they already have. The most important advantages of using charge out systems are improved organization wide IS function efficiency, improved communication and planning benefits, improved user accountability, autonomy and motivational benefits. However there are also some problems with charge out systems, for example short-term focus and costs in implementing the charge out system.

Swager (2008) listed some elements of SSCs that are important for the functioning of these units. These elements will be presented below and will be accompanied with a short description when necessary:

- *Structure and organization*: for good communication between different business units. Important aspects are for example hierarchy and responsibilities. Taking care of good coordination between these different parties can prevent potential conflict situations.
- *Change process:* the involved parties should participate in the business case to create commitment to the changes that will come
- *Communication*: Remmers et al. (2005) state that the communication structure is a condition expected to guarantee a clear governance structure. Communication channels and committees should be created (Swager, 2008).
- *Planning and control*: the SSC should be based upon the business planning
- *Charge model*: Swager (2008) refers to Strikwerda (2003) and Carlsson and Schurman (2004), who both state that charge models are required. Choices for internal allocation are needed to enhance the acceptance and success of the SSC, as this is influenced by the experiences and acceptance of units who use the services (Strikwerda, 2003). Carlsson and Schurmann (2004) agree to this by saying that it is essential for an SSC to have insight into the cost structure to manage the relationship with its customers.

- *Humans*: because humans are in many cases responsible for errors made in SSCs. They need sufficient support from the business (Korthals Altes, 2005).
- The element "additional conditions" contains other factors that have to be taken into account during the development and Construction of SSCs. Examples are the development of the IT environment architecture and the identification of the activities of the SSC.

Chapter 2 – Research method and protocol

1 Introduction

Research requires a strategy (Maimbo, Pervan, 2005). Two well-known research disciplines are behavioral science and design science (Hevner, March, Park, 2004). Design-science tries to develop and verify theories that explain or predict human/organizational behavior. It is a problem-solving approach that tries to create innovations through which the implementation, management and use of information systems can be effectively and efficiently accomplished (Hevner, March, Park, 2004). Even though this research is not about information systems, the paradigm of design-science can be applied to this research, because is aims at developing a method or set of guidelines that support organizations in achieving benefits of IT performance management. Below the guidelines by Hevner, Mark and Park (2004) for conducting design-science are presented. These guidelines are also interwoven in this research approach.

- *Design as an artifact:* Design-science research must produce a viable artifact in the form of a construct/model/method or instantiation
- *Problem relevance:* The objective of design-science research is to develop technology-based solutions to important/relevant business problems
- *Design evaluation:* The utility/quality and efficiency of a design artifact must be rigorously demonstrated, via well-executed evaluation methods
- *Research contributions*: Effective design-science research must provide clear/verifiable contributions in the areas of the design artifact/foundations/design methodologies
- *Research rigor:* Design-science research relies upon the application of rigorous methods in both the construction and evaluation of the design artifact
- *Design as a search process:* The research for an effective artifact requires utilizing available means to reach desired ends while satisfying laws in the problem environment
- *Communication of research:* Design-science research must be presented effectively both to technology-oriented as well as management-oriented audiences

A reason for the recognition of case study as a research method is the result of researchers "becoming concerned about the limitations of quantitative methods in providing holistic and in-depth explanations of the social and behavioral problems in question" (Zainal, 2007). Case study research (CSR) is a popular research strategy in IS (Cavaye, 1996; De Vries, 2005) that can be used for design-science research (Hevner, March, Park, 2004). It allows for the exploration of complex social phenomena in their natural environment (Yin, 1994; De Vries, 2005). And is widely used qualitative research method in information systems research (ISR) (Darke, Shanks, Broadbent, 1998; De Vries, 2005). Eisenhardt (1989) defines a case study as a research strategy which focuses on understanding the dynamics present within single settings. It allows for the development of, for example, descriptions, test theory or generate theory. Maimbo and Pervan (2005) describe a case study protocol as "a set of comprehensive guidelines that is an integral part of the case research design and contains the procedures for conducting the research, the research instrument itself, and the guidelines for data analysis.

Before conducting a CSR, a Case Study Protocol (CSP) has to be developed. A CSP is a set of guidelines that constitute an integral part of the research design and contain the procedures for conducting the research, the research instrument and the guidelines for data analysis

(Maimbo, Pervan, 2005; Brereton, Kitchen, Budgen and Li, 2008). It increases the reliability of case study research and guides the researcher in carrying out the data collection from a single case (Yin, 2009; Eisenhardt, 1989; Maimbo & Pervan, 2005). There are several reasons for using a CSP (Jansen, Brinkkemper, 2008): First of all, it defines the aims of the case study in order to avoid conflict and confusion in the future. Secondly, it is used to convince participants for the usefulness of the research. Finally, it is a useful document to instruct different researchers at different sites and the reuse of research results.

2 Case study research

In this chapter the basics of case study research will be introduced and explained.

2.1 *Choosing the research method*

CSR is one of the methods that can be applied in the IS domain from which a few are presented in figure 7. The choice for the research method(s) to apply depends on the nature of the research problem at hand (Noor, 2008, Yin, 2009; Darke, 1998).

Method	Form of Research Question	Requires Control of Behavioral Events?	Focuses on Contemporary events?
Experiment	How, why?	Yes	Yes
Survey	Who, what, where, how many, how much?	No	Yes
Archival Analysis	Who, what, where, how many, how much?	No	Yes/no
History	How, why?	No	No
Case Study	How, why?	No	Yes

Figure 7 Different Research Methods, based on Yin (2009)

When applying figure 7 to the research topic of IT performance management, CSR is chosen, as it is a descriptive method that allows for the development of theories based on the research results. Furthermore it can combine data collection techniques which are both qualitative and quantitative and seem to be suitable for this research (Darke et al., 1998; Yin, 1994; Yin 2009; Kaplan and Duchon, 1998; Eisenhardt, 1989). Because there is little research available in the field of IT performance management, it is important to first identify what IT performance management is about, before anything can be said about this concept. Afterwards, the development of theories and testing them enables the construction of valid statements, that can be used for future research. The availability of qualitative and quantitative data enables the gathering of more types of data.

2.2 *An introduction to case study research*

There is much literature available on CSR (Tellis 1997; Soy, 1997; Noor, 2008; Zainal, 2007; Rawsthorne, 2008; Darke et al., 1998; Darke Shanks and Broadbent, 1998; Yin, 2009). CSR can be used to provide descriptions of phenomena, and to develop and test theory and other types of investigations (Darke et al., 1998; Tellis, 1997; Rawsthorne, 2008; Soy, 1997; Yin, 2009; Zainal, 2007; Alvarez et al., 1990). Research by Glaser and Strauss (1967) and by Eisenhardt (1989) provide approaches that can be used to develop theory from a case study (Darke et al., 1998). In order to test theory, theoretical propositions from existing theory need to be derived (Darke et al., 1998).

Two well known definitions of CSR come from research by Yin (2009) and Cavaye (1996). The definition used by Yin (2009) to describe a case study as a research method is twofold and has a technical point of view. According to the definition, "a case study is an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident. As to Cavaye (1996) CSR investigates predefined phenomena but does not involve explicit control or manipulation of variables: the focus is on in-depth understanding of a phenomenon and its context. Yin (2009) states that the execution of CSR is a linear but iterative process that should encompass the following steps: plan, design, prepare, collect, analyze and share. For more information on these steps we refer to Case Study Research – Design and Methods, by Yin (2009). Darke et al. (1998) also have determined steps for the execution of CSR, which resemble the approach of Yin (2009).

2.3 *Advantages and disadvantages of case study research*

Some advantages of CSR are that variations in approaches (e.g. regarding instruments), allow for both quantitative and qualitative analysis of the data (Zainal, 2007; Darke et al., 1998). In addition, detailed qualitative accounts can help explain complexities of everyday situations which may not be captured through experimental or survey research. However CSR has also been criticized with the assumption that scientific valid research is not possible. Some of the disadvantages named are:

- Designing, scoping and collecting the results can be difficult and result in large amounts of data (Darke et al., 1998; Yin, 1994, p10; Cavaye, 1996; Zainal, 2007).
- Difficulties in generalizing research results and subjectivity of the data collection and analysis processes (Darke et al. 1998; Zainal, 2007).
- A frequent criticism of case study methodology is that its dependence on a single case renders it incapable of providing a generalized conclusion (Tellis, 1997; Zainal, 2007).

Overcoming disadvantages in this research

During the development and execution of this research, preparations were made to overcome these disadvantages. First of all the research scope was determined and the case studies were conducted within the utility sector, with one exception as this company was retrieved during a personal connection. A maximum of five organizations from the utility sector was involved to prevent data overload. There were two interviews with different people from each participating organization, to overcome subjectivity problems. Next to these two interviews, documentation from the organization was used, in order to compare the interviews with objective data. The focus of the research on the utility sector and the use of multiple case studies also allowed for easier generalization of the research results.

3 Research approach

Based on the research method by Yin (2009) the research approach for this research was developed. Here, the research questions and research plan will be introduced.

3.1 *Research questions*

The research questions are based upon a problem description provided by Ernst and Young, which focused on the pressure on organizations to achieve value for the money they invest in their IT performance management. This resulted in the main question of this research:

How do companies achieve and optimize the benefits of IT performance management?

To answer the main question, several sub-questions have to be answered. In order to optimize the benefits that organizations achieve by having IT performance management, we should first make clear what type of business benefits (tangible/intangible) are delivered by IT performance management. This results in the first sub-question.

1) What are the business benefits that IT performance management delivers?

KPIs are used to determine the performance of the organization and to see if the goals that the organization has set are being achieved. When they are made explicit organizations can validate if they use the right KPIs to measure what they want to know. Therefore, the second sub-question zooms in on the KPIs that the organization uses.

2) Which Key Performance Indicators are used, why and what are the results?

Once the KPIs are identified it is important to know how they are used to govern the organization. Insight into this process might explain if the organization achieves value from managing their IT performance. Also, insight into how the organization manages its IT performance can be derived from the allocation of the IT costs to the business, or by inspecting in general what their approach to IT costs is, which resulted in the third and fourth sub-question.

3) How are these KPIs used to govern the organization?
4) How are the IT costs allocated to the business?

3.2 *Research plan*

For the purpose of a structured approach, the research will consist of five different phases; (1) research planning, (2) literature research, (3) case studies, (4) synthesis of performance management approach and (5) the thesis. The planning overview can be found in Appendix 1- Planning overview.

Research planning
During the first phase, a schedule for the graduation project was made and research questions, scope, milestones and deliverables were determined. Also, the first contacts with the organizations who would participate in the CSR were made. The research planning served as a guideline throughout the process and the deliverables and milestones enable to determine if the process is on track.

Literature research
After the research plan was made, literature research and case studies were initiated in parallel. During literature research, the available literature on IT performance management was be collected and compared and a description of the different elements of IT performance management was made.

Case studies
Activities in the case studies phase were based on the CSP. During this phase interviews with clients of Ernst and Young were arranged, for which a one-pager Appendix 2 – One pager was created containing details about the research. When an actual visit could not take place a questionnaire was send by mail and discussed on the phone. An overview of the visits and answering of questionnaires can be found in figure 8. The (M) in this figure stands for questionnaire by email and the (I) for face to face interview.

Company	Visit 1	Visit 2
Company A	05-08-2010 (M)	03-06-2010 (I)
Company B	17-08-2010 (I)	17-08-2010 (I)
Company C	18-07-2010 (I)	03-05-2010 (I)
Company D	08-09-2010 (I)	20-08-2010 (M)
Company E	11-08-2010 (I)	11-08-2010 (M)
Company F	21-06-2010 (I)	27-05-2010 (I)

Figure 8 Visit schedule

The first interview session took 1 hour and showed that the duration of the interviews needed to be extended to 1,5 hour to be able to ask all questions. If not all questions could be answered, they were sent to the interviewee to answer them by mail. The interviewees all received an interview summary, which they could change and which later formed the basis of the actual data analysis. For the eventual chapter the results were anonymous. For the recording of the interviews a Philips Digital Voice Recorder LFH 0602 was used.

Synthesis of performance management approach
After finishing the literature research and data collection, the phase of synthesis of the performance management approach was initiated. This meant analysis and comparison of the findings of literature and the case studies to find if literature approaches connect to real-life practices. Also, the organizations were compared in order to recognize approaches which could result in better management of the organizations IT performance.

Thesis
The final phases contained the writing of the thesis and a structured presentation of all data gathered. This data will be used to answer the research questions composed in the first part of the research. Also, a scientific and a non-scientific paper will be made for Utrecht University and Ernst & Young. To speed up the writing process and all documents were written in English with a similar layout.

4 Case study protocol for IT performance management approach

This chapter will present several case study protocol examples which have been used to develop the case study protocol used for this research.

4.1 *Getting started*

Identify previous research
Previous research about IT performance management can be found in the literature part of the research. The approaches introduced here are derived from Brereton et al. (2008), Yin

(2009), Eisenhardt (1989) and Maimbo & Pervan (2005). Reasons for this selection are that these CSPs are developed by well-known authors and have been applied by many other researchers. Additionally, the approach by Brereton et al. (2008) provides clear steps which can be used to develop and determine the approach for this research. And the approach by Maimbo & Pervan (2005) takes the research by Eisenhardt (1989) as a starting point for the development of their own CSP. Brereton et al. (2008) identify 11 steps in their case study protocol template, which are presented below:

Activity	Sub activity
1. Background	1.1 Identify previous research 1.2 Identify main research question (RQ) 1.3 Identify additional research questions (ARQ)
2. Design	2.1. Identify use of single-case/multiple-case/embedded/holistic design and show link with 1.2 and 1.3
3. Case Selection	3.1 Criteria for case selection
4. Case Study Procedures and Roles	4.1 Procedures governing field procedures 4.2 Roles of case study research team members
5. Data Collection	5.1 Identify data to be collected 5.2 Define a data collection plan 5.3 Define how data will be stored
6. Analysis	6.1 Identify criteria for interpreting findings 6.2 Identify data elements to answer RQ/SRQ and how to combine elements into an answer 6.3 Consider range of outcomes and id alternative outcomes 6.4 Analysis should take place as the case study task progresses
7. Plan Validity	7.1 Check again Höst and Runesons (2007) checklist 7.2 Check construct validity 7.3 Check internal validity 7.4 Check external validity
8. Study Limitations	(none)
9. Reporting	(none)
10. Schedule	(none)
11. Appendices	11.1 Validation 11.2 Divergences

In addition, Yin (2009) describes several elements that a CSP should contain.

- Overview of case study project (project objectives, relevant readings and case study issues)
- Field procedures, presentation of credentials, access to the case study "sites"
- Case study questions that the researcher should keep in mind and the potential sources of information for answering each question
- A guide for the case study report (i.e., outline and format of data)

These elements contain similarities to the approach by Brereton et al. (2008), but also some differences. For example, Yin (2009) requires specific questions that the investigator should keep in mind and emphasizes on the protection of human subjects in the research. The third CSP development approach is extracted from the research of Eisenhardt (1989), which

combines the related research performed by Miles and Huberman (1984), Yin (1981) and Glaser and Strauss (1967). Figure 9 presents these different stages. The figure also contains a three phased division added by Maimbo and Pervan (2005) to simplify execution of the framework.

Phase	Stage	Activity	Reason
Phase one	Getting started	Define research question(s) Possible a priori constructs	Focuses on efforts Provides better grounding of measures
	Selecting Cases	Neither theory nor hypothesis Specified population Theoretical sampling	Retains theoretical flexibility Constrains extraneous variation and sharpens external validity
	Crafting instruments and protocols	Multiple data collection method Qualitative and quantitative	Triangulation strengthens grounding of theory
Phase two	Entering the field	Iterative data collection and analysis Flexible opportunistic data collection	Speeds up analysis Facilitates emergent themes
	Analyzing the data	Within-case Cross case analysis	Gains familiarity with data and preliminary theory generation Looks beyond initial impressions
	Shaping hypothesis	Iterative tabulation of evidence for each construct Replication logic across cases Search for the cause, i.e. the 'why' behind relationships	Sharpens construct definition, validity and measurability Confirms, extends and sharpens theory Builds internal validity
Phase three	Enfolding the literature	Comparison with conflicting literature Comparison with similar literature	Builds internal validity, raises theoretical level and sharpens construct definition Improves generalized ability, raises theoretical level and sharpens construct definition
	Reaching closure	Theoretical saturation	Ends process when marginal improvement becomes small

Figure 9 Process of Building Theory from Case Study Research based on Maimbo & Pervan (2005).

