Performance measurement of IT investments.

Master thesis

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Summary

The IT function in organizations is under pressure to proof how they realize value for the business. IT Governance is often seen as a solution for this issue. IT Governance consists of the leadership and organizational structures and processes that ensure that the enterprise its IT sustains and extends its strategies and objectives.

An important part of IT governance is performance measurement. In this research I focus on performance measurement of the portfolio of IT investments. This results in the following research objective.

Provide knowledge and insight into required performance measurement of IT investments, needed to support the board and executives in controlling and directing IT investments.

To realize this objective, the research has been carried out in two phases, a desk research and a field research phase.

1. In the desk research, first the existing literature is explored (chapter 2) where after a theoretic model is developed for measuring performance of IT investments (chapter 3).
2. The field research was carried out by testing the model and scoring organizations based on the model (chapter 4). Based on the results recommendations & conclusions are given (chapter 5).

Existing literature

Performance measurement of IT investments should be realized in the form of a multidimensional system of performance measures. A balanced scorecard should be used for this purpose.

IT investments are defined as significant business investments in sustaining, growing or transforming the business with a critical IT component. Different categories of IT investments can be distinguished. There are non-discretionary (mandatory, needed to comply with regulations and sustaining current business) and discretionary ("free" investments to improve current business). In general there is a portfolio of IT investments in an organizations, which consists of different programmes and projects, where programmes are a set of multiple projects.

Besides cost, time and quality of the end product (iron triangle) success of investments also depends on the quality of the project process as well as the effects of the project's final product or service, known as product success. This is supported by a BSC. The business contribution and customer orientation perspective show product success (outcomes of the

portfolio, programmes and projects); the operational excellence perspective shows process quality. Additionally, the future orientation perspective shows the readiness of the IT function for future demands, the basis for future investments.

Performance measurement is part of the overall governance framework of leadership, roles & responsibilities, organizational structures & processes and information requirements.

The board and executives are responsible for directing and controlling the IT function. For doing this they need information about the performance of the IT function and thus performance measurement. And for performance measurement to be useful, a plan-do-check-act cycle needs to be in place, requiring the right processes, structures and responsibilities and thus a complete IT governance framework in place to monitor the measures and act upon them.

Performance measurement of IT investments in theory

Based on existing literature an IT Investment BSC has been developed. The IT Investment BSC consists of four perspectives:

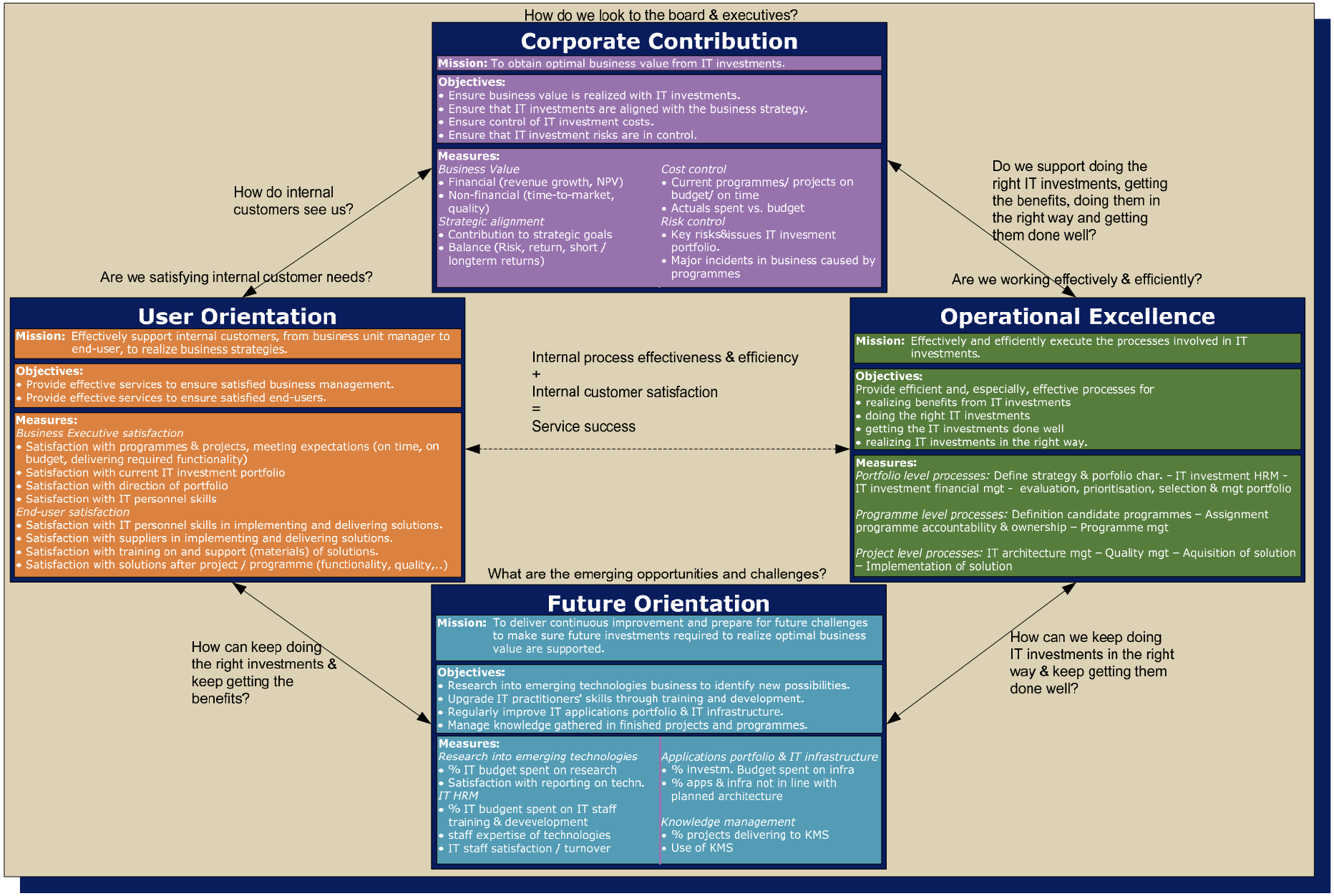
- *Corporate Contribution perspective*
  The Corporate Contribution perspective represents the view of the board and executives on performance of IT investments.
- *User Orientation perspective*
  The User Orientation perspective addresses the performance of the IT function from the viewpoint of internal customers.
- *Operational Excellence perspective*
  The Operational Excellence perspective focuses on the performance of internal processes related to IT investments.
- *Future Orientation perspective*
  The Future Orientation perspective addresses the readiness of the IT function for future IT investments.

As in practice the status and realization of performance measurement of IT investments will differ, three main context factors are identified that may influence this:

- the composition of the IT investment portfolio (what types of investments);
- the size of the IT investment budget (portfolio size and complexity);
- the maturity of IT governance (based on ITGI's IT governance maturity model).

Also, different possible issues in design, implementation and use are identified that organizations may encounter in practice.

An overview of the IT Investment BSC is shown on the next page.


How do we look to the board & executives?
Corporate Contribution
Mission: To obtain optimal business value from IT investments.
Objectives:
• Ensure business value is realized with IT investments.
• Ensure that IT investments are aligned with the business strategy.
• Ensure control of IT investment costs.
• Ensure that IT investment risks are in control.
Measures:
Business Value
• Financial (revenue growth, NPV)
• Non-financial (time-to-market, quality)
Strategic alignment
• Contribution to strategic goals
• Balance (Risk, return, short / longterm returns)
Cost control
• Current programmes/ projects on budget/ on time
• Actuals spent vs. budget
Risk control
• Key risks&issues IT invesment portfolio.
• Major incidents in business caused by programmes
How do internal customers see us?
Do we support doing the right IT investments, getting the benefits, doing them in the right way and getting them done well?
Are we satisfying internal customer needs?
Are we working effectively & efficiently?
User Orientation
Mission: Effectively support internal customers, from business unit manager to end-user, to realize business strategies.
Objectives:
• Provide effective services to ensure satisfied business management.
• Provide effective services to ensure satisfied end-users.
Measures:
Business Executive satisfaction
• Satisfaction with programmes & projects, meeting expectations (on time, on budget, delivering required functionality)
• Satisfaction with current IT investment portfolio
• Satisfaction with direction of portfolio
• Satisfaction with IT personnel skills
End-user satisfaction
• Satisfaction with IT personnel skills in implementing and delivering solutions.
• Satisfaction with suppliers in implementing and delivering solutions.
• Satisfaction with training on and support (materials) of solutions.
• Satisfaction with solutions after project / programme (functionality, quality,..)
Internal process effectiveness & efficiency
+
Internal customer satisfaction
=
Service success
Operational Excellence
Mission: Effectively and efficiently execute the processes involved in IT investments.
Objectives:
Provide efficient and, especially, effective processes for
• realizing benefits from IT investments
• doing the right IT investments
• getting the IT investments done well
• realizing IT investments in the right way.
Measures:
Portfolio level processes: Define strategy & porfolio char. - IT investment HRM - IT investment financial mgt - evaluation, prioritisation, selection & mgt portfolio
Programme level processes: Definition candidate programmes – Assignment programme accountability & ownership – Programme mgt
Project level processes: IT architecture mgt – Quality mgt – Aquisition of solution – Implementation of solution
What are the emerging opportunities and challenges?
Future Orientation
Mission: To deliver continuous improvement and prepare for future challenges to make sure future investments required to realize optimal business value are supported.
Objectives:
• Research into emerging technologies business to identify new possibilities.
• Upgrade IT practitioners' skills through training and development.
• Regularly improve IT applications portfolio & IT infrastructure.
• Manage knowledge gathered in finished projects and programmes.
Measures:
Research into emerging technologies
• % IT budget spent on research
• Satisfaction with reporting on techn.
IT HRM
• % IT budgent spent on IT staff training & devevelopment
• staff expertise of technologies
• IT staff satisfaction / turnover
Applications portfolio & IT infrastructure
• % investm. Budget spent on infra
• % apps & infra not in line with planned architecture
Knowledge management
• % projects delivering to KMS
• Use of KMS
How can keep doing the right investments & keep getting the benefits?
How can we keep doing IT investments in the right way & keep getting them done well?

Performance measurement of IT investments in practice

In the field research, 8 large organizations were put to the test. CIO's and/or portfolio managers were asked to fill in a survey. After the survey they were interviewed to verify survey results and to go into more detail into striking results from their survey.

The field research addressed the context of organizations, the performance measures of the IT Investment BSC (what is measured?, how important?) and the relevance of the possible issues identified in literature. Often (although initially not intended) also governance structures and processes were discussed.

From the survey data and interviews it came forward that the Operational Excellence and Future Orientation perspective are not actually measured. But ratings of those perspective do provide insight in status of relevant internal processes and aspects that drive future readiness.

Case analysis

Analysis of the specific cases showed a large difference between organizations in maturity concerning governance structures and processes and available and used performance measures. Three maturity categories were identified: **Starters**, **Followers** and **Leaders**.

- **Starters** are currently starting to think about governance practices and measurement concerning their IT investment portfolio but do not have much formal measurement and governance and involved internal processes implemented yet. Concerning the Operational Excellence perspective and User Orientation perspective, there is some insight in costs and risks and some insight in internal customer satisfaction. Internal processes (from the Operational Excellence perspective) are overall not very well implemented. Also in the Future Orientation perspective all four topics are not covered very well.
- **Followers** are currently improving their governance practices and measurement of their IT investment portfolio, but still have some work to do to reach an acceptable baseline of measures and maturity, governance and other internal processes. Governance structures and processes have often been formalized to some extend, but there are not much formal processes for performance measurement and projects and programmes are managed in different ways, there is not much standardization. In the Corporate Contribution perspective there is quite good coverage of Cost control and Risk control. Strategic alignment is often realized by making a long-term portfolio planning that supports the business goals. In the User Orientation perspective, there is some insight in the internal customer satisfaction of business management and end-users, though often not formally measured. The internal processes in the Operational Excellence perspective are performed reasonably well. In the Future Orientation

perspective there are some small issues concerning Knowledge management and Research into future technologies.

- **Leaders** are clearly in front concerning the measurement of their IT investment portfolio, but also with their governance practices and the maturity of other internal processes involved. They have formalized governance structures and processes. Measurement procedures and project management have often been standardized. Most of the measures in the Corporate Contribution perspective are well covered. , There is good insight in costs (budgets, actuals, progress), risks and (financial) business value while alignment with strategic goals is done quite well. In the User Orientation perspective there is quite well insight in the internal customer satisfaction of business management and end-users, although not always formally measured. Internal processes in the Operational Excellence perspective are performed well by the leaders but still small improvements can be made. In the Future Orientation perspective especially the existing IT architecture is something that is not always considered ready for the future.

General analysis

The findings in the general analysis are in line with the above. In general, only the Corporate Contribution perspective and User Orientation perspective are measured to some extent. The averages show quite high standard deviations, pointing out large differences between organizations, in line with the three 'maturity' groups found in the case analysis. Cost control and Risk control are best measured on average and can be seen as the first basic measures an organization should cover. Business value and Strategic alignment are only covered by the leaders.

In general the opinion in organizations is that there is quite good insight in Business management satisfaction and End-user satisfaction. But in a lot of organizations there is no formal measurement (i.e. with an annual survey) of internal customer satisfaction and especially the evaluation of projects and programmes is something organizations would like to improve.

The averages in the Operational Excellence perspective and Future Orientation perspective give a view on the extent to which organizations have covered the different processes and topics mentioned. Looking at the effectiveness of internal processes, the Portfolio level processes are quite well performed in general. General points for improvement are:

- management of resources across the portfolio;
- the clearness of business cases;
- availability of metrics for tracking the business case
- availability of programme performance information;
- the use of standards and best practices for project management

- post-implementation review of projects and programmes
- quality management
- efficiency in acquisition and implementation of solutions

Concerning the future readiness of organizations for future IT investments, of main importance are the state of the existing IT architecture and IT human resources, which vary a lot in the different organizations.

Relevance of the identified issues and the IT Investment BSC

Most issues where experienced at least to some extent by the participating organizations. In design, linking of strategy to measures is experienced to be difficult when the strategic goals of the business are non-financial or if different stakeholders have different priorities. The Definition of non-financial measures is an important issue if the portfolio consists of a lot of projects (i.e. strategic, informational) with no hard financial goals.

In implementation of performance measures there is in general not much IT to support performance measurement which is not considered to be a problem. Organizations actually using applications for this experience a lot of difficulties in getting project managers to use it in the right way and do not get much useful data out of systems. Top-management proves to be an issue in a lot of organizations, but the matter seems to get more and more priority in organizations.

In design but especially in use, getting the data for the measures is a major problem in most organizations, as are resistance, misunderstanding and reliability.

In general all items in the IT Investment Balanced scorecard are considered important and based on the interviews the IT Investment BSC can be considered quite complete. There are no items that should be removed from the IT Investment BSC. One possible addition could be the Human resource capacity in the Corporate Contribution perspective as often the lack of central insight in human resource availability and in bottlenecks was mentioned as an issue. Although the items in the Operational Excellence perspective and Future Orientation perspective proved to be useful for analysing the cases, the question is if these performance drivers will and should actually be measured. For now it is unclear if these are just irrelevant or if measuring those is a next step in maturity of measurement. The research shows that the IT Investment BSC provides a good starting point for discussing about these key KPIs.

Relation with context factors

As stated before, there is a clear positive correlation between IT governance maturity and the use of measures in the different perspectives of the IT Investment BSC. Higher maturity is related to higher ratings for the use of measures, meaning that Corporate Contribution and

User Orientation are more actively measured and monitored and there is better performance Operational Excellence and Future Orientation.

No relations were found between maturity and the relevance of issues, between the different portfolio compositions and measures (use & importance) and between IT investment budget and use and importance of measures.

Recommendations & conclusion

In general the IT Investment BSC proved to be relevant, with high ratings for importance for all measures. Only small improvements can be made. Human resource capacity should be added to the Corporate Contribution perspective. It is unclear if measuring the performance drivers in the Operational Excellence perspective and Future Orientation perspective is a next step in maturity or not very useful at all. The IT Investment BSC proves to be a good starting point for discussing about performance measurement of IT investment,

Organizations should primarily focus on establishing complete measurement of the outcomes in the Corporate Contribution and User Orientation perspective. Concerning the Operational Excellence and Future Orientation perspective, some key performance drivers that are particularly important for an organization may be measured. But organizations should make sure the internal processes in the Operational Excellence perspective are well implemented and that attention is paid to the important aspects in the Future Orientation perspective. Additionally, it came forward that it makes no sense to measure if there are no right structures and processes to use these measures. Therefore organizations need to ensure proper governance structures and processes are in place.

Recommendations on measurement

Based on this research a maturity model has been developed for performance measurement of IT investments. Organizations are recommended to follow the roadmap described by this model. The maturity model can be found on the next page.

	Starters	Followers	Leaders
Corporate Contribution	• Complete picture of all projects and programmes in the portfolio. • Insight in costs and risks of major programmes and projects. • Cost control: budgets. • Risk control: major issues.	• Complete insight for all projects and programmes in Cost control, Risk control and Human resource capacity. • Cost control: budgets, actuals and progress • Risk control: major issues. • Human resource capacity: planned, needed & available resources. • Strategic alignment is realized by making long-term IT strategy plans	• Complete insight in Cost control, Risk control, Human resource capacity, Business value and Strategic alignment. • Cost control: budgets, actuals and progress • Risk control: major issues, impact on business operations. • Human resource capacity: planned, needed & available resources. • Business value: financial benefits. • Strategic Alignment with business goals monitored & balance monitored i.e. risk vs. benefit, short vs. long-term.
User Orientation	• Insight in internal customer satisfaction but not formally measured.	• Annual measurement of internal customer satisfaction.	• Annually measured internal customer satisfaction of business managers & end-users concerning IT operations & IT projects/ programmes. Follow-up actions via plan-do-check-act cycle. • Formal evaluation of large / important projects & programmes.
Operational Excellence	• Business involved in IT strategy planning & high-level portfolio budgeting & monitoring. • Budget approval by executive management for new IT investments required.	• Regular meetings for evaluation, prioritization and selection of (new) investments in portfolio based on qualitative analysis. • Planning of human resource capacity across portfolio. • Basic business case and business owner required for new initiatives. • Programme management based on regular basic performance reports. • New initiatives are reviewed by IT architecture board.	• Evaluation, prioritization and selection of (new) investments based on quantitative analysis. • Detailed business case required with clear metrics for tracking, on which is regularly reported. • Standardized project / programme management (i.e. PRINCEII). • Post-implementation review of large projects. • Formal quality management of IT investments. • Effectiveness and efficiency of implementation and design monitored.
Future Orientation	• The existing IT architecture may not support future IT investments. • The capabilities of IT human resources may not be sufficient for future IT investments. • Knowledge management is not formally implemented. • There is limited insight in emerging technologies.	• Up-to-date IT architecture, ready for future investments. • Stable base of capable IT human resources for future IT investmens.	• Up-to-date IT architecture, ready for future investments. • Stable base of capable IT human resources for future IT investmens. • Formal procedures for Knowledge management, facilitated by an KM-application. Lessons learned, project deliverables and contact persons (of finished projects) are available. • Knowledge about emerging technologies is kept up-to-date.

Recommendations on issues

Some best practices were identified in the research to prevent and / or overcome issues in design, implementation and use

- *Do not start from scratch*
  Use a performance measurement framework to make sure the system of performance measures is complete and structured. The IT Investment BSC seems to be a good starting point for performance measurement of IT investments.
- *Have a clear business strategy and approach*
  Have clear strategic business goals as a basis. Also commitment of top-management is essential to increase the level of commitment and willingness to take the lead in setting up performance measurement.
- *Standardize and formalize*
  Use standard project management methods (like PRINCEII) across the organization and use standardized and formalized reporting processes and reporting templates to reduce the number of problems and speed up reporting processes.
- *Empower and Enable and Encourage*
  Empower stakeholders like project /programme managers by involvement in the design and implementation phase. Enable by education about and training on performance measurement. Also providing extra "hands" to facilitate reporting and reduce administrative tasks. Encourage with clear top-management commitment or a rewarding system.
- *Communicate advantages*
  Clearly communicate benefits of all governance practices to stakeholders.
- *Act pragmatically*
  Prevent a "report-driven culture" of measuring for the sake of measurement.
- *Create a professional culture*
  The culture has to grow with the governance and measurement practices from informal to more formal and professional. There have to be generally accepted formal procedures for making important decisions, a standard way of working and regular reporting to provide clear insight.

Recommendations for further research

This research has given a good insight in current governance practices and performance measurement of IT investments. But as time was scarce, interesting topics had to be scoped out. Also the number of participants in the field research was limited. Some recommendations for future research are now given.

- To be able to draw more reliable conclusions, one should investigate a larger group of organizations. This may also give more insight in a next maturity level for the identified leaders, to find out if measurement of performance drivers and the linking with outcomes play an important role in that next level.

- The focus in this research was on IT investments. It would be useful to analyze what the relation is between the IT investment BSC and a BSC focused on IT operations.
- The future IT organization will be a mix of internal and externally provided resources. Interesting would be to research what is the impact of this on performance measurement and governance and what are best practices in this context.

Preface

This master thesis is the result of my graduation project of eight months at Deloitte Consultancy, done in completion of my study Business Information Technology at the University of Twente.

The thesis contains the results of a graduation project at Deloitte Consultancy. An IT Investment Balanced Scorecard (BSC) has been developed for measuring the performance of IT investments. A field research has been done to test the model, get insight in current practices in measuring the performance of IT investments. Based on the IT Investment BSC and field research results, recommendations are given for developing a complete and consistent model of performance measures for measuring the performance of IT investments in different organizations and situations

I would like to thank everyone who contributed in one way or the other, helping me to achieve this result during my graduation.

Special thanks go out to my supervisors at Deloitte, Marco Deterink and Birgitte Catijn, and to my supervisors at the University of Twente, Celeste Wilderom and Manfred Reichert. Thank you for your contributions concerning the content of my thesis, but also for all mental support.

My graduation project has given me the opportunity to get to know the Business IT Strategy service line at Deloitte consultancy and its customers. I hope they, as well as the University of Twente, are as satisfied as I am with the results and our cooperation.

Gijs Meijer
August 2006

Table of contents

1. Research design

In this first chapter, the research design is described. The goal of writing a research design is to make sure that the research conducted in this graduation project happens in a clear and structured way.

To be sure the research approach itself is developed and described in a structured way this first chapter is merely based on the method of Verschuren en Doorewaard (2000). According to their method, a research project design consists of a conceptual design part and a technical research design part, both having different subparts.

First, attention will be paid to the conceptual research design, the "what" of this research project. Therefore the project context, problem definition, scope, research objective and research questions will be described.

The last part will describe the technical research design, the "how" of this research project. In this chapter, description of the research strategy can be found.

1.1 Project context

Organizations are becoming more and more dependent on Information Technology (IT) in the current knowledge-based economy. Organizations are using technology in managing, developing and communicating information and knowledge (Grembergen et al., 2004). A growing percentage of the market value of enterprises has transitioned from the tangible (inventory, facilities etc.) to the intangible (information, knowledge etc.)(ITGI, 2003).

The critical dependency of organizations on IT entails that risks associated with IT must be of an acceptable level (Grembergen et al., 2004; ITGI, 2003). Since IT requires large capital investments, shareholders demand the creation of measurable value through investments in IT (Grembergen et al., 2004). Although more and more money is spent on investments in IT (Weill & Broadbent, 1998) often there is no proof of the actual value realised, also known as the productivity paradox (Grembergen et al., 2004).

The IT function and their leaders are under pressure to demonstrate the proof of that business value (Reich & Nelson, 2003; ITGI, 2003). Together with business changes (mergers, acquisitions, strategic alliances, etc) and increasing technical complexity (Reich & Nelson, 2003), management of IT in organizations is becoming more and more complex.

In literature, IT Governance is often mentioned as a way of approaching the issues mentioned before, for paying attention to present and future demands of IT stakeholders like the

business (internal focus), customers and governmental bodies (external focus)(Grembergen et al., 2004).

IT Governance consists of the leadership and organizational structures and processes that ensure that the enterprise its IT sustains and extends its strategies and objectives (ITGI, 2003). Being a part of enterprise governance it is the responsibility of the board and executives (ITGI, 2003).

As stated by the IT Governance Institute (2003), IT Governance is driven by IT stakeholder value and concerned about two things: that IT delivers value to the business and that IT risks are mitigated. Important in this context are strategic alignment of IT with the business and appropriate IT risk management for preserving business value (Grembergen et al., 2004). Essential for IT governance is performance measurement (ITGI, 2003) to gain insight in performance of the IT function, be able to set goals and act upon deviations.

Performance measurement in this context can be defined as the use of a multi-dimensional (financial and non-financial) set of performance measures for the planning and management of a business (Bourne et al., 2003), in this case focussed on planning and management of the IT function.

Relevant IT portfolio, programme and operational performance have to be reported to the board and executives in a timely and accurate manner (ITGI, 2005). This has to serve a review of the enterprise its progress toward identified goals, including the extent to which planned objectives have been achieved, deliverables obtained, performance targets met and risks mitigated. Often, the IT balanced scorecard (IT BSC) is suggested as a tool for realizing the required performance measurement (ITGI, 2003; Bourne et al., 2003).

Based on the measures, the board and executives can challenge performance reports and give IT management the opportunity to explain deviations and performance problems, where after appropriate management action has to be initiated and controlled (ITGI, 2005).

In using the IT BSC for performance measurement, Grembergen et al. (2004) suggest a separation between operation of IT and development of IT. Additionally, looking at the IT function, Williams (2005) states that IT spending can be split in three categories:

- run the business, operation and maintenance of current IT;
- grow the business, investments to enhance revenue and profits;
- transform the business, investments resulting in projects to increase efficiency.

Concluding on this, when measuring the performance of the IT function, one can divide this in two areas:

- measuring the performance of operation and maintenance (small improvements) of the existing IT;
- measuring the performance of new IT investments, consisting of IT projects that are generally part of programmes of related projects, all together resulting in the total IT project portfolio.

In operating and maintaining IT, following the main goals of IT Governance, attention has to be paid to delivering the service more efficient and getting the required service levels while managing risks caused by current IT for the business (security, IT failure).

For IT investments, again following the main goals of IT Governance, the focus needs to be on creating business value against acceptable risk and aligning investments with business goals. Business value is created by changing your current IT, making investments in IT. For example to improve operational efficiency (of business processes, but also IT processes) or strategic IT investments to gain market share and increase revenue growth. Or to increase flexibility to be able to respond quickly to changes.

Deloitte is often involved in IT projects and management of these projects (or programmes of projects). They increasingly get questions about the performance of the portfolio of IT projects of a company, which is accordance with literature findings described before. Do projects actually contribute to the business? Are (internal) IT customers satisfied with projects delivered? Is money invested in the right projects (risk vs. return) in the right areas (aligned with business objectives)? And how can the performance be improved?

This is where my research topic comes in sight, as I would like to focus on the performance measurement of IT investments.

1.2 Problem definition

Although the importance of performance measurement for the governance of IT investments is evident, it is not clear in what way this can be done. An IT BSC is suggested, but only generic IT BSCs are available. These do not pay much attention to IT investments and focus on operational performance. Is an IT BSC relevant for measuring IT investments? And if so, how can the generic IT BSCs be changed to measure IT investments?

For measuring IT investments it is unclear what outcomes (what have we done) should be measured, how these outcomes should be measured, what factors drive performance (affecting the outcomes) and how these relate to the outcomes. This results in the main research problem.

It is unclear what needs to be measured for governing IT investments.

Besides this main problem, related issues can be identified.

As Martinsons et al. (1999) state, the specifics of performance measurement (in their case an IT BSC) of the IT function will differ from organization to organization (although it is beneficial to build upon a standard framework, the IT BSC, instead of starting from scratch). So the specific context of an organization will influence what should be (or can be) measured. But it is unclear what these context factors are and what is their influence.

Furthermore, in developing, implementing and using performance measures an organization can encounter different issues (Bourne et al., 2003; Franco-Santos & Bourne, 2005). But it is unclear what are important issues in developing, implementing and using measures of IT investments and how they can be overcome.

1.3 Scope

Performance measurement is only a small part of IT Governance. In this research, focus is on performance measurement, and even more specific, the performance measures needed for measuring the performance of IT investments. Other relevant matters like the processes to manage performance based on measures (performance management) and an IT governance structure addressing roles and responsibilities of different stakeholders in managing, controlling and directing the IT function are not main topic of research. It is recognised that these are important topics though.

As it already became clear in the previous paragraphs, not performance measurement of the whole IT function is covered. This research will focus on performance measurement of IT investments (changing your IT), as opposed to operation and maintenance of current IT (running the IT). A more elaborate definition of what actually are considered IT investments and the actual processes involved in these IT investments will be made clear in chapter 2 & 3 of the thesis.

This research will focus on performance measurement for providing *high-level (CXO) management information*, in example for monitoring that IT delivers value to the business and that IT risks are mitigated. By addressing these main concerns in IT governance, the board and executives are supported in controlling and directing IT investments. It is recognized that detailed management information for lower-level management is also needed.

The main focus in this research will be on developing and testing a model of performance measures of IT investments. To be able to give practical recommendations in the end on the use of the model, also the influence of an organization's context, required governance practices and issues related to designing, implementing and using performance measures will be touched.

1.4 Research objective

The following research objective can be deduced from the described project context, problem definition and scope:

Provide knowledge and insight into required performance measurement of IT investments, needed to support the board and executives in controlling and directing IT investments.

With this insight, organizations can be evaluated concerning their position in measuring the performance of IT investments and, if required, recommendations can be given to create a roadmap for improving measurement of their IT investments.

1.5 Research questions

The following main research question can be deduced from the overall research goal:

What are the performance measures that need to be taken, to support the board and executives in controlling and directing IT investments?

The following central research questions and subsequent research questions identifying the knowledge necessary to answer the central questions can now be formulated:

1. **What does current literature say about performance measurement of IT investments?**
   - *I. What does current literature say about performance measurement?*
   - *II. What does current literature say about IT investments, the topic of measurement?*
   - *III. What does current literature say about IT governance and what is the role of performance measurement in that context?*

2. **What measures need to be taken for performance measurement of IT investments?**
   - *I. What performance measures can be used in general for measuring the performance of IT investments?*
   - *II. What context factors influence what needs to be / can be measured?*
   - *III. What issues can be encountered in designing, implementing and using a system of performance measures?*

3. **What are the characteristics of performance measurement of IT investments in practice?**
   - I. *What performance measures are used in practice for IT investments and what measures would organization like to use?*
   - II. *Are there other performance measures used in practice that were not identified in this research?*
   - III. *What issues are encountered in practice in developing, implementing and using performance measures for IT investments and what are best practices to cope with these issues?*
   - IV. *What is the relation between identified context factors, use of measures and relevance of issues?*

4. **What recommendations can be given about performance measurement of IT investments?**
   - I. *What changes have to be made to the model of measures defined in this research?*
   - II. *What general recommendations can be given on performance measurement of IT investments?*
   - III. *What recommendations can be given on issues in designing, implementing and using performance measures of IT investments?*
   - IV. *What specific recommendations can be given to the different case organizations?*

1.6 Research strategy

The different phases in this research project require a different research strategy. To answer the first two research questions, a thorough desk research is required to get insight into different issues concerning performance measurement of IT investments in IT Governance.

In the second part of the research, covering the third and fourth research question, a combination of questionnaire (for broad and quantitative data) and interview (for in depth insights) will be used to get an idea of performance measurement of IT investments in practice.

1.6.1 Desk research

In this desk research the following types of sources will be used:

- database search of scientific articles and books (i.e. Picarta, Web of science, science-direct);
- Deloitte KM-network for Deloitte consultancy resources;
- not-scientific "opinion" sources of information (i.e. CIO.com, ComputerWorld, ComputerWeekly, CIO magazine).

Literature that will form the basis for answering the first two research questions:

- ITGI publications concerning best practices in IT governance (ITGI, 2003)
- Literature about IT investments from Broadbent & Weill, Van der Zee and the recently published the Val IT framework (ITGI, 2006).
- Generic literature about performance measurement (Bourne).
- ITGI publications concerning IT management and control, the CobiT framework (ITGI, 2005)
- Generic literature about (IT) BSCs (Kaplan & Norton; Grembergen; Martinsons et al., 1999).

1.6.2 Field research

To answer the third research questions, a field research is required. CIOs of large organizations are first asked to fill in a questionnaire. After that an interview will be used to get more detail and background information. Goal is to have between 5 and 10 respondents where interviews are carried and who fill in the survey. The questionnaire can be found in appendix III.

The questionnaire will give the respondent an introduction into the research and result in more quantitative data on the different topics. CIOs are asked to give estimates for the context factors, to score the extent of use and importance of different measures of the IT Investment BSC and to score the relevance of issues found.

After the survey answers have been returned and analyzed, an interview will be held to get more detailed answers to questions. Answers to the survey will be used to give direction in the interview, using the scarce interview time as good as possible to cover the most interesting topics. In the interview more detailed information about the performance measures used in the organization, about the organization itself and about the issues in developing, implementing and using the performance measurement system will be asked, as well as best practices used to overcome these.

For answering the first two sub-questions, respondents will be asked to what extent they have covered the different perspectives of the IT investment BSC described in chapter three and how important they find measuring the different perspectives and areas by scoring example measures. Also the context factors found in chapter three will be asked (IT investment types, IT investment budget size and maturity) to be able to relate answers to the context of different organizations.

Answers to these questions will show what performance measures are used in practice and to what extent balanced scorecard practices are used. By asking the importance of measuring

different areas, relevance of the model is tested. Also, it will show if there is a difference between measures used and measures wanted.

Based on this, the IT investment BSC defined in chapter 3 is tested and can possibly be refined and extended.

Furthermore it will show the current status in different organizations of measuring the performance of IT investments. This will result in general recommendations on where and how to make improvements in measuring the performance of IT investments, based on the IT Investment BSC and comparison between organizations. If outcomes of the research show relations between context factors and performance measures, recommendations can be made for a specific context (based on the context factors).

For answering the third sub-question, respondents will be asked to what extend they have encountered the different issues identified in the literature research and what practices they used to overcome issues. Also, respondents will be asked to give any additional issues they encountered. Answers will show the relevance of different issues identified, show additional issues and possibly give some best practices to overcome them.

2. Positioning performance measurement

*This chapter will discuss the first research question, describing **what current literature says about performance measurement of IT investments**. The following specific sub-questions will be answered:*

I.	***What does current literature say about performance measurement?***
II.	***What does current literature say about IT investments, the topic of measurement?***
III.	***What does current literature say about IT governance and what is the role of performance measurement in that context?***

First performance measurement, the main topic of research, is explained and defined in more detail in section 2.1. There is attention for performance measurement in general, but also more specific for performance measurement of the IT function.

In section 2.2, a clear definition is given of what is meant by IT investments in this thesis, as IT investments are the subject of measurement. Also attention is paid to what the consequences of the specific characteristics of IT investments are for performance measurement.

Last IT governance and it's relation to performance measurement will be further analysed in section 2.3, as IT governance is the broader organizational context in which performance measurement is one of the parts for controlling and directing the IT function.

Section 2.4 summarizes the findings and answers the research questions above.

2.1 Performance Measurement

According to Van der Zee (2002) it was the scientist Lord Kelvin who said:
"when you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meagre and unsatisfactory kind; it may be the beginning of knowledge, but you have scarcely in your thoughts advanced to the stage of science."

To demonstrate the importance of measurement in general, this is now often abbreviated to *"if you can measure it, you can manage it"* or *"if you cannot measure it, you cannot manage it"*.