The fourth CSP development approach is by Maimbo and Pervan (2005) and presents guidelines subtracted from the context of the research by Eisenhardt (1989). The main difference between the two figures is that the roadmap by Maimbo and Pervan (2005) has a very practical orientation while the method by Eisenhardt (1989) contains more scientific elements.

Section	Contents	Purpose
Preamble	Confidentiality and data storage Publication Documentation Layout of protocol	Contains information about the purpose of the protocol, guidelines for data and document storage, publication.
General	Overview of research project The case research method	Provides a brief overview of the research project and the case research method

Procedures	Initial approach to organizations Scheduling of field visits Length of sessions Equipment and stationery	Detailed description of the procedures for conducting each case to ensure uniformity in the data collection process and to facilitate both within case and cross case analyses.
Research instrument(s)	Research instrument(s) that may either be qualitative or quantitative	Research instruments developed utilizing guidelines by Neuman (2000) and Sekaran (2000).
Data analysis guidelines	Overview of data analysis processes Details regarding data triangulation and convergence Description of within case/cross sector analysis process Data schema Description of data display used in analysis A priori list of codes for qualitative analysis	Guidelines for data analysis
Appendix	Participation request letter	Template letter used to invite participants to research

Figure 10 Outline CSP by Maimbo and Pervan (2005)

4.2 *Case study protocol roadmap for this research*

Based on the approaches presented above, a new CSP roadmap specific for this research was developed. Several activities where extracted from the afore mentioned approaches and were used to construct this roadmap. Choices were made based on the goal to perform a valid and structured research. All activities included are aimed at easy identification of the process and decisions made.

Activity	Sub activity
1. Getting started	1.1 Identify previous research 1.2 Identify main research question (MRQ) 1.3 Identify sub research questions (SRQs) 1.4 Provide overview of research project 1.5 Describe confidentiality and data storage 1.6 Form of publication
2. Case selection	2.1 Determine the use of a single-case or multiple-case approach and embedded or holistic design and show link with MRQ and SRQs 2.2 Define criteria for case selection (selection/number/establishing contact) 2.3 Scheduling of visits 2.4 Length of sessions 2.5 Equipment and stationery
3. Collecting Data	3.1 Craft instruments and protocols (qualitative and quantitative) 3.2 Data collection description
4. Analyzing data	4.1 Identify criteria for interpreting findings 4.2 Identify data elements to answer MRQ and SRQs and how to combine them into an answer 4.3 How triangulation of perspectives from multiple participants will be achieved 4.4 Description of "within case" analysis 4.5 Description of "cross sectoral" analysis

	4.6 Consider range of outcomes and identify alternative outcomes
5. Plan Validity	5.1 Check construct validity 5.2 Check internal validity 5.3 Check external validity
6. Rounding up	6.1 Enfolding literature (compare with conflicting/similar literature) Limitations

4.3 *Case selection*

Determine the use of a single-case/ multiple-case approach and embedded/ holistic design and show link with MRQ and SRQs

The goal of the research is to make statements about how organizations achieve and optimize the benefits of IT performance management. This requires a multiple-case approach with a holistic design, because the ITPM of the individual companies is going to be observed and the results for the ITPM level of all companies will be compared. This links to the MRQ and SRQs that the MRQ is about companies in general and that the SRQs discuss just one element of the companies, namely the IT performance management.

4.4 *Collecting data*

Craft instruments and protocols

Data was collected by having interviews and acquiring data from the companies. The questionnaire was developed by the author and feedback was given by all supervisors to improve it. After the final agreement, the main questions were sent to the interviewees, so they could prepare for the interview.

Data collection description

The data was collected during two interviews per company. One with the CIO and one with the IT controller or someone at a similar position. These interviews were recorded and saved on a protected Ernst and Young laptop. The tapings were only used by the author to provide interviewees with a summary of the interview and a list containing the highlights of the conversation.

Company	Visit 1	Visit 2
Company A	IT controller	Demand manager
Company B	CIO	Program manager
Company C	Finance manager	CIO
Company D	Head Control Information management	CIO
Company E	CIO	Controller
Company F	Director IT and Facility Services	Senior IT manager

Figure 11 Job title interviewees

4.5 *Analyzing data*

Identify criteria for interpreting findings

To be able to compare the findings from the research, a questionnaire was developed. This categorized the answers to the questions and allowed for a categorized comparison.

Identify data elements to answer RQs and how to combine them into an answer
The data gathered through the questionnaire was used to answer the research questions. During the case study an adjusted questionnaire for the CIO was used, which left out some of the controller-specific questions. Both questionnaires are added as annexes and the main questions will be used to map the data elements to the RQs. The questionnaire for the IT controller can be found in Annex 3 – Questionnaire IT controller and the questionnaire for the CIO can be found in Annex 4 – Questionnaire CIO. Due to the open character of the interview, the interviewees provided a large amount of information on the approach of their organization which helped to fill out blanks about the research questions. The questionnaire contained the following six main questions:

1. What is the context of IT within the organization?
2. Which goal does the organization want to achieve with IT performance management?
3. Which Key Performance Indicators are used, why and what are the results?
4. How is IT performance management located in the business?
5. How is IT performance management used to govern the organization?
6. How do you make sure that IT is both effective and efficient?

These questions can be mapped onto the research questions and the sub questions and in total they could answer the main research question. Question one functioned as an introduction for the subject IT performance management in the organization and is therefore not mapped onto one of the research questions.

Research question	Questionnaire question(s)
How do companies achieve and optimize the benefits of IT performance management?	6
What are the business benefits (tangible/intangible) that IT performance management delivers?	2
Which Key Performance Indicators are used, why and what are the results?	3
How are these KPIs used to govern the organization	3,5
How are the IT costs allocated to the business?	4

How triangulation of perspectives from multiple participants will be achieved
When using multiple sources of evidence, a researcher has a broader range of issues on which the research can be based (Yin, 2004). To overcome the problem that an interviewee might give answers to please the interviewer, both the CIO and IT controller were interviewed.

Description of "within case" analysis
During the within case analysis the results of the cases will be compared to the findings from the literature study to find patterns. The possible result could be that the cases have the same approach as it is suggested by literature, however when different or new patterns are found these need to be explained.

Description of "cross sectoral" analysis
During the cross sectoral analysis the different cases will be compared. This comparison will be based on the highlight reports and interview summaries. With this cross sectoral analysis possible findings could be strengthened or new patterns could be found which could be of additional value to the research. The findings of the cross sectoral analysis can be found in chapter three and four.

4.6 *Plan validity*

Check construct validity

Construct validity is satisfied when concepts being studied are operationalized and measured correctly (Jansen, Brinkkemper, 2008). To guarantee construct validity for this research several actions have been taken that were based on the research of Yin (2004). First of all, multiple sources of evidence have been used for the interviews: interviews and data provided by the organizations. As can be derived from this description, two types of triangulation are applied in this research. These types are investigator triangulation and data triangulation (Patton, 2002).In addition to multiple sources of evidence, a chain of evidence will be established for repeatability of the research. Also key informants will review the draft case study report.

Check internal validity

To check internal validity, the analytic technique of explanation building will be performed, while causal links about the case studies will be developed. Because explanation building requires a careful approach to guarantee validity, the set of iterations by Yin (2004) will be used to guide this process. These steps are:

- Making an initial theoretical statement or an initial proposition about policy or social behavior
- Comparing the findings of an initial case against such a statement or proposition
- Revising the statement or proposition
- Comparing other details of the case against the revision
- Comparing the revision to the facts or >= 2 cases
- Repeat this process as many times as needed

Check external validity

External validity is defined as establishing the domain to which the findings of a study can be generalized (Jansen, Brinkkemper, 2008). The cases conducted for this research are found to be representative to the Dutch Utility sector.

4.7 *Rounding up*

A literature overview can be found in the literature list. Limitations of the research can be found in the discussion in chapter four.

Chapter 3 – The IT performance maturity model

Chapter three combines the results from literature and the results from the interviews. The data is used to develop a framework, a meta-model and a Process-data diagram. These deliverables are used to compare the research results.

1 IT performance maturity model

1.1 *Framework construction*

A framework has been developed to compare the different organizational IT performance management approaches and the characteristics retrieved from literature. The framework is developed by allocating the characteristics over three[1] identified elements of performance management which will shortly be explained.

- *IT performance management* can be defined as the area of setting goals, responsibility accounting and monitoring, analyzing, governing and improving the performance of IT
- *IT performance measurement* is about the development and adoption of a strategic set of performance metrics and using them to plan, implement, operate and monitor the strategies, functions and processes of the organization with (ITPMG, 2006)
- *Cost allocation* is the allocation of IT costs to the business

Each of the categories of performance management has characteristics that can be divided into a plan, do, check or act phase and will these phases will be explained below (HCI, 2010). All ITPM characteristics have been allocated to one of these phases so they could be more easily compared. The phases are developed by Shewart (1931) and allow for optimizing and improving a single process model (Basili, 1995).

- *Plan* to improve operations by identifying what is going wrong and developing solutions for these problems
- *Do* implements changes to solve problems. First this is done on a small scale first to minimize disruption of routine while testing if they really work
- *Check* if the small changes are achieving desired results. Also check key activities to ensure that the output allows for the identification of new problems when they arise
- *Act* to implement the changes when they show to be successful. This is done by making them part of your routine. Also involve other parties who are affected by the changes and whose cooperation is necessary to implement the changes on a larger scale and share experiences or lessons learned

[1] In the original situation there was a fourth element, budgeting, included in the framework. This aspect has been excluded from the framework as it was not covered sufficiently in the interviews to determine if characteristics had been applied or not and therefore would not be able to contribute to the research.

The structuring of these characteristics presents organizations with a structured approach per phase for each of the elements. In subchapter 1.1.1 to 1.1.3 the characteristics for IT performance management are presented. It shows that not all phases contain the same number of characteristics. It was decided by the author and supervisors not to develop additional characteristics to have the same number of characteristics for all IT performance management elements. This because we found that new characteristics should be retrieved from organizational approaches during future research.

1.1.1 Characteristics of IT performance management

During the literature study characteristics of IT performance management were retrieved from scientific literature and mapped on the Shewart cycle. Characteristics were selected when their construction process was clearly explained and substantiated. The mapping and grouping of the characteristics to the framework has been discussed with people experienced in the field of IT for validation purposes.

Phase	Characteristic
Plan	- Performance management requires good insight into the organizational processes (Seddon, Graeser, Willcocks, 2002) - Performance management should contain both the operation and business side of IT (Andra, 2006) - Before making changes to the performance management approach the current situation should be clear and understood (Simonson and Johnson, 2006)
Do	- The vision and strategy should be translated into concrete goals which should be organized based on four points of view: financial, customer, internal organization and learning and growth abilities of the organization (De Boer, 2002) - The IT performance of the organization should be discussed during regular meetings (Finding, 2004)
Check	- Business objectives should be met (Andra, 2006)
Act	- Reward employees based on the KPIs they are responsible for (Neely et al., 1997) - Use results for the development of new IT priorities (Finding, 2004) - Use performance management results to increase performance (Wettstein, Kuen, 2002). - Control or measure the performance based on a benchmark (Son, Weitzel, Gladyszewski, 2006)

1.1.2 Characteristics of IT performance measurement

The selection process of characteristics used to determine the IT performance measurement approach was similar to the one for IT performance management characteristics.

Phase	Characteristic
Plan	- Replace intuition by facts (Wettstein, Kuen, 2002) - Performance measurement frameworks need to be balanced, multidimensional (BSC), comprehensive and integrated (Jack, 2002; Martinsons, 2000; Coleman, 1995; Avram, 2001; Mulders, 2007; Kaplan, Norton, 1992) - Use a strategic and balanced set of KPIs to plan, implement, operate and monitor the strategies, functions and processes of the organization (ITPMG, 2006) - Measurement frameworks should be complemented by performance measurement techniques and improvement initiatives based on the requirements and goals of the organization (Jack, 2002) - Performance measurement should be based on the current strategy and can include metrics that

	anticipate on future goals for the organization (Andra, 2006)
Do	- Performance measurement requires a mixed approach to measure both financial and non-financial aspects (Martinsons, 2000; Coleman, 1995; Avram, 2001; Mulders, 2007; Kaplan, Norton, 1992) - Management teams need to be explicit about their performance priorities and corresponding relationships (Neely et al., 2000) - Measure performance by using performance measures that support critical business processes (Keynote, 2005) - Performance criteria should be well-defined (Globerson, 1985) - Task and responsibilities with regard to the flow of information should be explicit (Neely et al., 2000) - Performance measures should reflect the requirements and goals of the organization (Jack, 2002)
Check	- The measurement system needs to be aligned with the company's goals to reward people in proportion to their performance on the measures that are important (Eccles, 1991)
Act	- Performance measurement results require actions (Andra, 2006) - Methods for taking new performance measures should evolve as the company's experience increases (Eccles, 1991)

1.1.3 Characteristics of cost allocation

The selection process of characteristics used to determine the cost allocation approach was similar to the approach used for IT performance management and measurement.

Phase	Characteristic
Plan	- The SSC should be based upon the business planning (Swager, 2008) - A clear hierarchy and explicit responsibilities should be in place (Swager, 2008) - There should be a buyer and seller in the form of an IS and a user department (Verner, Toraskar, Brown, 1996)
Do	- Internal allocation is needed to gain acceptance and success of the SSC (Strikwerda, 2003) - The costs created by the SSC are allocated to departments who use the services (Swager, 2008) - The elements that make the costs are placed in a charge model (Swager, 2008) - The IT environment architecture should be developed and activities identified (Strikwerda, 2003) - Employees should get support from the business (Strikwerda, 2003) - All parties involved should participate in the business case to create commitment to the changes that will come (Strikwerda, 2003) - Communication channels and committees should be created to guarantee a good governance structure (Strikwerda, 2003)
Check	- Insight into the cost structure is needed to manage the relationship with customers (Carlsson, Schurmann, 2004) - There should be management by exception where both favorable and unfavorable variances get attention (Bhimani, Horngren, Datar and Foster, 2008) - Favorable and unfavorable variances should be analyzed (Bhimani, Horngren, Datar and Foster, 2008)

Act	- Corrective actions based upon the variances found in the Check-phase should be launched (Bhimani, Horngren, Datar and Foster, 2008)

We mapped and scored all organizations to the framework including a validation of how the characteristic was applied in practice. In the next section the scoring against this framework for two organizations will be presented. The other frameworks can be found in Annex 5 - Frameworks organization A, B, D and F.

1.2 *Application of the framework on Company C and Company E*

Here the frameworks for company C and E are presented as an example of the diversity of results the organizations have for the different IT performance management elements. In the column "Applied in organization" of the framework, a short description or some keywords are provided on how this characteristic is applied in the organization. The more elaborately the characteristic was discussed during the interview and the more detail that was provided in the documentation, the higher the level of detail in "Applied in organization".