According to Van der Zee (2002), "*Kaplan and Norton argue that senior managers understand that their organization's measurement system strongly affects the behaviour of managers and*

employees; what you measure is what you get." So performance measurement is necessary for management in general.

But as Bourne et al. (2003) state, *"performance measurement is a topic often discussed but rarely defined"*.

They define performance measurement (PM) as:

> *"the use of a multidimensional set of performance measures for the planning and management of a business."*

In this context, a performance measure can be defined as:

> *"a metric used to quantify the efficiency and/or effectiveness of action."*

The combination of different performance measures into the aforementioned multidimensional set is then called a performance measurement system (PMS).

Note that with a PMS in this context not the IT infrastructure and applications supporting the collection, consolidation and representation of measurement data is meant, as these systems are better known as Business Intelligence (Frolick & Ariyachandra, 2006).

According to Bourne et al. (2003) it comes forward from literature and practices in leading organizations that a PMS has to be a multidimensional set of measures, including financial and non-financial measures, internal and external measures and measures which quantify what has been achieved as well as measures used to predict future performance.

Although other balanced approaches to performance measurement exist like the Performance Prism and ECOGRAI (Bourne et al., 2003), only the Balanced Scorecard (BSC) approach of Kaplan and Norton (1996) will be considered in this thesis. This since it seems that the BSC is becoming the de facto standard approach to designing a PMS. ITGI (2003) suggests a BSC approach for measuring the performance of IT in the context of IT governance. Bourne (2005) states that the BSC of Kaplan & Norton is being widely promoted and is increasingly used for performance measurement. Furthermore, Hoque and James (2000) found a significant positive relation between organizational performance and the use of a diverse set of performance measures related to the four BSC perspectives.

2.1.1 Balanced scorecard as PMS

The basic idea about a BSC is that performance measurement should not be restricted to a traditional financial evaluation, but has to be supplemented with measures concerning intangible items, as is also suggested by the word "multi-dimensional" in the definition of Bourne mentioned before.

Kaplan and Norton suggest that the financial measures have to be supplemented with additional measures about customer satisfaction, internal business processes and the ability to learn and grow. This is needed to maintain a balance "*between short- and long-term objectives, between financial and non-financial measures, between lagging and leading indicators, and between internal and external performance perspectives*" (Kaplan & Norton, 1996). The last is in line with Bourne's (2003) definition of a multi-dimensional PMS. The lagging outcome measures tell management afterwards whether expected results are realised. The leading performance drivers tell how well processes are currently performing, forecasting if goals will be achieved.

In the BSC, each perspective is focused on answering a specific question about the organization's performance (ITGI, 2003; Kaplan & Norton, 1996):

- *Financial Perspective*
  To satisfy our stakeholders, what financial objectives must we accomplish?
- *Customer Perspective*
  To achieve our financial objectives, what customer needs must we serve?
- *Internal Business Process Perspective*
  To satisfy our customers and stakeholders, in which internal business processes must we excel?
- *Learning and Growth Perspective*
  To achieve our goals, how must our organisation learn and innovate?

The BSC perspectives and their relationships are shown in Figure 1.

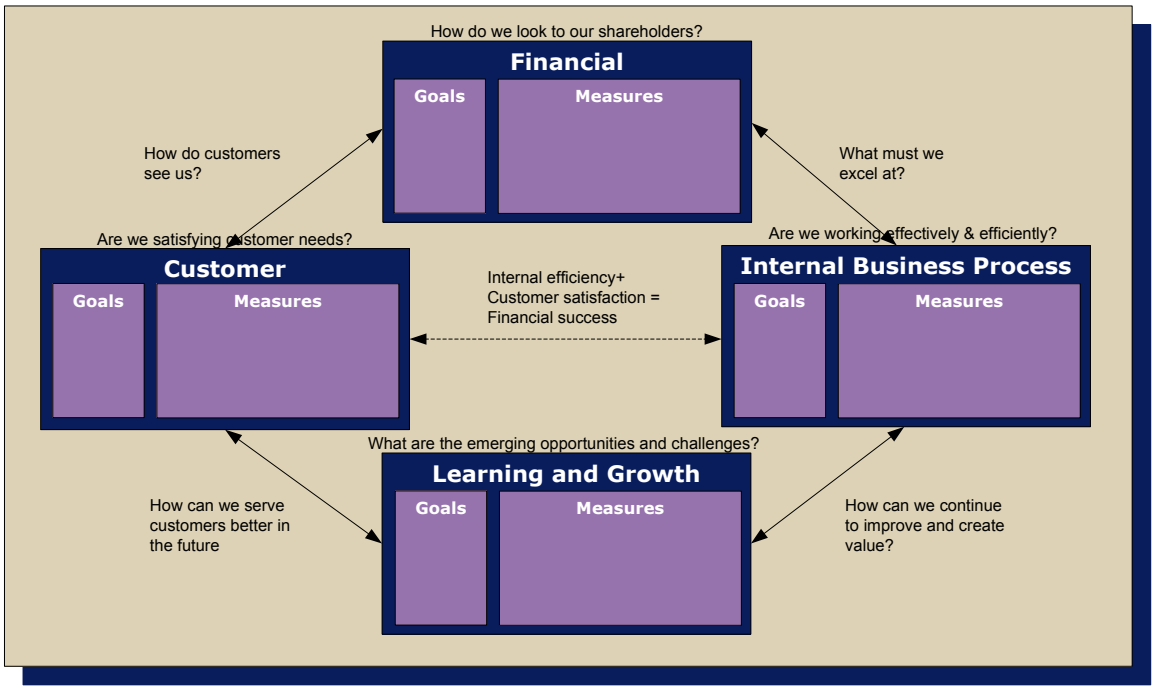


Figure 1: Relationship between perspectives of balanced scorecard (Martinsons et al., 1999)

The BSC can be used as a tool to clarify and communicate the business strategy and as a foundation for actively managing it by identifying key measures (Martinsons et al., 1999). Using the BSC as a strategic management system requires the definition of the following elements for each perspective (Martinsons et al., 1999; Grembergen et al., 2004), all based on the vision (what the organization will look like and do in the future) of the organization:

- *Mission*
  The purpose to the organization, i.e. to be the preferred supplier of televisions (customer perspective)
- *Strategic objectives*
  The mission (and vision) are translated into strategic objectives in a perspective, i.e. to have a certain level of customer satisfaction, to be seen as most innovative supplier.
- *Performance measures*
  The objectives can be measured through well chosen indicators, i.e. % of customers grading product quality and service as "good", ranking in list of most innovative television suppliers.

It should be clear that a BSC should not just be a collection of financial and non-financial measures organized in different perspectives. A BSC should reflect the strategy of an organization. To realize this, Kaplan & Norton (2001) suggest the process of strategy mapping for designing the BSC, defining mission, objectives and measures for the different perspectives.

A strategy map describing chains of cause-and-effect logic in a BSC, linking the strategic outcomes to the drivers that will lead to these strategic outcomes. A generic strategy map is shown in Figure 2.

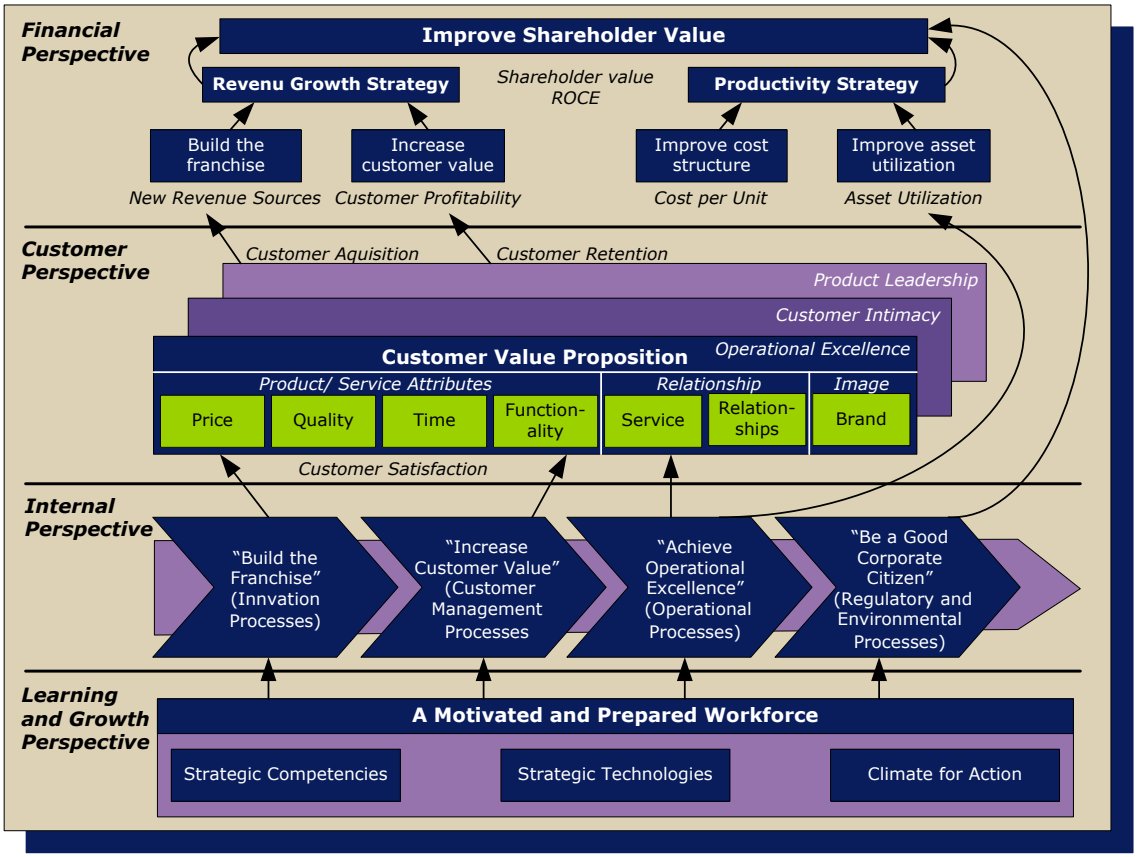


Figure 2: Strategy map template (Kaplan & Norton, 2001)

In this generic strategy map the customer perspective defines how growth will be realized. The customer value proposition gives specific strategies to increase the customer base. The internal perspective defines the processes and activities the organization must perform well to support the customer value proposition. Last, the learning and growth perspective defines the things needed to support these high-priority processes and activities. Thus the strategy map describes clearly how the strategy will be accomplished (Kaplan & Norton, 2001).

Although the BSC approach of Kaplan & Norton was originally meant to be used (as basis) for a PMS for strategic management of a whole organization or BU, it can also be applied to activities that take place in a specific functional area of a business (Martinsons et al., 1999). Martinsons et al. (1999) and Grembergen et al. (2004) applied it to the IT function.

2.1.2 IT Balanced Scorecard

According to Hasan & Tibbits (2000), the BSC can be related to IT in a number of ways:

1. IT is usually one of the factors contained in the internal business perspective box of an organisational scorecard;
2. scorecards have been developed for IT units within organisations, with the obvious benefit that it links measurement to strategy;

3. IT, in the form of software implementations, is sometimes used to automate the BSC.

To the IT BSCs of Martinsons et al. (1999) and Grembergen et al. (2004) obviously the second option applies. According to ITGI (2003), *"the use of an IT BSC is one of the most effective means to aid the board and management to achieve IT and business alignment. The objectives are to establish a vehicle for management reporting to the board, to foster consensus among key stakeholders about IT's strategic aims, to demonstrate the effectiveness and added value of IT and to communicate about IT's performance, risks and capabilities."*

So the IT BSC seems to provide a good framework for realising performance measurement of the IT function. In developing an IT BSC, Grembergen et al. (2004) and Martinsons et al. (1999) both recognise that IT is an internal service provider and consequently the perspectives of the business BSC of Kaplan and Norton have to be modified to fit this situation. Martinsons et al. (1999) also add that IT projects are carried out for the benefit of end-users as well as the organization as a whole.

Van Grembergen et al. (2004) state that a generic IT BSC template can be developed by considering the following perspectives, key questions, missions and objectives:

- *Corporate contribution*
  Question: How does management view the IT department?
  Mission: To obtain a reasonable business contribution of IT.
  Objectives:
    - Control of IT expenses
    - Business value of IT projects
    - Provision and provision of new business capabilities.
- *Customer (user) orientation*
  Question: How do users view the IT department?
  Mission: To be the preferred supplier of information systems.
  Objectives:
    - Preferred supplier of applications & operations.
    - Partnership with users.
    - User satisfaction.
- *Operational excellence*
  Question: How effective an efficient are the IT processes?
  Mission: To deliver effective and efficient IT applications and services.
  Objectives:
    - Efficient & effective developments & operations.
- *Future orientation*
  Question: How well is IT positioned to meet the future needs?

Mission: To develop opportunities to answer future challenges.

Objectives:

- Training and education of IT staff.
- Expertise of IT staff.
- Research into emerging technologies.
- Age of application portfolio.

In the example IT BSC shown in Figure 3 Van Grembergen et al. suggest some example objectives and measures. Relations between perspectives are not defined.

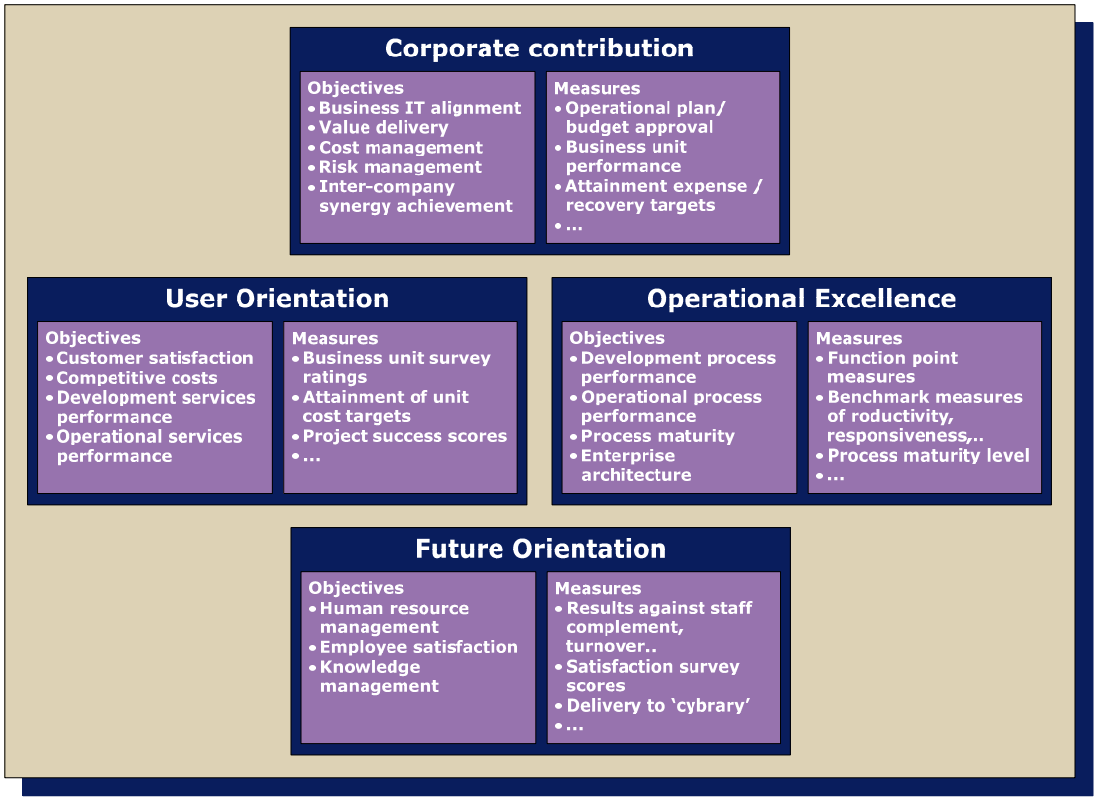


Figure 3: Van Grembergen's example IT BSC (Van Grembergen et al., 2004)

Between the different perspectives of their IT BSC, high level cause-and-effect relations can be modelled as shown in Figure 4. This visualises that having and creating a foundation for future delivery and learning and growth enables IT to perform IT processes in the required way, resulting in meeting business expectations and eventually satisfying corporate objectives.

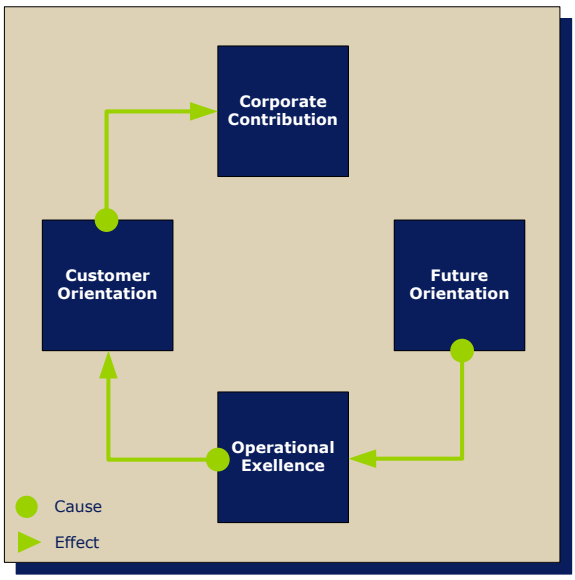


Figure 4: Cause-and-effect relationships perspectives of IT BSC (Grembergen et al, 2004)

Martinsons et al. (1999) defined an IT BSC with a detailed description of measures to be used, based on existing literature. They suggest the following perspectives, key questions, missions and objectives:

- *Business value*

  Question: Is the IT department accomplishing its goals and contributing value to the organization?

  Mission: Contribute to the value of the business.

  Objectives:
  - Establish & maintain a good image and reputation with management.
  - Ensure that IT projects provide business value.
  - Control IT costs.
  - Sell appropriate IT products & services to third parties.
- *(end) User orientation*

  Question: Are the products and services provided by the IT department fulfilling the needs of the user community?

  Mission: Deliver value-adding products and services to end-users.

  Objectives:
  - Establish and maintain good reputation with end-users.
  - Exploit IT opportunities.
  - Establish good relationship with user community.
  - Satisfy end-user requirements
  - Be perceived as the preferred supplier of IT products & services.
- *Internal processes*

  Question: Does the IT department create, deliver and maintain its products and services in an efficient manner?

Mission: Deliver IT products and services in an efficient and effective manner.

Objectives:

- Anticipate and influence requests from and-users and management.
- Be efficient in planning and developing IT applications.
- Be efficient in operating and maintaining IT applications.
- Be efficient in acquiring and testing new hardware and software.
- Effectively manage IS-related problems that arise.

- *Future readiness*

Question: Is the IT department improving its products and services and preparing for potential changes and challenges?

Mission: Deliver continuous improvement and prepare for future challenges.

Objectives:

- Anticipate and prepare for IS-related problems that could arise.
- Continuously upgrade IS skills through training and development.
- Regularly upgrade IT applications portfolio.
- Regularly upgrade hardware and software.
- Provide cost-effective training that satisfies end-users.
- Conduct cost-effective research into emerging technologies and their suitability for the business.

In Figure 5 the different perspectives, the topics that should be measured and the relationships between the perspectives of Martinsons' IT BSC are shown.

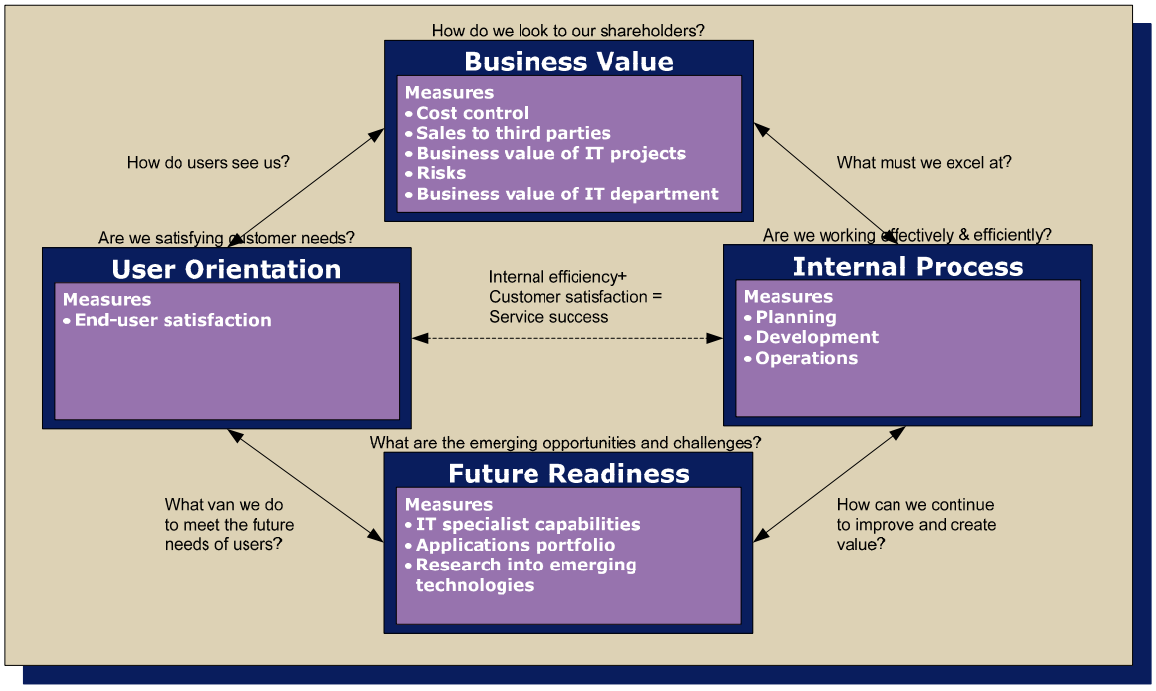


Figure 5: Martinsons' example IT BSC (Martinsons et al., 1999)

As a mechanism for top management for controlling and directing IT, Van Grembergen et al. (2004) suggest a "cascade or waterfall of scorecards" dividing development and operations and linking both as enablers to the IT Strategic BSC, which is an enabler of the Business BSC. The cascade of scorecards is shown in Figure 6.

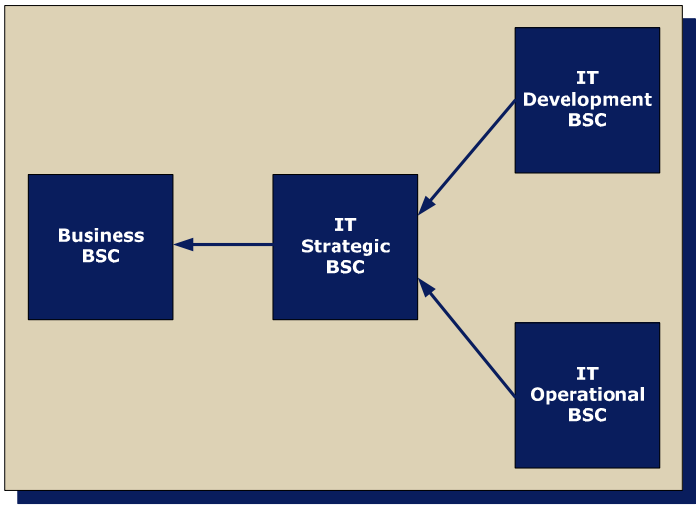


Figure 6: Cascade of Balanced Scorecards (van Grembergen et al, 2004)

This illustrates the division, also applied in this thesis, between operation & maintenance of current IT and changing an organization's IT (IT investments). In the next section it is defined what is understood by IT investments in this thesis.

2.2 IT investments

In chapter one, operating and running an organization's IT was separated from changing an organization's IT. These changes require investments (money, resources) in IT. It should be clear that in this thesis, when discussing investments in IT, only these changes are meant. Often in literature and research reports, i.e. from Gartner, the whole budget for IT is mentioned as "IT investment". Van der Zee (2002) splits the total IT investment (cost) in the following way:

- **IT costs to maintain the organization's status quo**, the so-called "going concern" costs: the costs of IT maintenance and IT operations added together, as well as the costs of new mandatory IT development.
- **IT infrastructure and IT research costs**, to acknowledge the fact that these IT costs are generally corporate-wide investments in a "core competence" of the organization, enabling other IT investments to create direct value.
- **Development costs of new IT applications**, to improve the efficiency and effectiveness of the organization, or to change the business, the business network, or the business scope.

A separation can be seen between the "going concern" costs of IT maintenance and IT operations and of the other IT costs involved in changing IT by developing new or improving existing IT.

Grembergen (2002) underlines that much of the changes to IT do not stand alone, but form a part of business change programs wherein IT is an essential, but often small part. He states that in applications of IT today the cost of the technology is only a small part of the total investment that organizations must make to achieve their desired outcome, often only 5% to 15%.

Statements of Van der Zee (2002) and Grembergen (2002) are well summarized in the definition used by Val IT (ITGI, 2006-1). Val IT is an extension of CobiT specifically focused on IT investments, where Cobit (ITGI, 2005) is the generally accepted standard for control over the whole IT function. Val IT gives the following definition of IT investments (IT-enabled business investments), which is also the definition used in this thesis:

> *"IT-enabled business investments are significant business investments in sustaining, growing or transforming the business with a critical IT component, where IT is means to and end, the end being to contribute tot to process of value creation in the enterprise."*

2.2.1 Categories & types of investments

According to ITGI (2005; 2006-2) and Williams (2005) there are two IT investment categories:

- *Non-discretionary*
  Mandatory investments that need to be undertaken to comply to regulations of industry regulators, environmental agencies or governmental bodies to stay in business or other investments that are necessary for continuing / sustaining the current business.
- *Discretionary*
  "Free" investments to improve you current business. These can be divided in four categories Weill & Broadbent (1998): infrastructure, transactional, informational and strategic/transformational.

Weill & Broadbent (1998) further divide the discretionary investments into four types:

- *Infrastructure*
  Often large and long-term investments in the IT infrastructure, focused on integration and standardization and upgrading of the existing infrastructure. Goal is to provide the ability to quickly and economically enable the implementation of new applications, often across BUs or organization wide.

- *Transactional*
  Provide the information technology to process the basic, repetitive transactions of an organization, that support streamlined processes and that automate transactions. Examples are systems that support order processing, inventory control, claims processing and billing. Main goal of these kinds of investments is to cut costs.
- *Informational*
  Information technology to provide the information for managing and controlling the organization. Examples are systems that support management & financial control, decision making, planning, communication and accounting. Main goals of these systems are to have a shorter time to market, superior product quality and thus the ability to charge higher prices to customers.
- *Strategic / Transformational*
  Information technology often new for an industry at a particular point in time. Some successful examples where an organization providing laptops for salespeople to allow on-site custom design, quotation and guaranteed delivery dates in the customers office and a fuel supplying firm delivering management information in the form of fuel purchase reports by vehicle. Unsuccessful (although very foreseeing) was a bank providing home banking on personal computers in the 1980s. Although somewhat dated, the examples give a good impression of strategic investments. Often the goals of these kinds of investments are to gain competitive advantage, to position the firm in the marketplace, especially by increasing market share or sales.

2.2.2 Projects, programmes & portfolio

As stated before, IT investments do not stand alone, but form a part of business change programs. Grembergen (2002) and ITGI (2006-1) state that IT investments should be managed as business programmes in concert with organizational, process and people initiatives. And that all programmes together should be managed as a portfolio.

ITGI (2006-1) defines a portfolio in this context as:

> *"a grouping of programmes, projects, services or assets selected, managed and monitored to optimise business return."*

A programme is defined as:

> *"a structured group of interdependent projects which are both necessary and sufficient to achieve the business outcome and deliver value. These projects could include, but are not limited to, changes to the nature of the business, business processes, the work performed by people, as well as the competencies required to carry out the work, enabling technology and organisational structure."*

Last, a project is defined as:

A structured set of activities concerned with delivering to the enterprise a defined capability (that is necessary but NOT sufficient to achieve a required business outcome) based on an agreed schedule and budget.

The relation between the different concepts is illustrated in Figure 7.

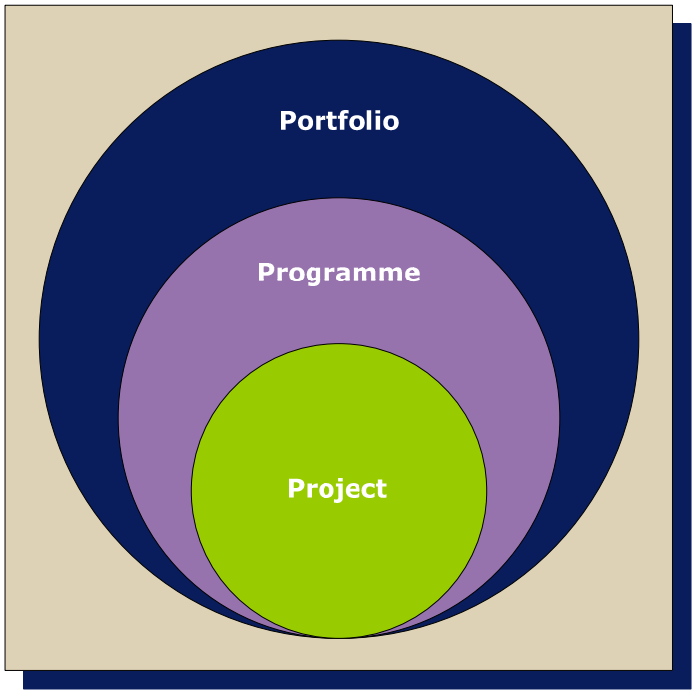


Figure 7: Portfolio, programme and project (Grembergen, 2002).

2.2.3 Managing IT Investments

Grembergen (2002) states that IT investments should be managed with a disciplined portfolio management approach and with effective measurement systems, wherein projects, programmes and portfolios are managed with clear accountability to ensure business sponsorships of programmes, from *"concept to cash rather than just from design to delivery"* (Grembergen, 2002). For successfully managing IT investments, CobiT (ITGI, 2005) and Val IT (ITGI, 2006-1) give best practices.

Best practices defined by CobiT are focused on execution, delivering high quality IT services:

- *Are we doing the investments the right way?*
- *Are we getting the investments done well?*

Best practices defined by Val IT are focused on the investment decision and the realisation of benefits of investments:

- *Are we doing the right investments?*
- *Are we getting the benefits of the investments?*

This results in a relation between CobiT, Val IT and IT investments which is illustrated by the 'four ares', shown in Figure 8.

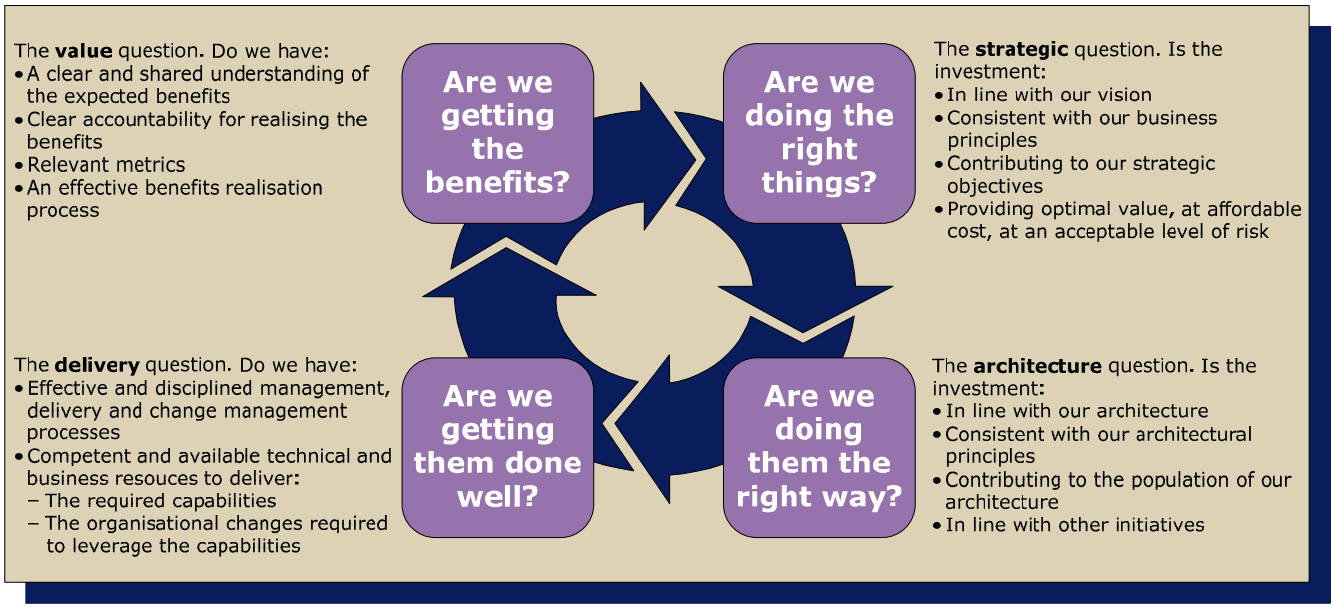


Figure 8: The 'Four Ares' (ITGI, 2006-1)

To make sure all four questions are answered with "yes", CobiT and Val IT processes should be implemented well. The processes will be discussed in more detail in chapter 3. Important is that in both Val IT (ITGI, 2006-1) and CobiT (ITGI, 2005) performance measurement plays a central role.

According to CobiT, for IT in general a balanced set of performance objectives, measures, targets and benchmarks has to be defined, including business contribution indicators, indicators of performance against strategic plans, risk and compliance indicators, internal and external user satisfaction indicators, key process indicators and indicators for future oriented activities.

Val IT states that an all-round view of portfolio, programme and IT performance has to be realized for supporting decision making and monitoring. This could include the extent to which planned objectives have been achieved, deliverables obtained, performance targets met and risks mitigated. Of different programmes, performance against the overall portfolio, IT strategy, compliance with policy and standards, benefit realisation, process maturity, end-user satisfaction, and the status of IT internal control should be measured and reported.

Additionally, Val IT states that in monitoring and managing these investments it has to be recognised that different categories of investments exist (as described before) and that these will have to be evaluated and managed differently, but that key practices and metrics have to be defined to monitor value delivery. According to the Val IT case study at ING (ITGI, 2006-2), priority has to be given to monitoring the discretionary projects, although total IT value is

dependent upon satisfactory delivery of all projects. Nondiscretionary projects consume resources and often have to be given priority to meet regulatory or other imposed deadlines, so it is essential to understand the impact of these projects on the delivery of the discretionary projects.

In line with the recommendations from CobiT and Val IT and the discussion of performance measurement in section 2.1, Bryde (2005) describes in a recent study that in measurement of project performance (comparable with IT investments) especially more and more the focus in scientific literature is on the multi-dimensional character of measurement. Only measuring cost, time and quality of the end product, also known as the 'iron triangle' and in practice often the case for IT projects, limits the ability to improve and optimize project performance. Bryde (2005) describes that project success depends on the quality of the project process as well as the effects of the project's final product or service, known as product success.

It is now clear what is performance measurement and what are IT investments, the subject of measurement. It is also clear that in managing IT investments, performance measurement is necessary. In the next section IT governance is discussed, to put performance measurement of IT investments in the bigger context of controlling and directing the IT function.

2.3 IT governance

The broadly accepted definition of the ITGI is used as basis in this thesis. They state that IT governance is **the responsibility of the board of directors and executive management**. It is an **integral part of enterprise governance** and consists of the **leadership** and **organisational structures** and **processes** that ensure that the organisation's IT sustains and extends its strategies and objectives (ITGI, 2003).

The high level objectives of IT Governance are (ITGI, 2003):

- Delivery of value by IT to business, driven by strategic alignment of IT with the business
- Mitigation of IT related (business & IT) risks, by embedding accountability into the enterprise.