1.2.1 Company C

Performance management

Phase	Characteristic	Applied in organization
Plan	Elements that should be considered during performance management are planning, controlling, costing, directing and decision-making.	All elements are taken into consideration
	Performance management should be executed through planning and control, metrics, measurements, KPIs, financial indicators and service levels.	The organization uses KPIs to measure performance
	Performance management requires good insight into the organizational processes.	KPIs are based upon critical processes, which results in insight into organizational processes.
	Performance management should contain both the operation and business side of IT.	Performance management only contains operations, finance and people
	Before making changes to the performance management approach the current situation should be clear and understood.	This is done by the organization because corporate, business and IT management are involved in the development of KPIs
Do	The vision and strategy should be translated into concrete goals which should be organized based on four points of view: financial, customer, internal organization and learning and growth abilities of the organization.	The organization does not use a BSC approach
	The IT performance of the organization should be discussed during regular meetings.	There are monthly meetings to discuss KPIs in the MT IT

Check	Business objectives should be met.	When business objectives are not met, actions are taken
Act	Reward employees based on the KPIs they are responsible for	Not applied
	Use results for the development of new IT priorities	Not applied
	Use performance management results to increase performance	Not applied
	Control or measure the performance based on a benchmark	The organization engages in a benchmark

Performance measurement

Phase	Characteristic	Applied in organization
Plan	Replace intuition by facts	Is done by using KPIs
	Performance measurement frameworks need to be balanced, multidimensional (BSC), comprehensive and integrated	The performance measurement framework does not fulfill the requirements of the characteristic
	Use a strategic and balanced set of KPIs to plan, implement, operate and monitor the strategies, functions and processes of the organization.	Not done by the organization
	Measurement frameworks should be complemented by performance measurement techniques and improvement initiatives based on the requirements and goals of the organization	To act upon abnormal values there is a improvement initiative and the framework does not stand alone
	Performance measurement should be based on the current strategy and can include metrics that anticipate future goals for the organization.	Unknown
Do	Performance measurement requires a mixed approach to measure both financial and non-financial aspects	Yes, but very limited
	Management teams need to be explicit about their performance priorities and corresponding relationships	Not developed yet
	Measure performance by using performance measures that support critical business processes	Not applicable
	Performance criteria should be well-defined	Not applicable
	Task and responsibilities with regard to the flow of information should be explicit.	Unknown
	Performance measures should reflect the requirements and goals of the organization	KPIs are based upon critical processes
Check	The measurement system needs to be aligned with the	Employees are made responsible for

	company's goals to reward people in proportion to their performance on the measures that are important	KPIs, but because these KPIs are financially oriented there is no full cover of the organizational objectives
Act	Performance measurement results require actions Methods for taking new performance measures should evolve as the company's experience increases	Yes Not applicable yet

Cost allocation

Phase	Characteristic	Applied in organization
Plan	The SSC should be based upon the business planning A clear hierarchy and explicit responsibilities should be in place There should be a buyer and seller in the form of an IS and user department	Yes (cost centre approach) Yes as employees are made responsible for KPIs and are determining solutions for (potential) problems There are a buyer and seller present in the organization
Do	Internal allocation is needed to gain acceptance and success of the SSC The costs made by the SSC are allocated to departments who use the services The elements that make the costs are placed in a charge model The IT environment architecture should be developed and activities identified Employees should get support from the business All parties involved should participate in the business case to create commitment to the changes that will come Communication channels and committees should be created to guarantee a good governance structure	Available Yes, this is done Unknown The IT architecture is based upon projects within the different domains. Unknown Because of the communication between domain managers and the MT all parties are involved Monthly evaluation of KPIs
Check	Insight into the cost structure is needed to manage the relationship with customers There should be management by exception where both favorable and unfavorable variances get attention. Favorable and unfavorable variances should be analyzed.	Present Unfavorable variances get attention Only unfavorable variances get

		attention
Act	Corrective actions based upon the variances found in the Check-phase should be launched	For the unfavorable variances there are corrective actions launched

Company C has varied results with regards to its performance management. While some characteristics are at a high level, others are only barely initiated. However the general performance management approach is available. Only the phase Act for performance management is not developed

1.2.2 Company E

Performance management

Phase	Characteristic	Applied in organization
Plan	Elements that should be considered during performance management are planning, controlling, costing, directing and decision-making.	No real planning and usage of measured results.
	Performance management should be executed through planning and control, metrics, measurements, KPIs, financial indicators and service levels.	No real planning for IT, KPIs are abstracted from business plans
	Performance management requires good insight into the organizational processes.	Not applicable as KPIs don't always measure what they need to measure
	Performance management should contain both the operation and business side of IT.	Usage of BSC
	Before making changes to the performance management approach the current situation should be clear and understood.	There is analysis of the current situation
Do	The vision and strategy should be translated into concrete goals which should be organized based on four points of view: financial, customer, internal organization and learning and growth abilities of the organization.	Is done
	The IT performance of the organization should be discussed during regular meetings.	No regular meetings
Check	Business objectives should be met.	Not done
Act	Reward employees based on the KPIs they are responsible for	Partly, ownership is not always clear
	Use results for the development of new IT priorities	Is done
	Use performance management results to increase performance	Is not done
	Control or measure the performance based on a benchmark	The organization does not participate in benchmarks

Performance measurement

Phase	Characteristic	Applied in organization
Plan	Replace intuition by facts	Is done
	Performance measurement frameworks need to be balanced, multidimensional (BSC), comprehensive and integrated	Yes, the organization uses the BSC approach
	Use a strategic and balanced set of KPIs to plan, implement, operate and monitor the strategies, functions and processes of the organization.	Is done
	Measurement frameworks should be complemented by performance measurement techniques and improvement initiatives based on the requirements and goals of the organization	Not done yet
	Performance measurement should be based on the current strategy and can include metrics that anticipate future goals for the organization.	Not yet (KPIs are abstracted from business KPIs)
Do	Performance measurement requires a mixed approach to measure both financial and non-financial aspects	Both financial and non-financial aspects are covered
	Management teams need to be explicit about their performance priorities and corresponding relationships	Minimal
	Measure performance by using performance measures that support critical business processes	Business scorecards are used, it is unknown if they support business processes
	Performance criteria should be well-defined	Yes
	Task and responsibilities with regard to the flow of information should be explicit.	Unknown
	Performance measures should reflect the requirements and goals of the organization	KPIs are developed based on business plans and ambitions
Check	The measurement system needs to be aligned with the company's goals to reward people in proportion to their performance on the measures that are important	The first part of the characteristic is partly developed, the second part is not developed.
Act	Performance measurement results require actions Methods for taking new performance measures should evolve as the company's experience increases	No actions, just discussion Not yet applicable

Cost allocation

Phase	Characteristic	Applied in organization
Plan	The SSC should be based upon the business planning	Not done

	A clear hierarchy and explicit responsibilities should be in place There should be a buyer and seller in the form of an IS and user department	Not available Yes, a buyer and seller are present
Do	Internal allocation is needed to gain acceptance and success of the SSC The costs created by the SSC are allocated to departments who use the services The elements that create the costs are placed in a charge model The IT environment architecture should be developed and activities identified Employees should get support from the business All parties involved should participate in the business case to create commitment to the changes that will come Communication channels and committees should be created to guarantee a good governance structure	Yes, there is internal allocation Yes, costs are allocated to the department using IT services There is no charge model Yes, this is done Yes, performance contract No, not all of the parties are involved during the development of the business case No
Check	Insight into the cost structure is needed to manage the relationship with customers There should be management by exception where both favorable and unfavorable variances get attention. Favorable and unfavorable variances should be analyzed.	There is insight into the cost structure There is discussion about the variances Only negative are analyzed
Act	Corrective actions based upon the variances found in the Check-phase should be launched	There are no corrective actions

The maturity of the characteristics for company E is more equally spread. As company C had some phases that had high maturity and another that was not even initiated at all. Company E has more average maturity levels and some phases that are not initiated yet.

2 IT performance maturity model

The list of ITPM characteristics has been divided over the four phases of ITPM defined in this research. Mapping the organizations on the characteristics and adding details about their approach, allows for an inter-organizational comparison. To determine the maturity per phase an adapted form of the Capability Maturity Model (CMM) has been used. The CMM is intended to provide software organizations with guidance on how they could gain control of their processes for developing and maintaining software (Paulk, Curtis, Chrissis and Weber, 1993). However the maturity levels can also be used to define the performance management maturity levels, because performance management is also aimed at gaining control of the

process. Like CMM performance management is also about continuous improvement of the process. The framework defines five maturity levels that form the foundation for continuous process improvement (Paulk, Curtis, Chrissis and Weber, 1993). In this research the description of maturity levels by Paulk et al (1993) will be adapted to fit the scope of the research. Maturity levels can be defined as evolutionary plateaus toward achieving a mature performance management process. Each of the levels comprises a set of process goals that, when satisfied, stabilize an important component of the performance management process (Paulk et al., 1993). Below an introduction of the five maturity levels for IT performance maturity is provided.

1. *Initial:* The IT performance management process is characterized as ad hoc, and occasionally even chaotic. Few processes are defined, and success depends on individual effort. During this phase the employees are struggling against the process, or inventing it as they go along (Dymond, 1997).
2. *Repeatable:* Basic IT performance management processes are established to measure and manage IT performance and to identify related IT costs created throughout the organization. The necessary process discipline is in place to repeat earlier successes with the measuring and management of IT and identifying the IT costs.
3. *Defined:* The IT performance management process for measurement, management and cost allocating is documented, standardized, and integrated into a standard IT performance management process for the organization. This standard IT performance management process is used every time an activity related to measurement, management and cost allocating is performed.
4. *Managed:* Following the Defined level, the organization-wide process used at level three has been instrumented so that it is quantitatively understood and controlled (Dymond, 1997). Detailed measures of the IT performance measurement, IT management process and cost allocation are collected. All elements are understood and controlled.
5. *Optimizing:* At this level, the organizations IT performance management processes operate as a matter of routine and stimulate people to focus on continuous improvement (Dymond, 1997). Continuous IT performance management improvement is enabled by quantitative feedback from the process and from piloting innovative ideas and technologies.

2.1 *IT performance maturity model applied on the organizations*

To be able to compare the organizations based on their maturity, each characteristic for all IT performance management aspects has been granted a value, namely: (1) satisfied, (2) partially satisfied or (3) not satisfied. These values have different weights. Value 1 has weight of one, value 2 weighs half and value 3 weighs zero. Per phase these values are added and divided by the number of characteristics for that phase. The value that results from this calculation will determine the actual IT performance maturity level. When this value is one, which means that all characteristics are satisfied the characteristic will get a level five. When 50% of the characteristic is satisfied the phase will get a level three and when none of the characteristics are satisfied the phase will get the maturity value level one.

2.1.1 IT performance maturity model per organization

Below overviews of the granted values levels per characteristic per organization are presented, with exception of cost allocation for company A. During the interview this subject was not discussed in enough detail to be able to answer the questions posed for this IT performance management element.

Performance management

Performance management	Characteristic	Company A	Company B	Company C	Company D	Company E	Company F
Plan	Elements that should be considered during performance management are planning, controlling, costing, directing and decision-making	2	2	1	1	3	1
	Performance management should be executed through planning and control, metrics, measurements, KPIs, financial indicators and service levels	3	2	1	1	3	1
	Performance management requires good insight into the organizational processes	2	3	1	1	3	1
	Performance management should contain both the opration and business side of IT	3	3	2	2	1	1
	Before making changes to the performance management approach the current situation should be clear and understood	2	2	1	2	1	1
Do	The vision and strategy should be translated into concrete goals which should be organized based on four points of view: financial, customer, internal organization and learning and growth abilities of the organization	2	3	3	2	1	1
	The IT performance of the organization should be discussed during regular meetings	3	3	1	1	3	3
Check	Business objectives should be met	3	3	1	1	3	1
Act	Reward employees based on the KPIs they are responsible for	3	2	3	1	2	1
	Use results for the development of new IT priorities	3	3	3	3	1	2
	Use performance management results to increase performance	3	3	3	3	3	2
	Control or measure the performance based on a benchmark	3	3	2	1	3	1

Performance measurement

Performance measurement		Company A	Company B	Company C	Company D	Company E	Company F
Plan	Replace intuition by facts	2	1	1	1	1	1
	Performance measurement frameworks need to be balanced, multidimensional (BSC), comprehensive and integrated	3	2	3	2	1	1
	Use a strategic and balanced set of KPIs to plan, implement, operate and monitor the strategie, functions and processes of the organization	3	2	3	2	1	1
	Measurement frameworks should be complemented by performance measurement techniques and improvement initiatives based on the requirements and goals of the organization	3	3	1	2	3	2
	Performance measurement should be based on the current strategy and can include metrics that anticipate on future goals for the organization	3	2	2	2	3	1
Do	Performance measurement requires a mixed approach to measure both financial and non-financial aspects	3	3	2	2	1	3
	Management teams need to be explicit about their performance priorities and corresponding relationships	3	3	3	1	2	1
	Measure performance by using performance measures that support critical business processes	3	3	3	3	2	3
	Performance criteria should be well-defined	3	3	3	1	1	1
	Tasks and responsibilities with regard to the flow of information should be explicit	3	3	3	1	3	1
	Performance measures should reflect the requirements and goals of the organization	3	3	1	1	1	1
Check	The measurement system needs to be aligned with the company's goals to reward people in proportion to their performance on the measures that are important	3	3	2	1	2	1
Act	Performance measurement results require actions	3	2	1	3	3	1
	Methods for taking new performance measures should evolve as the company's experience increases	3	3	3	1	3	1

Cost allocation

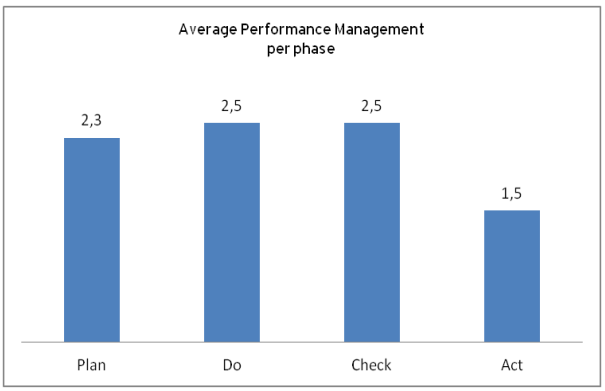
Cost allocation		Company A	Company B	Company C	Company D	Company E	Company F
Plan	The shared service center should be based upon the business planning	All not applicable, because there is no cost allocation	3	1	2	3	1
	A clear hierarchy and explicit responsibilities should be in place		3	1	3	3	1
	There should be a buyer and seller in the form of an Information System and User Department		3	1	1	1	1
Do	Internal allocation is needed to gain acceptance and success of the shared service center		2	1	2	1	1
	The costs made by the shared service center are allocated to departments who use the services		2	1	2	1	1
	The elements that make the costs are placed in a charge model		3	3	3	3	3
	The IT environment architecture should be developed and activities identified		2	1	3	1	1
	Employees should get support from the business		3	3	2	1	1
	All parties involved should participate in the business case to create commitment to the changes that will come		2	1	3	3	1
	Communication channels and communitees should be created to guarantee a good governance structure		3	2	1	3	3
Check	Insight into the cost structure is needed to manage the relationship with customers		3	1	2	1	1
	There should be management by exception where both favorable and unfavorable variances get attention		1	2	3	1	2
	Favorable and unfavorable variances should be analyzed		1	2	3	2	2
Act	Corrective actions based upon the variances found in the Check-phase should be launched		1	2	3	3	2

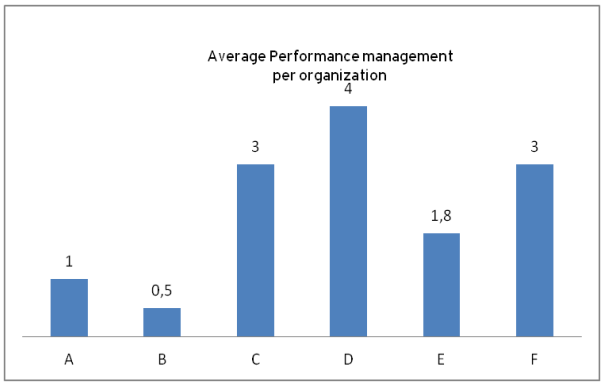
2.1.2 IT performance maturity model overview

Overviews of the averages per IT performance management element are presented below. Based on the performance maturity model presented in 2.1.1 the following maturity levels per phase of performance management were calculated for each of the organizations which show the distribution of maturity levels over the different phases.

Performance management	Company A	Company B	Company C	Company D	Company E	Company F
Plan	2	2	4	4	2	0
Do	2	0	3	4	3	3
Check	0	0	5	5	0	5
Act	0	0	0	3	2	4

It shows that while some organizations score high maturity levels others have not even applied any of the characteristics of performance management. Below the averages per phase and per organization are presented.





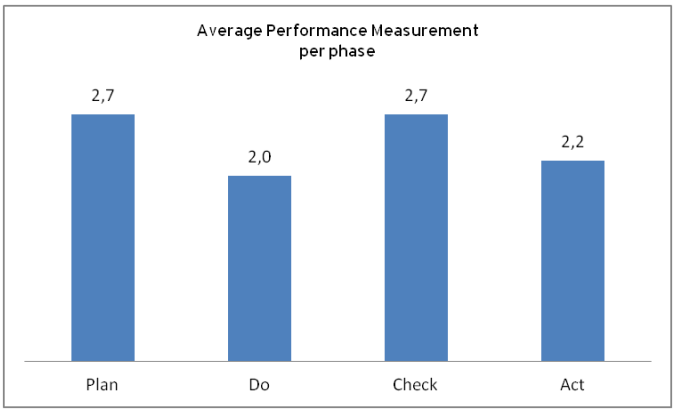
The phases of performance management are quite similar in maturity level, with exception of the act phase. It would be preferable to also have this phase at the level repeatable, because in this phase the basic IT performance management processes are established and provide enough structure to repeat successes achieved earlier. Independent of personal effort allows the organization to document the actual process and identify points of improvement. This enables the organization to start a continuous improvement cycle and more easily get to a higher maturity level, improving its performance management.

When comparing the average results per phase to the average performance management results per organization a different picture emerges. The organizational maturity levels with regards to performance management are quite diverse as only half of the companies have a maturity level of higher than two. Company D has by far the highest maturity level while companies A, B and C are still ad-hoc in their performance management approach. To achieve at least some benefits of IT performance management a level two maturity is necessary as explained above.

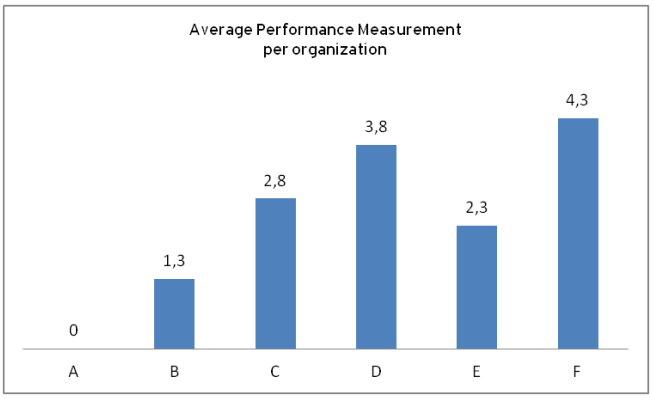
With regards to performance measurement the following distribution of maturity levels was abstracted from section 2.1.1.

Performance measurement	Company A	Company B	Company C	Company D	Company E	Company F
Plan	0	3	3	3	3	4
Do	0	0	2	4	3	3
Check	0	0	3	5	3	5
Act	0	2	3	3	0	5

This overview shows, just as the overview of performance management, that organizations have diverse results when it comes to the maturity levels of performance measurement. Below the averages per phase and per organization are presented.



The phases for performance measurement are not that diverse as they range from 2,0 to 2,7. Differences between the phases, and this also applies to performance management and cost allocation, are influenced by the number of characteristics in the framework. If a phase contains only one characteristic, this characteristic determines the maturity level. If a phase contains different characteristics, the more extreme values are neutralized by the values of the other characteristics. Over time, when new characteristics are added, the large influence of single characteristics on the maturity level will decrease. At that point dependencies between the phases could be identify, which is not possible yet because of the large influence of some of the characteristics.



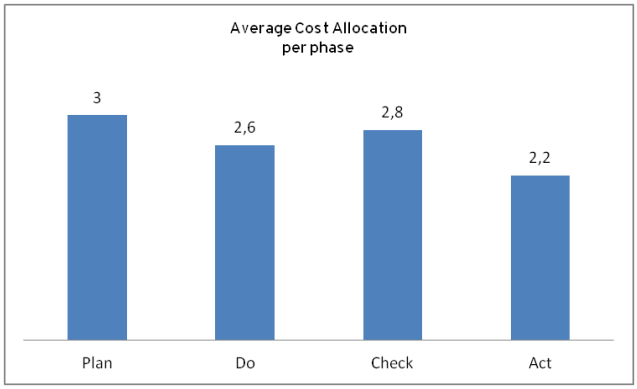
The organizational average performance measurement maturity levels are quite diverse. Where Company F has an achieved the highest maturity level of them all, which is 4,3, company A has applied none of the performance measurement characteristics. When comparing the performance management maturity per company with the performance measurement maturity per company, it shows that company A and B have the lowest maturity levels. Organizations C to F have the higher maturity scores, however for this IT performance management element instead of company D, company F has the highest score of all companies. Organizations that perform well in performance management generally also have a good performance measurement level. This is due to the fact that performance management and performance measurement are somewhat intertwined. KPI construction should be related to organizational goals, therefore to increase the quality of KPIs organizations should enable the connection between performance management, measurement and cost allocation.

The cost allocation overview overview abstracted from the cost allocation overview in section 2.1.1 shows the following averages per organization and phase. As explained before it was not possible to allocate values to the cost allocation characteristics as this subject was not covered in enough detail during the interview. This should be taken into consideration when

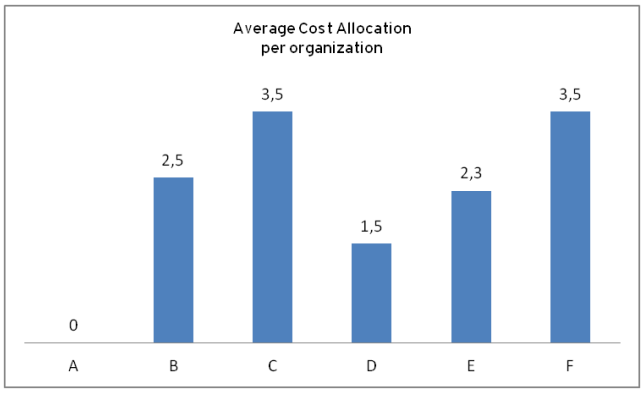
analyzing the averages per phase, as these consist of one less value in comparison with the phases of the other IT performance management elements.

Cost allocation	Company A	Company B	Company C	Company D	Company E	Company F
Plan	N/A	0	5	3	2	5
Do	N/A	2	3	2	3	3
Check	N/A	3	3	1	4	3
Act	N/A	5	3	0	0	3

Analyzing the maturity levels shows that the maturity allocation over the different phases is equally spread. However when compared to the cost allocation overview above it shows that the distribution over the phases and companies is diverse. Where some organizations have a high maturity in the plan phase they do not have such a high maturity level for the other phases. And when looking at company B it shows that this organization has not implemented any of the characteristics of the plan phase, however it has the highest maturity level in the act phase.



This distribution of values become visible when the averages per company for cost allocation are presented, as there is no organization that stands out with a high maturity level. Comparing the cost allocation results per organization shows that in the current situation there is only one organization that has an ad hoc approach. All other companies have a cost allocation process that is repeatable or even documented. Company C and F even have a value that is moving closer to maturity level four. This means that detailed measures of cost allocation are collected, understood and controlled.

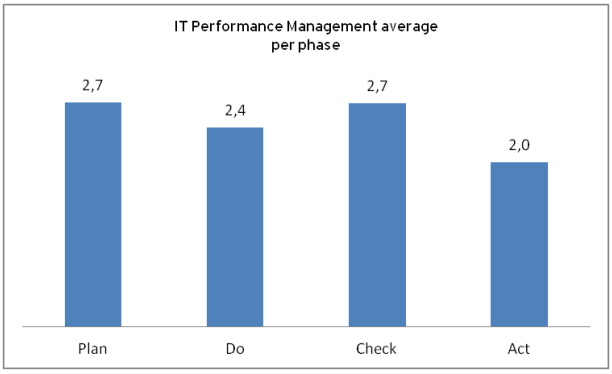


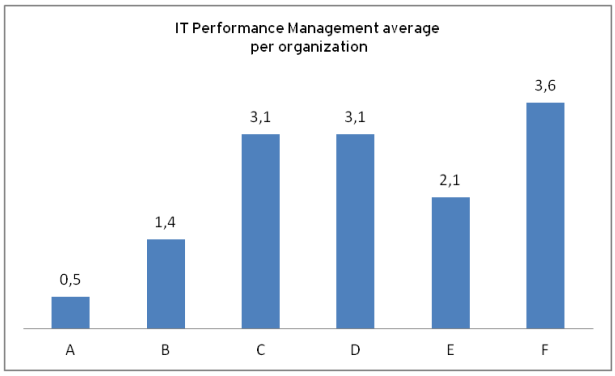
IT performance management average

The figures below present the IT performance management averages for the phases and the organizations. Differences in maturity value between the phases seem equally spread, however the phases plan and check have slightly higher maturity levels. This might indicate that planning and checking results for the IT performance elements is easier than taking actions and acting upon results. Implementing plans is difficult as it requires thorough

understanding of organizational processes and their intertwined relationships. When executing the do phase it could be that the understanding of processes and plans is less present than anticipated on during the plan phase. It could also be that protests only take shape when plans become clear and are going to be implemented. Acting on the results assembled can also be hard, because it requires the translation of an actionplan into actions. Additionally it could be that taking actions is hard, because the plans for the next year are not developed and they need to be considered during the development of actions.

Compared to the somewhat equally distributed averages for the IT performance management phases, the averages per organization are diverse. Three out of six organizations are quite mature, having achieved maturity averages of higher than three. At this maturity level IT performance management process is documented, standardized and integrated into a standard IT performance management process. These processes are used every time an activity related to measurement, management and/or cost allocation is executed.





Even though the IT performance management maturity level of company A, B and E are lower than the other organizations at least organization B and E have maturity level higher than one, showing their IT performance management are established and repeatable, enabling them to start improving their IT performance management maturity in a structured way. Organization A has by far the lowest maturity score, not even reaching level one which means their approach is ad hoc. However it has to be considered that for this organization the cost allocation characteristics could not be rated. Meaning that this average for IT performance management could easily be different when the maturity values for cost allocation were identified.

2.2 *Framework analysis*

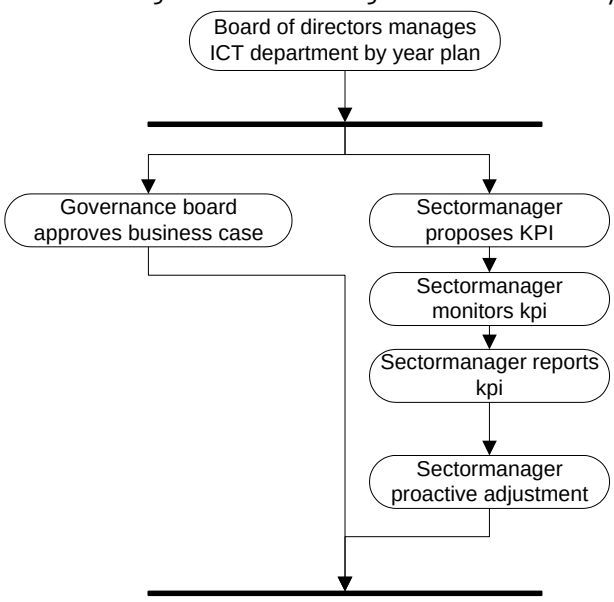
In this section the IT performance management activities for each organization are described. Also potential consequences will be explained when characteristics are not applied or only at a minimum. Also the activities the organizations have with regards to IT performance management are presented. However company B does not have a figure with its activities, as the interview provided no clear set of activities that could be used. The activities showed that not all organizations have a structured approach. Some organizations even seemed to use several loose activities for their IT performance management. The activities presented here will be merged into a process-data diagram in the next section.

2.2.1 Company A

Organization A has only just started to manage its IT performance. This is evidenced by the limited number of characteristics applied. Additionally there is a large amount of characteristics which are not applied yet. The few characteristics the organization is working with are part of the performance management element. This can indicate two things. First the organization has only recently started with performance management and was not able to apply characteristics in the other IT performance management elements. Second, the organization could be focusing only on IT performance management, and might implement the other IT performance management elements later.

Implementing performance management does not require all characteristics in the framework to be applied right away. However some characteristics require other characteristics to be applied first. For example performance management can only be done when the organization is measuring the right things. When an organization wants to perform IT performance management it should develop a plan taking into account the different characteristics. Taking these characteristics into account allows for a broader view when constructing the IT performance management approach. It also enables the identification of potential problem areas. Thinking about how to measure performance and how the organization will allocate IT costs makes way for other activities the organization has to undertake, for a good organization-wide implementation of IT performance management. If an organization has only implemented a few of the characteristics their value might be limited, because related characteristics are not implemented yet. To overcome this the organization should look at which characteristics should to be applied in parallel to strengthen each other.

The performance management activities that company A has defined are presented in the figure on the right. This figure shows that the board of directors steers the ICT department, but sector managers define the KPIs that will be used and report on them. The organization allows managers to be proactive by suggesting adjustments to KPIs when they notice events that require actions.



2.2.2 Company B

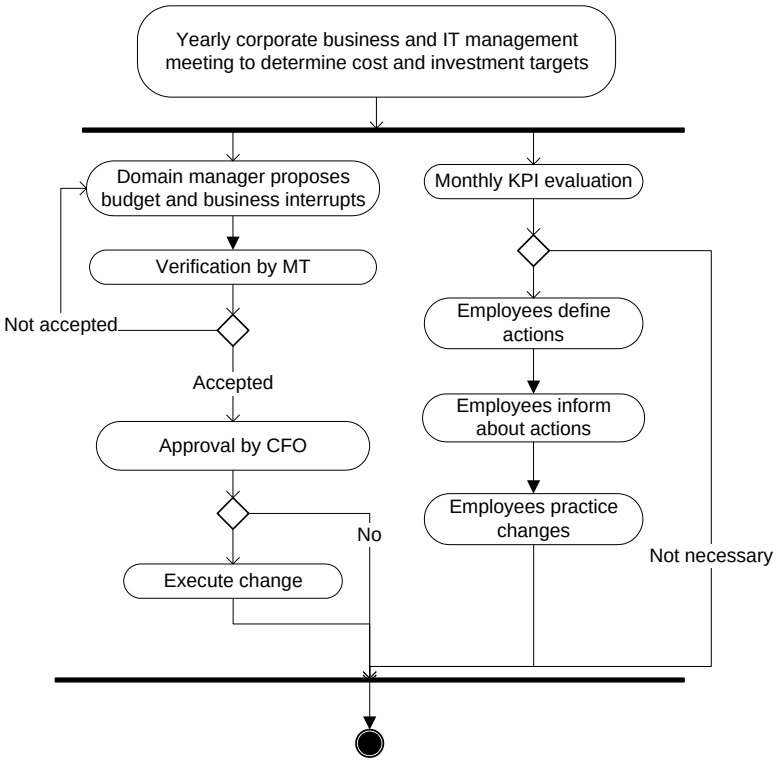
With regard to performance management and cost allocation Company B is applying some characteristics. The current situation has been analyzed and there is a limited number of KPIs. However the organization has applied almost none of the characteristics for IT performance measurement to guarantee a balanced, well-defined and organizational goal based set of KPIs. In addition the KPIs do not cover the financial, customer, internal organization and learning and growth abilities of the organization. This mismatch and the limited scope of performance management prevents an overall view of the organizational IT performance management and

the ability to recognize trends. When an organization does not communicate about IT performance and does not use the performance results to increase performance the organization stays reactive instead of becoming pro-active. Pro-activity allows the organization to respond to changes in the organization sooner and still deliver necessary performance results. With regards to cost allocation, Company B has applied some of the characteristics in the organization. Restructuring and acquiring insight into IT costs would allow the organization to allocate IT costs to the departments which use IT services and govern the IT costs.

2.2.3 Company C

Company C has applied almost all characteristics of performance management at a basic level. The organization uses KPIs which are based upon the critical processes of the organization. This set of KPIs is not multidimensional or well documented. The organization also does not use the performance results to its benefits by, for example, developing IT priorities or increase performance. A balanced and multidimensional set of KPIs which is well defined and where the KPIs are allocated to employees is an essential part of performance management. Managing IT performance requires that the right things are measured.
With regard to cost allocation the organization has a cost center approach and is allocating IT costs to departments which use these services. Also the monthly evaluation of the KPIs allows the organization to closely monitor if KPIs are measuring what they need to measure. A quick win for the organization would be to use performance results to start recognizing trends.

When analyzing the performance management activities of company C it is apparent that the business and IT management develop the goals for the IT department for the following year together. After that has been done the KPIs are proactively monitored by employees who can define actions to adopt KPIs when necessary. In addition to changing current KPIs domain managers also have the possibility to propose budget and business interrupts, which need to be validated by the MT before actual implementation.