According to ITGI (2003), both require performance measurement to gain insight in performance, be able to set goals and act upon deviations. This is illustrated with the focus areas of IT Governance and their relationships, as shown in Figure 9.

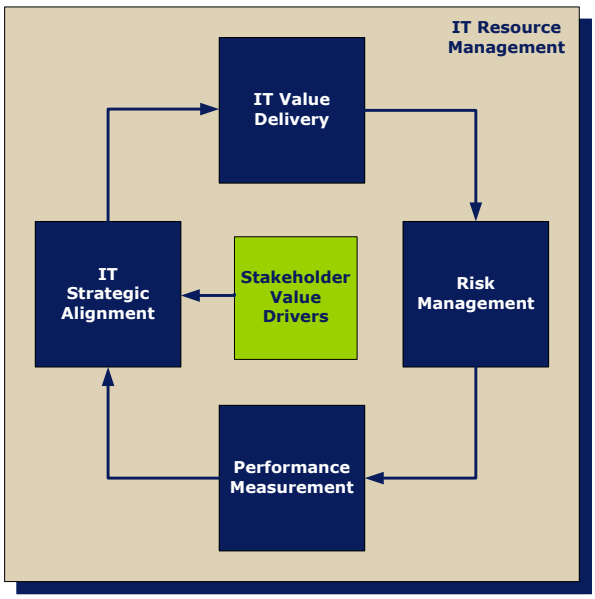


Figure 9: Focus Areas of IT Governance (ITGI, 2003)

The definition makes clear the board and executive management are responsible for IT Governance. Summarizing ITGI (2003), and in line with the focus area's mentioned before, **board and executive management are responsible for**:

- drive enterprise alignment by linking IT strategy with enterprise strategy and by (re)directing the IT strategy;
- direct management to deliver measurable value through IT, value being appropriate quality, on time and on budget;
- manage enterprise risk (in this case caused by IT) by creating awareness around and transparency of risks and making sure risk management is embedded in operation of the enterprise
- support learning and growth and manage IT resources;
- measure performance by setting objectives together with management, providing and evaluating these performance measures and set direction based on evaluation of the performance measures.

IT governance is **an integral part of enterprise governance**. Enterprise governance is "*the system by which the whole enterprise is directed and controlled"* (Grembergen et al, 2004).

Enterprise governance calls for sound strategic guidance of the enterprise, for effective monitoring of management by the board and for the board to be accountable for the enterprise and for shareholders. The importance of good enterprise governance has been emphasized in recent years by scandals like Enron and WorldCom, where obviously shareholders were the victim of lack of control. In this context, IT governance is the important (and, because strongly related, integral) part of enterprise governance that pays attention to the IT function of an organization, which is becoming more and more important and pervasive (Grembergen et al, 2004) in organizations and therefore requires special attention.

IT governance is realized in a framework that exists of **leadership, roles and responsibilities, organisational structures, processes and information requirements** (ITGI, 2005).

Leadership means that the board and executive management make sure that clear and unambiguous definitions of the roles and the responsibilities of involved parties are communicated and clearly understood throughout the whole organisation. They have to put IT governance on top of the agenda and should play an important role in assuring the governance of IT (Grembergen et al, 2004).

Structures involve the existence of responsible and accountable functions such as IT executives and a diversity of IT committees. An example of such a structure is the IT governance structure at ING as shown in the Figure 2. It shows a main decision-making body, the IT and Procurement Policy board which involves senior directors of business, together with the director of IT. The leadership council implements and executes the IT strategy, assisted by several subcommittees on security, architecture, standards and strategic infrastructure. Although organization-specific, it gives a good idea of the size and complexity of organizational structures needed for IT governance.

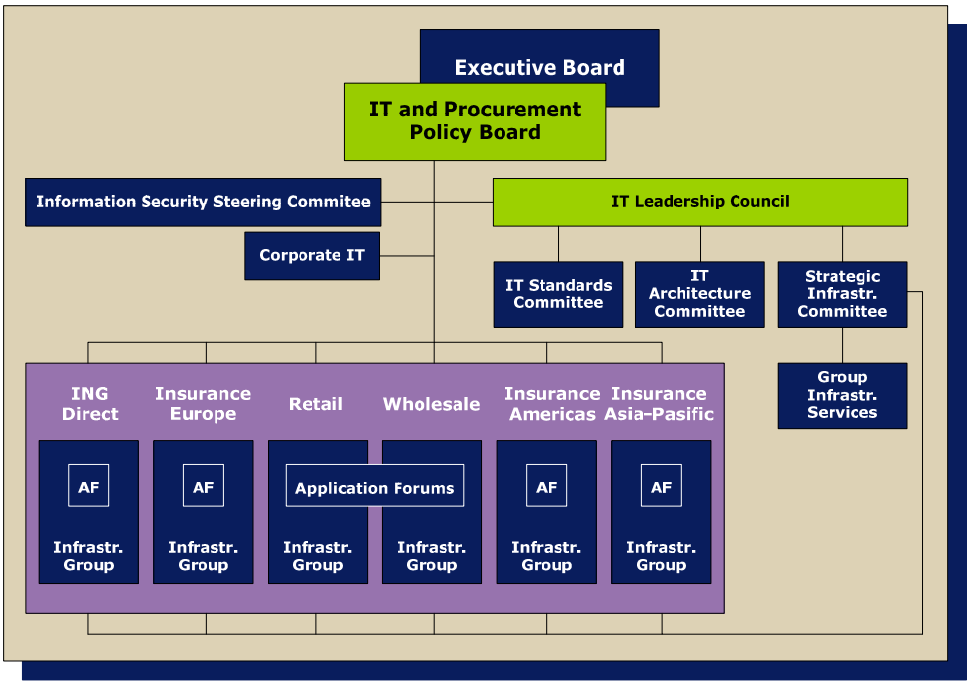


Figure 10: ING IT Governance structure (Williams, 2005)

Processes refer to strategic IT decision-making and monitoring (Grembergen et al, 2004). The strategic decision-making and monitoring by the board and executives often takes place through an IT strategy committee (setting and monitoring the strategy, IT and Procurement Policy Board in the ING example above) and IT steering committee (delivery of the IT

strategy, IT leadership counsel in the ING example) (ITGI, 2003; Grembergen et al, 2004). ITGI gives a good overview of responsibility, authority and membership of the IT strategy committee and IT steering committee, as shown in the next table.

	IT strategy committee	IT steering committee
Responsibility	• Provides insight and advice to the board on topics such as: - developments in IT from a business perspective - alignment of IT with business direction - achievement of strategic IT objectives - availability of suitable IT resources, skills and infrastructure to meet the strategic objectives - optimisation of IT costs, including the role and value delivery of external IT sourcing - risk, return and competitive aspects of IT investments - progress on major IT projects - The contribution of IT to the business (i.e., delivering the promised business value) - Exposure to IT risks, including compliance risks - Containment of IT risks • Provides direction to management relative to IT strategy • Is driver and catalyst for the board's IT governance practices	• Decides the overall level of IT spending and how costs will be allocated • Aligns and approves the enterprise IT architecture • Approves project plans and budgets, setting priorities and milestones • Acquires and assigns appropriate resources • Ensures projects continuously meet business requirements, including re-evaluation of the business case • Monitors project plans for delivery of expected value and desired outcomes, on time and within budget • Monitors resource and priority conflict between enterprise divisions and the IT function, and between projects • Makes recommendations and requests for changes to strategic plans (priorities, funding, technology approaches, resources, etc.) • Communicates strategic goals to project teams • Is a major contributor to management's IT governance responsibilities
Authority	• Advises the board and management on IT strategy • Is delegated by the board to provide input to the strategy and prepare its approval • Focuses on current and future strategic IT issues	• Assists the executive in the delivery of the IT strategy • Oversees day-to-day management of IT service delivery and IT projects • Focuses on implementation
Membership	• Board members and (specialist) non-board members	• Sponsoring executive • Business executive (key users) • CIO • Key advisors as required (IT, audit, legal, finance)

Table 1: IT strategy committee and IT steering committee responsibilities (ITGI,2003)

On a very high level, the process for monitoring of strategic objectives, showing the interaction between objectives set by the board and executives, the different IT processes and measurement of the performance of these processes can be modelled as shown in Figure 11.

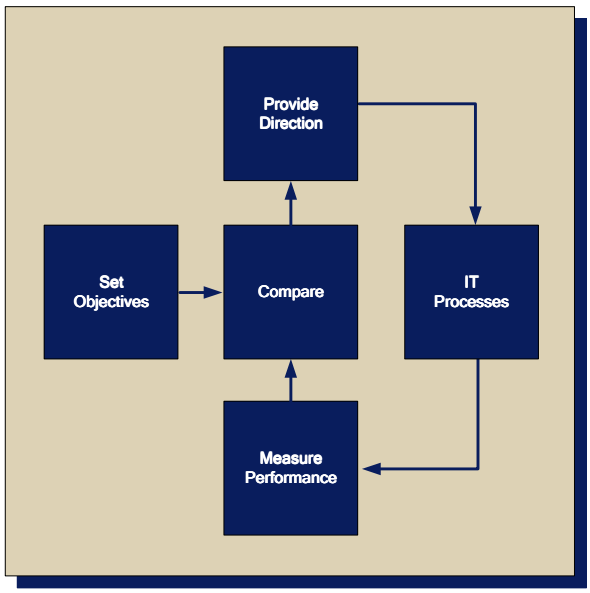


Figure 11: Interaction between objectives and IT processes (ITGI, 2003)

In figure 3 it can be seen that "IT processes" are provided with direction and measured on performance. As stated before, this thesis focuses on a part of these IT processes, the processes involved in IT investments.

This further elaboration of IT governance has provided an overview of the organizational context of the research topic of this thesis. It makes clear an important part of IT governance is performance measurement. It shows who need it (the board and executives, possibly in an IT strategy committee), why they need it and what kind of topics are on the agenda for measurement.

2.4 Conclusion

2.4.1 Performance measurement (I)

Focus in this thesis is on performance measurement of IT investments. This should be realised in the form of a multidimensional system of performance measures, including financial and non-financial measures, internal and external measures and measures which quantify what has been achieved as well as measures used to predict future performance.

Often a balanced scorecard is used for this purpose. In a BSC financial measures are supplemented with additional measures about customer satisfaction, internal business processes and the ability to learn and grow. A BSC should reflect the strategy of an organization. To realize this, a process of strategy mapping can be applied. A strategy map describing chains of cause-and-effect logic in a BSC, linking the strategic outcomes to the drivers that will lead to these strategic outcomes.

A BSC can also be applied to measuring the IT function or a specific part of it. For measuring the performance of the whole IT function, different generic IT BSCs have been developed.

2.4.2 IT investments (II)

In this thesis the focus is on IT investments, as opposed to the going concern of IT maintenance and IT operations.

IT investments are defined as *"IT-enabled business investments are significant business investments in sustaining, growing or transforming the business with a critical IT component, where IT is means to and end, the end being to contribute tot to process of value creation in the enterprise."*

Different categories of IT investments can be distinguished. There are *non-discretionary* (mandatory, needed to comply with regulations and sustaining current business) and *discretionary* ("free" investments to improve current business).

Discretionary investments can be further divided into *infrastructure investments*, *transactional investments*, *informational investments* and *strategic investments*.

In general there is a portfolio of IT investments in an organizations, which consists of different programmes and projects, where programmes are a set of multiple projects.

CobiT and Val IT give best practices for successfully managing IT investments. Best practices defined by CobiT are focused on execution, delivering high quality IT services, doing the investments in the right way and getting them done well. Val IT is focused on the investment decision and the realisation of benefits of investments, on doing the right investments and getting the benefits.

In both Cobit and Val IT performance measurement plays a central role. In line with general findings on performance measurement, performance of IT investments should be measured based in a multidimensional way. Besides cost, time and quality of the end product (iron triangle) success of investments also depends on the quality of the project process as well as the effects of the project's final product or service, known as product success.

This view is supported by a BSC. The business contribution and customer orientation perspective show product success (outcomes of the portfolio, programmes and projects); the operational excellence perspective shows process quality. Additionally, the future orientation perspective shows the readiness of the IT function for future demands, the basis on which the internal processes have to build.

2.4.3 IT governance (III)

Performance measurement is part of the overall governance framework of:

- **Leadership, roles and responsibilities**
  Clear and unambiguous definitions of the roles and the responsibilities, with a clear role for board and executive management in putting IT governance of top of the agenda.
- **Organisational structures**
  The existence of responsible and accountable functions such as IT executives and a diversity of IT committees, like a strategy committee and steering committee.
- **Processes and information requirements**
  The strategic IT decision-making and monitoring

The board and executives are responsible for directing and controlling the IT function. For doing this they need information about the performance of the IT function and thus performance measurement. And for performance measurement to be useful, a plan-do-check-act cycle needs to be in place, requiring the right processes, structures and responsibilities and thus a complete IT governance framework in place to monitor the measures and act upon them.

2.4.4 Overall

In chapter 3 a framework for an IT Investment BSC and an accompanying strategy map will be defined based on the previously mentioned IT BSCs and additional literature for addressing the specifics of IT investments.

Applying the IT BSCs to IT investments requires some adjustments though. Interesting is that the different perspectives of the IT BSCs often already have specific objectives and measures focused on IT investments. But these are on a very high level. To make the BSC useful for controlling and directing IT investments, the different perspectives have to be adapted to focus in detail on IT investments and relevant processes, while objectives specific to operations and maintenance should be left out. For example, corporate contribution has to pay detailed attention to business value of the portfolio and programmes, user orientation to customer satisfaction objectives related to projects, programmes and portfolios, operational excellence has to measure the specific processes involved in IT investments and future orientation needs to cover all aspects that determine the readiness of IT for future IT investments. Additionally, both example IT BSCs only have very high level cause-and-effect relations defined, by far not as specific as the strategy map required by Kaplan and Norton (2001). So a detailed strategy map will need to be supplied with the IT Investment BSC.

3. Measuring IT investments

*This chapter will discuss **what measures need to be taken for performance measurement of IT investments**.*

The following specific sub-questions are answered:

I. ***What performance measures can be used in general for measuring the performance of IT investments?***
II. ***What context factors influence what needs to be / can be measured?***
III. ***What issues can be encountered in designing, implementing and using a system of performance measures?***

An IT Investment BSC is described in section 3.1, developed based on existing literature.

Section 3.2 describes context factors that may influence what performance measures are used for IT investments

Section 3.3 gives an overview of possible issues in designing, implementing and using performance measures.

Section 3.4 summarizes the findings.

3.1 Developing an IT investment BSC

From chapter 2 it becomes clear that although adjustments have to be made, the IT BSCs are a good basis for developing the IT investment BSC. At least the perspectives can remain intact, as IT investments cover a part of the IT function, and thus have more or less the same stakeholders.

Based on the IT BSCs of Grembergen et al. (2004) and Martinsons et al. (1999) the IT Investment BSC should contain the following perspectives:

- business / corporate contribution / business value perspective;
- customer / user orientation perspective;
- operational excellence / internal process perspective;
- future orientation / future readiness perspective.

As the ITGI (2003) uses the naming of Grembergen et al. (2004), these will be used for the IT investment BSC as well. The different perspectives are now further analyzed and adapted to measure IT investments.

Following the methodology of Martinsons et al. (1999) a mission, strategic objectives and performance measures will be defined for the four perspectives. These will be generic in nature, as each organization will have a unique mission and strategic goals resulting (using the balanced scorecard methodology and cause-and-effect relations) in a unique set of missions, strategic objectives and measures.

But as a lot of background is provided on the perspectives, objectives and measures, the IT Investment BSC will provide a good and complete basis for analyzing and improving current measures of IT investments.

3.1.1 Corporate Contribution

As the corporate contribution perspective is aimed on board and executives, this perspective has to support their view of IT investments. From section 2.2 and 2.3 it becomes clear that for the board and executives it is of main importance that IT investments deliver optimal value for the business. For this:

- IT investments should deliver the promised business value;
- while being aligned with the business strategy and IT strategy;
- at an affordable cost;
- with a known and acceptable level of risk.

Taking this into account, together with the generic IT BSCs, the following mission and objectives can be defined for the corporate contribution perspective.

Mission:
To obtain optimal value from IT investments.

Objectives:

- Ensure business value is realized with IT investments.
- Ensure that IT investments are aligned with the business strategy.
- Ensure that IT investment risks are in control.
- Ensure control of IT investment costs.

By measuring these objectives, answers will be provided to "the four ares" of IT investments; are we doing the right things (alignment), getting the benefits (value), doing them in the right way and getting them done well (control of costs and risks).

Before measures for this perspective can be proposed, some more knowledge is required about the objectives mentioned: business value of IT investments, strategic alignment of IT investments, control of IT investment risks and control of IT investment costs.

Theory on Corporate Contribution objectives

Business value of IT investments

It is important to know the business value of IT investments, as it can show different stakeholders whether IT has been valuable, improve communication between business and IT by replacing opinions by facts. It is also useful for discussing different alternatives and monitoring the IT investments (Van der Zee, 2002).

It shows the need for answering "Are we getting the benefits", one of the questions of "the four ares" (section 2.2), which also emphasizes that a clear and shared understanding of benefits measured by relevant metrics is needed.

Business value of IT investments is part of the total value of IT. This is illustrated by Van der Zee (2002), who states the total value of IT is the extent to which:

1. IT contributes to business objectives and to business strategy, called the Business value of IT;
2. IT effectively supports business processes, activities and employees, called the Effectiveness of IT;
3. IT supply aligns with business requirements, called the Effectiveness of IT supply, and is supplied at minimum cost, called the Efficiency of IT supply.

According to Val IT (ITGI, 2006-1), business value can be defined in this context as:

> *"the end business outcome(s) expected from an IT-enabled business investment where such outcomes may be financial, non-financial or a combination of the two."*

Making business value more explicit, Weill & Broadbent (1998) show that IT investments can have positive impact on different levels of a hierarchy of business value, from high to low:

- Financial performance of the organization, like revenue growth, return on assets and revenue per employee.
- Operational performance of the organization, like time-to-market, new product sales and product/service quality;
- IT function performance, like implementation time and implementation costs;
- IT infrastructure performance, like availability, cost per transaction and cost per workstation.

It may be clear that the financial and non-financial business value sought in this Corporate Contribution perspective is in the top of the hierarchy. But the higher in the hierarchy, the more time it takes for the business value to be realized and measured. And the higher in the

hierarchy, the more the business value is diluted by external and internal factors like pricing decisions and competitor moves. This is illustrated by Figure 12.

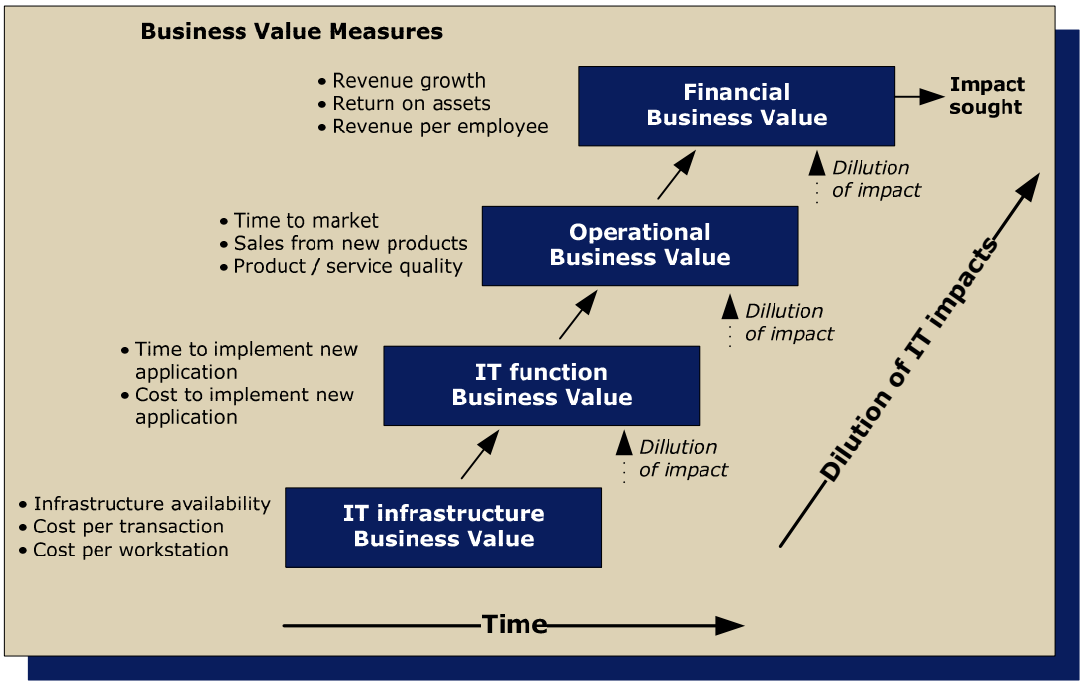


Figure 12: Hierarchy of impact of IT investments (based on Weill & Broadbent, 1998)

As the business objectives differ for different types of organizations, so will the character of business value generated by investments. In general for commercial or for-profit organizations business value will be the increase in profit. For not-for-profit organizations business value is often non-financial in nature (like improved customer satisfaction), although for example lowering operational costs at a governmental body also serves that organization's stakeholders.

But not only for different organizations will the character of business value differ.
This is also the case for different types of investments (as were identified in chapter 2).

In Figure 13 (on the next page) is shown that each type of the discretionary investments influences business value in a different way. Note that non-discretionary investments often do not actually deliver business value (besides keeping the business running by, for example, complying with regulations).

As the types of value differ, so will the time it takes for an investment to have impact and the dilution of the value. This will certainly affect the difficulty of measuring business value of investments. For example, the business value of a transactional investment that decreases the number of FTE's needed in a certain business process will be easier to measure then an informational investment that improves management information.

But at all times at least estimates should be made of the business value expressed in the two highest levels of the business value hierarchy to show stakeholders that investments have been valuable for the business and in this way create goodwill for IT investments. Or to show an investment was not successful and learn from that for the future.

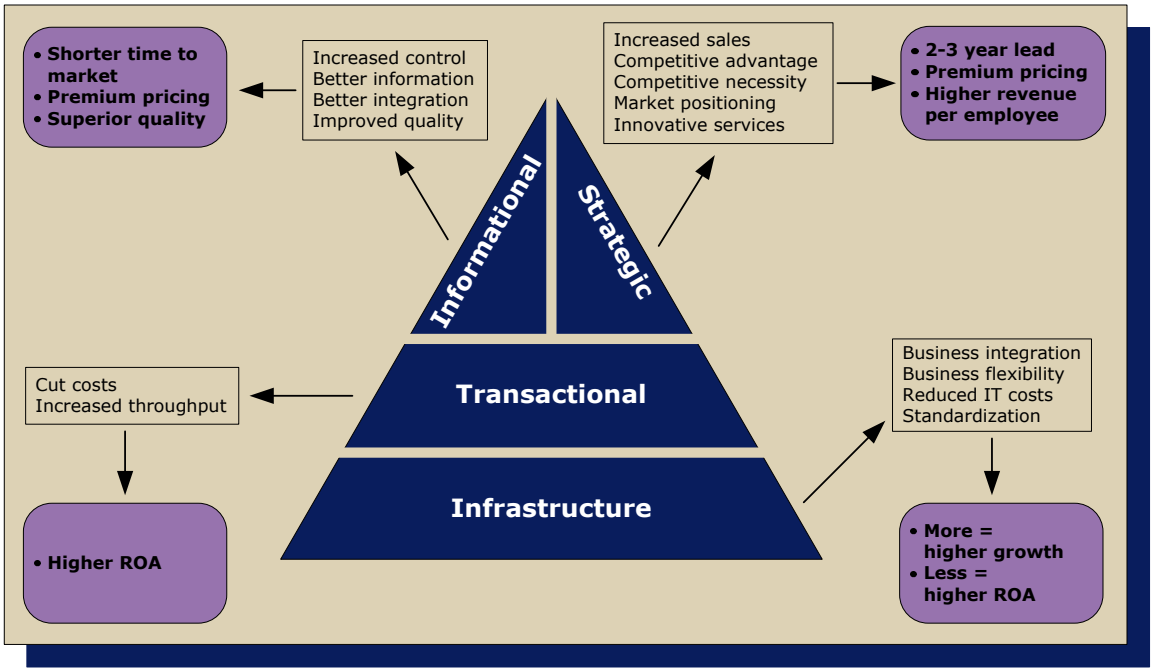


Figure 13: IT investment types & business value (Broadbent & Weill, 1998)

Strategic alignment of IT investments

According to the well known strategic alignment model (Henderson & Venkatraman, 1999), alignment should exist across all four domains in an organization:

- business strategy;
- IT strategy;
- organizational infrastructure and processes;
- IT infrastructure and processes.

Strategic alignment of IT investments means that the combination of current and planned IT investments, the total portfolio of programmes, contributes to the business and IT strategy by realizing the required changes in the organizational and IT infrastructure and processes. This comes down to answering the "are we doing the right things" question of "the four ares"; are the IT investments in line with the vision, consistent with business principles, contributing to the strategic objectives of the organization, providing optimal value at affordable costs and acceptable risks.

If the investment portfolio is strategically aligned, this means that there are no investments that do not contribute to any strategic goals, and that the investments contribute to all

strategic goals to the required extent (as different strategic goals may have different priorities).

Strategic alignment is realized, as described by Val IT (ITGI, 2006-1), by making sure the portfolio of IT investments is a right mix of investments on a number of dimensions.

As already mentioned, it is important that the strategic objectives of the organizations are achieved by the overall portfolio of IT investments. This means that, for example, an organization competing on cost with the objective to cut operational costs and increase the return on assets (ROA) will have more transactional investments. Whereas an organization with a differentiation-strategy should have relatively more informational and strategic investments.

But other dimensions play a role. As described by Weill & Broadbent (1998) and Val IT (ITGI, 2006-1), there should be a balance between risk and return, taking into account the different risk and return characteristics of the four types of investments. Strategic investments have high risks and high returns, where transactional investments have low risks and a solid return. Infrastructure and informational investments have a moderate risk and moderate return.

Additionally, Val IT (ITGI, 2006-1) suggests some more dimensions like short- vs. long-term returns and financial vs. non-financial benefits.

Weill & Broadbent (1998), based on their five year study of different organizations, found the following typical IT investment portfolio's for different types of organizations, as shown in Figure 14.

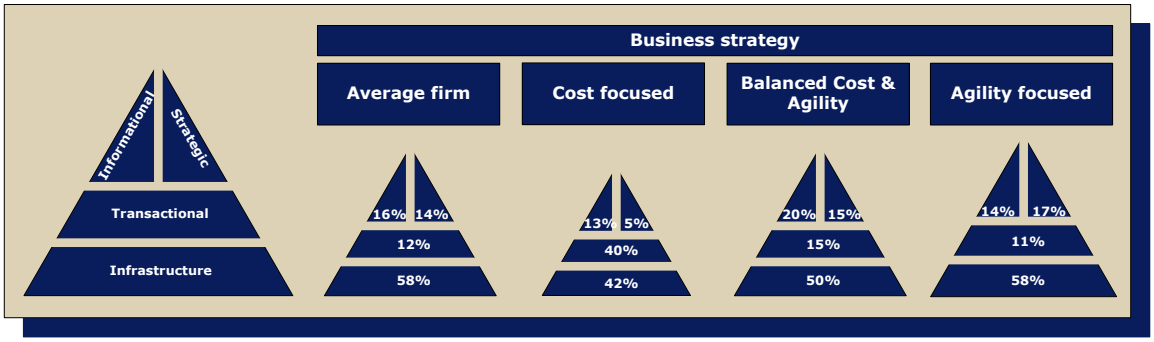


Figure 14: Typical IT investment portfolios (Weill & Broadbent, 1998)

It can be seen that cost-focused firms typically focus on transactional investments and have less infrastructure and strategic investments. At the other hand, agility focused organizations, seeing agility as a competitive advantage, typically have a lot of strategic and infrastructure investments.

For achieving the strategic alignment objective, goals will have to be set and monitored for the IT investment portfolio on the contribution of investments to different strategic goals, on risk vs. value, on short vs. long-term benefits and on financial vs. non-financial benefits.

Control of IT investments costs

This represents the traditional financial perspective on IT (Martinsons et al., 1999; Grembergen et al., 2004). Besides creating business value and realizing the strategic objectives, IT investments also bring huge costs.

Organizations typically work with IT budgets and part of this budget is reserved for IT investments. The budget needs to be controlled, as programmes and projects tend to take more budget (and time) then initially approved.

According to Grembergen et al. (2004), control of IT costs refers to the attainment of expense and recovery targets. Expenses are the costs made by IT investments and recovery targets refer to the allocation of investment costs for internal chargeback from BUs. Val IT (ITGI, 2006-1) states that an overall insight is required in the budget available for the portfolio covering the current commitment of that budget, the current approved spend and the actual spend to date.

A holistic view on the overall IT investment budget should be provided regularly provided. An example is shown in Figure 15, which has been taken from the Val IT case study at ING (ITGI, 2006-2).

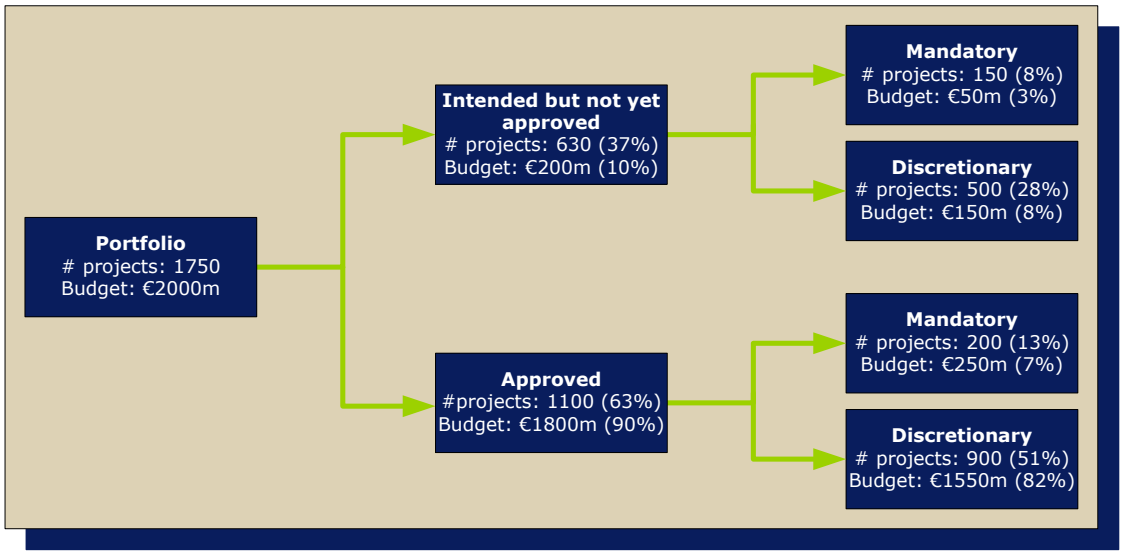


Figure 15: Holistic view of the IT investment portfolio (ITGI, 2006-2)

For monitoring the progress of programmes, actual costs and progress can be compared against budgets and milestones. Deviations have to be identified, the impact of the deviations has to be assessed and acted upon (ITGI, 2005).

Control of IT investment risks

The IT Governance Institute (ITGI, 2003) underlines the importance of risk management for the board and directors. There has to be a transparent view on significant risks for the organization, responsibility has to be taken and risk management has to be embedded in the operation of the organization to make sure (changes in) risks are reported and acted upon, either by mitigating, transferring or accepting the risks.

A nice illustration of the importance of risk management, also quite relevant for a lot of IT investments that failed in the past, is a quote of the captain of the titanic in 1912 (ITGI, 2003); "I cannot imagine any condition which could cause this ship to founder. I cannot conceive of any vital disaster happening to this vessel."

A lot of types of IT risks can be identified. When focusing on IT investments, three high-level types of risks are the most relevant (Hardy, 2005):

- *Investment risk (or expense risk)*
  The investment in IT fails to provide value for the money invested. Therefore, the most important risks have to be identified, reported on and taken action upon at the start of and during the course of the investment programmes. Example risks can be technical uncertainty (use of immature technology) and ownership risk (lack of accountability and commitment) at the beginning of a programme and lack of proper resources and interdependencies with other programmes (during the programme).
- *Impact on business*
  Issues related to IT investment programmes that can stop or harm the business like access or security risks (the risk that confidential or otherwise sensitive information is accessed without appropriate authority, impacting privacy), integrity risk (that data in unreliable) and availability risk (the risk of loss of service)(Hardy, 2005).
- *Risk of not being able to meet business requirements*
  Required investments can not be realized because of lack of knowledge, lack of resources or lack of IT infrastructure support.

To control IT investment risks, a status update on the most important risks has to be reported on a regular basis, so required actions can be taken.

Performance measures

Based on the previous analysis, generic performance measures can now be defined for the four objectives.

Business value of IT investments

Every programme or project in the overall portfolio of IT investments will result in business value that is very specific to that program or project.

To achieve the goals of measuring business value, it has to be expressed and measured at least on the third level of the business value hierarchy, the operational performance of the organization. But if possible, it should be expressed in the financial performance of the organization.

In general value is realized and thus should be measured in the time after the programme or project is finished. Measurement can take place by regularly comparing the expected value against the actually realized value.

Examples of financial performance measures:

- profitability, productivity / return on assets, earnings / revenue growth (Van der Zee, 2002; Weill & Broadbent, 1998);
- ratios like Return On Investment (ROI), Internal Rate of Return, Payback period, Net Present Value (NPV) (Grembergen & de Haes, 2005; Martinsons et al., 1999).

Examples of non-financial measures:

- time-to-market, new product sales and product/service quality (Broadbent & Weill);
- competitiveness, product development lead times, manufacturing lead times, distribution lead times, customer satisfaction (Van der Zee, 2002);
- customer responsiveness, process flexibility (Martinsons et al., 1999).

Last, CobiT (ITGI, 2005) gives some very high-level measures to measure the overall performance of the IT investment portfolio (derived from process PO5: Manage the IT investment):

- % of IT investments exceeding or meeting the predefined business benefit
- % of IT spend expressed in business value drivers (IT improvements expressed in financial / non-financial business value measures)

Strategic alignment of IT investments

Both the IT investments BSCs and also CobiT are rather vague about measuring the strategic alignment of IT investments.

Based on the analysis of this objective it comes forward that performance can be measured by comparing the current and planned IT investments with goals (that have to be defined) on different possible dimensions.

- Contribution to different strategic objectives; goal could be the % of IT investment budget to be spent on realizing different strategic objectives.
- Balance of risk & return, short- vs. long-term returns and financial vs. non-financial benefits; goal could be the % of IT investment budget to be spent on the four different investment categories as these all have a certain risk-return profile, short/long-term benefits profile & financial/non-financial benefits profile.

A High-level performance measure (from CobiT, PO1 "Define a Strategic IT Plan") in this area could be:

- the level of satisfaction of the business with current state (number, scope etc.) of the IT investment portfolio.

Control of IT investment costs

As described before, to control the IT investments insight is required in the use of the overall budget, the actual costs made (and possible deviations of the budget) and the allocation of costs.

On a very high level this can be measured by showing the use of the overall IT investment budget in the portfolio (as shown in Figure 15), specifying the intended vs. approved use of budget for discretionary vs. mandatory (non-discretionary) investments, compared to the actual spent.

One level deeper, the actual costs and progress of programmes have to be measured and deviations from the budget and planning have to be shown, so necessary actions can be taken. Furthermore, a clear allocation of the costs of different programmes to the business / cost centres has to be shown.

Furthermore, very high level performance measures can be defined for benchmarking purposes (Grembergen et al, 2004), like (Martinsons et al., 1999):

- the % of IT budget spent on IT investments vs. IT operational budget;
- the % of IT budget spent on discretionary vs. non-discretionary investments;
- IT budget of IT investment budget as % of revenue.

Control of IT investment risks

As described, for the control of IT investment risks, the different risks have to be identified and the progress of taking care of risks identified has to be monitored.

The most important risk, the investment risk, is dependent on good control of IT costs and good measurement of business value and strategic alignment, as IT cost control monitors the progress of programmes, if they are being delivered on time and on budget, measurement of

business value identifies (problems in) if business value is being realized and the measurement of alignment measures if programmes are useful. Measuring risks in this category comes down to identifying and reporting issues arising in the areas mentioned and reporting progress in overcoming the issues.

Possible issues related to the impact on business and on the ability to meet business requirements also have to be identified and reported, where after the actions taken have to be monitored on their effectiveness.

Possible high-level performance measures are provided by CobiT (ITGI, 2003) (derived from PO9 "Assess and manage IT risks & PO10 "Manage projects"):

- % of programmes & projects delivered on budget;
- % of programmes & projects delivered on time;
- % of programmes & projects meeting requirements.
- # of major incidents caused by risks (and not identified by risk assessment process)

Based on these CobiT measures, ideas for other high-level measures could be:

- # of programmes and projects with difficulties of finding staff;
- # of programmes and projects not possible because of lack of support by IT infrastructure.

3.1.2 User orientation perspective

This perspective evaluates the performance of the IT function from the viewpoint of internal business users. This as the IT function is an internal service provider and thus merely serves internal customers. The goal of IT is not to attract new (internal) customers, making the satisfaction of existing internal customers very important (Martinsons et al., 1999).

Internal customers in this case are end-users that have to work with the actual solution (changed business processes, new competencies required, new IT application etc.) but also the business managers trying to realize improvements in their BUs.

As illustrated by Van der Zee (2002), total IT value does not only exist of business value delivered. Applicable to IT investments is also the effectiveness of IT. This means that IT effectively supports business processes, activities and employees. IT specialist will have to establish and maintain a good relationship with internal customers to understand and anticipate their needs (Martinsons et al., 1999). Thus where the Corporate Contribution tries to answer "the four ares" in an objective way, the User Orientation perspective gives a subjective answer to the questions.

Mission:
Effectively support internal customers, from BU manager to end-user, to realize business strategies.

Objectives:
- Provide effective services to ensure satisfied business management.
- Provide effective services to ensure satisfied end-users

Theory on User Orientation objectives

As the value of IT investments from an internal customers perspective is for a large part determined by their (subjective) satisfaction with the services provided, it should play an important role (Martinsons et al., 1999).

Where business value can be quantified (to some extent) with objective measures like the measures in the corporate contribution perspective, the effectiveness experienced by the internal customers is more subjective.

For end-users, satisfaction will be largely determined by the extent to which the solution helps them do their jobs more effectively and efficiently (Martinsons et al., 1999). In the context of IT investments this comes down to for example the experienced usability, functionality and quality of solutions delivered.

Where Martinsons et al. primarily focus on end-users, Grembergen et al. (2004) focus more on satisfaction of business (unit) managers. For these internal customers, satisfaction with IT investments is determined by the quality of service in helping to achieve a positive impact on business processes and to achieve business strategies.

Demonstrating competitive cost (efficiency) is also considered important by both generic IT BSCs. But it is assumed that this applies more to operating the IT and that for IT investments effectiveness is considered more important.

Performance measures

To measure satisfaction, Martinsons et al. (1999) suggest a periodic survey among a broad cross-section of internal customers using quantitative methods, with additional semi-structured interviews to gain deeper insights.

This matches with an approach used by a specialized external party at a large financial firm and customer of Deloitte. In that organization, periodically the internal service quality (internal client satisfaction) is measured by surveying a large part of the end-users and a large part of decision-makers (business managers).

Although it will depend on the specific organizational context what is to be measured in a survey, some generic examples will now be given, retrieved from the IT BSCs, Cobit and the approach used at Deloitte's customer.

Business management satisfaction

Van Grembergen et al. (2004) identify some measures related to business management satisfaction, like:

- Service quality and responsiveness
- Value of IT advice and support
- (experienced) contribution to business objectives
- Satisfaction of (programme/) project sponsor(s)
- Satisfaction with management of projects (/programmes)

A lot of measures (outcome indicators) related to relevant CobiT processes refer to internal customer satisfaction. Some relevant measures for business executive satisfaction are described below.

Derived from PO1 "Define a strategic IT plan":

- Degree of approval of business owners of the IT strategic/tactical plans
- Level of satisfaction of the business with the current state (number, scope, etc.) of the project and applications portfolio

Derived from PO7 "Manage IT Human resources":

- Satisfaction level of stakeholders with IT personnel expertise and skills (for example in understanding business, providing advice).

Derived from PO10 "Manage projects":

- % of projects (& programs) meeting stakeholders expectations, weighted by importance:
    - on time
    - on budget
    - meeting requirements

Derived from AI4 "Enable operation and use":

- % of business owners satisfied with application training and support materials

Integrating the measures above results in the following list:

- Satisfaction with programmes and projects meeting expectations (on time & on budget, delivering required functionality);

- Satisfaction with current IT investment portfolio, with the overall portfolio of existing programmes and projects.
- Satisfaction with direction of portfolio, with strategic choices (priorities) made in selecting new programmes and projects.
- Satisfaction with IT personnel skills in providing services, understanding the business and providing relevant solutions, advice and support.

End user satisfaction

As described before end-users' satisfaction will be based largely on the extent to which solutions help them to their jobs more efficiently and effectively.

Some relevant measures provided by Cobit are described below

Derived from PO7 "Manage IT Human resources":

- Satisfaction level of stakeholders with IT personnel expertise and skills (for example in delivery & implementation of solutions).

Derived from AI1 "Identify automated solution":

- % of users satisfied with the functionality delivered.

Derived from AI4 "Enable operation and use":

- % of end users satisfied with application training and support materials.

Derived from AI4 "Procure IT resources":

- % of key stakeholders satisfied with suppliers.

Integrating the measures above results in the following list:

- Satisfaction with IT personnel skills in implementing and delivering solutions.
- Satisfaction with suppliers in implementing and delivering solutions.
- Satisfaction with training on and support (materials) of solutions.
- Satisfaction with solutions after project / programme (with functionality, quality, usability etc.).

3.1.3 Operational Excellence perspective

The Operational Excellence perspective gives a view on the performance of internal processes (Martinsons et al., 1999) involved in IT investments, serving the viewpoint of IT management (process owners, service delivery managers) and audit and regulatory bodies (Grembergen et al., 2004).

According to the two IT BSCs, the IT function has to provide high quality services at lowest possible costs, thus providing effective and efficient IT processes. Following the objectives in the Corporate Contribution and User Orientation perspectives, it is more important that processes are performed in the right way than that they are done as efficient as possible. Thus for IT investments the emphasis should be on effectiveness of processes involved.

This also follows from "the four ares" of IT investments. Supporting "the four ares", it is important that internal processes support doing the right investments, support realizing benefits of investments, support getting the investments done well and support doing them in the right way, in line with the architecture, applicable standards and policies.

Mission:
Effectively and efficiently execute the processes involved in IT investments.

Objectives:
- Provide efficient and, especially, effective processes for realizing benefits from IT investments
- Provide efficient and, especially, effective processes for doing the right IT investments
- Provide efficient and, especially, effective processes for getting the IT investments done well
- Provide efficient and, especially, effective processes for realizing IT investments in the right way.

Theory on internal processes

In section 2.2 it was made clear what is understood by IT investments in this thesis. And since the effectiveness and efficiency of the internal processes involved have a big influence on the performance of the investments, it is necessary to further explore what processes are (or should be) involved in IT investments and how their effectiveness and/or efficiency can be measured.
Martinsons et al. (1999) mention three processes in the internal process perspective:

- planning;
- development;
- operations.

Grembergen et al. (2004) mention three processes in their IT BSC:

- development process;
- operational process;
- enterprise architecture management;

Obviously, the operations / operational process do not apply for IT investments. Left are then planning, development and enterprise architecture management. But do these processes represent all processes directly involved in realising IT investments?

CobiT (ITGI, 2005) gives a generally accepted and very detailed process model for the IT function and will therefore be used as basis for identifying in more detail the processes involved. Recently, CobiT has been extended and complemented with Val IT (ITGI, 2006), which has a specific focus on IT investments.

CobiT is especially suitable because it also gives measures of outcomes (what processes deliver) and links these to measures monitoring how they deliver it (process performance). In CobiT, IT processes are structured according to the following domains of processes (ITGI, 2005):

- *Plan and organise*
  Planning and organising the enterprise resources. Processes concerning planning like defining an IT strategy and tactics and the realisation of that strategic vision. But also different management processes for managing i.e. projects, IT risks, IT human resources and quality.
- *Acquire and implement*
  Processes on realising the IT strategy, developing or acquiring, implementing and integrating IT solutions. Also changes in and maintenance of existing systems are covered.
- *Deliver and support*
  Actual delivery of required IT services, including service delivery, management of security and continuity, service support for users and management of data and operational facilities.
- *Monitor and evaluate*
  Processes involved in monitoring, evaluating and directing all IT processes.

Val IT focuses specifically on IT investments and recognises the following domains of processes:

- *Value Governance*
  Establish a governance, monitoring and control framework, establish strategic direction and establish investment portfolio directions, providing strategic direction for the investments and defining the relationship between IT, the business and the functions with governance responsibility.
- *Portfolio Management*
  Establish and manage (human) resource profiles, establish an investment threshold (investment budget), evaluate, prioritise and select new investments and manage, monitoring and report the performance of the current portfolio.

- *Investment Management*
  The three main components of investment management are business case development, programme management and benefits realization. This process is responsible for identifying business requirements, understand candidate programmes (& alternatives), definition of the programme including a detailed business case including benefit details, and for managing, monitoring and reporting the performance of programmes.

Where Val IT only applies to IT investments, CobiT covers the whole IT function. Thus, not all CobiT processes are relevant for IT investments, since CobiT also includes processes for maintaining and operating the IT environment. Processes involved in IT investments can be found in the Plan & Organise and Acquire & Implement domains. This also comes forward when relations between Val IT and CobiT are further investigated; Val IT processes and best practices mostly refer to CobiT's Plan & Organise, Acquire & Implement processes. Relations between Val IT and CobiT (ITGI, 2006-1) are shown in Figure 16.

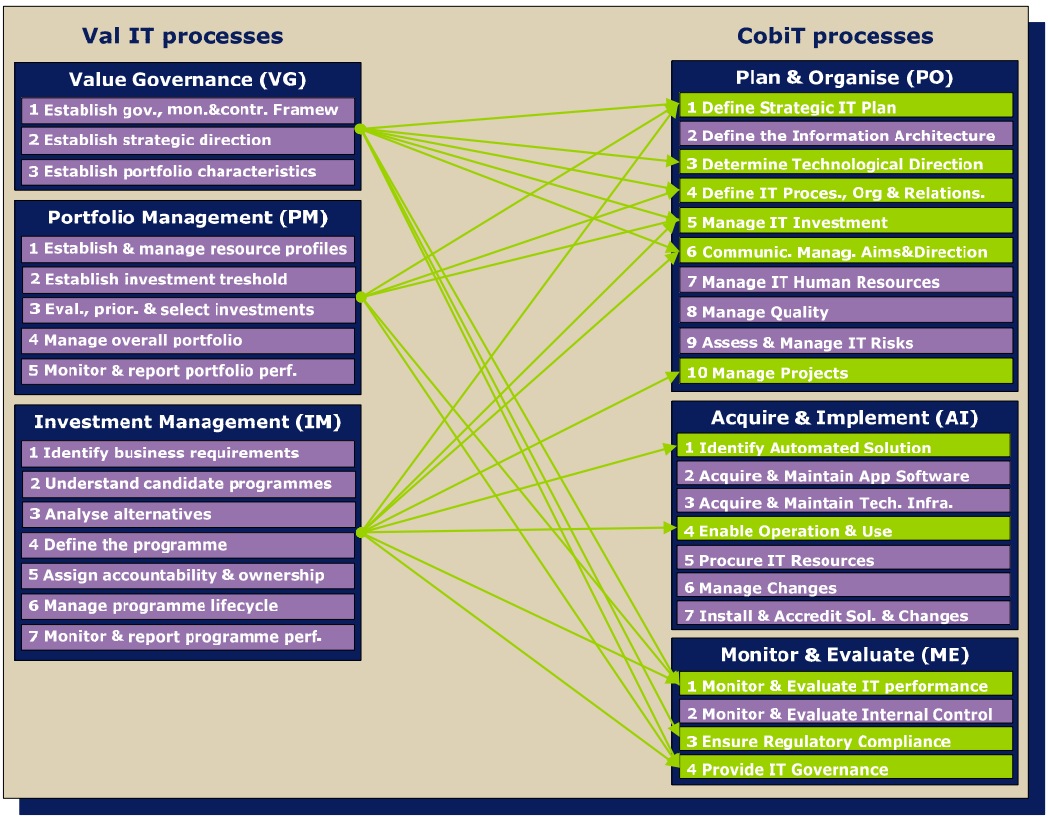


Figure 16: relations between Val IT & CobiT processes (ITGI, 2006-1)

From the figure it also comes forward that Val IT refers to CobiT's Monitor & Evaluate processes. These are Val IT & CobiT practises concerned about roles, responsibilities, structures and processes for directing and controlling IT investments. As these processes *use* the IT investment BSC, they are not considered part of the internal processes that have to be monitored in this IT investment BSC perspective. They could be part of internal processes of a

higher-level (business) BSC or a BSC specific for measuring the efficiency and effectiveness of governance processes.

Leaving out the processes concerned about roles, responsibilities, structures and processes for directing and controlling IT investments and integrating where possible, the following Val IT processes are considered part of the internal processes in this IT investment BSC.

Portfolio level processes

- **Define IT strategy and portfolio characteristics (VG2 & 3)**
  Establish IT strategy based on common agreed understanding between IT function & business regarding IT. Definition of investment categories, a target portfolio mix and evaluation criteria per category.
- **IT investment human resource management (PM1-5)**
  Asses existing IT human resources, the required resources for the portfolio and develop a plan for resources required to support the portfolio. Periodically review resource requirements & utilisation to adjust staffing requirements & sourcing strategies.
- **IT investment financial management (PM6)**
  Determine (annual) budget for portfolio, commitment to budget and current vs. actual approved spend.
- **Evaluation, prioritisation, selection & management of IT investments (PM7–13)**
  Evaluation of programme concept business cases, detailed evaluation of high potential programme business cases, assessment of impact on portfolio, decide what programmes are executed and stage-gating & funding of selected programmes. Regular review of the portfolio (identify synergies and manage risks) and reprioritisation of portfolio to reflect changes in internal or external business environment.

Programme level processes

- **Define of candidate programmes (IM1-7)**
  Identification and definition of opportunities in business and development of initial business case. For candidate programmes a clear and shared understanding of programme is developed and documented, analysis of alternative solutions is performed; also a programme plan is developed, including a benefits realisation plan and programme budget.
- **Assignment of programme accountability and ownership (IM9)**
  Assignment of accountability for achieving benefits, controlling costs, managing risks and coordinating different projects involved after a project is approved.

- **Programme management (IM10-13, 15)**
  Planning, resourcing and commission of necessary projects, management of programme and individual project performance against defined criteria, tracking of programme benefits and a possible update of the business case when necessary. And, at the end, the official retirement of the programme when there is agreement that business value is or will be realised.

Interesting is that the comparison shows some gaps in Val IT; processes from CobiT that directly influence the outcomes of IT investments, but are not covered by Val IT, especially on the project level. This is also recognised by Val IT though, as the authors state that Val IT especially pays attention to doing the right things and getting the benefits. Doing investments in the right way and getting them done well is to be covered by CobiT processes. Therefore, the following CobiT processes are also considered part of the internal processes in this IT investment BSC:

Project level processes

- **IT Architecture management (PO2 & PO3)**
  Together these CobiT processes cover the definition and management of different levels of the enterprise architecture model. Val IT does not pay attention to this topic, although new investments should be aligned with the existing and planned IT architecture.
- **Quality management (PO8)**
  Establishment and maintenance of a quality management system and the measurement, monitoring and review of the quality of the services delivered by IT. Val IT doesn't mention quality anywhere.
- **Acquisition of solution (AI2, AI3 & AI5)**
  These processes take care of the actual design & development of applications and acquisition of technical infrastructure upgrades based on procedures and according to standards.
- **Implementation of solution (AI4, AI6 & AI7)**
  All actions needed to implement the solution in the right way, based on standard procedures.

Performance measures

The Operational Excellence perspective gives a view on the performance of internal processes involved in IT investments.

What needs to measured is to what extent internal processes support doing the right investments, support realizing benefits of investments, support getting the investments done

well and support doing them in the right way, in line with the architecture, applicable standards and policies.

As stated before, CobiT provides for every CobiT process measures of outcomes (what processes deliver) and links these to measures monitoring how they deliver it (performance drivers). The first category results in outcomes in the User Orientation and Corporate Contribution perspective. The second category evidently has to be measured in this Operational Excellence perspective.

A lot of processes identified before are part of Val IT. But Val IT does not yet provide measures. It links its processes to CobiT processes though. Therefore, measures for these processes will be based on measures of CobiT processes, with small modifications based on Val IT process descriptions.

For all identified processes, some possible measures (performance drivers) are described below.

Portfolio level processes

- **Define IT strategy and portfolio characteristics**
  - % of strategic / tactical plan meetings, addressing strategy and portfolio characteristics, where business representatives have actively participated (PO1 & Val IT)
  - Frequency of meetings of strategy and steering committees (PO4)
- **IT investment human resource management**
  - Frequency of resource utilisation & requirements reviews (P04 & Val IT)
  - % of IT positions with job descriptions & hiring qualifications (P07)
- **IT investment portfolio budget management**
  - % of strategic / tactical plan meetings, addressing the IT investment portfolio budget, where business representatives have actively participated (PO1 & Val IT)
  - % of IT investment budget that is costed / allocated to the business (PO5 & Val IT)

- **Evaluation, prioritisation, selection & management of IT investments**
  - % of strategic / tactical plan meetings, addressing the IT investment portfolio, where business representatives have actively participated (PO1 & Val IT)
  - % of new IT investments championed by business owners (PO1)
  - compliance of decisions to defined IT strategy and portfolio characteristics (PO1 & Val IT)

- % of programmes decided on with expected benefits, risks & availability of resources defined upfront (PO1 & Val IT)
- Frequency of portfolio review and reprioritisation (PO5 & Val IT)

Programme level

- **Definition of candidate programmes**
  - % of new programme initiatives with a comprehensive business case defined (risks & interdependencies, required resources, costs & benefits, strategic alignment, programme plan) (PO5 & Val IT)
  - % of new programme initiatives subject to feasibility study, signed off by the business process owner (business case) and IT manager (technical aspects) (AI1 & Val IT)
  - % new programme initiatives championed by business owners (PO1)
  - % of new programme initiatives with defined target measures for key (business) outcomes (PO5 & Val IT)

- **Assignment of programme accountability and ownership**
  - % of new programme initiatives compliant to corporate policy, having clear accountability and ownership (for achieving benefits, controlling costs, managing risks, co-ordinating activities) (PO6 & Val IT)

- **Programme management**
  - % of projects & programmes where performance information (budget status, risks/issues, milestones, benefits) is (regularly) available (PO5 & Val IT)
  - Frequency of performance reporting (PO5 & Val IT)
  - % of programmes & projects following management standards and practices (PO10 & Val IT)
  - % of certified or trained programme & project managers (PO10 & Val IT)
  - % of programmes & projects receiving post-implementation review (PO10 & Val IT)
  - % of stakeholders participating in programmes & projects (PO10 & Val IT)
  - % of involved vendors evaluated p/y (not mentioned in CobiT or Val IT, but should important as often a large part of the work is outsourced)

Project level

- **IT Architecture management**
  - % IT new programmes / projects verified against information architecture (based on PO3)
  - Frequency of meetings held by the technology forum, IT architecture board and of technology infrastructure plan review/update (PO3)

- **Quality management**
  - % of programmes / projects receiving QA review (PO8)

- **Acquisition of solution**
  - Average time & cost to deliver required functionality (based on AI2)

- **Implementation of solution**
  - % of solutions with available, complete and accurate user and operational documentation (based on AI4)
  - % of solutions with adequate user and operational support training provided (based on AI4)

3.1.4 Future orientation perspective

This perspective shows the performance from the viewpoint of the IT organization itself: process owners, practitioners and support professionals (Grembergen et al., 2004). It addresses the readiness of the IT function for the future (Martinsons et al., 1999). Logically, relating this to IT investments, it should address the readiness of the IT function for IT investments required in the future.

Referring to the "four ares" again, this perspective should address to what extent the IT function is ready (and improving) to make sure demanded future investments will be supported, that the organization can keep doing the right investments, keep getting the benefits, that the organization can keep doing them in the right way and can keep getting them done well (or better). First two will have to be supported by researching new technologies, the last two have to be supported by continuously improving IT personnel capabilities and the application & technology infrastructure. In general, improvement can be supported by managing knowledge.

Mission:
To deliver continuous improvement and prepare for future challenges to make sure investments required to realize optimal business value in the future are supported.

Objectives:
- Conduct research into emerging technologies and their suitability for the business to identify new IT investment possibilities.
- Continuously upgrade IT practitioners' skills through training and development so IT personnel capabilities support demand.
- Regularly improve IT applications portfolio & technology infrastructure to support future investments.
- Manage knowledge gathered in projects and programmes to continuously improve.

Theory on future orientation

Research into emerging technologies

According to Martinsons et al. (1999), there has to be a thorough understanding of emerging technologies as well as their specific suitability to the organization. By doing this, different possible new IT investments are identified in time and can be turned into improvement programmes after setting priorities.

Research into emerging technologies is also important to support IT-driven improvements. The investment processes and measures in the other perspectives mainly support a business driven focus on IT investments. Which is good as in the past too often IT improvements were pushed by the IT department, while they did not result in much improvement for the business. But sometimes emerging technologies can support the business or even radically change the way of doing business. And those opportunities should be identified.

IT Human Resource Management

Martinsons et al. (1999) state that the skills of IT personnel have to be continually improved to prepare them for changes and challenges in the future. This certainly applies to IT investments, as new investments may require new skills. Furthermore, to keep doing things better, requiring a motivated and experienced IT staff, IT personnel should be satisfied (van Grembergen et al, 2004) with their work, resulting in higher motivation and lower turnover/ retention rates.

Applications portfolio and IT infrastructure

New IT investments may require a certain supporting infrastructure, concerning hardware and software. Also, new investments may require certain support of the existing application portfolio (for example supporting certain communication) protocols. The IT function must make sure that infrastructure and applications are regularly updated and improved (Martinsons et al., 1999) to ensure these will not form a bottleneck for future IT investments.

Knowledge management

Grembergen et al. (2004) underline the importance of knowledge management for future readiness of the IT function. To keep doing things better, not making the same mistakes and thus learn from lesson in the past, knowledge gained in programmes that have been finished should be preserved and shared within the organization. Grembergen et al. (2004) suggest a 'Cybrary', an intranet that employees can access for seeking and sharing knowledge. To be effective, knowledge has to be shared on this 'cybrary', for example by sharing lessons learned in a project and sharing relevant project documents. But also it must be made sure that the

cybrary is used when starting a programme or project to find out if relevant knowledge is available.

Performance measures

The generic balanced scorecards already suggest some performance measures for the identified objectives. Also, relevant processes in CobiT provide possible measures.

Research into emerging technologies

- % of overall IT budget spent on IT research / innovation (based on Martinsons' IT BSC)
- Satisfaction of top management with reporting on suitability of emerging technologies (based on Martinsons' IT BSC)

IT Human Resource Management

- % of overall IT budged spent on IT training & development (based on Martinsons' IT BSC)
- IT staff expertise with existing and emerging technologies (based on Martinsons' IT BSC & P07)
- Satisfaction of IT personnel (PO7, Martinsons' & van Grembergen's IT BSC)
- IT staff turnover / retention (PO7, Martinsons' & van Grembergen's IT BSC)
- Age distribution of IT staff (Martinsons' & van Grembergen's IT BSC)

Applications Portfolio & IT infrastructure

- % of IT investment budget spent on improving IT infrastructure (based on Martinsons' IT BSC)
- % of IT investment budget spent on maintaining existing applications (AI2)
- % of applications portfolio & IT infrastructure not in line with defined IT architecture & technology standards (based on AI3)
- Age distribution of applications portfolio (based on Martinsons' IT BSC)
- Platform distribution (based on Martinsons' IT BSC)

Knowledge management

- % of projects delivering lessons learned and relevant project documents to 'Cybrary' / knowledge management system. (based on Grembergen's BSC)
- Use of 'Cybrary'/ knowledge management system (for example by # unique visitors, # contributions).

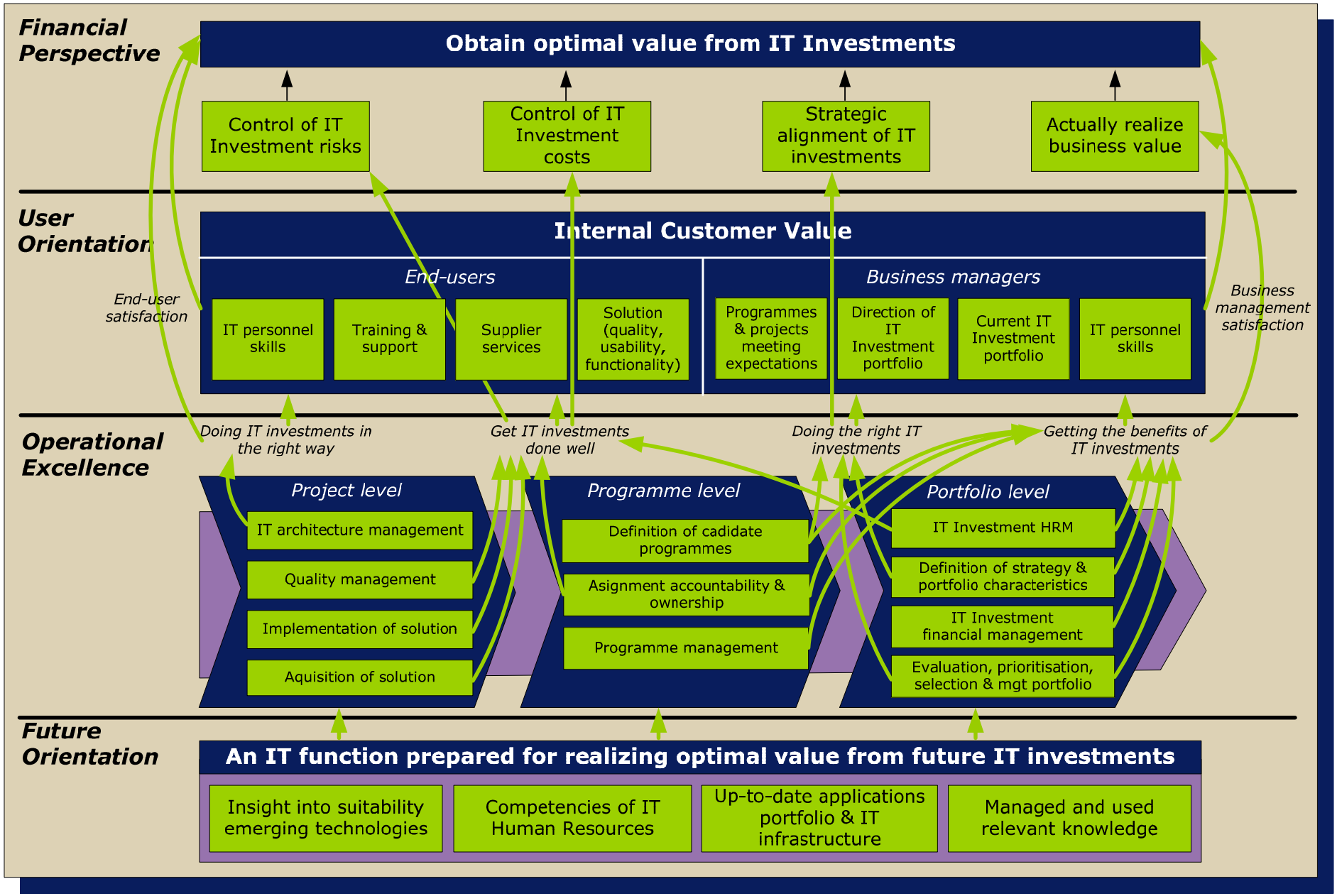


Figure 17: Strategy map of IT investment BSC, linking cause and effect.

The strategy map shows on a high level the cause-and-effect relations between objectives in the different perspectives:

- By realizing objectives in the future orientation perspective, the IT function is prepared to optimally support the internal processes of IT investments.
- Performing the involved processes in the right way supports doing IT investments in the right way (in line with architecture, standards etc), getting the IT investments done well (delivering the right functionality in a proper way, in time and with control of costs and risks), doing the right IT investments (strategic alignment) and getting the benefits of IT investments;
- Performing internal processes in the right way will result in satisfied internal customers and support realizing corporate contribution objectives; actually realize business value, a strategically aligned portfolio of IT investments, with control of risks and costs.
- The last support the highest level goal; obtain optimal value from IT investments.

The IT Investment BSC described before gives a good basis for developing a PMS of IT investments. In the last part of this third chapter, attention is paid to some practical issues to consider related to the IT Investment BSC. First, attention is paid to important (organizational) context factors that will possibly influence what performance measures can be measured and what performance measures should have priority. Last, issues will be discussed that possibly are encountered in designing, implementing and using performance measures.

3.2 IT Investment BSC context

According to a publication of Deloitte Research (2004-1), there is no one-size-fits-all IT Governance model. The implementation of IT governance is influenced by a number of drivers (Deloitte, 2004-1) creating a specific context for every organization:

Business drivers

- *Trends and developments* like cost pressures to reduce IT expenditure and new regulatory requirements.
- *Business strategy* as some organizations lead on costs (requiring IT to support cutting operational costs as well as its own costs) where others lead in quality (requiring IT to deliver high quality, customized IT environments, making cost a less important issue).
- *The industry environment*; some organizations need decentralised IT functions to respond to local business requirements where other organizations need a centralized IT function to improve synergy and cut IT costs.
- *Corporate organization model*; different independent BUs with own facilities versus centralized facilities and more central authority.

IT drivers

- *Role of IT*; Is IT a service provider, only required to deliver the basic IT services to as low as possible cost? Or is IT considered a strategic partner, where IT is considered a key competence by the business to differentiate and for business growth.
- *Level of integration*; required link between different IT systems of different parts (BUs) of the organization. Depending on the possible synergy between different parts. Utilizing possibilities for synergy require more integration between IT systems of the different parts of the organization.
- *IT environment*; the existing (legacy) IT infrastructure
- *IT sourcing strategy*; shared service centres, off shoring and/or outsourcing parts of IT.

But what is the influence of these context factors on performance measurement of IT investments?

The industry environment and the corporate organization model, but also the IT sourcing strategy, will influence the IT organization's structure.

Powerful decentralized IT departments in separate, powerful BUs can be seen as individual organizations, not having much consequences for performance measurement, as the same IT Governance demands (add business value, mitigate risks etc) apply to a powerful BU as to the whole organization.

Outsourcing is mostly focused on operating the IT environment, not impacting the investment part that much. In the case that IT projects are being outsourced, it means you will have less influence on some parts of the process. This means that although you may be able to measure outcomes, it will be more difficult to influence these outcomes.

A different strategy means different types of investments. This will have consequences for the type of value that will be measured and the difficulty in measuring those values. But the same outcome indicators and performance drivers apply, i.e. for a differentiation strategy, the strategic alignment measure would require that investments have to increase for example product quality, resulting in more customers and increased revenue (outcome). In a cost strategy, investments should for strategic alignment increase operational efficiency, resulting in lower operating cost (outcome).

The required level of integration and the status of the IT environment will also affect the type of investments (Weill & Broadbent, 1998) (especially more / less IT infrastructure projects), changing values of goals of investments, as with the difference in strategy.

Last, the role of the IT function will be influenced by the importance of IT for the organization, which in turn is influenced by the type of industry. The role will influence the need for "change", impacting the budget for change and the type of investments. As with the difference in strategy, this will influence the required outcome value of IT investments. But as the size of changes is less, this will possibly also change the required sophistication (and cost!) of measurement and thus the required maturity level of performance.

From the IT governance context, two important context factors are derived that will possibly influence the design of a PMS:

- **Type of investments**
  A different portfolio with different types of IT investments (as described in chapter 2) will require a different focus in measurement. In organizations with a lot of transactional investments, the measurement focus will be on the value realized. But for example organizations with a lot of strategic investments or infrastructure investments will focus more on risk control and cost control.
- **Total investment size (€)**
  If budget is small, it might be the case that extensive performance measurement / management with complex measures and a lot of processes & structures for decision making cost more than the value it creates. This is underlined by Hoque and James (2000). They found that as size increases, organizations find it more practical and useful to place greater emphasis on the BSC that supports their strategic decision-making. Thus, one would expect organizations with a large IT investment budget to have more attention for controlling and directing these properly, thus paying more attention to performance measurement.

Not addressed yet is the **maturity of the IT function in governance of IT investments**. This maturity affects what an organization can and should measure. The model of IT Governance maturity suggested by ITGI (2003) is shown in Figure 18 on the next page.

A lower maturity implies the absence of a lot of structures and processes required for controlling & directing IT investments. Processes as described by Val IT and CobiT will not always be in place. It also means people are not used to giving detailed insight in what they are doing. This will result in different measures and different issues in implementing and using measures for different levels of maturity. As Gartner (Gomolski, 2004) puts it:
"Organizational maturity should be considered when selecting an approach. If a firm has little history of measuring IT performance, it should begin by measuring efficiency and service levels, as opposed to taking on value metrics that are difficult to quantify. Later, when IT measurement has become part of the company's culture, IT measurement can begin to capture the business value of IT. This indicates the need for an IT performance maturity model."

(0) Nonexistent	(1) Initial / adhoc	(2) Repeatable but intuitive	(3) Defined process	(4) Managed and measurable	(5) Optimised
There is no senior management oversight of IT-related activities to ensure that the enterprise's IT goals add value to the organisation and to ensure that IT-related risks are appropriately managed.	The concept of IT governance does not exist formally and oversight is based mostly on management's consideration of IT-related issues on a case-by-case basis. The governance of IT depends on the initiative and experience of the IT management team, with limited input from the rest of the organisation. Upper management is involved only when there are major problems or successes. The measurement of IT performance is typically limited to technical measures and only within the IT function.	There is a realisation that more formalised oversight of IT is required and it needs to be a shared management responsibility requiring the support of top management. Regular governance practices such as review meetings, creation of performance reports, and investigation into problems take place, but rely mostly on the initiative of the IT management team, with voluntary or co-opted participation by key business stakeholders, depending on current IT projects and priorities. Problems identified are tackled on a project basis with teams formed as necessary to undertake improvements.	An organisational and process framework has been defined for oversight and management of IT activities and is being introduced to the organisation as the basis for IT governance. The board has issued guidance, which has been developed into specific procedures for management covering key governance activities. These include regular target-setting, reviews of performance, assessments of capability against planned needs, and project planning and funding for any necessary IT improvements. Previous informal but successful practices have been institutionalised and the techniques followed are relatively simple and unsophisticated.	Target-setting has developed to a fairly sophisticated stage with relationships between outcome goals in business terms, and IT process improvement measures now well understood. Real results have been communicated to management in the form of a balanced scorecard. The enterprise's management team is now working together for the common goal of maximising IT value delivery and managing IT-related risks. There have been regular assessments of IT capabilities and projects have been completed that have delivered real improvements to IT's performance. Relationships among the IT function, its users in the business community and external service providers are now based on service definitions and service agreements.	IT activities have been optimally directed toward real business priorities, value being delivered to the enterprise can be measured and steps taken to correct significant deviations or problems. The BSC approach has evolved into one that is focused on the most important measures relevant to the enterprise's overall business strategy. The effort spent on IT management activities has been streamlined through adoption of standardised & automated processes. Continuous improvement of IT capability is embedded in the culture including regular external benchmarking and independent audits providing positive assurance to management. Cost of IT is monitored effectively and the organisation is able to achieve optimal IT spending through continuous internal improvements, the effective outsourcing of selected services and effective negotiation with vendors.