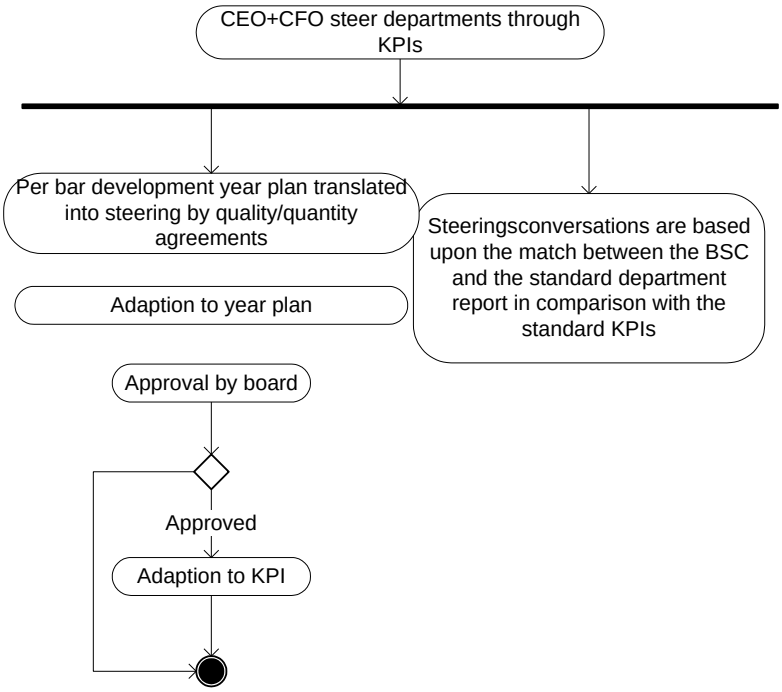


2.2.4 Company D

Performance measurement and management are well arranged at company D, as almost all characteristics are applied. The organization has a balanced scorecard approach. However this

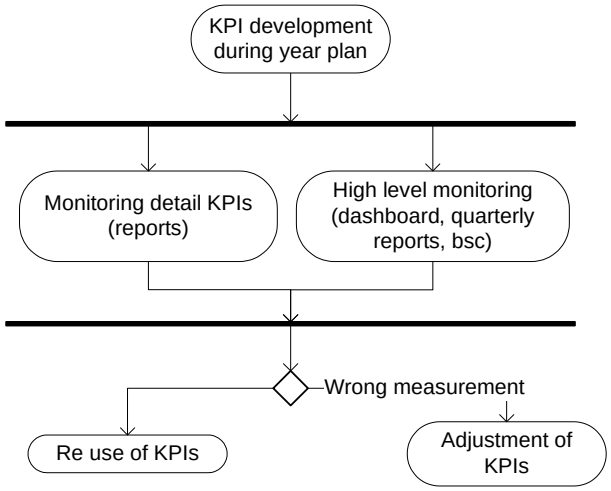
approach does not contain all views and the number of KPIs is limited. KPIs are developed by the CEO and CFO which enables a match with the overall organizational goals. The departments of the organization also develop KPIs which are documented and related processes are mapped to provide insight into how they will be influenced. As the high level KPIs are developed by the CEO and CFO they can easily improve their performance by implementing the missing views and increase the number of KPIs. In Company D KPIs are documented and employees are made responsible for them. Additionally Company D takes into account that employees have to be able to influence the KPIs they are responsible for. This creates commitment as the actions taken by employees affect the KPI. The organization could improve by using their performance results to improve performance and develop new IT priorities. For Company D this would mean improving their cost center approach.
Comparing performance measurement and management to cost allocation shows that cost allocation is less mature. The organization has started to apply some of the characteristics, however it will take some time to get cost allocation at the same level as performance management and measurement.

The performance activities of Company D are that the CEO and CFO together develop and steer the IT department by KPIs. The departments within the organization develop a year plan based on these KPIs and make changes when necessary. Additionally the company has steering conversations, but the actual activities that contribute to this activity are unclear and could not be modeled.



2.2.5 Company E

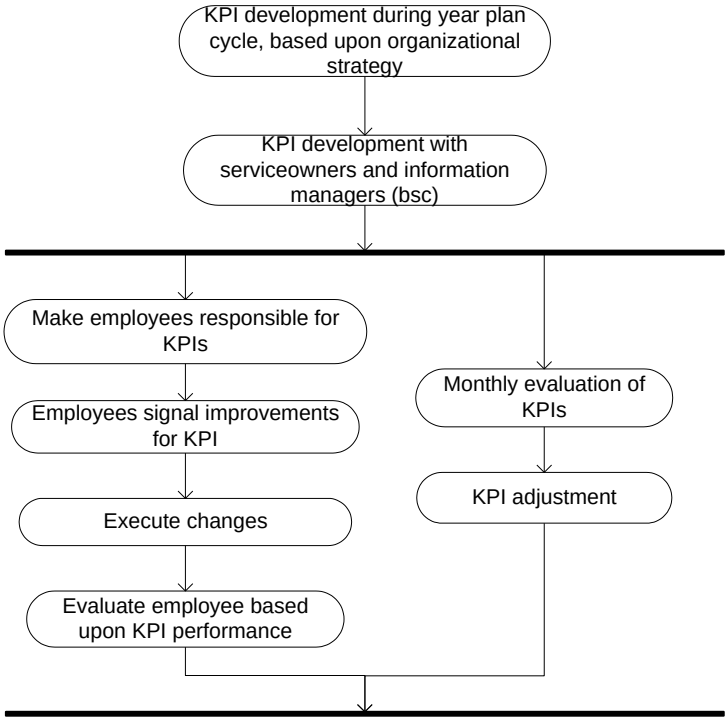
With regards to performance measurement the Company E has applied almost all characteristics. The organization uses a balanced scorecard, which allows for a multidimensional performance measurement framework. The KPIs used are based upon the business plan, however not all KPIs measure what they need to measure. The current performance management results do not result in actions, which allows for improvement. This because when these results are analyzed and it becomes clear that adjustments need to be made to organizational processes, they can be adapted. Analyzing the cost allocation shows that the organization has already implemented the majority of characteristics. Costs are allocated to departments that use the services and there is insight into the cost structure. Suggestions for improvement are to place the costs in a charge model and to create communication channels to enable a good governance structure.



The performance management activities of company E are presented in the figure on the right. The KPIs for the IT department are developed during the year plan. The results of the KPIs are monitored through high and low level monitoring. KPIs are adjusted when they do not measure what they need to measure. Additionally they are reused for the development of the next annual plan.

2.2.6 Company F

The performance measurement and management of Company F are well arranged and the organization has applied almost all characteristics. Within the organization the KPIs are developed during the year plan cycle, together with the organizational plan and themes. KPIs are developed in collaboration with the business units, who subsequently develop KPIs with service owners and information managers. During the corresponding discussions all people involved have the possibility to speak up and performance priorities and corresponding relationships are discussed. The KPIs are documented, employees are made responsible and the performance results influence their bonus. The performance results are also used to adapt KPIs. One area of improvement for Company F would be to have regular meetings to discuss IT performance. This could stimulate organization-wide support.



The organization has also implemented almost all cost allocation characteristics. The first cost allocation approach the organization used, where all costs were allocated to the business, has been replaced by a more suitable one. Now costs are allocated based

upon the number of workplaces and applications used by business units. There is insight into the cost structure and employees are aware of the costs involved with using IT services.

3 Modeling the IT performance management construction

In this section the concepts of IT performance management that were found during the interviews have been gathered and merged into a meta model and process-data diagram. This is done because we want to provide insight into the concepts and activities of ITPM to provide a generic method for ITPM. In this section a metamodel and process-data diagram are presented. The activities from the process-data diagram will be compared with the characteristics retrieved from literature that should be applied when performing IT performance management.

3.1 *Metamodel*

The metamodel presented in figure 12 shows the concepts and relationships between different elements of IT performance management identified during the interviews. A metamodel was chosen as this makes it possible to structure and compare methods and approaches, and in this research performance management approaches are compared. Additionally the metamodel is presented in the form of a process-data diagram to allow for the development of a performance management super method. The super method will contain the performance management activities of all organizations and merge them into one. The goal of developing this super method is to make a performance management method that can be applied by other organizations. The construction of the metamodel is based upon data retrieved from the interviews. After the main elements were abstracted the relationships between the elements were defined and described. The process-data diagram is based upon the performance management activities retrieved from the interviews. These activities are presented in chapter 3, section 1.3. In the process-data diagram these activities were merged into one method. This method will be used to compare the performance management approach from literature with the performance management approach of organizations.

The following IT performance management concepts were retrieved from literature: Organization, Department, Employee, Goal, Organizational Scorecard, Department Scorecard and KPI. These concepts and their relationships are presented below. The relationship between employee and KPI implies that an employee is responsible for zero or more KPIs. Reading the relationship the other way round shows that a KPI can belong to one or more employees.

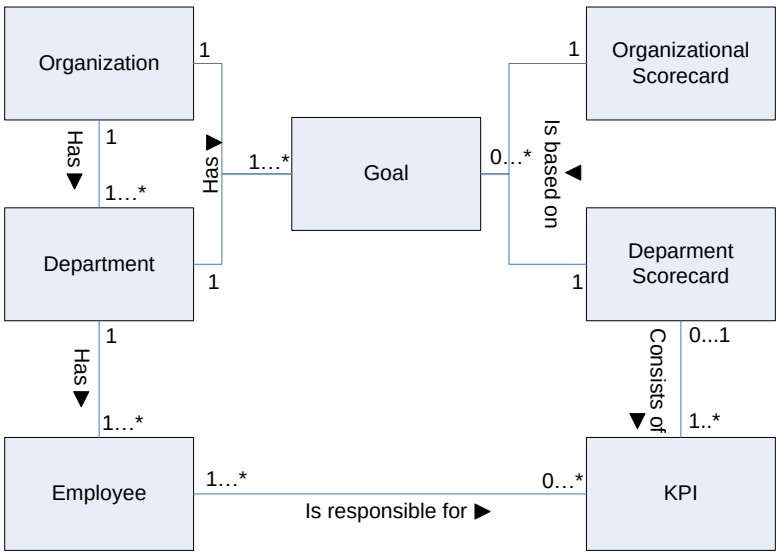


Figure 12 Metamodel IT performance management

After the construction of the process-data diagram a comparison will be made between the metamodel and the process-data diagram to see if all concepts described are also present in the organizational approaches.

3.2 *IT performance management method*

The super method of the activities is presented below. The left side of the process-data diagram contains the activities of the method. On the right side the diagram contains the deliverables of the process diagram. These tables contain all elements in the process-data diagram including a description. For more information on process-data diagrams see Van de Weerd and Brinkkemper (2008).

3.2.1 Description of the method

The process-data side of the process-data diagram consists of three activities: Annual KPI cycle, proactive monitoring and reactive monitoring. These activities were derived from the different sections that could be identified during the development of the process-data diagram. The names are based on the objective of the sub-activities of the activities. In the Annual KPI cycle the KPIs that will be applied during the next year are developed. Some organizations only have organization wide KPIs, while in other organizations departmental KPIs are also developed.

During the proactive monitoring activity employees are allowed to define actions for improvement possibilities they identify. It is also possible to make changes to the organizational KPIs. All changes proposed need to be approved by the board of the organization. Only with this approval can changes be made to KPIs.

In the reactive monitoring activity sub-activities are assigned to employees. Employees do not propose changes to KPIs and employees are evaluated based upon the KPI results. In some organizations the KPI evaluation reports lead to KPI adjustment. Other organizations keep on using these KPIs and change them during the next annual KPI cycle.

The activities of the process-data diagram and corresponding deliverables/ concepts are put into an Activity table and a Concept table, which are presented below. The Activity table contains the Activities and sub-activities including a description. The Concept table contains the different concepts and a description.

Activity table

Activity	Sub-activity	Description
Annual KPI cycle	Development of KPIs during year plan	Based upon organizational goals develop KPIs
	Departmental KPI development	Based upon organizational KPIs develop DEPARTMENTAL KPI
Proactive monitoring	Employee signals improvement	Based upon KPI results employee signals IMPROVEMENTs.
	Employee defines actions	Based upon IMPROVEMENTs the employee defines a REQUEST FOR KPI CHANGE which results in an ACTION.
	Make changes to year plan	Employees can decide to make changes to the year plan, which are defined in a REQUEST FOR KPI CHANGE and result in ACTION.
	Verification actions by board	The organization verifies actions, which result in a verified ACTION.
	Approval by board	Once an ACTION is verified the board can approve the ACTION after which it can be adjusted
	KPI adjustment	After an ACTION is approved the KPI will become a adjusted KPI
Reactive monitoring	Assign responsibility for KPI to employee	KPIs are assigned to employees, which makes them KPI OWNER
	Monitor KPI	During this sub-activity the KPI is monitored and MONITORING RESULTs are gathered
	Evaluation report of KPI	With the MONITORING RESULTs the KPI EVALUATION REPORT is developed
	KPI adjustment	When necessary KPIs will be adjusted during this sub-activity result in an adjusted KPI
	Evaluate employee based upon KPI performance	Based upon the MONITORING RESULTs an EMPLOYEE EVALUTION REPORT will be constructed

Concept table

Concept	Description
KPI	An organizational, departmental or adjusted Key Performance Indicator.
KPI OWNER	An employee made responsible for a KPI
MONITORING RESULT	The results of the KPIs monitored
KPI EVALUATION REPORT	An evaluation report which contains the monitored KPI results
EMPLOYEE EVALUATOR	Someone in the organization who evaluated the performance of employees
EMPLOYEE EVALUATION REPORT	A report used by the EMPLOYEE EVALUATOR which contains the performance results of the employee
REQUEST FOR KPI CHANGE	A request for a KPI change which is suggested by employees. After approval by the board the REQUEST FOR CHANGE can become an approved REQUEST FOR CHANGE.
IMPROVEMENT	An improvement is defined by employees based upon a REQUEST FOR CHANGE

ACTION	An ACTION is based on an approved REQUEST FOR CHANGE and results in an adjusted KPI

Comparing the metamodel to the activities and concepts of the process-data diagram shows that the concepts organization and department are not present in the process-data diagram. This is because the organization and department are the executing parties for the activity "Development of KPIs during year plan" and "Departmental KPI development". Owners of sub-activities are not modeled in a process-data diagram. The organization and department are also the subject of some concepts, but based on data retrieved from the interviews no activities were identified in which the organization and department played an active role.

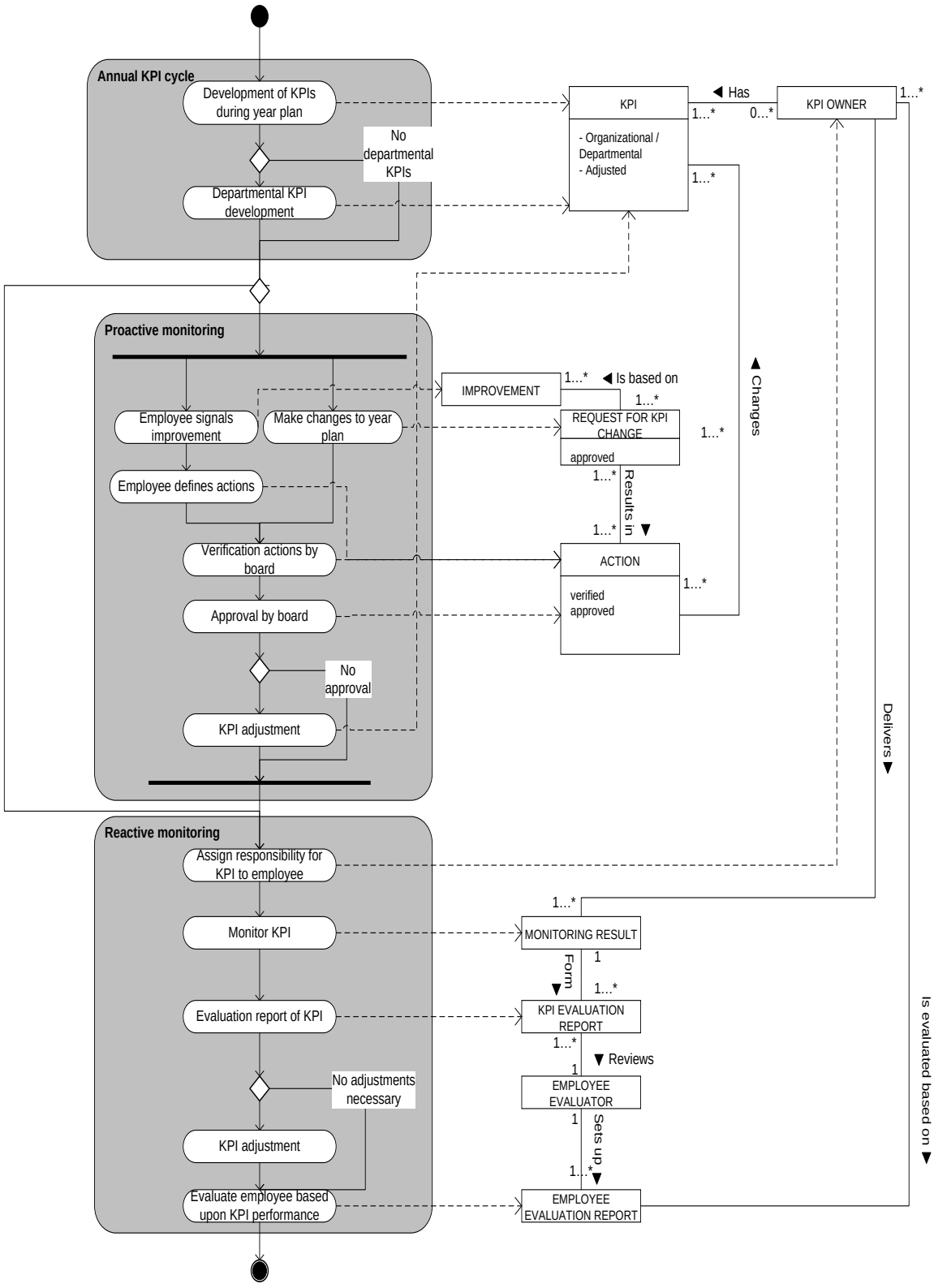


Figure 13 IT performance management process-data diagram

4 Comparing the method to ITPM characteristics from literature

Comparing the process-data diagram and the ITPM characteristics results in two remarkable findings. First of all the process-data diagram consists of three activities, which are Annual KPI cycle, Proactive monitoring and Reactive monitoring. Mapping these on the findings from literature it is apparent that organizations structure their IT performance management process differently. Literature suggests that the IT performance management process consists of the areas IT performance management, IT performance measurement and cost allocation. This difference may result from the fact that there is little scientific literature available on IT performance management approaches and there is only a very limited amount of guidelines available for organizations on how to structure their IT performance management approach.

Second, even though the process-data diagram contains several characteristics from literature most of the characteristics are not applied. This could be due to the fact that literature analysis characteristics come from a scientific point of view and organizations have a more practical approach. There could be additional factors influencing the organizational IT performance management approach that were not considered in scientific research. Additionally in literature is it possible to have two totally separate phases, while in practice there often is a grey area in which phases overlap.
Another possibility is that the processes and organizations do not have a high maturity level and therefore have not implemented all characteristics, as some might not be applicable for lower maturity levels.

Chapter 4 – Research questions and discussion &future research

In this chapter the research questions will be answered based on the results presented in the previous chapters. First the sub-questions will be answered, after which those answers will be used to answer the main research question. After that the discussion and future research will be presented.

5 Research questions

5.1 *What are the business benefits that IT performance management delivers?*

IT performance management allows for the governing of the organization. Applying IT performance management allows for the translation of the mission, vision and strategy of an organization into explicit goals that are organized into four points of view: financial, customer, internal organization and learning and growth abilities of the organization (De Boer, 2002). These four points of view, along with a limited amount of KPIs which address these points of view, result in the benefit of a balanced and multidimensional framework. As the goals are based on the vision and strategy of the organization the framework will also be integrated in the organization (Jack, 2002). Additionally the evaluation of IT performance results provides the business with the benefit of insight into the functioning of processes. This can be used to improve the measurement process and increase performance. Other benefits for the organization are (De Boer, 2002):

- Applying a focus on the realization of strategic, financial and non-financial goals
- Making KPIs explicit and measurable
- The management of prognosis and action oriented reports
- The availability of consistent management information on strategic, tactical and operational level (drill down)
- Using the results as a guideline for intra organizational communication
- Fostering a result-oriented culture/climate
- The possibility to benchmark the organization

Business benefits to be achieved with IT performance management according to the interviewed organizations are the following. Evaluation of performance allows for the recognition of trends which allows organizations to become proactive instead of reactive. Cost allocation enables organizations to create an awareness among its employees about the costs involved with IT activities. Cost allocation results can also be used when determining new budgets. As costs become transparent, organizations can more easily identify where improvements can be made and determine goals for the next year. Additionally organizations acknowledge benchmarking as a benefit that can be obtained when IT performance management is applied.

5.2 *Which Key Performance Indicators are used, why and what are the results?*

With regards to KPIs three organizations use a balanced scorecard approach, albeit partially developed. One organization uses no balanced scorecard approach but developed its own set of KPIs. The other two organizations had no KPIs developed yet. As the KPIs are confidential and make identification of the involved organizations very simple they are not added to this research. However the exact formulation of KPIs is not relevant for this research. It is the elements they cover that are relevant. The organizations that use the balanced scorecard approach explain that they use this approach because they want an overall view of the IT performance results. The results of using a balanced scorecard are an overall view of the IT performance management elements. It is this complete view which allows for good steering.

5.3 *How are these KPIs used to govern the organization?*

The literature study showed that KPI measurement results should lead to actions when abnormal variances, both positive and negative, are registered. Based on these variances actions should be taken and additionally the results should be used to develop new IT priorities. The data gathered during the interviews indicated that not all organizations collect KPI results and register both the positive and negative variances and take corrective actions for these variances. Additionally the majority of the organizations does not use the results to develop new IT priorities. The organizations that do collect the data use it to change KPIs when they do not measure what they need to measure or when they need to be adapted because of changes to the organizational plans. However the results are not used to govern the organization. Therefore with this dataset it has to be concluded that KPIs are almost not used at all to govern the organization. Even though the organizations do not use the KPIs to steer the organization, some of them make employees responsible for KPIs to create commitment at the employees to their KPIs. When an employee is made responsible and when this KPI potentially will influence his/her bonus the employee will closely monitor the KPI. When employees are made responsible and constantly monitor their KPI they can recognize trends and propose necessary adaptions / solutions. This flexible and ad hoc approach can be used by organizations to govern the organization and making it flexible and minimize response time with regard to changes.

5.4 *How are the IT costs allocated to the business?*

The dataset retrieved with the interviews showed that cost allocation has diverse implementation levels. Several of the organizations who engaged in the research have not developed their cost allocation approach and/or have only recently started thinking about how their organization could benefit from cost allocation. In the other organizations cost allocation is applied differently. One organization that recently started with cost allocation is only allocating costs for one role, while another organization that has been applying allocation costs for longer has revised its current approach and moved on to one that is better fitting. The cost allocation approach this organization applied first allocated all costs throughout the business and made employees aware of the costs involved when using IT services. However this approach was overdone and became harmful for the organization as disagreements evolved about prices and services were acquired outside the organization. The new approach the organization has suits the organization much better, but this is also based on the fact that employees are already aware of the costs involved when they use IT services, making them

use these services more consciously. The other organizations apply cost allocation by using an approach where costs are allocated based on cost price or on the usage of applications and number of workplaces a department has. This allows for the easy recognition of costs, including potentially hidden costs or the location of expensive processes and optimization of them to reduce costs.

5.5 *How do companies achieve and optimize the benefits of IT performance management?*

The process-data diagram, shown in figure 13, presents the approach organizations use to achieve and optimize the benefits of IT performance management. This process-data diagram shows that only a few of the organizations use their performance results of the previous year when developing their new year plan. Even though using performance results could be of use to the organization to identify problem areas or processes that could be improved. Using performance results is done to achieve and optimize the benefits of IT performance management. Benefits of IT performance management could also be achieved when organizations use their performance results to develop new IT priorities, however currently none of the organizations use these results to increase their performance. It seems that organizations are not aware that these results could also be used to improve IT performance management, or they do not know how to as it has not yet been done. Organizations also try to achieve benefits from IT performance management by letting making employees responsible for KPIs and letting them identify and suggest improvements and adaptions to KPIs. These improvements and adaptions are always approved by the board of the organization to make sure they match with the organizational approach. Also cost allocation is used to achieve benefits of IT performance management by making employees aware of the costs involved with IT. Also cost allocation can contribute to the benefit of IT performance management as budgets are allocated to departments forcing them to think about what IT can mean to their department and the plan required to realize these potential benefits. Based on the dataset gather during this research it can be said that the organizations are not mature enough to optimize their IT performance management benefits, as they have not yet been able to develop a loop back into the IT performance management cycle to use the results to their benefit.

6 Discussion

When looking critically at the research there are some points that require attention. First of all as the literature study and interviews were conducted in parallel some characteristics from literature were not mentioned sufficiently during the interviews to be able to provide a description of how they were implemented. This was the case with the budgeting characteristics, which were insufficiently covered during the interviews and therefore had to be excluded from the framework. This risk was known at the beginning of the research and a measure was taken to have an elaborate interview to cover as much detail as possible. However it turned out that even this elaborate interview did not cover all elements in detail. As the response time of several of the companies was long it was decided not to send out additional questionnaires.

The second point of attention is the processing of the interviews. The time span of 1,5 hours proved to be too short to answer all questions. A measure was taken to prevent that research

questions had to be answered with an incomplete set of answers by sending the questionnaire back with the request to answer the remaining questions, however this was not successful. A solution to this situation would be a combination of the answer to the previous point. In this situation the interviewer first develops the questionnaire and engages in more interviews at the participating organizations. This would prevent dependence on the participating organizations to return the questionnaire and would speed up the process.

7 Future research

The deliverables of this research are the starting point for follow-up research in the area of IT performance management. We recommend that future research addresses the development and identification of new IT performance management characteristics for more accurate determination of how organizations achieve and optimize the benefits of IT performance management. Additionally the IT performance management framework should be updated, so it can serve as a checklist for organizations to determine their IT performance management maturity level. This could be done by conducting more interviews with companies. However the amount of research and commitment with regards to the interviews needs to be made more explicit to the participating companies. When this is clear to all parties involved the participating organizations would understand better what the timely response of required data would mean to the research. As the framework and super method are based on the results retrieved from these interviews. With more interviews the framework can be supplemented with characteristics applied by organizations that have proven to be of value for the IT performance management process. This data can also be used to determine whether the characteristics from literature are applicable in real life situations, or only in situations presented in literature where there are no environmental factors that have an influence. If necessary characteristics from the framework may need to be removed. The data retrieved from more interviews can also be used to supplement the super method that was developed during this research. New activities can be identified and merged into the process-data diagram. Subsequently the process-data diagram can be improved by deleting activities that prevent a good IT performance management approach.

The combination of the IT performance management framework and the IT performance maturity model could be used as the basis for a quantitative study to identify relations between the maturity scores of the different elements of the framework.

Literature

Alvarez, M., Binkley, E., Bivens, J., Highers, P., Poole, C., Walker, P. (1990). Case-based instructing and learning: An interdisciplinary project. *Proceedings of 34yth Annual Conference*, 2-18, College Reading Association. Reprint.

Andra, S. (2006). Action-Oriented Metrics for IT Performance Management. *Cutter IT Journal, 19*(4), 17-21.

Banks, R.L., Wheelwright, S.C. (1979). Operations versus strategy – trading tomorrow for today, *Harvard Business Review,* 112-120.

Barocci, T.A., Wever, K.R., Tessier, D.A. (1983). I/S charge-out systems: options and personnel implications, *Working paper (Sloan School of Management)*, 1479-1483.

Basili, V. (1995). The Experience Factory and its Relationship to other Quality Approaches, *Advances in Computers*, 41, Academic Press

Bhimani, A., Horngren, C.T., Datar, S.M., Foster, G. (2008). *Management and cost accounting*. Essex: Pearson Education Limited.

Brereton, P., Kitchenham, B., Budgen, D., Li, Z. (2008) Using a Protocol Template for Case Study Planning, *Conference Proceedings of EASE 2008 Business Excellence*, Vol. 5 No 2, p. 6-12.

Brownell, P. (1983). The motivational impact of management-by-exception in a budgetary context. *Journal of Accounting Research*, 21, 456-472.

Brynjolfsson, E., Hitt, L. **(**1995). "Information Technology as a Factor of Production: The Role of Differences Among Firms." *Economics of Innovation and New Technology*. *3(4)*, 183-200.

Camp, R.C. (1989). Benchmarking – the search for Industry Best Practices that Lead to Superior Performance, Milwaukee: ASQS Quality Press.

Carlsson, E., Schurmman, A. (2004). Management control in Shared Service Centers – How to influence people in the striving towards organizational goals, Zweden: Linköpings University.

Cavaye, A.L.M. (1996). Case study research: a multi-faced research approach for IS. *Information Systems Journal, 6*(3), 227-242

Chandi, R. (2009). *Key Performance Indicators – Measuring Performance in the Oil and Gas EPC Industry*. Delft: Delft University of Technology.

Darke, P., Shanks, G., Broadbent M. (1998) Successfully completing case study research: combining rigour, relevance and pragmatism. *Information Systems Journal, 8(4)*, 273-289.

De Boer, J.C. (2002). Het dashboard van de ICT-manager, Compact 2002/3, 9-15.
De Haes, S., Van Grembergen, W. (2004). IT Governance and Its Mechanisms, *Information Systems Control Journal, 1*.

Dekkers, T. (2004) IT Governance requires performance measurement, Kwaliteit Op Maat retrieved on 25-06-2010 from http://www.kwaliteitopmaat.nl/Images/PSQT2004%20IT%20Governance%20requires%20performance%20measurement_tcm158-35896.pdf

Dymond, K.M. (1997). *A Guide to the CMM*. Maryland: Process Inc US.

Eccles, R.G. (1991). The Performance Measurement Manifesto, *Harvard Business Review*, January-February, 131-137.

Eisenhardt, K.M. (1989) Building theories from case study research. *Academy of Management Review, 14*(4), 532-550.

Finding, K. (2004). Measuring IT Performance. *IT Alignment in Higher Education,* volume 3, 103-114.

Glaser, B.G., Strauss, A. (1967) *The Discovery of Grounded Theory: Strategies of Qualitative Research*. London: Weidenfeld &Nicholson.

Globerson, S. (1985). Issues in developing a performance criteria system for an organisation, *International Journal of Production Research, 23*(4), 639-646.

Hallikainen, P., Frisk, E., Eikebrokk, T.R., Hu, Q., Päivärinta, T., Nurmi, A. (2006). The Use of Formal It Investment Evaluation Methods in Organizations: A Survey of European Countries. *Proceedings of the Twelfth America Conference on Information Systems*, Mexico, 528-535.

Hayes, R.H., Abernathy, W.J. (1980), Managing our way to economic decline, *Harvard Business Review,* 67-77.

HCI (2010), Retrieved from http://www.hci.com.au/hcisite3/toolkit/pdcacycl.htm#Plan-Do-Check-Act on 09-12-2010

Heschl, J. (2004). CobiT in Relation to Other International Standards, *Information systems control journal, 4*, 37-40.

Hevner, A.R., March, S.T., Park, J. (2004). Design Science in Information Systems Research, *MIS Quarterly, 28*(1), 75-105.

IT Governance Institute. (2007) CobiT 4.1, ITGI, retrieved on 25-06-2010 from http://www.isaca.org/Knowledge-Center/cobit/Pages/Downloads.aspx

ITPMG (2006). IT Performance Management – What is your IT organization's readiness?, *IT Performance Management Group,* Conneticut.

Jack, A.T (2002). ValueMapping-A second generation performance measurement and performance management solution", Conference paper, Performance Measurement Association, Boston.

Jansen, S., Brinkkemper, S. (2008). Applied Multi-Case Research in a Mixed-Method Research Project: Customer Configuration Updating Improvement. In A.C. Steel & L.A. Hakim (Eds.), Information Systems Research Methods, Epistemology and Applications.

Kang, H., Bradley, G. (2002). Measuring the performance of IT services: An assessment of SERVQUAL, *International Journal of Accounting Information Systems, 3*(3), 151-164.

Kaplan, B., Duchon, D. (1988). Combining Qualitative and Quantitative Methods in Information Systems Research: A Case Study. *MIS Quarterly, 12*(4), 571-586.

Kaplan, R., Norton, D. (1996). *The balanced scorecard: translating a strategy into action*. Boston: Harvard Business School press.

Kaplan, R.S., Norton, D.P. (1992). The balanced scorecard – measures that drive performance, *Hardvard Business Review,* 71-79.

Keynote (2005). Score High on Business Scorecards. Monitor What Matters. *Keynote*. Retrieved June 28, 2010, from http://www.keynote.com/docs/whitepapers/ScoreHighBusScore_MonitorwhatMatters.pdf

Korthals Altes, A. (2005) Meer dan zomaar centraliseren, *fiNext Wrup Up,* najaar 2005.