Figure 18: IT Governance maturity model (ITGI, 2003)

Grembergen et al. (2004) suggest the following performance measurement maturity model for their generic IT BSC, as shown in the table below. It illustrates the increasing complexity of the PMS as maturity increases.

Level	Description
1: Initial	There is evidence that the organization has recognized there is a need for a measurement system for its information technology division. There are ad hoc approaches to measure IT with respect to the two main IT processes, i.e., operations and systems development. This measurement process is often an individual effort in response to specific issues.
2: Repeatable	Management is aware of the concept of the IT Balanced Scorecard and has communicated its intent to define appropriate measures. Measures are collected and presented to management in a scorecard. Linkages between outcome measures and performance drivers are generally defined but are not yet precise, documented or integrated into strategic and operational planning processes. Processes for scorecard training and review are informal and there is no compliance process in place.
3: Defined	Management has standardized, documented and communicated the IT BSC through formal training. The scorecard process has been structured and linked to business planning cycle. The need for compliance has been communicated but compliance is inconsistent. Management understands and accepts the need to integrate the IT BSC within the alignment process of business and IT. Efforts are underway to change the alignment process accordingly.
4: Managed	The IT BSC is fully integrated into the strategic and operational planning and review systems of the business and IT. Linkages between outcome measures and performance drivers are systematically reviewed and revised based upon the analysis of results. There is a full understanding of the issues at all levels of the organization that is supported by formal training. Long term stretch targets and priorities for IT investment projects are set and linked to the IT scorecard. A business scorecard and a cascade of IT scorecards are in place and are communicated to all employees. Individual objectives of IT employees are connected with the scorecards and incentive systems are linked to the IT BSC measures. The compliance process is well established and levels of compliance are high.

5: Optimized	The IT BSC is fully aligned with the business strategic management framework and vision is frequently reviewed, updated and improved. Internal and external experts are engaged to ensure industry best practices are developed and adopted. The measurements and results are part of management reporting and are systematically acted upon by senior and IT management. Monitoring, self-assessment and communication are pervasive within the organization and there is optimal use of technology to support measurement, analysis, communication and training.

Table 2: Performance measurement maturity levels (Grembergen et al., 2004)

Concluded can be that the use of measures of the IT Investment BSC in practice will be influenced by the *type of IT investments* in the IT investment portfolio, *the budget for IT investments* and *the maturity* of the IT function in governance of IT investments.

3.3 Issues in designing, implementing and using performance measures

According to Franco-Santos & Bourne (2005), five main factors have an impact on how successful organizations are in managing with measures; is dependent on the process of designing, implementing and using the measures and on the external and internal context.

These factors give a nice framework to analyze what issues may be encountered when using the IT Investment BSC to set up a PMS. Categorized based on the factors of Franco-Santos & Bourne (2005), possible issues identified in literature are now described.

3.3.1 Design

The design is mainly focussed on choosing a suitable framework and filling it with the right measures. Different issues can arise in this phase, according to literature.

- *Linking strategy to measures*
  Issues the integration, linkage and cascading of mission, vision and strategy (Franco-Santos & Bourne, 2005) in the BSC, also experienced by Papalexandris et al (2005) as difficulties in designing the strategy map, the issue of reaching consensus on the various performance measures. Difficulties also arise in this case if there is not a clear business strategy (Mettanen, 2005).
- *Defining non-financial measures*
  Defining non-financial measures is often difficult (Papalexandris et al, 2005).
- *Identifying cause-and-effect relations relationships*
  Martinsons et al (1999) describe possible difficulties in identifying cause-and-effect relationships between performance drivers and outcome measures. They suggest that explicit cause-and-effect relationships have to be identified before an IT BSC is

implemented. Also it should be considered how performance drivers will improve performance.

3.3.2 Implementation

Implementation is the stage in which a BPM system and its procedures are put in place (Franco-Santos & Bourne, 2005). Possible issues in this phase are mentioned below.

- *IT to support PM*
  An IT system to support collecting, analysing and reporting data seems to be crucial. The data collection, analysis and reporting should be automated as much as possible to save time and effort as well as to provide consistency (Nudurupati & Bititci, 2005). But difficulties exist in the integration of a BPM system with other key management systems such as planning and budgeting, rewards or information systems (Franco-Santos & Bourne, 2005). Also, using information systems to measure non-financial measures seems to be difficult (Franco-Santos & Bourne, 2005).
- *Top management support*
  Top management is recognized by a lot of authors as being a critical success factor for a PMS. But top management commitment often changes (decreases) (Bourne, 2005) during a PMS project, as the perceived benefits decrease compared to the effort (increase) required during the project. The priority of the PM project among other initiatives / projects often decreases.
- *Getting the required data for measures*
  Obtaining the data for some of the measures (Mettanen, 2005) and designing and implementing new processes to facilitate has proven to be complex. Also, data collection for non-financial measures can require a lot of work (surveys) compared to data for financial measures, which can be taken i.e. from the financial statement.

3.3.3 Use

The actual use of the PMS for monitoring performance and taking actions based on the system.

- *Resistance*
  A PMS can result in a lot of resistance; this can be in applying the system in a specific BU or for example in delivering the (right) data. Often, performance measurement is seen as the latest attempt of higher level management to interfere in internal business processes. Brady (1993) states one should design targets around long term objectives to offset this concern. Also the involvement of employees in design and implementation is crucial (Franco-Santos & Bourne, 2005; Martinsons et al., 1999; Mettanen, 2005). Additionally, it is also important to involve the Human Resources and the Information System functions in the development of a BPM system, since their expertise and knowledge of people management and technology respectively, is extremely useful (Franco-Santos & Bourne, 2005). Also enablement and

encouragement helps overcome resistance and improve the (right) use later on. This underlines the need for people's education and training on the measures and on the related tools and procedures and the need for actions or activities that actually motivate people to use the data provided by a BPM system in their day-to-day work (Franco-Santos & Bourne, 2005; Martinsons et al., 1999; Mettanen, 2005). Last, communication is important in the form of feedback on measurement results, but also to clarify all aspects related to measurement (Franco-Santos & Bourne, 2005).

- *Misunderstanding*
  Indicators are usually poorly defined which can lead to misunderstanding. The measures and indicators should be clearly defined (Nudurupati & Bititci, 2005) and, as stated before, people have to be trained on measures and related tools and procedures.
- *Relevance of measures diminishes over time*
  To be prevented by continuous review of measures, their results and impact on goals and strategy (Franco-Santos & Bourne, 2005).
- *PM results in data, but not in insight.*
  Analyse the data based on a business question and act, based on the analysis results (Franco-Santos & Bourne, 2005).
- *Reliability of data*
  Frolick & Alichandra (2006) state that close to 50 percent of executive managers place no confidence in the numbers presented to them.
  On one hand rewards are presented here as the solution to improve the use and perceived results, but on the other hand it is argued that rewarding will increase subjectivity and therefore the reliability of the measurement system (Franco-Santos & Bourne, 2005).

3.3.4 Internal & external context

In literature an important internal issue is recognized is the culture in an organization.

- *Culture*
  As stated before IT measurement has to become part of an organization's culture. What are characteristics of such a culture is unclear. Bourne (2005) suggests "*a paternalistic culture might well be beneficial for the implementation of performance measures as this would reduce the fear of measurement and therefore the resistance to implementation*".

3.4 Conclusion

3.4.1 Performance measures (I)

An overview of the IT Investment BSC that is suggested as a system of performance measures for measuring the performance of IT investments is shown in Figure 19 on the next page.

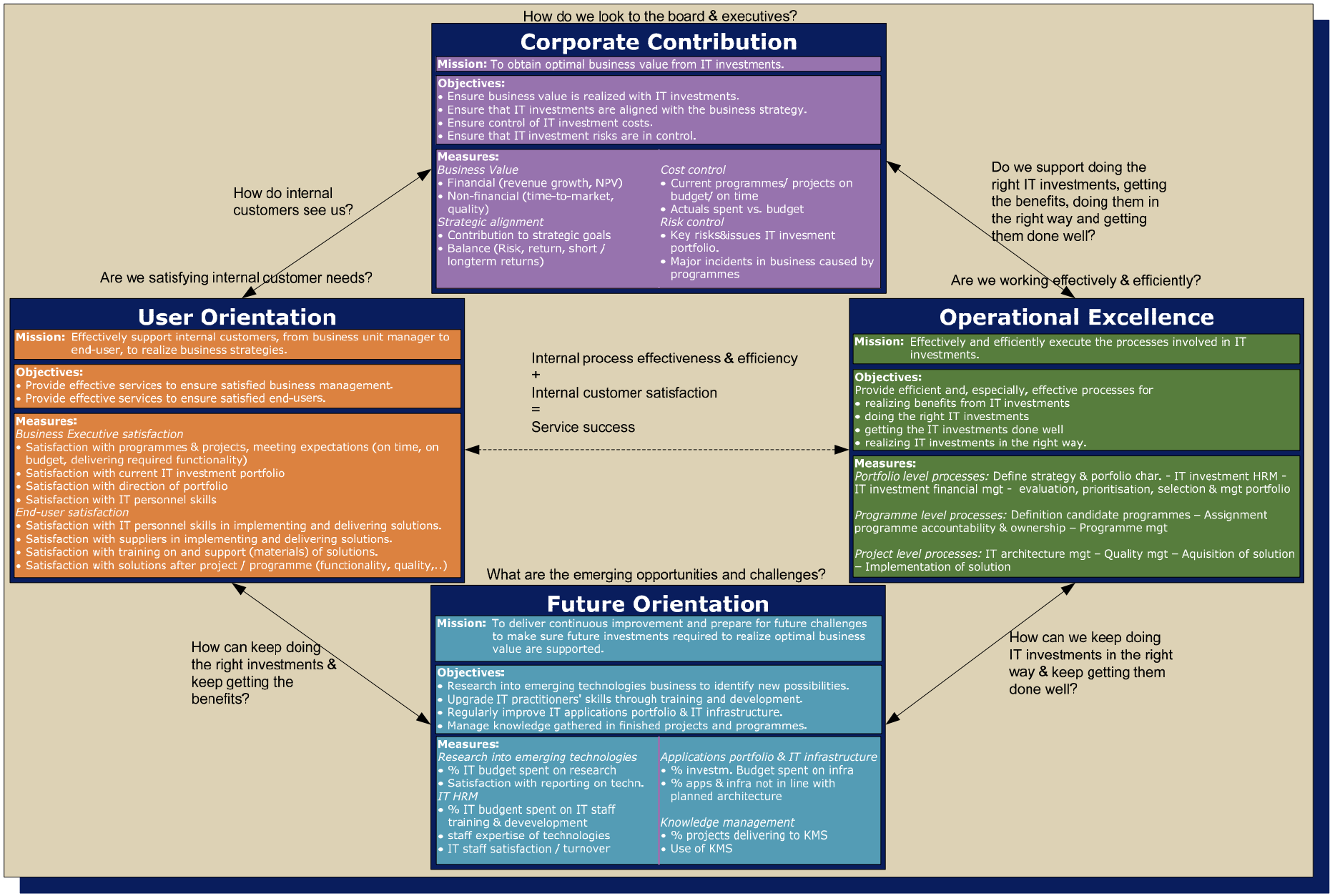


Figure 19: IT Investment BSC overview with perspectives, missions, objectives & measures

3.4.2 Context factors with possible influence (II)

Three factors are identified that may influence performance measurement of IT investments.

- **Type of investments in the portfolio**
  The IT investment portfolio can have a different composition (concerning infrastructure, informational, transactional and strategic investments) in different organizations. It is expected that more transactional investments are related to more focus on (financial) business value, where more infrastructure and strategic investments are related to more focus on cost and risk control.
- **Size of investment budget**
  It is expected that at a lower budget level (and thus portfolio size and complexity) organizations may find it less important to have a complex system of performance measures.
- **Maturity in governance of IT investments**
  It is expected that at a higher maturity level there will be better, completer and more advanced performance measurement of IT investments.

3.4.3 Possible issues (III)

The following issues are expected to be encountered in designing, implementing and using a system of performance measures.

In **design**, relevant issues can be:

- The *linking of strategy to measures*, integrating, linking and cascading strategy into the system of measures, while consensus is reached among stakeholders
- The *definition non-financial measures* are often difficult to quantify and thus to define.
- The *identification of cause-and-effect relations relationships* between performance drivers and outcome measures

Possible issues in **implementation**:

- The *IT to support PM*, an IT system to support collecting, analysing and reporting data, can be difficult to develop and to integrate with other systems.
- *Top-management support* is a critical success factor for a PMS, but often top-management support is limited and decreases during implementation.
- *Getting the required data for measures* is often complex, the collection of non-financial data a lot of work.

Possible issues in **use**:

- There may be *resistance,* for example in delivering the (right) data. Stakeholders therefore need to be involved and trained on the use

- *Misunderstanding* of the measures can take place, especially when measures are not clearly defined, which can lead to misunderstanding. Measures need to be defined clear and stakeholders trained on measures and related tools and procedures.
- The *Relevance of measures diminishes over time*, especially when there is no regular review of the system of measures, their results and impact on goals and strategy.
- The *PM* may *results in data, but not in insight.*
- Reliability of data is a problem that may be encountered and can be the result of different causes.

4. Field research results

This chapter will show the field research results in a structured way. It describes what the survey and interviews showed about ***the characteristics of performance measurement of IT investments in practice****.*

The following specific sub-questions are answered:

I. ***What performance measures are used in practice for IT investments and what measures would organization like to use?***
II. ***Are there other performance measures used in practice that were not identified in this research?***
III. ***What issues are encountered in practice in developing, implementing and using performance measures for IT investments and what are best practices to cope with these issues?***
IV. ***What is the relation between identified context factors, use of measures and relevance of issues?***

First in section 4.1 and 4.2 the participants and measurement data are shortly described to give an idea about the applicability of the results and to explain the methods of analysis. After that the research results are analysed.

In section 4.3 for every case the specific measures and issues are analyzed. This is followed by a general analysis of use and importance of measures and the relevance of issues in section 4.4. Together these sections will answer sub-questions I to III.

In section 4.5 the relation between measures, issues and identified context factors is discussed. This will answer sub-question IV.

In the last section (4.6) the findings are summarized.

4.1 Description of participants

There are 8 large organizations participating in this research. They are from different sectors; manufacturing (1), healthcare (1), financial services & insurance (5) and consulting (1).

The people participating in the research are all in the higher layers of IT management. Often CIO's, sometimes people coordinating the portfolio of IT investments like a programme / portfolio manager.

The organizations have different levels of IT governance maturity, ranking from level 2 (repeatable but intuitive) to level 4 (managed & measurable). This implies a difference in existence and maturity of involved processes (like performance measurement) and organizational structures.

All are very large organizations with a considerable but varying IT budget and IT investment budget.

Also the composition of the investment portfolio varies. Infrastructure investments are always considerable, but make up from 20% to 50 % of the portfolio. Transactional investments are between 5% and 30 %, informational between 10% and 25 % and strategic between 10% and 60%.

4.2 Description of survey data

The data tables with survey results can be found in Appendix V.

The different performance measures are rated on numerical scales from 1-5 on the extent to which they are measured and on importance, resulting in ordinal data. By assuming that the intervals between rating 1-2, 2-3, 3-4 and 4-5 are of equal distance, the scores can be treated as interval data (Cooper & Schindler, 2001). That means that the arithmetic mean (average) can be used as measure of central tendency and standard deviation as measure of dispersion of the ratings.

The context factors are expressed on an interval scale:

- maturity from 1-5 (assuming this ordinal data can be interpreted as interval data);
- IT investment size in millions of €;
- IT investment types from 0-100 (%).

This means that bivariate correlation analysis could be applied comparing the context factors with ratings of the measures, revealing the magnitude and direction of possible relationships (Cooper & Schindler, 2001). But as there are only a small number of participants and the context factors are rough estimates, it will not be possible to show significant and strong relationships. By illustrating the correlations with so-called scatter plots (Cooper & Schindler, 2001), trends in the data can be shown though.

Analysis of the results thus will be qualitative but illustrated by trends in the data.

4.3 Analysis of the 8 cases

In this section the different cases are analysed. Therefore the specific survey data and interview findings for a case are combined. Cases are referred to by a number since the

participating organizations were promised their data would be incorporated in the research anonymously.

In practice there proved to be a large difference between more developed and mature organizations and less developed organizations. Based on the analysis of survey data and impressions in the interviews, the cases can be divided in three groups.

- **Starters (2)**, organizations that are currently starting to think about governance practices and measurement concerning their IT investment portfolio, but do not have much formal measurement and governance and other internal processes implemented yet. No coverage of measures in the Corporate Contribution and User Orientation perspective and low ratings for the aspects in Operational Excellence and Future Orientation.

- **Followers (4)**, organizations that are currently improving their governance practices and measurement of their IT investment portfolio, but still have some work to do to reach an acceptable baseline of measures and maturity of governance and other internal processes. Some measures in the Corporate Contribution perspective, good insight and possibly formal measurement in User orientation perspective, some coverage of processes in the Operational Excellence perspective and the aspects in the Future Orientation perspective

- **Leaders (2)**, organizations that are clearly in front concerning the measurement of their IT investment portfolio, but also with their governance practices and the maturity of other internal processes involved. Complete measurement of the Corporate Contribution and User Orientation perspective, good coverage of internal processes in the Operational Excellence perspective and of the aspects in the Future Orientation perspective.

4.3.1 Starters

Case 3

Context

Organization 3 is a large institute in healthcare. Compared to the other organizations, it has a rather small *IT budget* (5-10 million) of which 1-5 million is spent on *IT investments*, discretionary & non-discretionary.

The *portfolio* contains a considerable amount of infrastructure investments (40%), quite some transactional & informational investments (both 25%) and a small amount of strategic investments (10%).

The organization has a low *IT governance maturity* (level 2 – repeatable & intuitive). Some governance activities exist like governance meetings and performance reporting, although this is initiated by IT management and not very mature. There is some voluntary participation of the business in governance practices but there are not much formal governance structures.

In this organization, change is based on a five-year-plan, for which the first two years have defined projects. For the larger projects there is a steering committee with business and IT representatives.

Performance measures

Organization 3 is in a very early stage of performance measurement. There is a high-level view on the budget status and there are quarterly reports (written documents about projects) but these do not provide a clear view on the performance.

- As described before, in the **Corporate Contribution perspective** *Cost control* is measured to some extent on a very high level. But there is lack of detailed insight in budgets and progress of projects, which are considered very important.

  There is limited measurement of and insight in *Business value* and *Strategic alignment*. Alignment is realized to some extent with the five-year-plan, but that plan is written by IT with limited business participation. Business value is considered important but not a priority as it is very difficult to quantify the results which are often non-financial ("better quality of care"), it is more important that projects are delivered on time, with the right functionality, meeting expectations.

  Risk control is limited, although issues are escalated when very problematic. Central insight in risks and issues is a point of interest and quite important for this organization.

  For this organization it is important to change the way they report performance. Currently this is done by producing a massive paper report every quarter, which is not very "readable". According to the CIO this has to be changed into an insightful dashboard, providing a quick and clear view on the performance of IT to the board.

- Concerning the **User Orientation perspective** there is some insight in internal customer satisfaction. Although not formally measured, internal customers, *Business management* as well as *End-users*, are considered to be quite content. Both are considered to be of average importance but do not have much priority to be actually measured.

- As not much of the processes suggested by the IT Investment BSC exist in organization 3, it is difficult to judge the **Operational Excellence perspective**. There is no formal measurement of internal processes effectiveness and not much insight. Most processes are considered important but are not formally implemented in any way.

- In the **Future Orientation perspective**, there is limited insight in the *IT architecture* and *IT human resources*. Especially IT architecture is considered important. There is not much insight in *Knowledge management* and *Research into emerging technologies*. Knowledge management is not considered very important, while research into emerging technologies is considered of average importance.

Issues in performance measurement

The most important issue in organization 3 is that "*there is no project-management culture*", not much happens according to formal procedures. The CIO has sent some project-managers to a PRINCE2 course to make a start. A second problem that came forward from the interview is that it is unclear what should be on the dashboard that will replace the existing reporting in large paper documents.

Referring to the issues mentioned in the survey, especially the *definition of non-financial measures* (as almost all results are non-financial) is relevant (**design**). And as a consequence of the current organizational culture, *getting the required data* (**implementation**) and *resistance*, *misunderstanding* and *reliability of data* (**use**) are very eminent issues.

Case 7

Context

Organization 7 is a BU of a large financial services organization. *IT governance maturity* is not very high as it is estimated to be on level 2 (repeatable but intuitive).

Since January 2006 a lot of changes have been made to the structure of the BU, a lot of people have changed functions and BU. The BU has the most complex IT function within the whole organization as it supports all the other BU's. Additionally, most programmes and projects are realized by external parties. For every vendor currently different governance practices exist.

They are in the midst of an improvement process, setting up centralized and standardized performance measurement with the required governance structures and processes.

The BU is responsible for most organization-wide programmes and projects. It therefore has a very large *IT budget* of about 250 million €, of which about 150-250 million € is spent on *discretionary and non-discretionary investments* together.

The discretionary *portfolio* of projects consists largely of informational and strategic investments (both about 45 %), infrastructure and transactional investments are both around 5%.

Performance measures

As described before, organization 7 is currently in the midst of implementing improved performance measurement. Therefore there is not much insight in the portfolio at the moment.

- In the **Corporate Contribution perspective** goal is to first get a basic oversight of existing projects, focused on *Cost control,* covering the cost and progress of projects. Currently this is not yet realized. *Risk control* is quite well implemented though as the vendor management is quite mature, important issues are escalated to the right level when necessary. Most important risks are interdependencies between projects / programmes and the delivery-risk (delivered in-time, meeting expectations). There is no central overview of the different projects & programmes in the portfolio. *Business value* and *Strategic alignment* are both considered quite important but are considered the next step after cost control and risk control. The idea is to measure the business value of IT investments based on baseline measures that need to be established first. Also mapping of the investments on the strategic goals is something that needs to be done.
- There are quite mature measures in the **User Orientation perspective**. Based on an annual internal customers satisfaction survey, both the satisfaction of *Business management* and of *End-users* is measured every year about a lot of aspects including the satisfaction with IT investments. Based on the results of the survey actions are undertaken. As the same survey is used every year internal customer satisfaction can be benchmarked.
- Involved processes are currently being standardised, redesigned and implemented in organization 7 and therefore the **Operational Excellence perspective** is unclear. There is no formal measurement of internal processes effectiveness.

  The survey shows that concerning the *Portfolio level* processes there is a lack of central insight in the financials of current projects and programmes in the portfolio. Also there is no overview of needed and available human resources. Furthermore the quality of business cases needs to be improved. All are considered (very) important.

On the *Programme level*, again the lack of a clear business case and also metrics to track the business case are important issues. Furthermore it seems that project management standards and best practices are not much used and (the use of this) needs to be improved.

On the *Project level* quality management is considered very important but not performed at all. Also there is not much insight in the efficiency (time and cost) of delivery of required solutions.

- Same as the previous perspective, there is not much insight in aspects mentioned in the **Future Orientation perspective**. The survey shows that all four aspects are considered (very) important. *Knowledge management* is considered very important and needs a lot of improvement. The *IT architecture* is not considered very flexible and modular and is currently far away from the desired future state. *Research into emerging technologies* is also not done very well although not considered the most important.

Issues in performance measurement

Currently organization 7 is starting up the **design** of the performance measurement system. One important issue is now *linking strategy to measures* as a lot of stakeholders have different requirements for the performance measurement. Also the *definition of non-financial measures* and *cause-and-effect relations between measures* are difficult, although those issues are not very important in the current state in which mainly an overall baseline of measures needs to be established

In the **implementation** especially the *IT supporting performance measurement* is an important issue. Different implementations of the same tool are used, which are difficult to integrate. A programme is currently running to integrate and standardize this tool. Positive is that already such a tool is in use. *Getting the data for measures* is very difficult and mainly caused by the major organizational changes and the lack of IT governance structures, processes and responsibilities. *Top management support* is available for improving IT governance practises though.

As IT governance practices are currently being implemented and improved, especially *resistance, misunderstanding* and *reliability of data* are important issues in **use.**

Additionally, the different ways project / programme management and governance are organized for different vendors is a big issue which is being resolved by standardising the processes (and the supporting portfolio management tool, as explained before). Also the governance structure is therefore being improved.

4.3.2 Followers

Case 2

Context

Organization 2 is a medium-sized bank. It has a considerable *budget for change* (10-25 million) of which 5-10 million is spend on discretionary investments.

The *portfolio* consist mainly of infrastructure (40%) and strategic (40%) IT investments, transactional and informational IT investments are small (both 10 %).

The organization considers itself to have a level 3 (defined process) *maturity in IT governance*, implying a framework of processes for IT governance is implemented and the board is involved in decisions concerning IT investments.

It was not possible to have an interview (in time) with the CIO of this organization. The analysis is therefore solely based on the survey data.

Performance measures

Based on the survey data, the organization does not have much insight in the performance of IT investments while a lot of measures are rated to be quite important.

- In the **Corporate Contribution perspective** only *Cost control* seems to be measured to some extent, while this is considered of average important. There is limited measurement of *Business value* and *Strategic alignment*, while these are considered to be important. Also the *Risk control* is limited, while measuring is considered the most important by this organization.

- Concerning the **User Orientation perspective** there is little insight in and measurement of *Business management satisfaction* and especially satisfaction by meeting expectations and with IT personnel skills are considered important. There is some insight in and measurement of *End-user satisfaction*. End-user satisfaction is considered important in this organization.

- There is not much insight in and measurement of the **Operational Excellence perspective**. On the *Portfolio level*, especially *IT investment HRM* is important while there is limited measurement. There seems to be some insight in the *evaluation, prioritisation, selection and management of IT investments*, which is considered of average importance.

On the *Programme level*, there is a lack of insight in the *definition of candidate programmes* which is considered of average importance. There is average measurement of and insight in *assignment of programme accountability and ownership* and *programme management*, where especially accountability is considered to be important.

Of the *Project level* processes, *IT architecture management* and *quality management* are of special interest and considered important, while for all project level processes there is a lack of insight and measurement.

- In the **Future Orientation perspective**, there is average measurement & monitoring of the *IT architecture* and of *IT human resources* which are both concerned important. There is less insight in *Knowledge management*, which is also considered less important. There is no insight in (*research into) emerging technologies*, although this is considered of average importance.

Issues in performance measurement

Almost all issues are relevant for organization 2. In **design** of the performance measurement system, especially the *linking of strategy to measures* is a relevant issue.

Top management support for performance measurement and especially *getting the required data for measures* are very relevant issues in **implementation**.

In **use**, *resistance* to performance measurement, *misunderstanding* of performance measures and *reliability of data* are the most relevant issues.

Case 4

Context

Organization 4 is a large organization active in accountancy, tax advice, consultancy and financial advice. It has an IT budget of 25-50 million €. About 10-25 million is used for change, of which 1-5 million is used for discretionary investments.

The portfolio of investments contains mainly strategic (60%) investments. 20 % is used for infrastructure improvements and 15% for informational investments. Only 5 % is spent on transactional investments.

The organization estimates its IT governance maturity to be on a high level, level 4 – managed and measurable. But this seems to merely reflect governance of the operational part; the IT investment portfolio governance seems to be more on level 2-3.

It was not possible to have an interview (in time) with the CIO of this organization. The analysis is therefore solely based on the survey data.

Performance measures

Based on the survey data, there seems to be quite well insight in outcomes. Also the processes and areas mentioned as performance drivers seem to perform well, although some improvements can be made.

- In the **Corporate Contribution perspective** there is quite well insight in *cost control*. Budget information and status is available and progress of programmes / projects is monitored. Allocation is also clear. An aggregated view on the overall budget status of the portfolio is available to some extent.
  Risk control is also quite well developed; there is good insight in key risks and issues of projects / programmes. To a lesser extend there is insight in risks of programmes / projects for the business and incidents caused in the business.
  There is limited measurement of *business value*. To some extent there is insight in non-financial benefits but there are no hard benefits measured.

  Especially *strategic alignment* needs attention. There is currently no insight in the alignment of the portfolio with strategic goals, while this is considered important.

- Concerning the **User Orientation perspective** there is some insight in and measurement of *business executive satisfaction*, although considered quite important.

  There is good insight in and measurement of *end-user satisfaction*, which is formally measured. End-user satisfaction is also considered important in this organization.

- There is no formal measurement of the **Operational Excellence perspective**. But on average the processes mentioned seem to be well implemented and effectiveness is secured.

  On the *portfolio level*, all processes are considered important and are mostly implemented and effective. But in the *evaluation, prioritisation, selection and management of IT investments* there seem to be some issues. Business ownership of new projects and a clear business case are not always secured and are topics that need to be improved.

  On the *programme level* the processes are implemented to some extend and are not all as effective as they should be. Especially the *definition of candidate programmes* needs to be improved; a clear business case, sign-off by a business owner and

measures defined upfront are not yet standard procedures. Also the *assignment of programme accountability and ownership* is not always performed well. And in *programme management*, the following of standards and best practices needs improvement.

The *project level* processes seem to perform well, although there no real insight in the average time and cost to deliver solutions; the efficiency of delivering solutions.

- In the **Future Orientation perspective**, there is average insight in and effectiveness of the areas *IT human resources management, IT architecture* and *research into emerging technologies* which are all concerned very important. There is less insight in *Knowledge management*, though considered as quite important.

Issues in performance measurement

All issues are considered to be quite relevant in organization 4.

Case 6

Context

Case 6 is a BU of a large organization active in financial services, insurance and care. The BU *spends* between 10 and 25 million on IT, of which 1<5 million is spent on *discretionary and non-discretionary investments*. In the last year roughly 60 % was spent on projects and programmes for compliance and regulations, 30-40 % on other projects.

Looking at the *portfolio* of projects, 10 % is spent on infrastructure (this is mostly taken care of by a centralized IT unit for the whole organization), 50% on transactional investments, 20 % on informational and 10 % strategic investments.

They consider the *IT governance maturity* to be on level 2 – repeatable but intuitive, as they are currently setting up and improving their governance practices.

On a high level, based on the business planning, an information plan is developed which gives the framework and budgets for projects & programmes in the coming year. For projects a business case is developed with the goal, costs & benefits and required results. In principle every project / programme needs to have a business owner. Currently PRINCE2 is being implemented as the standard project management methodology.

The management team of the BU prioritizes the projects. To have larger projects (>2,5 million) executed (and get the required resources) they need to get on the top-20 list of projects / programmes organization wide, which is decided on by the central board of the

organization. This as the scarce resources and support for all IT projects / programmes are provided by the central IT unit and therefore priorities have to be established.

Projects and programmes are monitored on financial aspects by the control-group of the BU. Also there is a regular (two-weekly) meeting for discussing the portfolio of projects. In this meeting the budgets, the progress of current projects, issues and interdependencies between projects are discussed on a high level.

On the short term the aim is to reach a level 3 maturity by further extending and improving the current monthly meeting, a full implementation of PRINCEII, better evaluation and control of projects on results (quality, functionality) and more insight in effectiveness and efficiency of projects an programmes.

Performance measures

As described before, organization 6 is currently setting up and improving governance practices. There is only some insight in basic outcome measures.

- There is some measurement and monitoring in the **Corporate Contribution perspective**. The budget and progress status of programmes and projects (*Cost control*) is considered important. There is a good high-level oversight of the budget but no detailed insight in budgets and actuals of running projects / programmes. Especially there is lack of detailed insight in the progress of projects / programmes and the quality of the delivered results.

  In *Risk control*, there is some insight in key risks and issues of different programmes although there is no complete overview. Incidents are quite well monitored though. There is average insight in the biggest IT disablers for realizing the strategy. But this out of scope for the BU as this is an issue for the central IT department.

  There is no insight and measurement of actually realized *Business value* of IT investments. In the future "hard" financial benefits will be monitored and the benefits will be balanced with the budgets of the business. There are no plans for measuring non-financial benefits, although these are considered important.

  Concerning *Strategic aligment*, the contribution to strategic goals is considered very important, but not entirely clear. The framework for investments is set by the management team of the BU based on strategic goals. There is some insight in the balance on different aspects in the portfolio, like risk, expected value and required resources.

- Concerning the **User Orientation perspective** there is no actual measurement on internal customer satisfaction, for example with a survey.

  Though, *Business management satisfaction* is quite well secured by current processes. Only their satisfaction with the results of projects is not totally clear. This is something the organization wants to improve in the near future; controlling and evaluating the quality of projects and programmes, get insight in effectiveness (quality, in time, in budget) and efficiency (realistic time, acceptable costs) of projects.

  In *End-user satisfaction* there is less (average) insight, this is also considered to be less important.

- As stated before, no performance drivers are measured. So no measures are used from the **Operational Excellence perspective**. But the different processes involved are quite well implemented, securing good performance of the internal processes.

  Concerning the *Portfolio level* processes all processes are well performed. Things that may be improved are the clearness of business cases of new programmes and the reprioritisation of the portfolio during the year.

  On the *Programme level*, the compliance of programmes to the internal control regulations and vendor evaluation are considered not so important and accordingly there is not much attention for these issues. This can be explained because governance processes have been implemented well and there is not much cooperation with external vendors. What definitely needs more attention is the post-implementation review of programmes and projects, which is concerned important. Therefore key metrics could be defined in the initial business case. Additionally, the standard project management approach (PRINCEII) needs to be used better and more often; this is a matter of time though.

  Processes on the *Project level* are considered important and implemented well. The efficiency in acquisition of the solution (time and cost to deliver solution) is unclear. This is considered to be of average importance though. Additionally quality management of projects needs to be improved, as the organization wants to get more insight in the quality of projects' process as well as the projects' results.

- Concerning the **Future Orientation perspective**, *IT human resources* seem to be ready for the future and are concerned to be managed quite well, although there is not much insight in IT personnel's satisfaction. But this seems to be more an issue for the central IT department.

For *Knowledge management* there is not much insight and not much attention. Opinions in the organization differ about the importance of (improving) knowledge management.

The *IT architecture* seems to be quite good and ready for future demands (this is more an issue for the central IT department also).

Research into emerging technologies is concerned to be important, but there is currently not much attention in the organization for this topic.

According to organization 6, the current focus needs to be on baseline measures first; transparency in the form of a central overview of costs, issues and especially planning & progress. An important next step is the evaluation of projects / programmes: to what extent is the required and promised functionality and quality actually realized, what is the effectiveness of the process of projects / programmes? And if it can be quantified (for example by function points), what is the efficiency of projects and programmes?

Issues in performance measurement

The most important issue currently is the lack of insight in efficiency and effectiveness of projects and the quality of project results. For now it is also unclear how this can be monitored and managed.

Compared to the other cases the issues mentioned in the survey are not experienced as much in organization 6 as they are in most other case organizations.