Krakar, Z., Žgela, M., Tomić Rotim, S. (2008). CobIT – Framework for IT Governance – Analysis and experience, FOI, retrieved 25-06-2010 from www.foi.hr/CMS_home/znan_strucni_rad/konferencije/IIS/2007/papers/T03_05.pdf

Lagsten, J., Goldkuhl, G. (2008). Interpretative IS Evaluation: Results and Uses, *Electronic Journal of Information Systems Evaluation*, 11*(2)*, 97-108.

Lomerson, W.L., Tuten, P.M. (2005). Examining Evaluation Across the IT Value Chain. *Proceedings of the 2005 Southern Association of Information Systems Conference*, Savannah, GA, USA, 124-129.

Maimbo, H., Pervan, G.: Designing a case study protocol for application in IS research. In Chau, P., ed.: Proceedings of the Ninth Pacic Asia Conference on Information Systems (PACIS'05), Hong Kong (2005) 1281- 1292.

Martinsons, M., Davison, R., Tse, D. (1999). The balanced scorecard: a foundation for the strategic management of information systems. *Decision Support Systems, 25*(1), 71-88.

Miles, M., Huberman, A.M. (1984). *Qualitative data analsysis*. Beverly Hills CA: Sage Publications.

Miles, M., Huberman, A.M. (1994). *Qualitative data analsysis: An Expanded Source Book*. 2nd edn, Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, december 1999, *Waarom prestatie-indicatoren falen* (Handreikingen externe verzelfstandiging), Den Haag

Mulders, M. (2007). *75 Managementmodellen*. Groningen/Houten: Wolteres-Noordhoff.

Neely A., Adams C. and Crowe P., (2001), "The Performance Prism in Practice", *Measuring*

Neely, A (1999). Performance measurement revolution: why now and what next?, *International Journal of Operations & Productions Management, 19*(2), 205-228.

Neely, A., Richards, H., Mills, J., PLatts, K, Bourne, M. (1997), *Designing Performance Measures: a Structured Approach*, in International Journal

Neely, A.D., Gregory, M., Platts, K. (1995). Performance measurement system design: a literature review and research agenda, *International Journal of OPerations and Production Management, 15*(4), 80-116.

Noor, H.B.M. (2008) Case Study: A Strategic Research Methodology, *American Journal of Applied Sciences, 5*(11), 1602-1604.

Patton, M.Q. (2002). *Qualitative research and evaluation* (3rd ed.). Thousand Oaks, CA: Sage.

Paulk, M.C., Curtis, B., Chrissis, M.B., Weber, C.V. (1993). Capability Maturity Model, Version 1.1., *IEEE Software*, 10*(4)*, 18-27.

Petri, R. (2008). *Budgettering*.

Rawsthorne, P. (2008) Case Study Research – as important now than ever. *Rawsthorne*. Retrieved April 13, 2010, from: http://www.rawsthorne.org/bit/medit/ed6610/docs/PeterRawsthorne.CaseStudyReseach.pdf

Read, T. (2009). The IT value network – from IT investment to stakeholder value.New Jersey: Hoboken.

Remenyi, D., Money, A., Sherwood-Smith, M. (2000). *The effective measurement and management of IT costs and benefits*, Oxford: Butterworth-Heinemann

Remmers, W., de Jager-de Windt, N. (2005). Labels en Shared Service Center op Gespannen Voet?, Whitepaper Magnitude Consulting

Rouyet-Ruiz, J. (2008). COBIT as a Tool for IT Governance: between Auditing and IT Governance, Upgrade – The European Journal for the Informatics Professional, 9(1), 40-43.

Schmenner, R.W. (1988). Escaping the black holes of cost accounting, *Business Horizons,* 66-72.

Seddon, P.B., Graeser, V., Willcocks, L.P. (2002). Measuring Organizational IS Effectiveness: An Overview and Update of Senior Management Perspectives, *The DATA BASE for Advances in Information Systems, 33*(2), 11-28.

Shewhart, W.A. (1931). Economic control of quality of manufactured product.

Simonsson, M., Johnson, P., (2006). Assessment of IT Governance – A prioritization of Cobit-, Proceedings of the Conference on Systems Engineering Research, Los Angeles, USA.

Skinner, W. (1974). The decline, fall and renewal of manufacturing, *Industrial Engineering,* 32-38.

Son, S., Weitzel, T., Gladyszewski, T. (2006). Assessing the influence of management control on IT performance – An empirical analysis. *LSE Department of Information Systems,* Retrieved June 28, 2010, from http://is2.lse.ac.uk/asp/aspecis/20060086.pdf

Son, S., Weitzel, T., Laurent, F. (2005). Designing a Process-Oriented Framework for IT Performance Management Systems. *The Electronic Journal Information Systems Evaluation, 8*(3), 219-228.

Soy, S. (1997) The Case Study as a Research Method, *Ischool*, Retrieved April 21, 2010, from http://www.ischool.utexas.edu/~ssoy/usesusers/l391d1b.htm

Strikwerde, J. (2003). *Shared Service Centers*. Van kostenbesparing naar waardecreatie. Den Haag: Van Gorcum/SMS.

Swager, J. (2008). Shared Service Center Charges – Een onderzoek naar het verantwoordelijkheidsgevoel van de business voor Shared Service Center Charge, *Handboek Management Accounting*. (pp c1425-c1425-33).

Tellis, W. (1997) Introduction to Case Study. *The Qualitative Report, 3*(2). Available: http://www.nova.edu/ssss/QR/QR3-2/tellis.html.

Turban, E., McLean, E., Wetherbe, J. (2001). *Information Technology for Management – Making Connections for Strategic Advantage*. USA: John Wiley & Sons, Inc.

Turney, P.B.B., Anderson, B. (1989) Accounting for continuous improvement, *Sloan Management Review, 30*(2), 37-48.

Tuten, P.M. (2009). A Model for the Evaluation of IS/IT investments, dissertation.

Van Grembergen, W. (2000). The balanced scorecard and IT governance, *Information Systems Control Journal* (previously *IS Audit & Control Journal*), 2, 40-43.

Van Grembergen, W., De Haes, S., Moons, J. (2005). Linking Business Goals to IT Goals and CobiT Processes, *Information Systems Control Journal, 4*.

Van Grembergen, W., Van Bruggen, R. (1998): Measuring and improving corporate information technology through the balanced scorecard, Electronic Journal of Information Systems Evaluation, 1(1).

Van Grembergen, W., Van Bruggen, R., (1997). Measuring and improving corporate information technology through the balanced scorecard technique, *Proceedings of the Fourth European Conference on the Evaluation of Information Technology, Delft,* October, 163-171.

Venkatraman, N. (1997). Beyond Outsourcing: Managing IT Resources as a Value Center. *MIT Sloan Management Review, 38*(3), 51-64.

Venkatraman, N. (1998) Not fixing technical bugs but creating business value. *European Management Journal, 16*(5), 573-585.

Verner, J.M., Toraskar, K.V., Brown, R. (1996). Information systems chargeout: a review of current approaches and future challenges, *Journal of Information Technology, 11*(2), 101-117.

Weerd, I. van de, Brinkkemper, S. (2008). Meta-modeling for situational analysis and design methods. In M.R. Syed and S.N. Syed (Eds.), *Handbook of Research on Modern Systems Analysis and Design Technologies and Applications (pp. 38-58).* Hershey: Idea Group Publishing.

Weill, P., Woodham, R. (2002). *Don't Just Lead, Govern: Implementing Effective IT Governance* (4237-02). Cambridge USA, MIT Sloan School of Management.

Weill, P., Woodham, R. (2003) Don't Just Lead, Govern: Implementing Effective IT Governance, *MIT Sloan School of Management Working Paper; 4237-02*, 326.

Wettstein, T; Kueng, P. (2002). A Maturity Model For Performance Measurement Systems, *Management Information Systems*, 113-122.

Wiggers, P., Kok, H., de Boer – de Wit., M. (2004). IT performance management, Burlington: Elsevier Butterworth-Heinenmann.

Willcoks, L. (1994) Information management – The Evaluation of Information Systems, London: Chapman and Hall.

Yin, R.K. (1994). Case Study Research: Design and Methods, 2nd edn. Thousand Oaks: Sage Publications, Thousand Oaks.

Yin, R.K. (2009). *Case Study Research – Design and Methods.* Thousand Oaks: SAGE Publications.

Zainal, Z. (2007). Case study as a research method. *Jurnal Kemanusiaan, 9,* 1-6.

Zee, H. van der (1996) In search of the value of Information Technology, Disseration

Annex 1 – Planning overview

Project phase	Activities	Milestones/ Deliverables	Week (cumulative)
1) Starting up	Creating work plan. Appointment with all supervisors for work plan approval Preparation for research execution phase by making appointments with clients of Ernst and Young	Work plan Approved work plan List of clients List of 1st appointments	6 to 11
2) Literature research and interviews	Create interview Write research approach Develop case study protocol Execute literature research Make (preliminary) conceptual model 2nd interview 3th interview Collect date Write discussion and conclusion	Interview Research approach Case study protocol Related work chapter (Preliminary) conceptual model Preliminary results Results Processed data Discussion and conclusion	12 to 45
4) Thesis document	Writing the final thesis document (1st and 2nd version) Find conference to send paper in to Write paper	Thesis document Conference Paper	46 to 52

Annex 2: One pager

IT Performance Management

Introduction

In todays' economic turmoil, organizations have fewer resources available for their supporting functions including IT. The pressure on receiving 'optimal value for every Euro spent' is therefore increasing. For this reason, organizations focus on optimizing performance and removing non value adding activities. IT performance management is the area of setting goals (budgeting and target setting), responsibility accounting, and monitoring / analyzing / governing / improving the performance of IT.

IT performance management comes in various shapes and sizes and should be custom-fit to the organizational needs in order to optimize goal congruence and cultural fit.

Research objectives

This investigation will focus on the development of practical improvement guidelines regarding IT Performance Management. The main research question is:

"How do companies achieve and optimize the benefits of IT Performance Management?"

Sub-questions that will be answered include:

a. Which Key Performance Indicators are used, why, and what are the results?

b. How is the IT Performance governed?

c. How are the IT costs allocated to the business?

d. What are the results (tangible/intangible) that IT Performance Management delivers to a company?

Your participation

The research questions will be answered by a comparison based on the case-study of several Dutch companies in the pension fund sector. This sector is **chosen because it is 'IT intensive'.**

We are currently looking for participants in this research to show us how they handle their IT Performance Management. The anticipated investment will be participating in 2 meetings, one with the IT controller and one with the CIO. The total maximum investment is therefore estimated at approximately 3 hours.

What is in it for you?

This research is not an investment only. The results will provide you with insights in leading practices from other companies and with opportunities to improve IT Performance Management. We will be happy to provide you with the results (sanitized for confidentiality reasons) in a clear overview and a full report (anticipated Q4 of 2010).

The research team consists of the following people:

- Suzanne Haanappel
- Dr. Roel Drost (E&Y)
- Prof. Dr. Frank Harmsen (E&Y)
- Prof. Dr. Sjaak Brinkkemper (UU)
- Dr. Ir. Johan Versendaal (UU)

For questions or suggestions, you can contact us at 06-[redacted] or e-mail:
suzanne.haanappel@nl.ey.com

ERNST & YOUNG
Quality In Everything We Do

Universiteit Utrecht

Annex 3: Questionnaire IT Controller

Vraag 1: Wat is de context van IT binnen de organisatie?

1. Is er sprake van 1 centrale IT afdeling binnen de organisatie?
2. Wordt IT binnen het bedrijf gezien als kostenpost of investment center?
3. Wordt er op decentraal of centraal niveau beslissingen genomen met betrekking tot de IT? (wie is hiervoor verantwoordelijk?)
4. Maakt u gebruik van bepaalde technieken om uw Performance te managen? (Zo ja, welke?)
5. Wat wil het bedrijf bereiken in de komende jaren waarvoor IT van belang is?
6. Welk strategisch voordeel denkt u met IT te kunnen behalen t.o.v. uw concurrenten?

Vraag 2: Welk doel wordt er door uw organisatie nagestreefd met het gebruik van IT performance management?

1. Hoe lang bent u al bezig met ITPM?
    a) 1-5 jaar
    b) 6- 10 jaar
    c) 11 – 15 jaar
    d) langer, namelijk……
2. Wat verwacht u van ITPM en de bijbehorende resultaten?
   (voorbeelden kunnen zijn: kostenbesparing, verbeteren van IT prestaties, sturen van de organisatie beoordelen van medewerkers op prestaties, verbeteren medewerkertevredenheid, vergemakkelijken communicatie van de strategie)
3. Wat zijn volgens u de verbeteringen die binnen uw bedrijf zouden kunnen worden doorgevoerd aan het ITPM proces?
4. Het volwassenheidsniveau van ITPM binnen mijn organisatie is hoog?
    a. Sterk mee oneens
    b. Oneens
    c. Eens
    d. Sterk mee eens

Vraag 3: Welke Key Performance Indicatoren worden gebruikt, waarom en wat zijn de resultaten?

1. Waarop is het ontwikkelingsproces van de KPIs gebaseerd?
2. Hoe zorgt u ervoor dat KPIs bruikbaar zijn om zaken te meten die van belang zijn voor de organisatie om gemeten te worden?
3. Wat zijn de rollen en verantwoordelijkheden van de eigenaars en de KPIs?
4. Hoe vaak worden KPIs geëvalueerd en is dat volgens u de ideale frequentie?

Vraag 4: Wat is de plaats van IT Performance Management in de business?

1. Is het budget voor IT Performance Management onderdeel van het algemene IT budget?
2. Wie maakt er gebruik van de IT diensten die u aanbiedt?
    a) alleen medewerkers (intern)
    b) ook externen
    c) beide
3. Worden er kosten gerekend voor deze diensten, worden deze kosten gealloceerd naar de business?
4. Waarop wordt dit tarief gebaseerd (naar rato)?
5. Wat voor cost-drivers zijn er en hoeveel tarieven worden er gebruikt?
6. Wordt er activity-based costing of department costing gebruikt?

Vraag 5: Hoe wordt IT performance management binnen uw organisatie gebruikt om de organisatie aan te sturen?

1. Wat gebeurt er met resultaten die voortkomen uit de IT Performance Management, vindt er bijvoorbeeld monitoring plaats?
2. Wie analyseert de resultaten en wat voor type analyse wordt gebruikt?
3. Wat is de reactie vanuit de business als er een afwijkende waarde wordt gemeten?
4. Wordt ITPM meegenomen in de beoordeling van de werknemers met betrekking tot behaalde resultaten? (hoeveel tijd zit hierin, invloed op beloning/prestatiebeloning)
5. Wat levert ITPM uw bedrijf op, zowel op financieel als niet-financieel gebied?

Annex 4: Questionnaire CIO

Vraag 1: Wat is de context van IT binnen de organisatie?

1. Is er sprake van 1 centrale IT afdeling binnen de organisatie?
2. Wordt IT binnen het bedrijf gezien als kostenpost of investment center?
3. Wordt er op decentraal of centraal niveau beslissingen genomen met betrekking tot IT (wie is hiervoor verantwoordelijk)?
4. Wat wil het bedrijf bereiken in de komende jaren waarvoor IT van belang is?
5. Welk strategisch voordeel denkt u met IT te kunnen behalen t.o.v. uw concurrenten?
6. Wat zijn de kritieke succesfactoren? (bijvoorbeeld integriteit, continuïteit)

Vraag 2: Hoe zorgt u ervoor dat IT efficient en effectief is?

1. Met betrekking tot beoordeling, maakt u gebruik van benchmarking en activity based costing om uw IT efficiënt en effectief te laten zijn?
2. Met betrekking tot sturing:

- Wat doet u met betrekking tot de architectuur?
- Wat doet u met betrekking tot portfolio management?
- IT balanced scorecard/performance management?

Vraag 3: Welk doel wordt er door uw organisatie nagestreefd met het gebruik van IT performance management?

1. Wat verwacht u van ITPM en de bijbehorende resultaten?
   (Voorbeelden van eventuele resultaten kunnen zijn: Kostenbesparing/ verbeteren van IT prestaties / sturen van de organisatie/ beoordelen van medewerkers op prestaties/ verbeteren medewerkertevredenheid/ vergemakkelijken communicatie van de strategie)
2. Wat zijn volgens u de verbeteringen die binnen uw bedrijf zouden kunnen worden doorgevoerd aan het ITPM proces?
3. Het volwassenheidsniveau van ITPM binnen mijn organisatie is hoog?
   a. Sterk mee oneens
   b. Oneens
   c. Eens
   d. Sterk mee eens

Vraag 4: Welke Key Performance Indicatoren worden gebruikt, waarom en wat zijn de resultaten?

1. Waarop is het ontwikkelingsproces van de KPIs gebaseerd?
2. Hoe zorgt u ervoor dat KPIs bruikbaar zijn om zaken te meten die van belang zijn voor de organisatie om gemeten te worden?
3. Wat zijn de rollen en verantwoordelijkheden van de eigenaars en de KPIs?
4. Hoe vaak worden KPIs geëvalueerd en is dat volgens u de ideale frequentie?

Vraag 5: Hoe wordt IT performance management binnen uw organisatie gebruikt om de organisatie aan te sturen?

1. Wat gebeurt er met resultaten die voortkomen uit de IT performance management? Vindt er bijvoorbeeld monitoring plaats?
2. Wie analyseert de resultaten en wat voor type analyse wordt gebruikt?
3. Wat is de reactie vanuit de business als er een afwijkende waarde wordt gemeten?
4. Wordt ITPM meegenomen in de beoordeling van de werknemers met betrekking tot behaalde resultaten? (hoeveel tijd zit hierin, zowel invloed op financieel als niet-financieel gebied?

Annex 5: Frameworks organization A, B, D and F

Company A

Performance management

Phase	Characteristic	Applied in organization
Plan	Elements that should be considered during performance management are planning, controlling, costing, directing and decision-making.	PM process is in development
	Performance management should be executed through planning and control, metrics, measurements, KPIs, financial indicators and service levels.	Not for the IT department
	Performance management requires good insight into the organizational processes.	Begin has been made
	Performance management should contain both the operation and business side of IT.	Not applicable
	Before making changes to the performance management approach the current situation should be clear and understood.	In development
Do	The vision and strategy should be translated into concrete goals which should be organized based four points of view; Financial, customer, internal organization and learning and growth abilities of the organization.	Only at high level and not applicable for the IT department.
	The IT performance of the organization should be discussed during regular meetings.	No regular meetings
Check	Business objectives should be met.	No business objectives determined
Act	Reward employees based on the KPIs they are responsible for	Not applicable
	Use results for the development of new IT priorities	Not applicable
	Use performance management results to increase performance	Not applicable
	Control or measure the performance based on a benchmark	No monitoring

Performance measurement

Phase	Characteristic	Applied in organization
Plan	Replace intuition by facts	In development, no formal approach yet
	Performance measurement frameworks need to be balanced, multidimensional (BSC), comprehensive and integrated	Not present yet
	Use a strategic and balanced set of KPIs to plan, implement, operate and monitor the strategies, functions and processes of	Not present yet

	the organization. Measurement frameworks should be complemented by performance measurement techniques and improvement initiatives based on the requirements and goals of the organization Performance measurement should be based on the current strategy and can include metrics that anticipate on future goals for the organization.	 No measurement framework for IT performance Not done yet
Do	Performance measurement requires a mixed approach to measure both financial and non-financial aspects Management teams need to be explicit about their performance priorities and corresponding relationships Measure performance by using performance measures that support critical business processes Performance criteria should be well-defined Task and responsibilities with regard to the flow of information should be explicit. Performance measures should reflect the requirements and goals of the organization	Not available for ITPM Not done Not done for ITPM Not done Not applicable Not done yet, so not applicable
Check	The measurement system needs to be aligned with the company's goals to reward people in proportion to their performance on the measures that are important	No official measuring
Act	Performance measurement results require actions Methods for taking new performance measures should evolve as the company's experience increases	Not applicable Not applicable

Cost allocation

Phase	Characteristic	Applied in organization
Plan	The SSC should be based upon the business planning A clear hierarchy and explicit responsibilities should be in place There should be a buyer and seller in the form of an IS and user department	All not applicable because there is no cost allocation
Do	Internal allocation is needed to gain acceptance and success of the SSC The costs made by the SSC are allocated to departments who use the services	

	The elements that make the costs are placed in a charge model The IT environment architecture should be developed and activities identified Employees should get support from the business All parties involved should participate in the business case to create commitment to the changes that will come Communication channels and committees should be created to guarantee a good governance structure	
Check	Insight into the cost structure is needed to manage the relationship with customers There should be management by exception where both favorable and unfavorable variances get attention. Favorable and unfavorable variances should be analysed.	
Act	Corrective actions based upon the variances found in the Check-phase should be launched	

Company B

Performance management

Phase	Characteristic	Applied in organization
Plan	Elements that should be considered during performance management are planning, controlling, costing, directing and decision-making. Performance management should be executed through planning and control, metrics, measurements, KPIs, Financial indicators and service levels. Performance management requires good insight into the organizational processes. Performance management should contain both the operation and business side of IT. Before making changes to the performance management approach the current situation should be clear and understood.	In development Limited amount of KPIs No insight in processes No performance management Analysis of current situation
Do	The vision and strategy should be translated into concrete goals which should be organized based four points of view; Financial, customer, internal organization and learning and growth abilities of the organization.	Not applicable yet

	The IT performance of the organization should be discussed during regular meetings.	No regular meetings
Check	Business objectives should be met.	Not applicable
Act	Reward employees based on the KPIs they are responsible for	In development
	Use results for the development of new IT priorities	Not done yet
	Use performance management results to increase performance	Not done
	Control or measure the performance based on a benchmark	No benchmark yet

Performance measurement

Phase	Characteristic	Applied in organization
Plan	Replace intuition by facts	Done by measuring
	Performance measurement frameworks need to be balanced, multidimensional (BSC), comprehensive and integrated	No BSC yet
	Use a strategic and balanced set of KPIs to plan, implement, operate and monitor the strategies, functions and processes of the organization.	No strategic/balanced set of KPIs
	Measurement frameworks should be complemented by performance measurement techniques and improvement initiatives based on the requirements and goals of the organization	Not applicable
	Performance measurement should be based on the current strategy and can include metrics that anticipate on future goals for the organization.	KPIs are not based on the strategy
Do	Performance measurement requires a mixed approach to measure both financial and non-financial aspects	Not applicable
	Management teams need to be explicit about their performance priorities and corresponding relationships	Not applicable
	Measure performance by using performance measures that support critical business processes	Not done
	Performance criteria should be well-defined	Not defined yet
	Task and responsibilities with regard to the flow of information should be explicit.	Not defined yet
	Performance measures should reflect the requirements and goals of the organization	No defined performance measures
Check	The measurement system needs to be aligned with the	Not applicable

	company's goals to reward people in proportion to their performance on the measures that are important	
Act	Performance measurement results require actions Methods for taking new performance measures should evolve as the company's experience increases	Just analysis Not applicable

Cost allocation

Phase	Characteristic	Applied in organization
Plan	The SSC should be based upon the business planning A clear hierarchy and explicit responsibilities should be in place There should be a buyer and seller in the form of an IS and user department	No Unknown Not applicable
Do	Internal allocation is needed to gain acceptance and success of the SSC The costs made by the SSC are allocated to departments who use the services The elements that make the costs are placed in a charge model The IT environment architecture should be developed and activities identified Employees should get support from the business All parties involved should participate in the business case to create commitment to the changes that will come Communication channels and committees should be created to guarantee a good governance structure	Very limited internal allocataion Only costs for projectleaders are allocated. Additionally departments pay the costs for the first year when a project is executed. No charge model Only reactive Not yet In development Not done yet
Check	Insight into the cost structure is needed to manage the relationship with customers There should be management by exception where both favorable and unfavorable variances get attention. Favorable and unfavorable variances should be analysed.	No insight into cost structure When abnormal values are detected an analyses is always conducted Both variances are analysed
Act	Corrective actions based upon the variances found in the Check-phase should be launched	Yes.

Company D

Performance management

Phase	Characteristic	Applied in organization
Plan	Elements that should be considered during performance management are planning, controlling, costing, directing and decision-making.	Within the organization measures are taken to guarantee the functioning of performance management. There are guidelines which should be executed when is a change with regards to the original plan. When an department wants to take a different path the ultimate responsible is the board. In addition employees are made responsible for KPIs.
	Performance management should be executed through planning and control, metrics, measurements, KPIs, Financial indicators and service levels.	The planning comes from high in the organization and is applied on the different bars. For each bar quality and quantity deals are made which should be accomplished. This while taking into account that KPIs need to be impressionable by employees.
	Performance management requires good insight into the organizational processes.	KPIs within the IT department are documented and related processes are mapped, allowing insight in how these processes will be influenced.
	Performance management should contain both the operation and business side of IT.	Both aspects are covered, but not very broad.
	Before making changes to the performance management approach the current situation should be clear and understood.	Yearly a new plan is developed, but it is unknown if the previous plan is taken into account. Responsibilities are granted to lower departments.
Do	The vision and strategy should be translated into concrete goals which should be organized based four points of view; Financial, customer, internal organization and learning and growth abilities of the organization.	The organization uses a BSC which contains the views: financial, internally, customer and employee
	The IT performance of the organization should be discussed during regular meetings.	The organization uses reports to communicate IT performance
Check	Business objectives should be met.	The organization uses KPIs which can be influenced by controllers, who can take actions to achieve the objectives. Because there are also standards these steps allow for an optimal fit between business

		objectives and ITPM, which facilitates realization.
Act	Reward employees based on the KPIs they are responsible for	Employees are responsible for KPIs which they can influence
	Use results for the development of new IT priorities	These results are not used for the development of new IT priorities
	Use performance management results to increase performance	Results are not used to adjust the system
	Control or measure the performance based on a benchmark	KPIs are used to measure performance

Performance measurement

Phase	Characteristic	Applied in organization
Plan	Replace intuition by facts	Is done
	Performance measurement frameworks need to be balanced, multidimensional (BSC), comprehensive and integrated	The BSC does not contain all views. The views contain a minimum of KPIs.
	Use a strategic and balanced set of KPIs to plan, implement, operate and monitor the strategies, functions and processes of the organization.	The board steers the bars on fixed KPIs. The board steers executing departments primary on the achievement of efficiency goals, while the assigner steers on the achievement of made quality/quantiy deals.
	Measurement frameworks should be complemented by performance measurement techniques and improvement initiatives based on the requirements and goals of the organization	Currently there is a measurement framework and is performance measured, this should become more pro-active instead of reactive
	Performance measurement should be based on the current strategy and can include metrics that anticipate on future goals for the organization.	The organizational approach is based on cost saving approach. It is unknown if results of the framework are used for improvement initiatives.
Do	Performance measurement requires a mixed approach to measure both Financial and non-financial aspects	There is a BSC approach, without learning aspect.
	Management teams need to be explicit about their performance priorities and corresponding relationships	The board steers executing departments on the achievement of efficiencygoals. The lower departments develop agreements

		for quantity/quality agreements made.
	Measure performance by using performance measures that support critical business processes	Unknown
	Performance criteria should be well-defined	Elaborate documentation available
	Task and responsibilities with regard to the flow of information should be explicit.	Employees are made responsible for KPIs and this is documented.
	Performance measures should reflect the requirements and goals of the organization	Is done as KPIs are developed by the CEO/CFO
Check	The measurement system needs to be aligned with the company's goals to reward people in proportion to their performance on the measures that are important	Is done, also because employees are only responsible for KPIs they can influence.
Act	Performance measurement results require actions	Not developed
	Methods for taking new performance measures should evolve as the company's experience increases	Is already done as KPIs are used which employees can influence

Cost allocation

Phase	Characteristic	Applied in organization
Plan	The SSC should be based upon the business planning	In development.
	A clear hierarchy and explicit responsibilities should be in place	Not available
	There should be a buyer and seller in the form of an IS and user department	Available
Do	Internal allocation is needed to gain acceptance and success of the SSC	In development
	The costs made by the SSC are allocated to departments who use the services	In development
	The elements that make the costs are placed in a charge model	No
	The IT environment architecture should be developed and activities identified	Unknown
	Employees should get support from the business	There is support
	All parties involved should participate in the business case to create commitment to the changes that will come	Is not done, because decisions are made top down
	Communication channels and committees should be created to guarantee a good governance structure	Applicable

Check	Insight into the cost structure is needed to manage the relationship with customers	In development
	There should be management by exception where both favorable and unfavorable variances get attention.	Not done
	Favorable and unfavorable variances should be analysed.	Not done
Act	Corrective actions based upon the variances found in the Check-phase should be launched	Not done

Company F

Performance management

Phase	Characteristic	Applied in organization
Plan	Elements that should be considered during performance management are planning, controlling, costing, directing and decision-making.	KPIs are developed during the yearplancycle together with the organizational plan and themes.KPIs are developed together with the units, who develop KPIs together with serviceowners and information managers of the organization.
	Performance management should be executed through planning and control, metrics, measurements, KPIs, Financial indicators and service levels.	Is done. During decision moments the balance between OE and CI is analyzed to determine what to do well and what to do average.
	Performance management requires good insight into the organizational processes.	The talk about the KPIs enables discussion which allows contradictory opinions to arise.
	Performance management should contain both the operation and business side of IT.	Yes
	Before making changes to the performance management approach the current situation should be clear and understood.	There is a continuous search for aspects where performance improvement can be made.
Do	The vision and strategy should be translated into concrete goals which should be organized based four points of view; Financial, customer, internal organization and learning and growth abilities of the organization.	The organization uses the BSC.
	The IT performance of the organization should be discussed during regular meetings.	No meetings
Check	Business objectives should be met.	The organization takes an approach which allows for the best possible fit between business objectives and ITPM to enable the realization of

		these objectives.
Act	Reward employees based on the KPIs they are responsible for	Is done
	Use results for the developmentof new IT priorities	Unknown
	Use performance management results to increase performance	The measurement results are used to adapt KPIs, it is unknown if processes are adapted.
	Control or measure the performance based on a benchmark	Is done

Performance measurement

Phase	Characteristic	Applied in organization
Plan	Replace intuition by facts	Is done
	Performance measurement frameworks need to be balanced, multidimensional (BSC), comprehensive and integrated	The organization has a BSC
	Use a strategic and balanced set of KPIs to plan, implement, operate and monitor the strategies, functions and processes of the organization.	Is done by elaborate internal discussion
	Measurement frameworks should be complemented by performance measurement techniques and improvement initiatives based on the requirements and goals of the organization	The organization misses improvement initiatives
	Performance measurement should be based on the current strategy and can include metrics that anticipate on future goals for the organization.	Applicable. The goal of the IT department is to support the business when achieving strategic goals.
Do	Performance measurement requires a mixed approach to measure both Financial and non-financial aspects	No BSC approach on ITPM level
	Management teams need to be explicit about their performance priorities and corresponding relationships	Is done by the extensive communication process during the development of KPIs
	Measure performance by using performance measures that support critical business processes	Unknown
	Performance criteria should be well-defined	Yes, in documentation
	Task and responsibilities with regard to the flow of information should be explicit.	Yes, agreed upon

	Performance measures should reflect the requirements and goals of the organization	Realized with the KPI development process
Check	The measurement system needs to be aligned with the company's goals to reward people in proportion to their performance on the measures that are important	Within the IT department employees are rewarded based on their KPI results
Act	Performance measurement results require actions Methods for taking new performance measures should evolve as the company's experience increases	Yes, when not KPIs are adapted Concurrent analysis is adaption of KPIs is necessary

Cost allocation

Phase	Characteristic	Applied in organization
Plan	The SSC should be based upon the business planning A clear hierarchy and explicit responsibilities should be in place There should be a buyer and seller in the form of an IS and user department	During the year plan development the plan for the IT department is developed, taking into consideration this plan. Applicable Both present
Do	Internal allocation is needed to gain acceptance and success of the SSC The costs made by the SSC are allocated to departments who use the services The elements that make the costs are placed in a charge model The IT environment architecture should be developed and activities identified Employees should get support from the business All parties involved should participate in the business case to create commitment to the changes that will come Communication channels and committees should be created to guarantee a good governance structure	Type of costallocation is available Yes Unknown Done Done Done Unknown
Check	Insight into the cost structure is needed to manage the relationship with customers There should be management by exception where both favorable and unfavorable variances get attention. Favorable and unfavorable variances should be analysed.	There is insight in the cost structure There is management by exception for negative variances The negative variances are analysed
Act	Corrective actions based upon the variances found in the Check-phase should be launched	There are corrective actions for the negative variances