In the **design** of the performance measurement system, the *definition of non-financial measures* may be an issue as the focus now shifts to quality, effectiveness and efficiency, all topics that are quite difficult to measure.

There are not much major issues in the **implementation** of performance measurement. *Top management support* is available for improvement of governance practices, *the required data* of projects and programmes is available to some extent. It is unclear if IT is used to support performance measurement.

In **use** of performance measurement *resistance* and *misunderstanding* do not play an important role. But the *reliability of data* from projects may need some improvement.

Case 8

Context

Organization 8 is a BU of a large bank. The BU has a considerable *IT budget* (100 – 150 million €), spend about 25-50 million € on *investments*, of which 10-25 million is discretionary spent. The *portfolio* consists largely of transactional (50%) and infrastructure (30%) investments. Small investments are made in informational (10%) and strategic (10%) investments. The organization has an average *IT governance maturity*, level 3 – defined process.

As the BU was quite recently reorganized, governance of IT investments is in build-up phase. Structures, processes and responsibilities are currently changing, but it is unclear what the final governance structure will look like.

Currently there is a separation between governance of IT-programmes / projects and business projects. IT-programmes and projects are managed by the IT Project Office, which is the central part of the IT Programme Management Office. The IT Project Office is the main supporting unit in facilitating the governance of the portfolio of IT projects & programmes.

Per programme there is a steering committee which meets once every 1 to 2 weeks. This steering committee tracks the progress of programmes, monitors issues and escalates key programme risks and issues. Above the steering committee there is an IT allocation board (CIO & business owners), which acts on a tactical level. It decides funding of new projects/programmes, changes in current programmes, so mainly from a financial perspective.

New project / programme ideas start by making a high-level business case, a quick-scan. If this is approved, additional budget is provided to develop a detailed business case which covers the purpose, the benefits, the costs/ budget and the risks. Projects / programmes are based on business needs or regulatory compliance issues and have a business owner.

Performance measures

There is some insight in budgets of the different programmes and projects and a quite good insight in risks & issues. The last is because of the experienced project managers. Though, currently the baseline info about all projects is not yet complete on for example budgets, actuals and planning.

- In the **Corporate Contribution perspective** first a baseline of information about all projects needs to be established. Without this information it has not much sense to go any further. Currently the main focused on *Cost control,* covering budgets, actuals and progress of projects. As explained before there is no complete insight in this basic information yet. *Risk control* is quite well implemented as experienced programme / project managers manage this well and escalate when necessary. Though, there needs to be more transparency in risks and issues, possibly by implementing a framework for

reporting, providing a good central overview. What need to be considered also are the possible operational issues after the project has finished. These issues should also be included in the business case and mitigating actions need to be defined. *Business value* and *Strategic alignment* are both considered quite important but are not within the scope of the IT PMO. Business value is currently not an issue for the IT PMO as they cannot measure and cannot influence this. IT programmes just have to be delivered in time, on budget and with right functionality. Same goes for alignment. The IT PO does not have the power and responsibility for this. Although alignment needs more attention on a higher level.

- The **User Orientation perspective** is quite well measured. An annual internal customer satisfaction survey has been used to establish a baseline of internal customer satisfaction last year. This survey will be used every year to measure and compare internal customer satisfaction. The survey pays attention to both the satisfaction of *Business management* and of *End-users*.
- Involved processes are currently being redesigned. And it may be clear that no actual measures are taken of the **Operational Excellence perspective**. The survey shows that concerning the *Portfolio level* processes there is not much insight in human resources needed for projects. Also alignment with business goals and the quality of business cases need attention. All are considered very important.
  On the *Programme level*, especially the lack of metrics delivered regularly by programmes and projects and the absence of a standard project / programme management approach are considered important.
  On the *Project level* IT architecture management is mainly considered important and also well covered. Quality management, the acquisition of solutions and the implementation of solutions are considered less important.
- For the **Future Orientation perspective**, *IT HRM* and the *IT Architecture* are considered important. In IT Architecture there is quite well insight, IT HRM to some extent. *Knowledge management* and *Research into emerging technologies* are considered less important and currently not much attention is paid to these issues.

Issues in performance measurement

Organization 8 is currently developing its governance structure and improving measurement. Because of lot of internal changes in the organization, PO had to start practically "from scratch".

In the **design** of the performance measurement system, *linking strategy to measures* needs work and is currently an issue, mainly because responsibilities (for alignment) do not reside at the PMO level. *Definition of non-financial measures* is also a difficulty; this has to be interpreted in the context of progress of projects, efficiency of projects and the quality of delivery.

In the **implementation** the *IT supporting performance measurement* is a major issue. The current implementation does not fulfil all requirements and the processes in using the tool are not well defined. Also within the organization different implementations of the same tool are used. Furthermore (the lack of) *top-management support* and *getting the data for measures* are important issues.

In **using** performance measures, *resistance*, *misunderstanding* and *reliability of data* are major issues.

Issues in implementation and use are mainly caused by the absence of proper governance structures, priority of this topic on the top management agenda and a lack of standard project methodology and standard processes. Overall the absence of a culture of transparency and regular reporting on key measures seems to be the main problem. As the possibility arises that PMO is seen as policing unit, the advantages (i.e. resource management, early warnings) have to be clear for project/programme managers. But also there needs to be pressure from higher level management.

Additionally there seems to be a budget-bias. Everything is aimed on finance and budgets, not on efficiency & effectiveness, on results, progress, planning & milestones. Within projects there are detailed MS project plans but there is no central overview. "The biggest mistake of project managers is that they make a very detailed project planning, but measurement (to milestones, budgets etc.) is not done."

4.3.3 Leaders

Case 1

Context

Organization 1 is a large manufacturing firm. The organization has a considerable *IT budget* (50 – 100 million €) and spend about 5-10 million € on *discretionary and non-discretionary investments* together.

The *portfolio* consists largely of infrastructure (50%) and transactional (30%) investments. Only a small part of the budget is invested in informational and strategic investments, both 10 %.

The organization has a high *IT governance maturity*, level 4 - managed and measurable.

A few years ago there was a big reorganization and since then IT governance practices have been improved. IT governance is being improved for a few years now, which explains the

maturity. The high maturity translates itself in, for example, well organized processes for alignment of investments with business goals, prioritisation of investment options and a lot of involvement and ownership in the business for IT investments.

Performance measures

Organization 1 measures on outcomes, not on performance drivers:

- They actively measure and monitor the **Corporate Contribution perspective**. The actually realized *Business value* of IT investments is monitored where possible and if expressed in financial benefits. This is considered to be important. If it is not possible to measure solid financial business value, organization 1 does not focus too much on this, but prefers to make sure there is strict project control (cost and risk control) to prevent that projects / programmes become a "bottomless pit". In that case organizations should not fear to cut of projects and programmes that have been "in the red" for 3 or more months.

  Strategic aligment; a prioritized list of initiatives is made in the BUs based on business goals. This list is approved (and possibly changed) by a steering committee. There is no central monitoring of strategic alignment though. Is considered to be important.

  The budget and progress status of programmes and projects (*Cost control*) is actively monitored and measured and considered to be very important.

  Concerning *Risk control*, key risks and issues of different programmes are monitored; there is also insight in incidents in the business caused by projects & programmes. There is no insight in what may be major IT disablers for realizing the business strategy.

The other three perspectives are not actively measured and monitored:

- In the **User Orientation perspective**, *Business management satisfaction* is not measured but expected to be high, as they are highly involved in different parts of the IT investment process and no projects are undertaken without a business owner.

  End-user satisfaction is also not formally measured and especially not concerned to be important directly after projects as "end-users are never satisfied after change".

- As stated before, no performance drivers are measured. So no measures are used from the **Operational Excellence perspective**. Although the measures are concerned quite important, processes are implemented in such a way that they that most of them do not need to be measured. Some processes need attention though.

Concerning the *Portfolio level* processes there is not much insight in and management of human resources needed for projects. Reprioritisation of programmes is not performed.

On the *Programme level*, there is no insight in the compliance of programmes to the internal control regulations and in programmes following management standards and practices. These things are also considered to be less important.

There is not much insight in processes on the *Project level*. IT architecture management and the implementation of solutions are considered important but not well covered. Quality management and the acquisition of solutions are considered less important.

- Also in the **Future Orientation perspective**, nothing is actively measured and monitored. Especially the monitoring of the *IT architecture* and of *IT human resources* is concerned (very) important. *Knowledge management* should not be implemented with an IT system and does not have to be formalized according to organization 1. Same goes for *Research into emerging technologies*, as organization 1 does not aspire to lead the market but follow the market concerning IT.

Issues in performance measurement

From the survey it comes forward that in **design**, *linking the strategy to the performance measures* is difficult. This is especially the case when the strategic goals are non-financial, like the increase of market share in a certain market.

All the **implementation** issues seem to be very relevant also in organization 1. There is not much *IT to support*, the topic is not high on the *top management* agenda and *getting the required data* results in a lot of difficulties.

Also the *reliability* of data is a problem in practice of **use**.

In the interview it came forward that furthermore especially the baseline measure in measuring the results of investments is difficult. Also measuring the financial business value is a challenge. Particularly when results are achieved over a long period of time, a lot of dilution is caused by all kinds of context factors. Therefore, although achieved over a longer period, results have to be measured within a short and reasonable period of time like a year.

Case 5

Context

Organization 5 is a medium-sized insurance company, specialized in pension and life insurance. The organization has an *IT budget* of 10 – 25 million €, of which about 5-10 million € is spent on *discretionary and non-discretionary investments* together.

The *portfolio* consists equally of infrastructure, transactional and strategic investments (all 30%). Small part of the budget is invested in informational, about 10 %.

The organization has a quite high *IT governance maturity*, they judge themselves on level 3 – defined process, but the interview showed they are well underway in level 4 – managed and measurable.

In this organization, programme management together with executive management makes a year programme of different programmes and projects, based on the strategic goals of the organization. This is a high-level plan, which is further filled in with concrete projects by the business.

The portfolio of all programmes and projects with an IT component is centrally managed by the head of programme management. Every quarter there is a strategic programme meeting in which executive management & head of programme management discuss the portfolio on high level; major issues, direction, priorities, overall budgets and deliverables.

Additionally, there is a 2-4 weekly tactical programme meeting in which business owners & sponsors, executive management (except CEO), project / programme managers, architecture (enterprise architecture) manager and information manager (to represent business) meet. In this meeting the programmes are discussed in more detail; financial budget (requested, reserved, assigned), progress of projects & programmes, interdependencies between programmes, important project / programme decisions, resources (agreed, needed, available) and benefits. If projects are underperforming or if projects are overlapping then there is not much hesitation to "kill" projects.

Last, there is a 2-weekly steering group meeting for the large programmes and projects in which project-specific issues are discussed.

Performance measures

Organization 5 is quite mature in measuring outcomes. As in case 1 there is not much attention for performance drivers in measuring the performance of IT investments.

- They actively measure and monitor the **Corporate Contribution perspective**. Actually realized *Business value* of IT investments is measured to some extent. If "hard" financial benefits are defined in the business case, then these are directly

balanced with the budgets of the business. There are currently efforts in measuring non-financial benefits by using a different business case template (used for business projects) as the portfolio is becoming more focused on growth (implying more non-financial benefits).

Concerning *Strategic aligment*, the contribution to strategic goals is ensured by top-down provision of high-level profile of the portfolio plan every year. Also every quarter the current direction of the portfolio is discussed. There is not much attention for a balance of programmes on risk, benefits, resources etc. in strategic alignment. The interview also showed that alignment on a lower (tactical / operational) level can be improved, that the business should have more influence in setting priorities in running projects and programmes.

The budget and progress status of programmes and projects (*Cost control*) is considered important and is actively monitored and measured. For the regular tactical review of the portfolio data is available of all projects and programmes about budget, actuals and progress. Also there is insight in the overall budget status; requested, reserved and approved.

For *Risk control*, key risks and issues of different programmes are available and monitored, although the impact of projects and programmes on the business operations (after delivery) requires attention and needs to be improved.

Additionally, this organization regularly monitors the human resource capacity by aggregating the planned, needed and available resources

- Concerning the **User Orientation perspective**, *Business management satisfaction* and *End-user satisfaction* have been measured in the previous year. Focus is therefore shifting from the process to the results. Internal customer satisfaction will be judged now based on achieving different "measurement points", which mainly are based on the evaluation of projects and programmes. For IT-projects the measures on-time, on-budget and on-specification are monitored. The satisfaction of end-users is measured in an IT survey, although it is unclear how satisfied they are with the results (functionality, quality, usability etc.). Also the insight in business satisfaction with the results of projects and programmes delivered could be better.

- As stated before, no performance drivers are measured. So no measures are used from the **Operational Excellence perspective**. But the different processes involved are quite well implemented, securing good performance of the internal processes.

Concerning the *Portfolio level* processes all processes are well performed. The one thing that may be improved is the clearness of business cases of new programmes.

On the *Programme level*, the compliance of programmes to the internal control regulations and vendor evaluation are considered not so important and accordingly there is not much attention for these issues. This can be explained because governance processes have been implemented well and there is not much cooperation with external vendors. What needs more attention is the post-implementation review of programmes and projects, which is concerned important.

Processes on the *Project level* are considered important and implemented well. Only the efficiency in acquisition of the solution (time and cost to deliver solution) is unclear. This is considered to be of average importance though. On the project level, improvements will be made in the development model used. Currently this is the waterfall model but organization 5 want this to change to a more incremental model for improving efficiency, like prototyping ,rational unified process (RUP) or time-boxing.

- Concerning the **Future Orientation perspective**, *IT human resources* are concerned to be managed well and quite ready for future investments. There is no real *Knowledge management* system, but project documents are shared and there is a quarterly meeting of project / programme managers for exchanging experiences. The *IT architecture* needs attention. It is not considered very modular and flexible. And although architecture plans are ready, control of projects on architecture issues can be improved. *Research into emerging technologies* is not considered to be important.

Issues in performance measurement

Compared to the other cases the issues mentioned in the survey are not experienced as much in organization 5 as they are in most other case organizations.

In the **design** of the performance measurement system, the linking of different measures (*cause-end-effect relations*) is experienced to be difficult.

Not many issues in the **implementation** and **use** are considered relevant by organization 5. Issues that play a small role are *getting the data for measures* and *reliability of data*.

In organization 5 some steps were taken that seem to resolve a lot of issues. Of main importance was to provide project/ program managers assistance for getting and reporting the performance information required. Also organization 5 uses standard templates for reporting, for business cases etc. and has a standardized project management methodology. What also

has been realized is a cultural change in the central program management. There is more focus on the importance of provided services for the business, instead of being report-driven. Culture is to not measure for the sake of measurement and pragmatism is encouraged.

4.4 General analysis of research results

In the previous section a detailed analysis has been provided of the individual cases. In this section the results of the survey are aggregated to identify the general trends. Of course, in the analysis of the data also the knowledge gained in the interviews is used.

4.4.1 Measures used in practice

To get a general insight in the current use of measures in practice and the relevance of the IT Investment BSC, average ratings of the extent to which these are actively measured and monitored and average importance are now analysed for the different measures and perspectives. To make the data more visual, the data (in tables) is illustrated with bar charts.

Overall perspectives

The table and bar chart show the average ratings of the different perspectives.

	Measured?		Importance?		Satisfied?		Overall Perf?		Usefull?		Need?	
Perspective	Avg	StDev	Avg	StDev	Avg	StDev	Avg	StDev	Avg	StDev	Avg	StDev
Corporate Contribution	2,5	0,7	3,9	0,3	2,6	1,3	2,6	1,3	5,1	0,8	5,1	1,1
User Orientiation	3,3	0,3	3,8	0,2	3,8	1,0	3,5	1,2	4,3	1,3	4,3	1,2
Operational Excellence	2,9	0,6	4,0	0,3	3,0	1,1	2,8	1,0	4,8	0,9	4,6	1,2
Future Orientation	2,4	0,5	3,6	0,5	2,8	0,9	2,9	1,0	4,4	0,9	4,4	0,7

Table 3: Average ratings for the overall perspectives of the IT Investment BSC

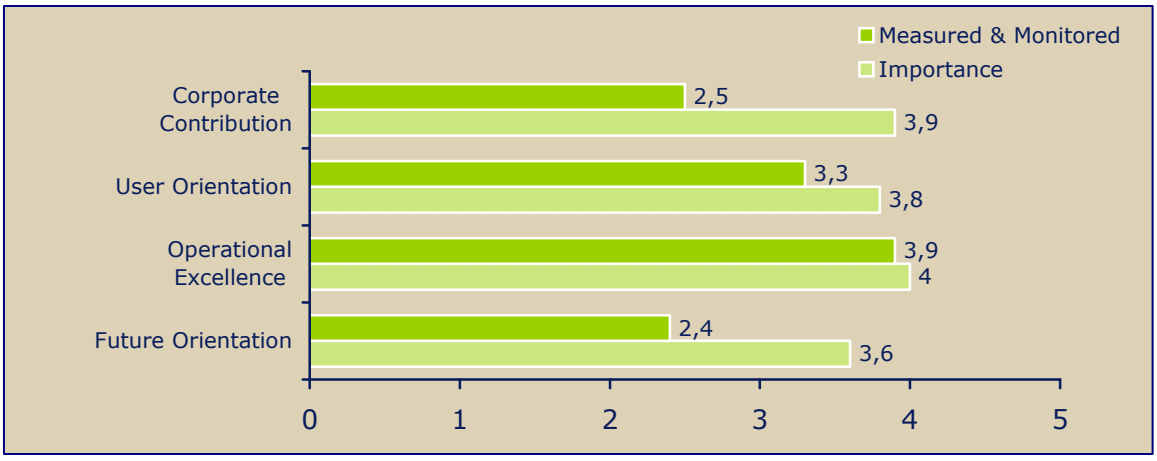


Figure 20: The numbers illustrated with a bar chart

Important to see is that on average all perspectives of the IT Investment BSC are rated to be quite important, that insight in the topics mentioned is considered useful and that the need to

have insight in the different perspectives is quite high. The quite low standard deviations show that this is firmly supported by the data.

In general the extent to which things are measured and monitored is quite low, as are the overall satisfaction with and overall performance of measurement of the different perspectives. Also there are higher standard deviations for especially the extent to which all perspectives are measured and monitored and the satisfaction with and performance of the measures in the corporate contribution perspective. This is a first indication of the mixed experience (and maturity) of organizations with performance measurement of IT investments and that performance measurement of IT investments overall needs improvement in organizations.

The data shows that on average the **User Orientation perspective** is the most actively measured and monitored. The interviews show that internal customer satisfaction indeed is often measured with surveys, although the high rating is also caused by the fact that most organizations *think* that they have a good insight in the internal customer satisfaction while this is not formally measured.

The **Corporate Contribution perspective** is measured and monitored less extensive on average, while considered quite important. In fact interviews show that the main focus is on the Corporate Contribution perspective, which is by far the most important. This is illustrated by the survey data by the high ratings of importance (more important than User Orientation), usefulness and need (both 5 on average) of this perspective.

Although the **Operational Excellence perspective** and **Future Orientation perspective** seem to be measured to some extent, the interviews show that this is not the case. In practice there is no actual measurement of performance drivers, only outcomes (in the other two perspectives) are measured. What the ratings of these perspectives show is the extent to which the processes mentioned in the Operational Excellence perspective are effectively performed and secured and the extent to which the areas mentioned in the Future Orientation perspective are covered.

The fact that there is no actual measuring and monitoring of the Operational Excellence perspective and Future Orientation perspective can be interpreted in two ways:

1. for IT investments it is just not interesting and useful to measure performance drivers;
2. organizations are not (yet) at a level of maturity in which performance drivers are used and are considered relevant.

The interviews show that the truth is somewhere in between. In general the IT governance maturity is just not at such a level that organizations are interested in performance drivers in

the Operational Excellence and Future Orientation perspective. Main focus in most organizations is on getting a basic central insight in outcomes (Corporate Contribution and User Orientation perspective). But on the other hand measuring outcomes is considered more important and therefore needs to be done more elaborate. Only some key performance drivers may be used in the future, the effectiveness in the Operational Excellence and Future Orientation perspective should be mainly realized by implementing the right processes, structures and responsibilities.

In the next section a more detailed insight is provided in the importance of items in the different perspectives and the extent to which these are measured and monitored

Measures in the different perspectives

Corporate contribution perspective

Below the ratings of the Corporate Contribution perspective are shown.

	Measured?		*Importance?*	
Measures	*Avg*	*StDev*	*Avg*	*StDev*
Business value				
Financial KPIs	1,8	1,0	4,0	0,9
Non-financial KPIs	2,0	0,9	3,9	0,4
Strategic alignment				
Contribution to strategic goals	2,1	1,2	4,3	0,7
Balance between risk, value etc	1,9	0,8	4,0	0,5
Cost control				
On budget, On time	3,4	1,2	4,3	0,7
Allocation of costs	3,1	1,0	3,4	1,2
Overall % spent	3,6	0,9	4,1	0,6
Risk control				
Key risks & issues	2,9	0,8	3,9	0,6
Business incidents	2,5	1,1	3,8	0,7
IT disablers for strategy	2,1	0,8	3,6	0,9

Table 4: Average ratings of the measures in the Corporate Contribution perspective

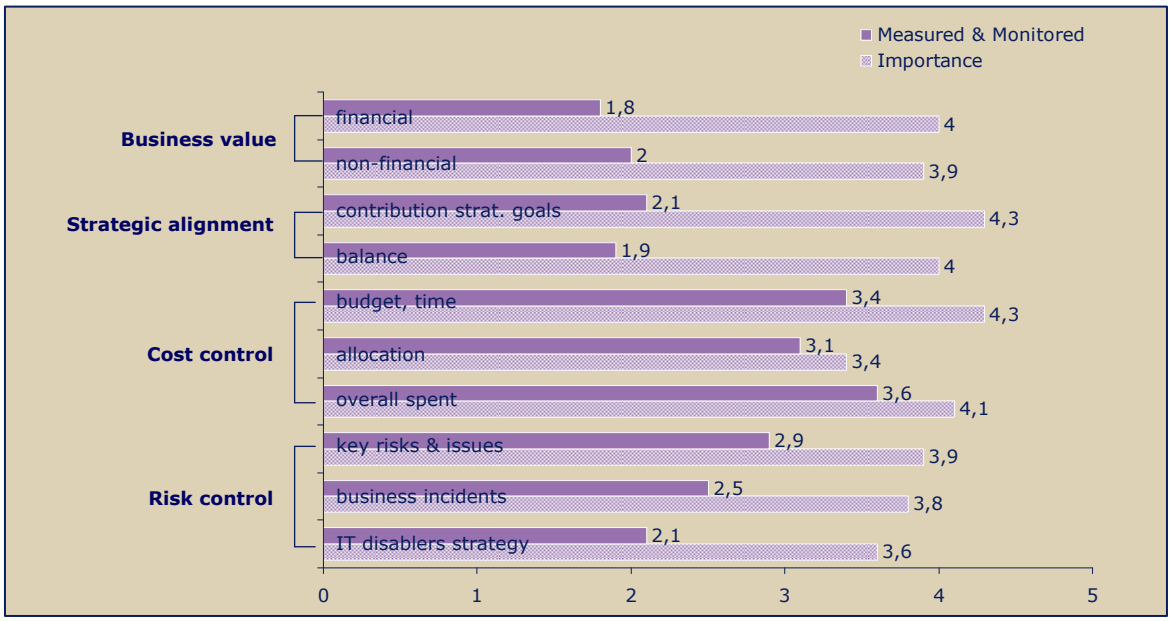


Figure 21: The numbers in Table 4 graphically represented as a bar chart

The data shows that all measures are considered quite important (an average rating of importance of all measures at about 4). Only the allocation of costs is considerably lower rated (average 3) and seems to be a less important issue in organizations.

Although all four measurement areas are rated to be quite important, only *Cost control* seems to be measured and monitored to some extent (ratings around 3). Also *Risk control* is reasonably covered (ratings around 2,5), especially the key risks and issues of projects and programmes are monitored.

In contrast, the *Business value* and *Strategic alignment* of projects and programmes is monitored much less with an average rating for the specific measures around 2. As their importance is rated high, these measures seem an issue in most organizations.

The standard deviations average around 1. This means that in the research population there are organizations that do not measure much (around 2 for cost & risk control and around 1 for business value and alignment) and quite high ratings (around 4 for cost & risk control and around 3 for business value & alignment).

This is consistent with case analysis that showed a lot of difference in the "maturity" of measurement. The more experienced organizations have quite good insight in most of the measures mentioned in this perspective, but others don't know much and still have to start finding out what projects & programmes are actually in their portfolio.

In general the first focus in organizations is on establishing a *"baseline"* of measures which consists of the *Cost control* and *Risk control*. Main subjects of measurement in this baseline are an overview of the budget status (requested / reserved/ assigned), budgets and actuals of projects / programmes, the progress of projects / programmes and the major risks and issues of projects / programmes. Often mentioned were also the risks & issues of investments during and after the project / programme for business operations, although not yet monitored by any of the organizations.

When this baseline is established the more advanced *Business value* and *Strategic alignment* receive attention. Concerning business value the focus then seems to be on "hard" financial benefits that are tracked (and are often directly balanced with business budgets). In none of the organization non-financial measures of business value are used.

Strategic alignment is often realized by making plans for one or more years that give a direction to and framework for the investments based on business goals. During the year a regular review of the portfolio status is then used for possible reprioritisation. But a balance in the portfolio on different aspects like expected value, risk, used resources, long- and short term benefits was not formally measured and monitored by any of the organizations.

An additional topic of interest in practice, which is not defined in the IT Investment BSC, is the *Human resource capacity*. This tends to be an issue in a lot of organizations, as projects and programmes often need the same people from business and IT at the same time. To prevent delay and optimize the use of human resources, this subject needs to be monitored and managed. One organization already does this by requiring a planning on the use of resources of every project / programme and after that overall monitoring the planned, needed and available resources to quickly identify possible problems.

User Orientation perspective

Below the ratings of the User Orientation perspective are shown.

Measures	*Measured?*		*Importance?*	
Business management satisfaction	*Avg*	*StDev*	*Avg*	*StDev*
Satisfaction with current portfolio	3,4	0,5	3,6	0,7
Satisfaction with direction portfolio	3,4	0,5	3,6	0,7
Meeting expectations	2,9	0,4	4,0	0,5
Satisfaction with IT personell skills	3,4	0,9	4,0	0,0
End-user satisfaction				
Satisfaction with functionality, quality, usability	3,0	0,9	3,9	0,6
Overall IT service quality	3,8	1,0	3,8	0,7

Table 5: Average ratings of measures in the User Orientation perspective

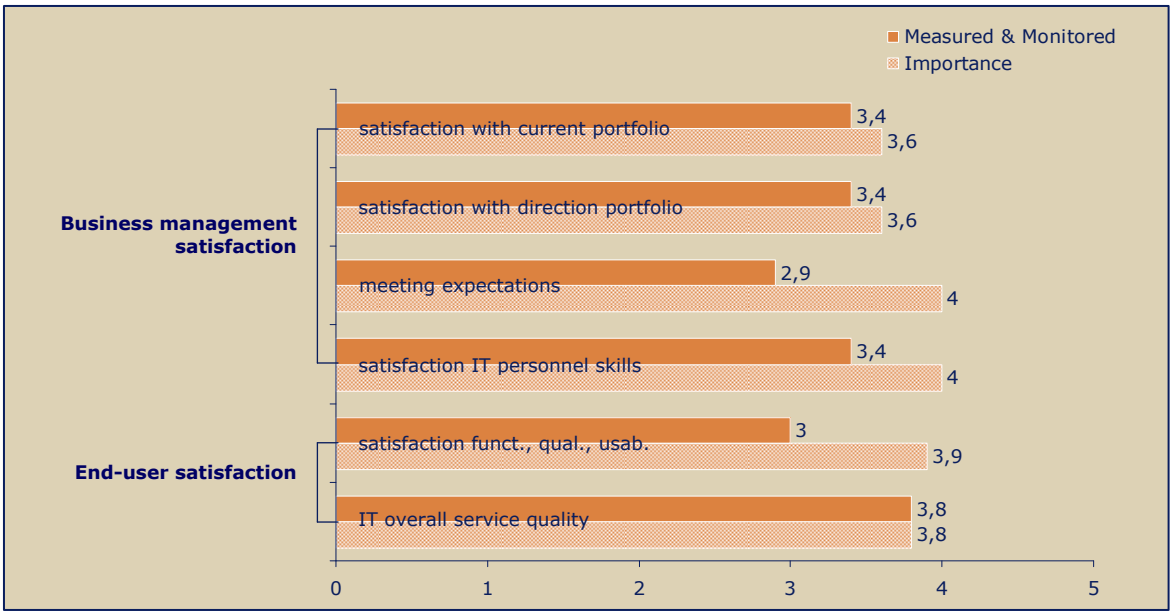


Figure 22: The numbers in Table 5 graphically represented as a bar chart

Again the data shows that all measures are considered quite important, with average ratings of importance between 3,5 and 4.

There seems to be quite good insight in the internal customer satisfaction, as most aspects mentioned are measured and monitored to some extend. There is no real difference between the extent of measurement of *Business management satisfaction* and *End-user satisfaction*.

Often there is an annual survey on general satisfaction with IT among all internal customers, which is more oriented to IT operations though (availability, quality of service of helpdesk etc.). Some organizations also use an annual survey with specific attention for projects & programmes and involved processes for a general view on satisfaction with these processes.

There are a lot of organizations that state that by implementing the right processes (for example involvement of business in planning and prioritization in the portfolio, involvement of end-users in development, monitoring of projects to be on time an on budget) the internal customers should be satisfied and no additional formal measurement and monitoring is needed

What came forward from the interviews is that often there is no good insight in and formal monitoring of the results of IT investments. This also shows itself a little in the ratings for measuring and monitoring, with a 2,9 for meeting expectations and a 3,0 for satisfaction of end-users after project delivery. In most organizations it is not clear if IT investments realize the required (and intended) functionality and what is the quality and usability of delivered solutions. Only few do or plan to evaluate IT investments for more specific information about satisfaction with the results.

Operational Excellence perspective

As came forward before, there is not much formal measurement of effectiveness (focus in the IT Investment BSC) or efficiency of internal processes involved in IT investments. From the interviews it came forward that the ratings of the measures represent the extent to which the mentioned processes are implemented well; not the actual measurement and monitoring of the measures.

A high rating of a measure in this perspective therefore has to be interpreted as that the subject of measurement is secured / taken care of as a result of a well implemented process.

Measures		*Measured?*		*Importance?*	
Portfolio level processes		*Avg*	*StDev*	*Avg*	*StDev*
IT strategy definition	% business participation	3,6	1,1	4,1	0,6
IT investment HRM	frequency HRM reviews	2,4	1,3	4,0	0,0
IT inv. financial mngt.	frequency budget reviews	3,5	1,1	4,0	1,1
Evaluation, prioritization and selection of new investments	% business participation	3,9	1,1	4,3	0,9
	% championed by business	3,3	1,0	4,1	0,8
	alignment to strategy and char.	3,4	0,9	4,1	0,8
	% with clear bus. case	2,5	0,8	4,1	0,6
	frequency review & reprior.	3,3	0,9	4,1	0,6
Programme level processes					
Definition candidate programmes	% detailed bus. case upfront	2,8	1,8	4,4	0,7
	% bus. case signed off	2,9	1,7	4,3	0,9
	% with key metrics defined	2,0	1,4	4,1	0,8
Accountability & ownership	% with clear accountability and ownership	3,3	1,4	4,5	0,5
Programme management	% with compliancy review	2,1	0,8	3,5	0,9
	% of vendors evaluated	2,6	1,3	3,6	1,1
	% regular perf. inf. available	3,3	1,2	4,5	0,8
	% following standards	2,1	1,1	3,6	0,9
	% with postimpl. review	2,6	1,4	4,0	0,8
Project level processes					
IT architecture mngt.	%reviewed by arch. board	3,1	1,1	4,0	0,5
Quality management	% receiving quality review	2,4	0,9	3,9	0,8
Acquisition solution	efficiency in delivery	1,9	0,6	3,4	0,9
Implementation solution	% with good user doc available	2,8	1,0	3,8	0,7
	% with user&operation training	2,6	0,9	3,9	0,8

Table 6: Average ratings of measures in the Operational Excellence perspective

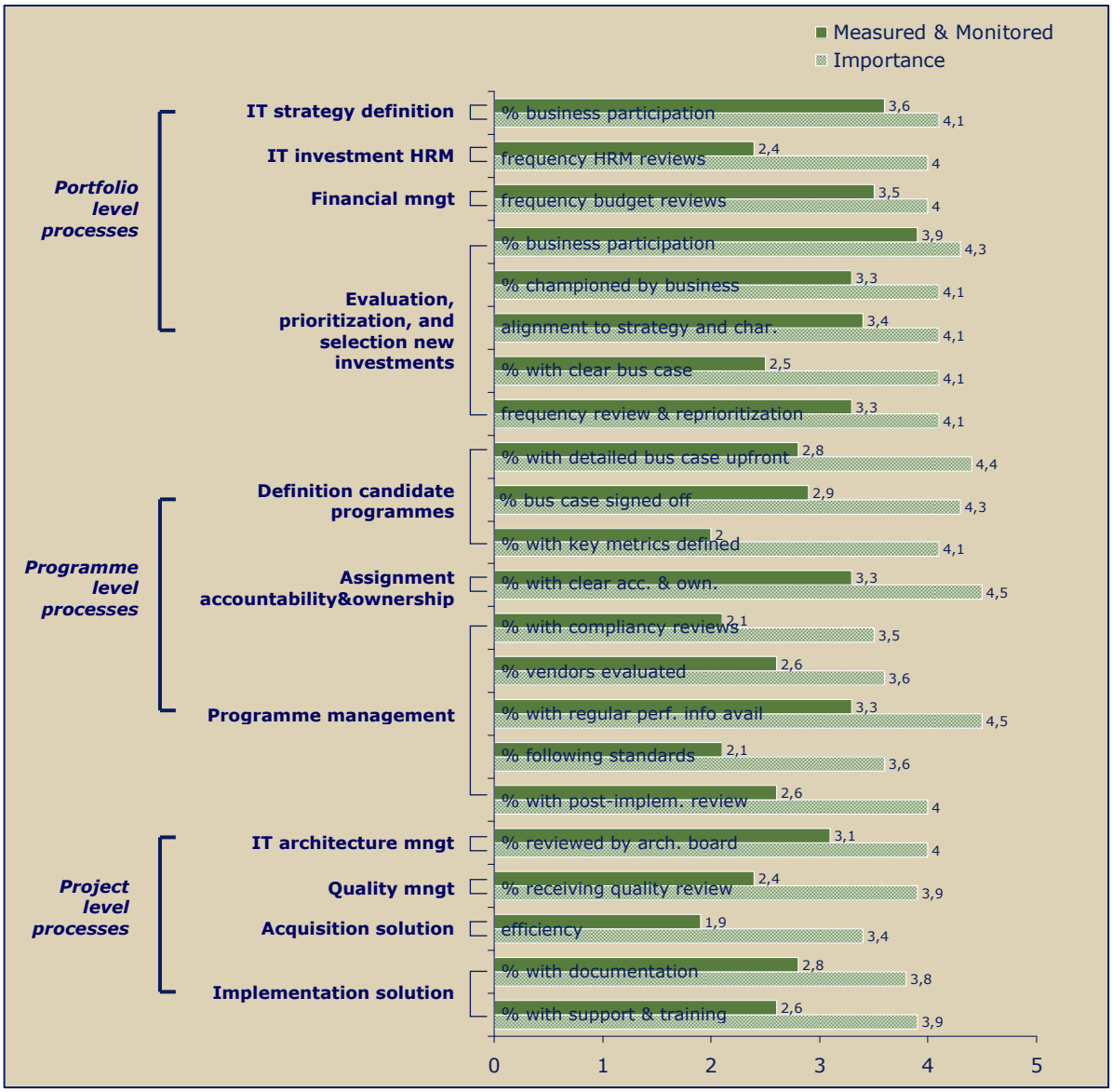


Figure 23: The numbers in

Project level processes					
IT architecture mngt.	%reviewed by arch. board	3,1	1,1	4,0	0,5
Quality management	% receiving quality review	2,4	0,9	3,9	0,8
Acquisition solution	efficiency in delivery	1,9	0,6	3,4	0,9
Implementation solution	% with good user doc available	2,8	1,0	3,8	0,7
	% with user&operation training	2,6	0,9	3,9	0,8

Table 6 graphically represented as a bar chart.

Although there is no actual measurement and monitoring of processes, the results of the survey and the individual cases provide an interesting view on the effectiveness of current processes involved in IT investments.

In general it can be stated that the processes defined in the IT Investment BSC (and based mainly on Val IT and CobiT) are relevant and complete. The average ratings of importance are between 3,3 and 4,4, while most are around 4, and a standard deviation mostly below 1. Also the interviews showed that most processes are considered very important.

Looking at the average ratings of the extent to which things are measured and monitored, the large standard deviations show again the large differences between organizations
Concerning the *Portfolio level processes*, the *definition of the IT strategy and portfolio* and the (high-level) *financial management IT investments* seem to be performed quite well. In general the strategy and high-level portfolio characteristics as well as the high-level budgets are determined together with the business.

Especially the *management of human resources for IT investments* seems to be a process that is not well performed in general. This is supported by the interviews in which often the lack of insight is mentioned in requirements and use of human resources from the business as well as IT. Human resources often are (more than budget) a bottleneck for projects and programmes, resulting in delay in and postponement of projects and programmes.

In the *evaluation, prioritisation and selection of (new) investments* the involvement of business seems to be good. In most organizations there is (some) business participation in meetings discussing the portfolio on a strategic level. High-level strategic alignment is often achieved by making (information) plans for one or more years which are based on business goals. But not in all organizations projects / programmes always have a business owner and not always do new projects / programmes have a clear business case signed of by the business. Furthermore the review and reprioritisation of running programmes and projects is not regularly done in most organizations.

On the *Programme level*, the *definition of candidate programmes* is not in all organizations well performed. Very important but not standard performed in all organizations is the development of a clear business case for new programmes, signed-off by the business owner. And especially there is a lack of metrics for tracking the business case. But this fits in the picture that there is not much detailed measurement information about the performance of IT investments in a lot of organizations, especially not concerning business value.

Assignment of accountability and ownership of programmes is arranged well in most organizations. Often there is someone accountable for the specific programme or project though not always there is a clear owner in the business.

Concerning *programme management*, compliancy reviews are in general not considered very important. Vendor evaluation is important and certainly performed in most organizations that

work with a lot of external vendors in their projects and programmes. The availability of programme performance information differs a lot, in line with the difference in IT governance maturity in different organizations. On the use of standards and best practices for project management the opinions differ. But it seems to be useful for the governance of the portfolio if programmes and projects use the same management methods (like PRINCEII). The post-implementation review of projects and programmes is an issue that needs attention in most organizations, as this is scarcely done.
Processes on the *Project level*, *IT architecture management* is concerned the most important and done quite well in most organizations. In most organizations there is an IT architecture board or architecture group that defines the target architecture and monitors if projects and programmes are in line with the defined architecture. The extent to which an architecture is defined differs. Some organizations have a real enterprise architecture plan with different levels (from business processes to information, applications and the technical infrastructure) while others only have a target application landscape and a definition of standards used.

As stated before there is not much evaluation of results, *quality management* may therefore be considered an issue. Though not all organizations find quality management very important.

There seems to be not much focus on the design, development and implementation of solutions (*acquisition of solution* and *implementation of solution*). The interviews show it is assumed in most organizations that these processes are performed well (effective), but that it is unclear how efficient these processes are performed. The last is considered quite important by most organizations.

Future Orientation perspective

As in the Operational Excellence perspective, there is no actual measurement of the Future Orientation perspective. The ratings below provide insight in how organizations perform in the different areas that shape the readiness of organizations for future IT investments.

	Measured?		*Importance?*	
Measures	*Avg*	*StDev*	*Avg*	*StDev*
IT HRM				
% satisfied IT personell	2,8	0,7	4,0	0,9
average # day fill in vacancies	2,3	0,7	3,6	0,9
% IT budget for training &development of personnel	2,9	0,8	4,0	0,5
Knowlegde man				
% projects with lessons learned & other docs in KM	2,0	1,1	3,5	1,1
use of KM	1,4	0,7	2,9	1,2
IT arch				
% architecture considered flexible & modular	2,9	0,8	4,1	0,6

% compliant to target architecture	3,0	0,8	4,3	0,5
Research emerging tech				
% IT budget for research / innovation	2,1	0,8	3,4	0,9
Perceived satisfaction of top-management reports innovation	2,1	1,0	3,0	1,3

Table 7: Average ratings of the measures in the Future Orientation perspective.

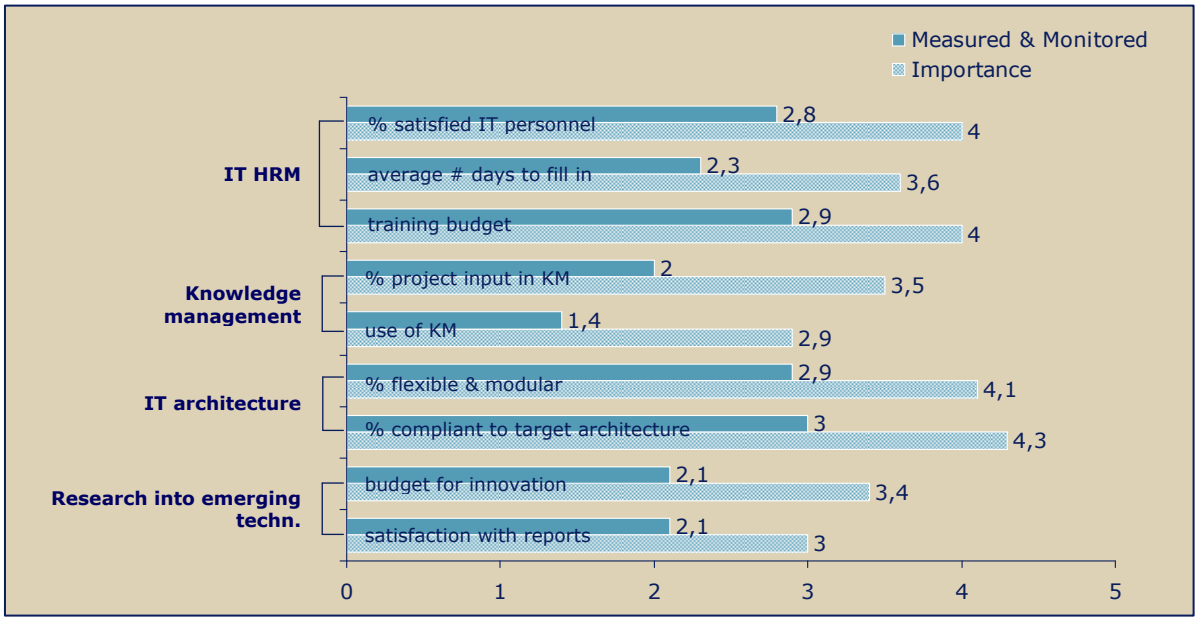


Figure 24: The numbers in Table 7 graphically represented as a bar chart.

What comes forward from the average data above, and also clearly from the interviews, is that *Knowledge management* and *Research into emerging technologies* are not considered very important. Or at least do not receive much priority.

Often there is not much insight in how well knowledge is shared and reused in projects and programmes. For *Knowledge management* there are in general no formal (IT) systems and procedures to facilitate the knowledge sharing. Often there is a central hard-disk with project documents available and sometimes there are meetings organized (for project managers) for sharing information and learning from each other.

Also for supporting *Research into emerging technologies*, most organizations seem to have no formal processes. Most organizations prefer to follow the market. In some organizations assessment of new technologies is done by the architecture group.

The ratings show that the state of the *IT architecture* and *IT human resources* are considered important in all organizations. This is underlined by the interviews. Especially a flexible and up-to-date IT architecture is considered very important for facilitating future investments, although this is not realized in most organizations. In general there is also considerable

attention for realizing (training, recruitment) an IT workforce that is ready for the future. Most organizations are quite flexible in that area also by hiring people with specific knowledge or skills when necessary.

4.4.2 Relevance of issues

In the table and figure on the next page the average ratings for the relevance of issues are shown.

Issue	Relevance	
	Avg	*StDev*
Design		
Link strategy to measures	3,8	1,0
Defining non-financial measures	3,5	0,9
Cause-and-effect relations measures	3,4	0,7
Implementation		
IT supporting pms	3,6	1,1
Top management support	3,4	1,1
Get data for measures	4,3	0,7
Use		
Resistance	3,6	0,7
Misunderstanding	3,4	0,9
Relevance of measures diminishes	2,8	1,0
No insight with measures but data	3,1	0,6
Reliability of data	4,1	0,6

Table 8: Average ratings of the relevance of issues.

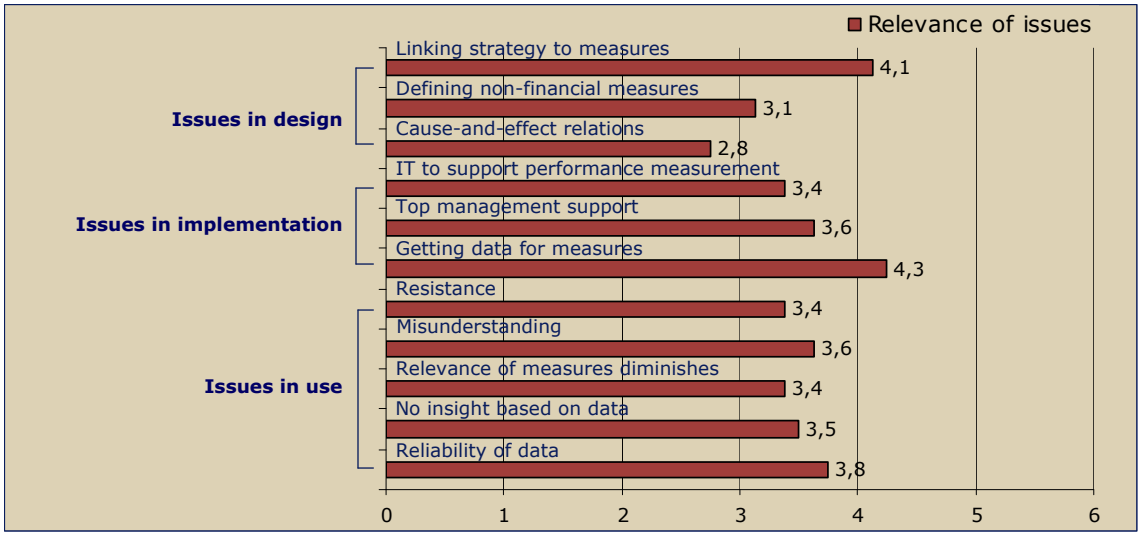


Figure 25: The numbers in Table 8 graphically represented as a bar chart.

The ratings of the issues show that all issues are considered quite relevant in most organizations. And according to the ratings, especially getting the required data for measures (which is an issue in implementation but remains an issue in use) is problematic in most organizations, while also the reliability of data seems to be a major issue. The interviews confirm these findings. But they also provide a more sophisticated view on the issues.

Concerning the **issues in design**, *linking of strategy to measures* is often experienced to be difficult when the strategic goals of the business are non-financial or if there are no clear business goals at all. Also if different stakeholders have different priorities, it proves to be difficult to determine what needs to be measured.

Definition of non-financial measures is an important issue if the portfolio consists of a lot of projects (i.e. strategic, informational) with no hard financial goals. Also the efficiency / effectiveness of the project / programme process is something a lot of organizations want to know but difficult to measure. This is also caused by the lack of quantitative and or qualitative evaluation of projects and programmes mentioned in the general analysis of measures used.

Cause-and-effect relationships are not often mentioned in interviews, these will play a more important role as maturity increases and there is more attention for performance drivers instead of basic outcome measures.

For **implementing** performance measures, there is not much *IT to support performance measurement* in general, especially not on the level of management of a portfolio of programmes and projects. Mainly Excel & PowerPoint are mentioned to be used. This is mostly not considered a problem, although it takes quite some hours to realize the reporting. But organizations actually using applications (like CA's Clarity, previously called Niku) experience a lot of difficulties in getting project managers to use it in the right way and do not get much useful data out of systems. This may be caused by a lack of attention for the processes that are needed around such a system and proper change management (involvement of end-users, good training & manuals etc).

The governance of the portfolio of projects & programmes and performance measurement is not always high on *top-management agenda*, but this varies between organizations. Based on the interviews the matter seems to get more and more the attention in organizations.

In design but especially in **use**, *getting the data for the measures* is a major problem in most organizations, as are *resistance*, *misunderstanding* and *reliability*. All of these seem to be mainly caused by a lack of "project-management culture" (as described by one of the participants), proper IT governance practices (and thus the IT governance maturity level) but also the extra work (bureaucracy) caused by reporting. Often not much in projects and

programmes works according to formal procedures. For good governance of the investment portfolio a culture of transparency and regular reporting on key measures is needed.
To create this transparency, standard project management methods (like PRINCEII which was often mentioned) have to be implemented across the organization, as well as standard templates for reporting, for the business case, etc. Also there need to be governance structures & processes with right responsibilities appointed for the reporting and for the results. Some pressure from top management is needed here to get reporting process going.

But one has to prevent a "report-driven culture" in the "programme management office". It should not be a "policing unit" with a culture of measuring for the sake of measurement. For getting cooperation from project managers there needs to be a focus on the services provided to them like the timely recognition of resource issues and other interdepencies, thus the added value of all this reporting. A solution also used is to provide assistance to project managers for helping and supporting them in reporting.

4.5 Relation with context factors

The previous data and analysis gave a general view on the performance measures and perspectives and on possible issues. But as stated in section 3.2, context factors may be related to what issues are encountered, what is actively measured & monitored and what is concerned important to be measured.

As stated before, it is not possible to show strong and statistically significant relations with the gathered data. But exploring trends based on the survey data and the interviews will give insight in possible relations between a different maturity/ a different budget type/ a different portfolio and the measures and issues. This makes a more balanced judgement of previous findings possible.

4.5.1 IT governance maturity

As came forward in the analysis of individual cases (section 4.3) as well as in the general analysis (section 4.4), there is quite some difference in the IT governance maturity in organizations, resulting in different measures and issues. Based on a first perception after analysis of cases, the cases were classified in three groups; starters, followers and leaders.

To make the relation between maturity, use of measures and relevance of issues more concrete and visible, this section shows these relations in scatter plots.

Maturity & Corporate Contribution

In Figure 26 the correlation is shown between maturity and the ratings of the use of the different measurement categories in the **Corporate Contribution perspective**.

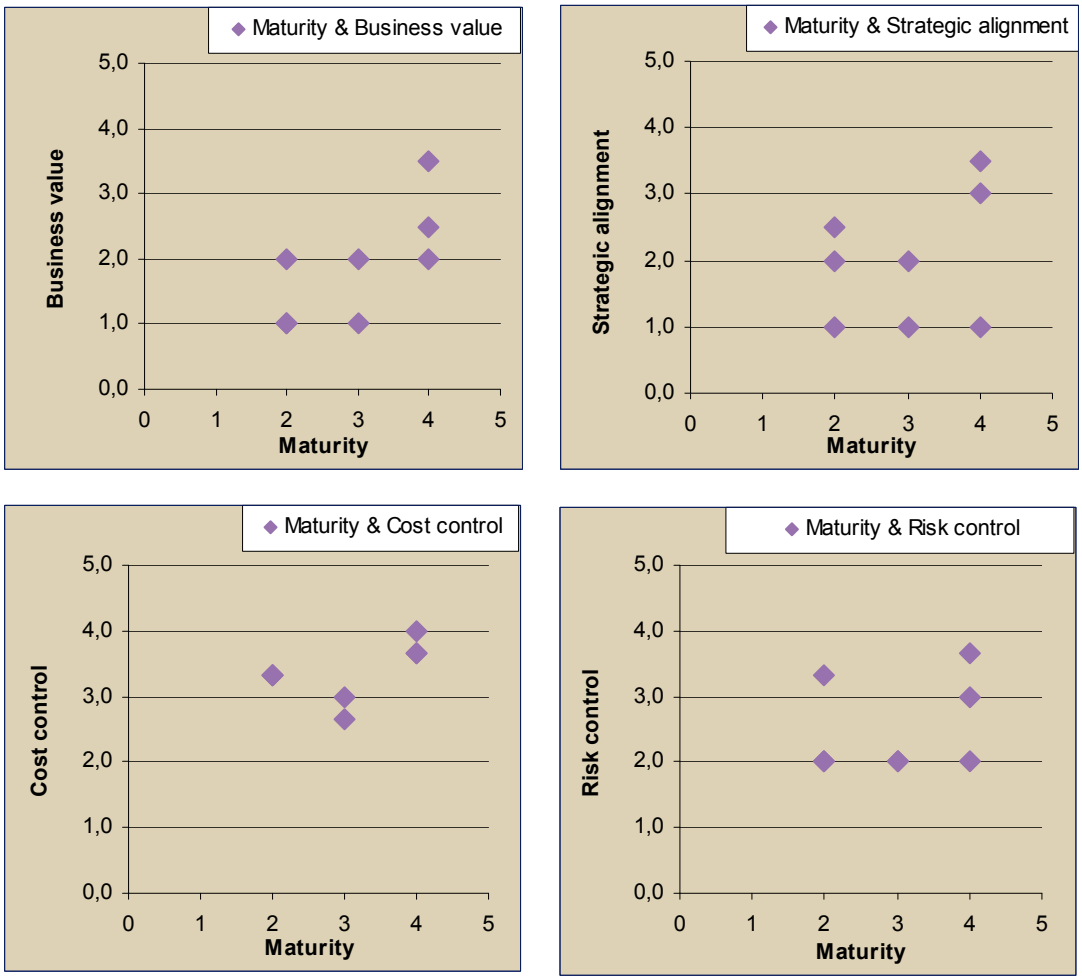


Figure 26: Correlation between maturity and average ratings in Corporate Contribution

What can be seen is that all plots show a more or less positive relation; a higher maturity is often seen together with better measurement of the Corporate Contribution perspective.

Business value and *Strategic alignment* show a stronger positive correlation; lower maturity results in much lower ratings for measurement, higher ratings in much higher. This is in line with the previous findings that *Business Value* and *Strategic alignment* are not measured much by starters and followers but are more used by the more experienced leaders.

Cost control is, as also discussed in section 4.3 and 4.4, something that most organizations have to some extent. But at a higher maturity there is better measurement, a more complete insight in *Cost control.*

Risk control is also something most organizations have to some extent, although again at a higher maturity there is better *Risk control*.

Maturity & User Orientation

In Figure 27 the correlation is shown between maturity and the ratings of the use of the different measurement categories in the **User Orientation perspective**

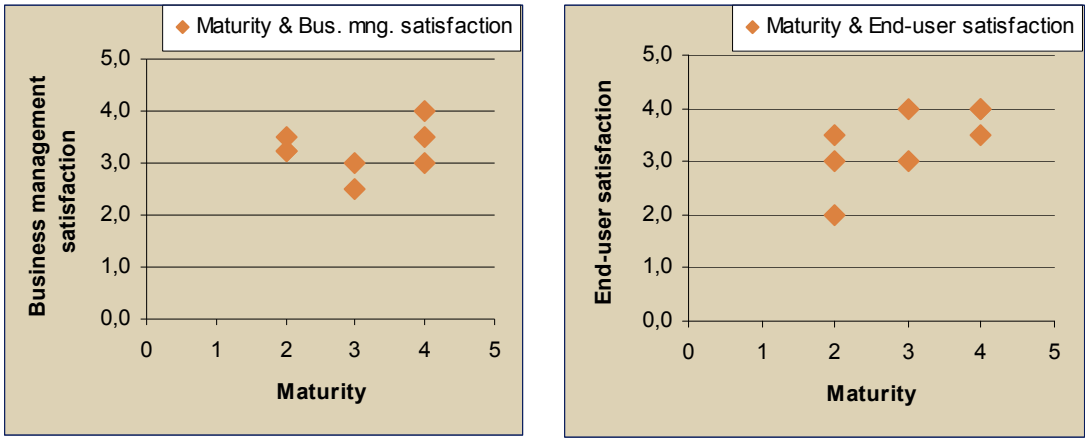


Figure 27: Correlation between maturity and average ratings in User Orientation

Both plots show a positive relation, although not very strong. In line with previous findings in section 4.3 & 4.4, the **User Orientation perspective** is quite well measured in most organizations, at least there is quite well insight in the internal customer *satisfaction* of *end-users* and *business management*. But again the more mature organizations have better insight and measurement.

Maturity & Corporate Contribution

In Figure 28 the correlation is shown between maturity and the ratings of the use of the different internal process categories in the **Corporate Contribution perspective**. As described before, these ratings show the extent to which the subject of measurement is secured / taken care of as a result of a well implemented process.

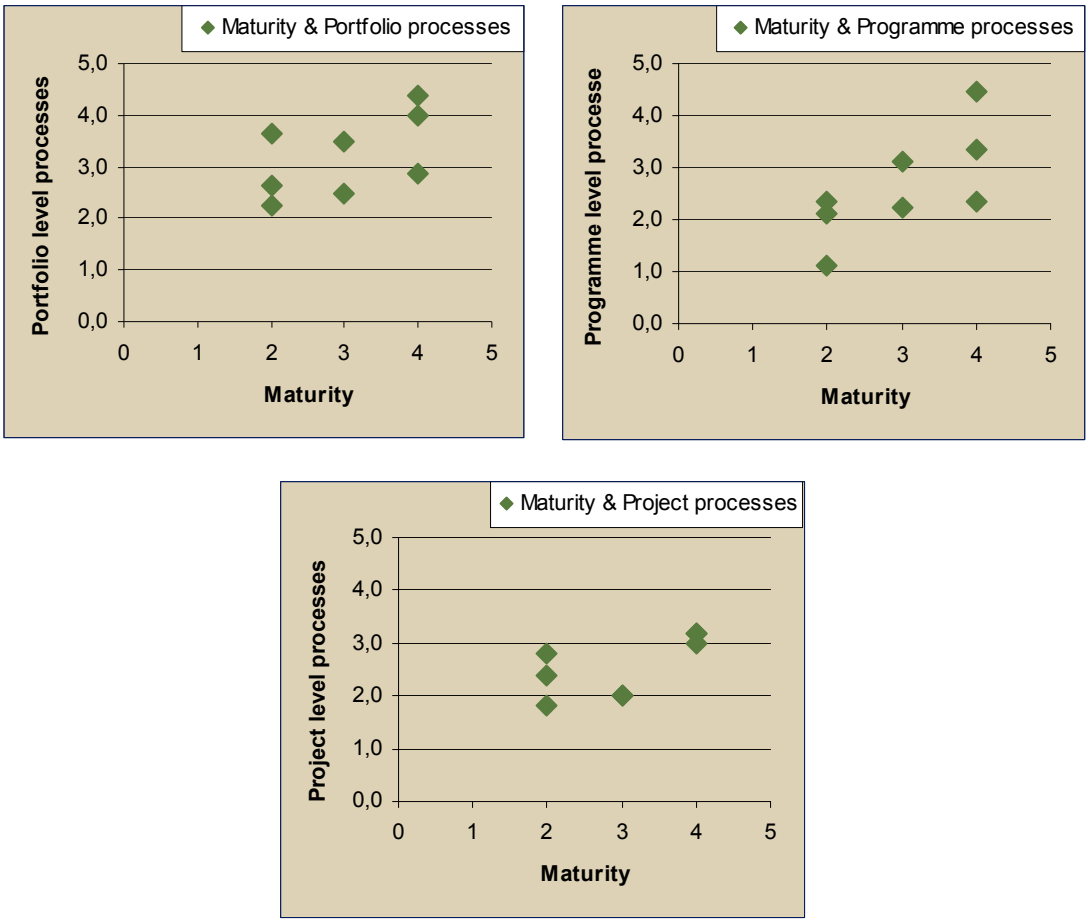


Figure 28: Correlation between maturity and average ratings in Operational Excellence

Again all show a positive correlation with maturity. For the *portfolio level processes* there is a small positive relation, showing that it seems like these processes are performed reasonably well in all organizations, although still better in the more mature organizations.

For the *Programme level processes* there is much more difference, illustrate with a stronger positive relation. This indicates that there is more difference in the effectiveness of performance on these processes between more and less mature organizations.

The *Project level processes* show a less strong correlation, although it is interesting to see that these processes are in none of the cases rated to be performed well. This may also be due to the fact that some of the processes on this level were concerned to be less important. But it also indicates that processes in this area in general need to be improved.

Maturity & Future Orientation

In Figure 29 the correlation is shown between maturity and the ratings of the different aspects in the **Future Orientation perspective**. As described before, the ratings provide insight in how organizations perform in the different areas that shape the readiness of organizations for future IT investments.

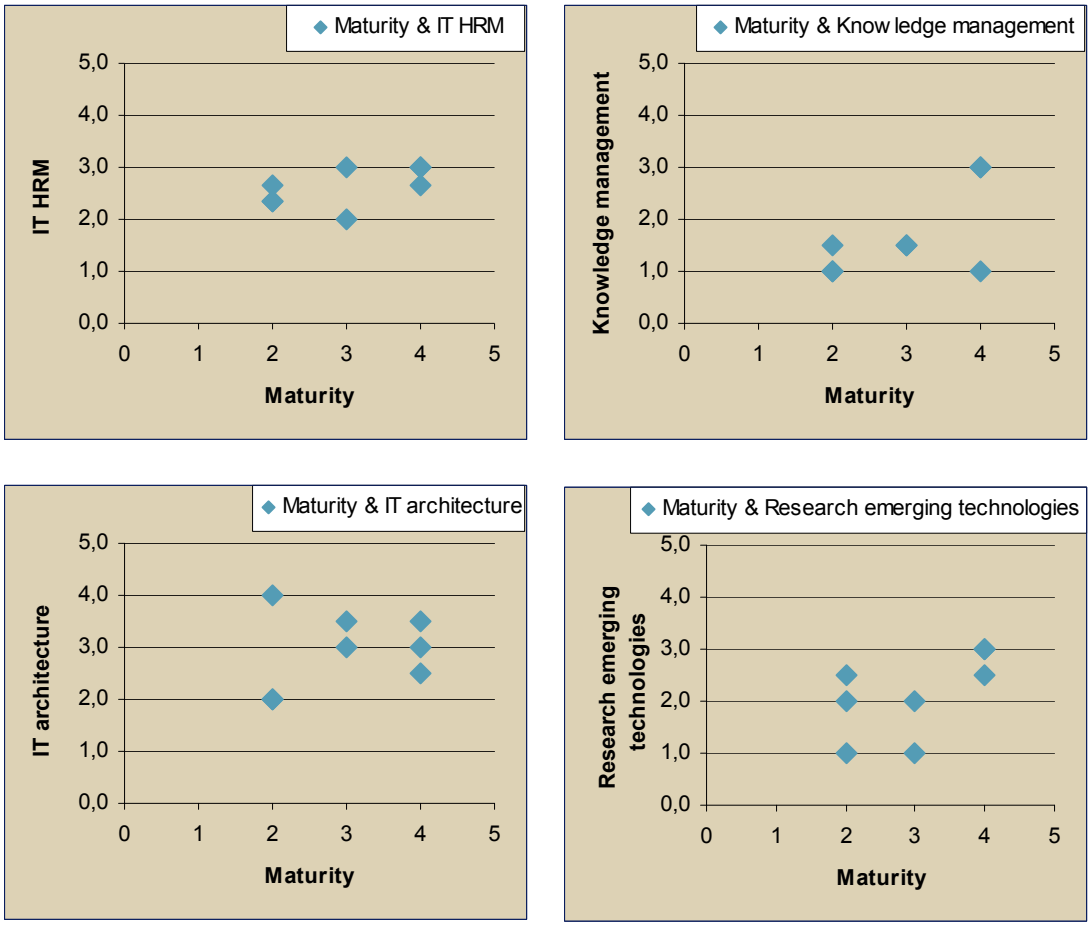


Figure 29: Correlation between maturity and average ratings in Future Orientation

There is no real correlation with maturity in the **Future Orientation** perspective. In general the opinion in organizations is that their *human resources* are reasonably ready (and well managed) for future investments.

Knowledge management is less well performed in most organizations; there is also a lot of difference in the opinions about the importance of this aspect. The two leaders (maturity 4, average KM 3) seem to pay some attention to this aspect though.

In general the *IT architecture* is reasonably well managed (with most ratings between 3 and 4); although it is interesting to see that especially the two starters (maturity 2, average IT architecture 2) perform less well on this aspect.

Research into emerging technologies is not considered to be very important in most organizations. That explains the quite low ratings for this aspect.

Maturity & Issues

In Figure 30 the correlation is shown between maturity and the ratings for relevance of the different types of issues. This is done to see if certain issues play a more important role for a certain maturity level.

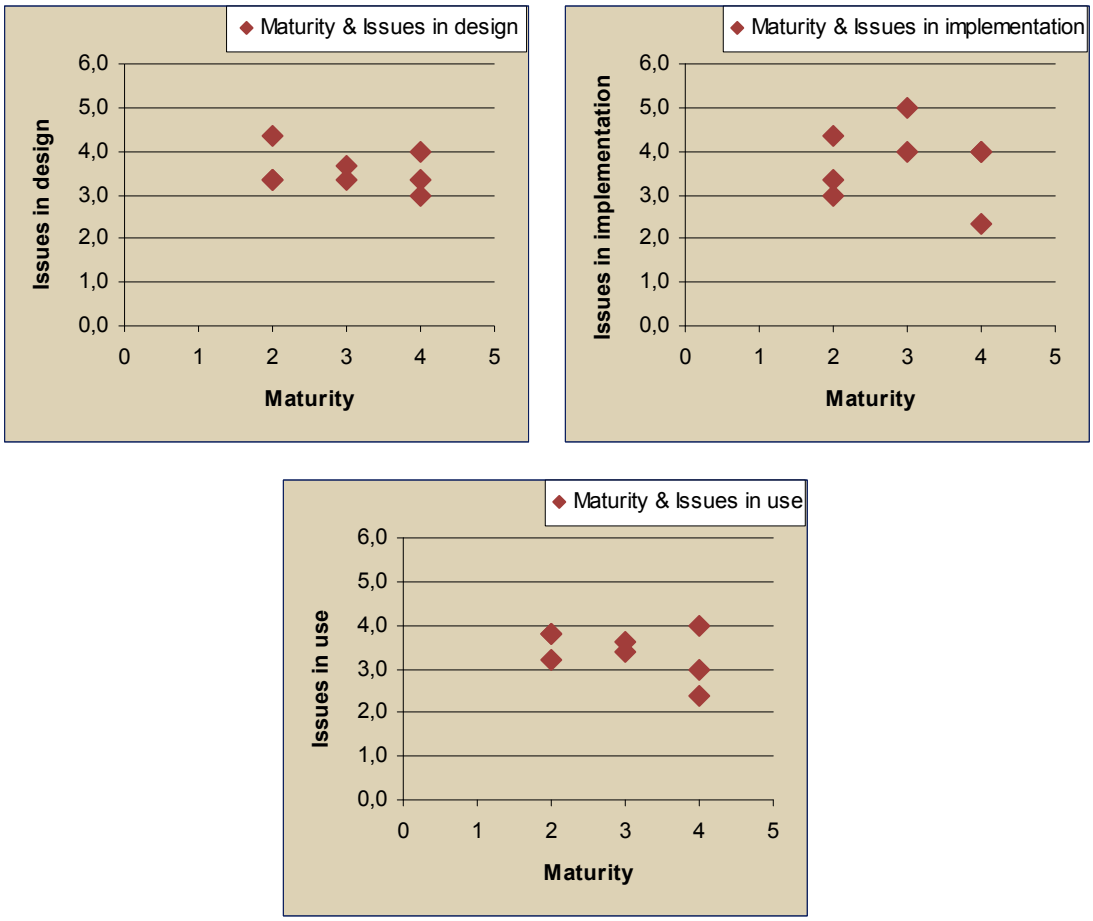


Figure 30: Correlation between maturity and relevance of issues

There do not seem to be very strong correlations between maturity and the relevance of the different types of issues. The scatter plots show that on average the issues are considered quite relevant, especially those in *implementation*. Interesting is that although there is no real correlation, one organization (one of the leaders) rated the issues to be much less relevant, especially those in *design* and *use*. As described in section 4.3 and 4.4 that organization took some specific measures to cope with the problems.

4.5.2 IT investment types & measures

In section 3.2 it is stated that a different portfolio with different types of IT investments will require a different focus in measurement.

One would expect organizations with more *transactional investments* to find especially *financial business value* important and to have this measured well, as the main (and often quite measurable) goal of these investments is to cut costs (deliver *financial business value*).

Organizations with a lot of *strategic* and/or *infrastructural* investments may have better measured and find it more important to measure *Cost control* and *Risk control*, as both strategic and infrastructure investments are often very risky and actual business value is difficult to measure.

But as became clear in the previous part of this chapter, all measures in the **Corporate Contribution perspective** are considered quite important in all organizations and the extent to which the different things are measured is mainly influenced by the IT governance maturity of organizations.

As a result, no real correlations were found between the percentage of *transactional* investments and the use & importance of *financial business value* and between the percentage of *infrastructure* investments and the use & importance of *Cost control* and *Risk control*.

4.5.3 IT investment size, use & importance

In section 3.2 it is stated that if budget is small, it might be the case that extensive performance measurement / management with complex measures and a lot of processes & structures for decision making cost more than the value it creates. Therefore one would expect organizations with a large IT investment budget to have more attention for controlling and directing these properly, thus paying more attention to performance measurement.

In this research al organizations have a considerable budget for change (discretionary and non-discretionary):

- 2x 1<5 (3&6),
- 2x 5<10 (1&5)
- 2x 10<25 (2&4)
- 1x 25<50 (8)
- 1x 150<250 (7)

In all organizations performance measurement is considered quite important, therefore size of the portfolio budget does not seem to have much influence on the maturity of measurement and governance, as cases with same size have different maturities.

Interesting is though that case 7 & 8 have considerably larger portfolio. And in practice this (combined with recent reorganizations) has resulted in a very complex governance organization and a complex portfolio, making it difficult to get central insight in measures. Thus size does not have much influence on the use and importance of measures, but when size of the portfolio is very large this may result in a complex portfolio and accompanying organization, making it difficult to realize proper governance of the portfolio of IT investments.

4.6 Conclusion

In this section the findings of this chapter are summarized, by answering the four research questions.

4.6.1 Use of measures (I)

A first analysis of the cases immediately showed the large difference between organizations in maturity concerning governance structures and processes and available and used performance measures. The cases where therefore split in three categories: starters, followers and leaders.

- **Starters** are currently starting to think about governance practices and measurement concerning their IT investment portfolio but do not have much formal measurement and governance and involved internal processes implemented yet. In general the governance structure and processes are not very formal and mainly driven by IT management with some voluntary participation of the business. Often strategic IT plans are proposed by IT. During the year, issues are solved and decisions are made on an ad-hoc basis.

  Concerning performance measurement in the **Operational Excellence perspective** and **User Orientation perspective**, there is not much central insight in performance of IT investments. There is some, but no complete insight in *costs* and *risks* and some insight in *internal customer satisfaction*.

  Internal processes (from the **Operational Excellence perspective**) are overall not very well implemented. Especially *human resource management*, the quality and existence of *business cases*, *project management standards & best practices*, *quality management* and efficiency in *acquisition and implementation* need improvement. Also in the **Future Orientation perspective** all four topics are not covered very well. Especially the existing *IT architecture* and *IT human resources* are point of interest here, while also *knowledge management* and *research into emerging technologies* need some more attention.

  In both organizations all issues are very relevant and mainly caused by the limited experience with performance measurement and governance, the culture that has to become more professional. Processes and structures need t become more formalized and standardized concerning IT investments.

Cause for the low maturity is the type of organization and culture in one, and the complexity and recent organizational changes in the other.

- **Followers** are currently improving their governance practices and measurement of their IT investment portfolio, but still have some work to do to reach an acceptable baseline of measures and mature processes.

  Governance structures and processes have often been formalized to some extent. There are steering groups for management of specific larger projects and programmes and there is often a combination of a strategic and tactical level committee for regular discussion of the overall portfolio of IT investments. Strategic IT plans are often developed together with the business. There are not much formal processes for performance measurement though and projects and programmes are managed in different ways, there is not much standardization.

  Concerning performance measurement in the **Corporate Contribution perspective**, there is quite good coverage of *Cost control* and *Risk control*. All projects and programmes in the portfolio report on budgets and key risks and issues. Sometimes there is also insight in the actual budget spent. There is often limited insight in the actual progress in the programmes and projects. Also the risks for day-to-day business operations of investments (during and after) are often unclear. *Strategic alignment* is realized by making a long-term portfolio planning that supports the business goals.

  In the **User Orientation perspective**, there is some insight in the *internal customer satisfaction* of *business management* and *end-users*, although this is mostly not formally measured. But the opinion often is that things are organized in such a way that internal customer wishes should be fulfilled. In general the evaluation of projects and programmes at the end is a point of interest though.

  On average the internal processes in the **Operational Excellence perspective** are performed reasonably well. On the portfolio level *resource management*, *quality of business cases* and *business ownership* need attention. Also regular review and *reprioritisation* is something that often needs to be improved. The *definition of candidate programmes* definitely is point of interest on the programme level, where *metrics to track the business case and business ownership* need to be improved. Also the *use of standards and best practices* in project and programme management needs attention. On the project level the *efficiency of acquisition and implementation* and *quality management* are main issues.

Concerning the **Future Orientation perspective**, *Knowledge management* and *Research into emerging technologies* are possible issues but the opinion about importance of these aspects differs.

Most issues are concerned relevant by followers. Often mentioned is *linking the strategy to the measures* in design, as it is often difficult to determine what needs priority in measurement. In implementation, there is often limited *top-management support* and there are difficulties in *getting the required data for the measures*. In use often mentioned are *resistance*, *misunderstanding* and the *reliability of data*.

- **Leaders** are clearly in front concerning the measurement of their IT investment portfolio, but also with their governance practices and the maturity of other internal processes involved.

  They have formalized governance structures. Relevant processes have often been formalized, with steering groups for management of specific larger projects and programmes, tactical level committees for regular discussion of progress and issues of projects and programmes in the portfolio and a strategic level committee for directing the portfolio and making important decisions. Strategic IT plans are developed together with the business, based on business needs. Measurement procedures and project management have often been standardized.

  Leaders have well covered most of the measures in the **Corporate Contribution perspective**, although *impact of the portfolio on the business* and *resource management* may need attention. Also the measurement of *non-financial business value* is a difficulty. Also balance in the portfolio (on short/long-term benefits, financial / non-financial benefits, risk / value) may be a point of discussion, while alignment with strategic goals is done quite well. There is good insight in costs (budgets, actuals, progress), risks, and financial business value.

  Concerning the **User Orientation perspective** there is quite well insight in the *internal customer satisfaction* of *business management* and *end-users*, although not always formally measured. But things are organized quite well, realizing satisfied internal customers. Still the evaluation of projects and programmes at the end is a point of interest. Formal measurement of internal customer satisfaction may be used to fine-tune processes.

  Internal processes in the **Operational Excellence perspective** are performed well by the leaders. Still small improvements can be made. On the portfolio level *human resource management* and regular *reprioritisation* are things to have a better look at. On the

programme level, *post-implementation review* of programmes is a point of interest, as is the efficiency in acquisition and implementation. On the project level *IT architecture management* is not always performed very well.

In the **Future Orientation perspective** especially the existing *IT architecture* is something that is not always considered ready for the future.

The issues in design, implementation and use of performance measures are not very prevalent in the leading organizations. *Linking the strategy to performance measures* is especially found difficult when strategic goals are non-financial. *Top management support* is an important issue for one of the two leaders. Issues in *Getting the required data* and *reliability*. An additional problem identified is the measurement of a baseline for financial business value, which is experienced to be difficult.

The findings in the general analysis are in line with the above. Only the **Corporate Contribution perspective** and **User Orientation perspective** are measured to some extent. The averages show quite high standard deviations, pointing out large differences between organizations, in line with the three 'maturity' groups found in the case analysis.

Cost control and *Risk control* are best measured on average and can be seen as the first basic measures an organization should cover. Most organizations would like to improve the measurement and monitoring of the actual spent, the progress of investments and the impacts of investments on day-to-day business. *Business value* and *Strategic alignment* show much lower averages, in line with the finding above that these are only covered by the leaders yet. Often only financial business value is measured, and concerning alignment general point for improvement are regular review and reprioritisation of the portfolio and more attention for balance on different aspects.

In general the opinion in organizations is that there is quite good insight in *Business management satisfaction* and *End-user satisfaction*. But in a lot of organizations there is no formal measurement (i.e. with an annual survey) of internal customer satisfaction and especially the evaluation of projects and programmes is something organizations would like to improve.

The averages in the **Operational Excellence perspective** and **Future Orientation perspective** give a view on the extent to which organizations have covered the different processes and topics mentioned.

Looking at the effectiveness of internal processes, the *Portfolio level* processes are quite well performed in general. Low ratings are there for the *management of resources for IT*

investments, in line with previous findings, and the clearness of business cases of IT investments in the *evaluation, prioritisation and selection of (new) investments*. Processes on the *Programme level* and *Project level* have much lower ratings on average. On the programme level in general improvements need to be made to the *definition of candidate programmes* concerning the quality of the business case and the availability of metrics for tracking the business case. Concerning *programme management*, the availability of programme performance information differs a lot, there is of the a lack of standards and best practices for project management. Also the post-implementation review of projects and programmes needs attention in most organizations. On the project level in general *quality management* and especially the efficiency in *acquisition and implementation of solutions* are not very well performed, though opinions about the importance of these processes differ.

Concerning the future readiness of organizations for future IT investments, of main importance are the state of the existing *IT architecture* and *IT human resources*, which vary a lot in the different organizations. Opinions about the importance of *Knowledge management* and *Research into emerging technologies* differ. But both are not very well performed in general.

4.6.2 Relevance of issues (II)

Most issues where experienced at least to some extent by most organizations. In **design**, *linking of strategy to measures* is experienced to be difficult when the strategic goals of the business are non-financial or if different stakeholders have different priorities. The *Definition of non-financial measures* is an important issue if the portfolio consists of a lot of projects (i.e. strategic, informational) with no hard financial goals.

In **implementation** of performance measures there is in general not much *IT to support performance measurement* which is not considered to be a problem. Organizations actually using applications for this experience a lot of difficulties in getting project managers to use it in the right way and do not get much useful data out of systems. *Top-management* proves to be an issue in a lot of organizations, but the matter seems to get more and more priority in organizations.

In design but especially in **use**, *getting the data for the measures* is a major problem in most organizations, as are *resistance*, *misunderstanding* and *reliability*. All of these seem to be mainly caused by a lack of "project-management culture" (as described by one of the participants), proper IT governance practices (and thus the IT governance maturity level) but also the extra work (bureaucracy) caused by reporting.

To overcome issues, standard project management methods (like PRINCEII) may be implemented across the organization, as well as standard templates for reporting, for the

business case, etc. Also there need to be governance structures & processes with right responsibilities appointed for the reporting and for the results. Some pressure from top management is needed here to get reporting process going. A best practice is also to provide assistance to project managers for helping and supporting them in reporting. Also one has to prevent a "report-driven culture" in the "programme management office". It should not be a "policing unit" with a culture of measuring for the sake of measurement.

4.6.3 IT Investment BSC in practice (III)

In general all items in the IT Investment Balanced scorecard are considered important and based on the interviews the IT Investment BSC can be considered quite complete. There are no items that should be removed from the IT Investment BSC.

One possible addition could be the *Human resource capacity* in the **Corporate Contribution perspective** as often the lack of central insight in human resource availability and in bottlenecks was mentioned as an issue. One leader already uses human resource capacity as one of the main measures and discusses this regularly at different levels.

Although the items in the **Operational Excellence perspective** and **Future Orientation perspective** proved to be useful for analysing the cases, the question is if these performance drivers will and should actually be measured. For now it is unclear if these are just irrelevant or if measuring those is a next step in maturity of measurement. What is clear is that only a small selection of key KPIs would then be used in these perspectives. The research shows that the IT Investment BSC provides a good starting point for discussing about these key KPIs.

4.6.4 Relation with context factors (IV)

As stated before, there is a clear positive correlation between IT governance maturity and the use of measures in the different perspectives of the IT Investment BSC. Higher maturity is related to higher ratings for the measures, meaning they are more actively measured and monitored.

In the **Corporate Contribution perspective**, *Business value* and *Strategic alignment* show a stronger positive correlation than *Cost control* and *Risk control*, supporting the previous statements that the first two are only measured by leaders, where the latter are covered to some extent by all organizations.

There is a small positive relation between measures of *satisfaction* of *end-users* and *business management* with maturity in the **User Orientation perspective**, on average all ratings are quite high, showing that measures in this perspective are covered by all organizations to some extent, though a little better by the more mature ones.

In the **Operational Excellence perspective**, for *portfolio level processes* there is a small positive relation while on average ratings are quite high, showing these processes are covered quite well by most organizations. For *Programme level processes* there is a stronger positive relation showing more difference between the mature and less mature organizations. *Project level processes* show a small positive relation; while on average ratings for these processes are quite low, showing these processes are not very well performed.

There is no real correlation with maturity in the **Future Orientation** perspective. The figures show that *human resources* are reasonably ready (and well managed) for future investments, *knowledge management* is less well performed in most organizations. The *IT architecture* is reasonably well managed although it is interesting to see that especially the two starters perform less well on this aspect. *Research into emerging technologies* is not considered to be very important in most organizations, explaining the quite low ratings for this aspect.

No relations were found between maturity and the relevance of issues, between the different portfolio compositions and measures (use & importance) and between IT investment budget and use and importance of measures. The figures showed that importance of measures is not related to the portfolio composition (as all measures are considered quite important) and that only when the IT investment budget becomes very large this will increase complexity of measurement, making it more difficult to realize proper governance of the portfolio of IT investments.

5. Recommendations & conclusion

This last chapter will answer the last research question, discussing ***what recommendations can be given on performance measurement of IT investments****.*

The following sub-questions are answered:

I. ***What changes have to be made to the model of measures defined in this research?***
II. ***What general recommendations can be given on performance measurement of IT investments?***
III. ***What recommendations can be given on issues in designing, implementing and using performance measures of IT investments?***
IV. ***What specific recommendations can be given to the different case organizations?***

For answering the first question, the relevance of the IT Investment BSC in practice is analysed in section 5.1.

Section 5.2 and 5.3 will answer sub-question II and III, giving directions and best practices on measurement and for major issues.

In section 5.4 some additional specific recommendations are given for the different cases analysed.

Last, section 5.5 gives the overall conclusion of the research and section 5.6 gives recommendations for further research.

5.1 Relevance of the IT Investment BSC

The IT Investment BSC was defined based on literature research. This is not always a guarantee for a model useful in practice. But the field research showed that the model is a good basis for designing a performance measurement model of IT investments. Almost all measures were rated to be of average or more than average importance. Only some extra measures were suggested in the interviews and survey.

In the analysis in chapter 4 it came forward that one small change should be made by adding the aspect *Human resource capacity* to the **Corporate Contribution perspective** as there is often lack insight in this aspect and it is considered a key outcome measure for the business.

The analysis showed that it is unclear if the performance drivers in the **Operational Excellence perspective** and **Future Orientation perspective** should actually be measured. It may be a next step in the maturity of performance measurement. But as the items in these perspectives proved to be useful and important for organizations no changes have to be made to the model.

The IT Investment BSC is a good starting point for discussing about performance measurement of IT investments, as it provides a holistic view of performance measures. It is flexible and can be adapted to each specific organization. It forces management on different levels to develop a clear and shared view of what they are trying to achieve and what is critical to reach those objectives. As the IT Investment BSC is focused on top-down performance measurement, that may result in resistance on a lower level. See the recommendations on issues for some best practices to overcome or prevent problems in design, implementation and use of the IT Investment BSC.

5.2 General recommendations

As described before, the model gives a good start for designing a system of performance measures. But as most organizations are at the beginning of measuring the performance of IT investments, priorities need to be established. Based on the field research results and interviews, directions are given for making these choices and best practices are described.

5.2.1 Use of perspectives of the IT Investment BSC

In general one could say that the **Corporate Contribution** and **User Orientation perspective** show outcomes of IT investments and **Operational Excellence** and **Future Orientation** show performance drivers.

From chapter 2 it came forward that the lagging outcome measures tell management afterwards whether expected results are realised. The leading performance drivers tell how well processes are currently performing, forecasting if goals will be achieved.

Chapter 4 gives a view on the current status in practice.

- **Starters** are only starting to recognize the importance of governance and measurement of the investment portfolio. They do not have much central insight in the portfolio of IT investments. Also internal processes are not performed very well.
- Most organizations are considered **followers** and have implemented some governance practices and have some central measures, often limited to financials and major issues, with additionally some insight in internal customer satisfaction. Most related internal processes are performed quite well, but small improvements are needed.

- **Leaders**, the best (at least in this research) have quite well covered all outcome measures (business value, alignment, costs and risks) and have quite mature governance practices and standardized and processes.

Thus most organizations are just starting to measure the performance of IT investments. Often there is no complete insight in the outcomes, not to mention the performance drivers of these outcomes. What came forward is that therefore organizations first have to strive for a good baseline of outcome measures, covering most of the **Corporate Contribution** and **User Orientation perspective**.

But when no performance drivers are measured, there is no understanding of how current performance (shown by outcome indicators) is being influenced. This means no solid decisions can be made on how to improve the performance of IT investments. Therefore organizations should also consider what specific outcome measures in the **Corporate Contribution** and **User Orientation perspective** they consider to be important and subsequently focus on measuring specific related performance drivers in the **Operational Excellence** and **Future Orientation perspective**. This is illustrated by findings of Gartner (Gomolski, 2004) which state that IT performance management will evolve to include a greater focus on the measurement of IT processes. But first these internal processes (as described in the ***Operational Excellence perspective***) have to be implemented well. The field research showed that in all organizations there are some improvements to be made concerning internal processes. Also there needs to be more attention for the aspects in the **Future Orientation perspective** where also there a lot can be improved.

By implementing the internal processes in the right way and looking after the aspects that drive future performance, already a good step is taken to optimize performance of IT investments, lowering the urgency to actually measure these. But as described before, performance drivers that are of key importance may still be selected to monitor the extent to which the current processes drive the performance of IT investments and make sure future performance is guaranteed.

5.2.2 Governance of the IT investment portfolio

Although the governance (of which performance measurement is only one part) was not the main focus of this research, the topic was very much encountered and discussed in the interviews in the field research.

What was already known, but came forward very clear, is that it makes no sense to measure if there are no right structures and processes to use these measures. Furthermore it became clear that different measures are used on different levels of the organization.

Before providing recommendations on measurement, some general recommendations on the governance of the IT investment portfolio are now given.

The analysis of current practices showed that the IT investment portfolio consists of programmes (with accompanying "sub-projects") and large projects. This is illustrated by the figure below:

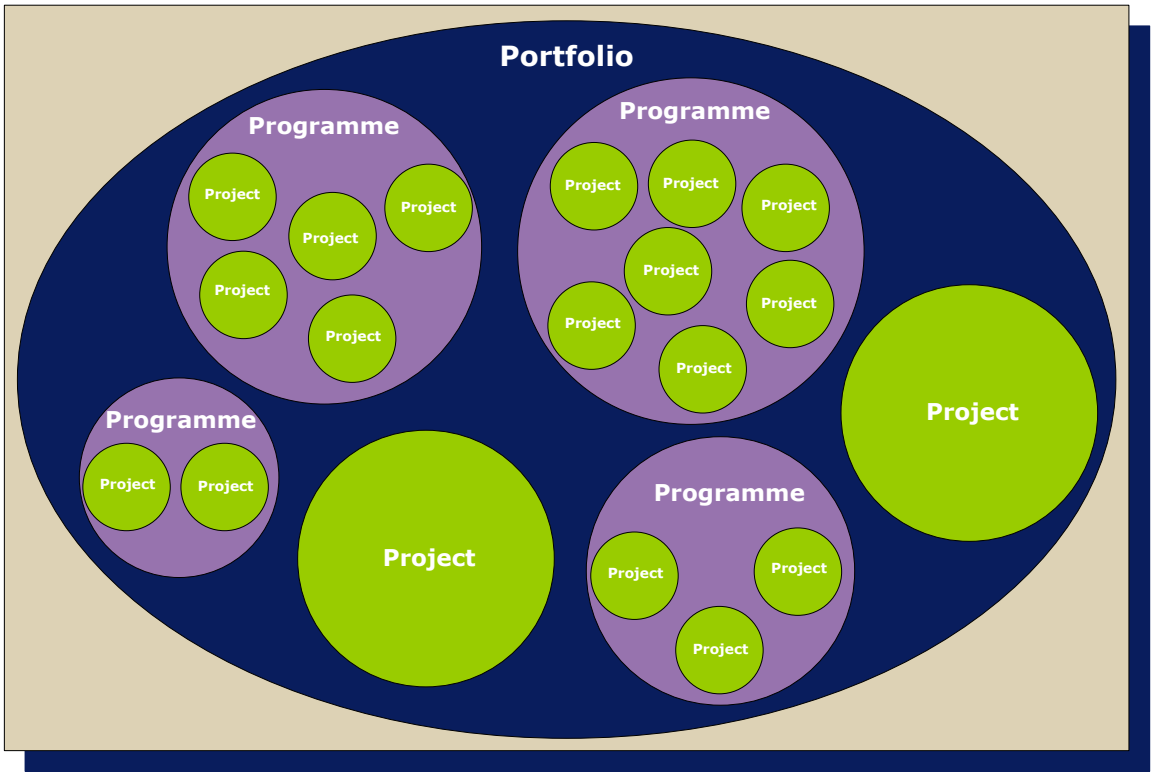


Figure 31: An illustration showing the average portfolio of programmes and projects

On the strategic level a high-level framework is determined, setting the long-term IT strategy plan (3-5 years), which provides high level directions and budgets. The first and (sometimes) second year of this plan are filled with concrete projects, which should be mainly filled in by the lower (tactical) level.

In practice often three layers of governance can be identified for the IT investment portfolio:

- strategic level committee;
- tactical level committee;
- operational level committee.

Strategic level committee

The strategic level committee is often called the "IT Strategy committee". In general the different CxOs, the portfolio manager and possibly business managers take a chair in this committee. Meetings are often planned quarterly.

General topics that may be discussed on this level:

- (budget) approval of new programmes;
- the high-level direction of the portfolio, with possible reprioritization during the year;
- results / deliverables of projects / programmes;
- high-level monitoring of (lack of) progress of programmes;
- major issues in programmes / projects that can harm the business.

Tactical level committee

The tactical level committee is sometimes called "project / programme progress meeting" or "portfolio meeting". Participating are the CIO, the head of portfolio management, business owners / sponsors of programmes / projects, programme/project managers and optionally also an architecture manager and information manager. Meetings often take place on a biweekly or monthly basis.

General topics that may be discussed on this level:

- the progress, the budget status, major issues / problems and benefits / business case status of different programmes & projects in the portfolio;
- important project / programme decisions / changes with possible budget changes;
- the detailed overall budget status (requested, reserved, assigned);
- status of resources (agreed, needed, available);
- (other) interdependencies / bottlenecks between programmes / projects.

Operational level committee

The operational level committee is often called the "Steering committee" and is in place for the larger and more important programmes / projects. The steering committee often consists of the business owner / sponsor, the project / programme manager, the CIO and the portfolio manager (especially when there are major issues or important decisions to take. Depending on the organization also others may participate in this meeting. The steering committee often meets on a weekly or bi-weekly basis. The steering committee discusses programme / project specific risks & issues.

The possible governance structure described above is illustrated in Figure 32 on the next page.

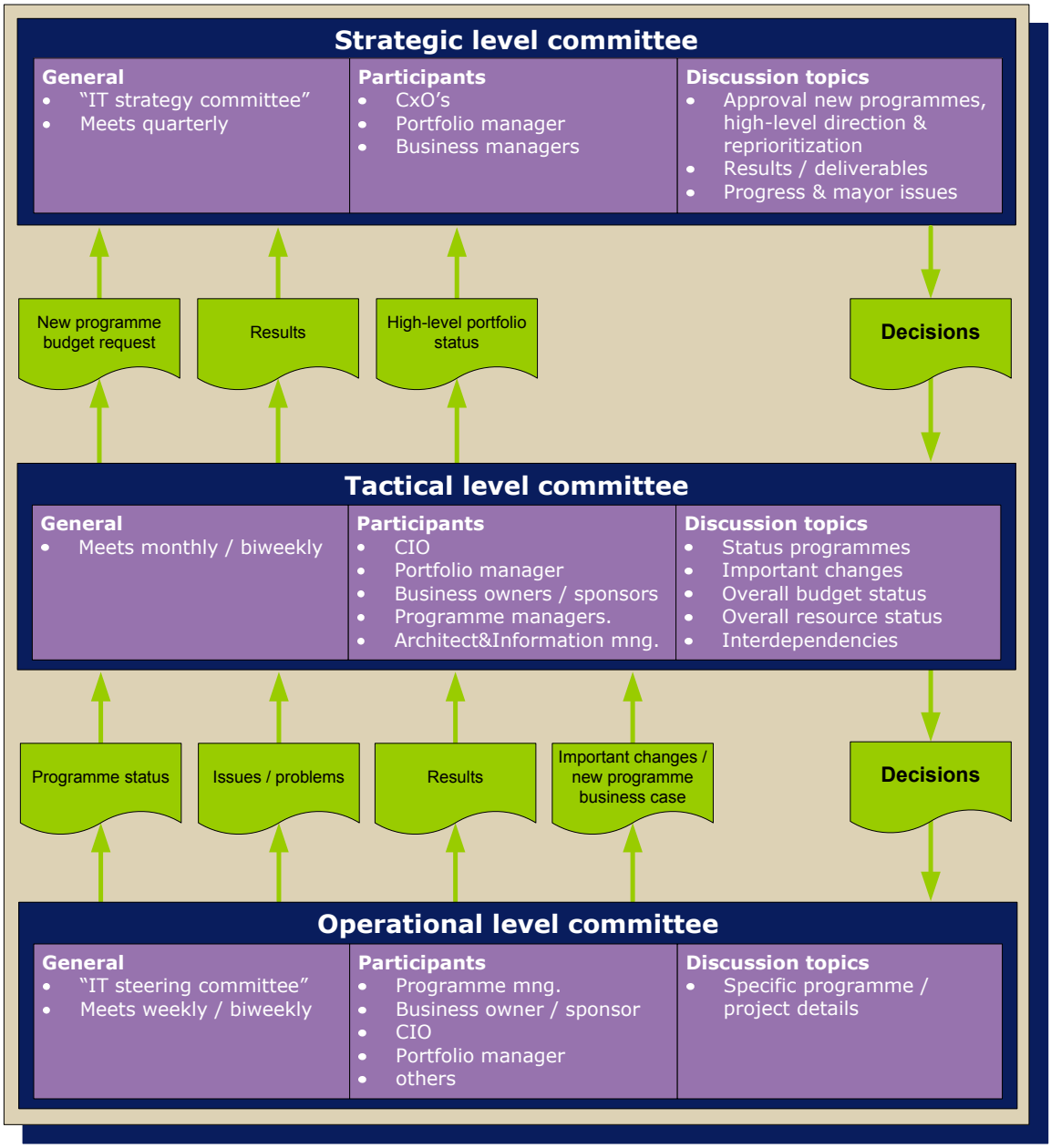


Figure 32: Illustration of the average governance structure for the IT investment portfolio

Figure 32 shows that (different) reports are needed. To facilitate the processing of these reports it is recommended to use standard reporting templates, also when working with (different) external parties / vendors. Standard templates therefore have to be designed and communicated, for example a template for the report on the progress of programmes / projects and a template for a business case for a new programme / project request. To create uniformity in the way projects and programmes work and report often also the project management methods are standardized, for example by requiring all projects and programmes to work according to the PRINCEII method.

In general the different reports are aggregated in short, to-the-point PowerPoint documents that provide a clear overview. This in contrast to the large paper reports that are often provided.

Before thinking about measurement, organizations first have to focus on changing the culture in their projects and programmes into open, transparent and professional. Sometimes decisions concerning the portfolio are taken in an obscure and unclear way, often strongly influenced by internal politics. Experience in most organizations shows, the change in culture is not something that will happen over night but may take year(s).

Organizations need to realize a proper governance structure and have to start up reporting processes like the example governance structure in Figure 32, which is based on the best governance practices encountered in this research. There also needs to be a focus on the internal processes involved, Val IT provides a good starting point for this. The recommendations on Operational Excellence and Future Orientation (5.2.4 and 5.2.5) show where to put priorities in this context.

5.2.3 Recommendations on measurement

In this section general recommendations are provided for measurement of IT investments for the three identified groups. These are based on the findings in chapter 4 from the case-analysis, general analysis and analysis of the relation with context factors.

As described in section 3.3, organizational maturity should be considered when selecting a measurement approach, indicating the need for an IT performance measurement maturity model. Although not a complete maturity model like for example the IT governance maturity model, the recommendations for the categories of organizations described next show a basic growth path for performance measurement of IT investments.

Starters

Starters first have to focus on getting an overall and detailed insight in costs and risks. This starts with drawing up an inventory of the current projects and programmes in the portfolio. A baseline needs to be established of the budgets of different projects and programmes. Next step is to let the different projects and programmes report on the actual spent (what part of the budget has been used yet) and on their major issues. This should result in the following practices on different levels in the organization.

- On the *operational level*, new projects / programmes have to define a business case. At least this should clearly define the goal, required budget and a qualitative description of benefits. It should be signed of by an accountable business owner. The individual projects and programmes should regularly discuss the financial status and

identify major issues that need to be escalated. These have to be regularly reported to the portfolio manager.

- On the *tactical level*, it has to be made sure there is a complete insight in the financials and major issues of the different projects and programmes. It needs to be monitored if updated information is regularly delivered by the projects and programmes. The financials of the different projects and programmes have to be monitored and controlled. Budget requests for new projects or major changes have to be assessed and approved, or reported upwards for approval (above, for example, 100.000 €). Interdependencies and other issues have to be identified and solved. If issues can't be solved or there is no agreement on giving priorities (concerning interdependencies), issues need to be escalated to the strategic level.

- On the *strategic level*, there needs to be a high-level portfolio plan with specific directions and budgets for the first one or two years. The high level budget status needs to be monitored (planned vs. approved, budgeted vs. actual spent). Decisions need to be made for additional budget for major new investments or changes and priorities have to be given in solving major issues.

Followers

Followers mainly need to further improve their existing measures, building on the existing baseline measures. Following the current practices at leaders, this means that all topics described in the Corporate Contribution perspective need to be covered.

- Business value; at least measured and tracked for investments with hard financial benefits. The benefits should be incorporate in budgets of the business owner to make sure that benefits are actually achieved.
- Strategic alignment; by regular reprioritization of the portfolio of IT investments, putting priorities in the existing portfolio, selecting new investments that fit into the portfolio and stopping investments that are structurally underperforming.
- Cost control; there should be a complete overview of investment financials covering budgets as well as the actual spent. Additionally it should be clear what the progress is of all investments in the portfolio
- Risk control; there should be a complete overview of all important issues in the different investments in the portfolio.
- Human resource capacity; an overview is needed of the planned use of resources, actually needed resources and available resources for the different investments in the portfolio.

This results in the following governance practices on the different levels.

- On the *operational level*, besides budget and goal, new projects and programmes have to clearly define possible financial benefits. Also there has to be made an estimate of the different human resources needed throughout the project / programme. The individual projects and programmes should then regularly discuss the status of the project / programme concerning progress (milestones), budget, business case and resources and identify major issues that need to be escalated. All have to be regularly reported to the portfolio manager.

- On the *tactical level*, it has to be made sure there is a complete insight in the progress (milestones, planning), financials, major issues, business value (financial) and human resources (planned, needed, available) of the different projects and programmes. Interdependencies (resources or other) and issues in progress, budget and status of the business case have to be identified and solved. If issues can't be solved or there is no agreement on giving priorities issues need to be escalated to the strategic level. Budget requests and business cases for new projects or major changes have to be assessed and approved with special attention for a clearly defined resource planning and estimated business value. Also compliance with architectural plans has to be assessed. After initial approval larger requests need to be reported upwards for definitive approval.

- On the *strategic level*, there needs to be a high-level portfolio plan with concrete goals and budgets for the first one or two years. In the quarterly meetings there should be an assessment of the portfolio (new requests, planned and current investments), making decisions based on alignment with described goals. A possible reprioritization may be the result. Also there needs to be a review of the high-level budget status, progress of major investments in the portfolio and of major issues (interdependencies, resource bottlenecks, other).

Leaders

Leaders in most will have implemented and covered the practices and measures as described for the followers. Leaders can then further professionalize their governance practices. Some possible improvements are now described.

- In strategic alignment, besides alignment to strategic goals, there may be put more effort in creating a balance in the portfolio based on target values for defined criteria. Example criteria could be expected hard benefits, a balance of risk & return, short- vs. long-term returns and financial vs. non-financial benefits.
- For risk control, there needs to be more attention for the impact / issues in the business that may appear during & after projects and programmes. These have to be identified (in the business case and during the project /programme) and mitigating

actions should be defined. Additionally, a regular update on the status of the IT architecture in supporting new investments could be monitored.

- There should be formal, annual measurement of internal customer satisfaction that pays attention to the investment portfolio, to processes as well as results, from business manager perspective as well as end-user perspective. Additionally there should be special attention for the evaluation of projects and programmes after delivery paying attention to the extent to which expectations are met. For management (in time, in budget, required functionality) as well as end-users (functionality, quality, usability, etc).
- There may be more attention for formal assessment of the performance drivers in the Operational Excellence and Future Orientation perspective. Concerning the effectiveness this may be realized by a regular (annual / half-yearly) audit of key internal processes and of key aspects for future readiness. Or by defining and measuring key KPIs in these areas.
  Concerning efficiency, there may be measurement and possibly benchmarking of some relevant internal processes (like the acquisition / development of applications).
- As in this stage of development measurement has crystallized out quite well, there may be thought about IT for supporting performance measurement. Tools often mentioned are MS project (on programme level) and Clarity (on portfolio level).

This results in the following governance practices on the different levels.

- On the *operational level*, when a business case is developed, also try to identify the possible impact on business operations and define mitigating actions and monitor the risks. Always formally evaluate project or programme after delivery on business management and end-user level. And regularly update data of programme / project management in the facilitating tool (i.e. Clarity).

- On the *tactical level*, risks of programmes / projects for business operations & their mitigating actions should be monitored. Project / programme evaluations have to be discussed and improvement actions should be defined. Investment portfolio topics should be included in an annual internal customer satisfaction survey. And one has to decide on the use of IT for supporting performance measurement and monitor data quality if such a system is used.

- On the *strategic level*, put more effort in creating a balance in the portfolio. Define target values for criteria like risk vs. return, short- vs. long-term returns and financial vs. non-financial benefits. Also, a decision has to be made on the use of performance drivers by defining key KPIs for internal processes effectiveness / efficiency and future readiness. Or by requesting an audit of involved processes.

5.2.4 Recommendations on internal processes

In general chapter 4 showed the relevance of the internal processes defined in the IT Investment BSC. This shows that standards like CobiT and especially Val IT form a good basis for analysis of internal processes in an organization. A general recommendation for organizations is to compare the existing processes with process descriptions and other best practices in these standards.

Portfolio level processes

In general the *definition of the IT strategy* and budgeting (*financial management*) is performed quite well. It is a generally accepted best practice to have good business participation in related meetings.

In line with the finding that the human resource capacity should be monitored for the IT investment portfolio, the research showed that *management of human resources for IT investments* is a process that is not well performed in general. As described before management of human resources should be a main topic in governance meetings on operational, tactical and strategic level.

Another process that in general needs to be improved in organizations is the *evaluation, prioritisation and selection of (new) investments.* Again the involvement of business seems to be well. But there has to be more emphasis on the quality of the business case of new investments. Generally accepted is that good decisions can only be made when a business case is well defined with a clear goal, costs and benefits, resource planning and specific metrics for tracking the benefits. And above all, the business case needs to have a business owner and should be formally signed off. The process for approval of new investments should be formalized and standardized. Additionally, a regular review of the investment portfolio and possible reprioritisation (stopping running projects / programmes, starting new ones) needs to be done more often.

Programme level processes

In line with the previous, on the programme level there should be more attention for the *definition of candidate programmes*. Where on the portfolio level it must be ensured that budget requests for new investments are only accepted when the business case meets the requirements described before, on the programme level it must be made sure that a request is not communicated before it meets the described requirements.

Also *programme management* needs some attention in general. There needs to be more attention for regular delivery of performance information, serving as input for the meetings on operational, tactical and strategic level. Furthermore it seems to be useful to implement a standard for project / programme management like PRINCEII. This makes governance of the

portfolio on the tactical and strategic level easier and above all professionalizes the way of working, especially important at a low governance maturity to create a change in culture. Last, there need to be formal procedures for the post-implementation review of investments. This is something a lot of organizations do not yet do. But what is the use of making a business case upfront if there is evaluation afterwards? A formal and proper evaluation of investments will show the actual effectiveness of programmes and projects, improve the business case definition of future investments and prevent making the same mistakes over and over again

Project level processes

On the project level the *IT architecture management* is essential and quite well performed in most organizations. There should be an IT architecture board or architecture group that defines the target architecture and monitors if projects and programmes are in line with the defined architecture, that projects are aligned with the target architecture on infrastructure, application, information and process level.

The opinions in organizations about *Quality management* differ, and quality management is not very well done in general. But if formal measurement of internal customer satisfaction (process quality) and good evaluation of investments (outcome quality) is realized, quality management is quite well performed.

Concerning the design, development and implementation of solutions (*acquisition of solution* and *implementation of solution*), in general the effectiveness does not seem to be a problem. It is especially unclear how efficient these processes are performed. Organizations should therefore compare the costs in these areas with other organizations to see how efficient the processes are. This may result in outsourcing parts of the work to external vendors. Or in a change to a more incremental development model like prototyping, rational unified process (RUP) or time-boxing.

5.2.5 Recommendations for future readiness

The state of the existing *IT architecture* and the state of *IT human resources* are by far the most important aspects that drive the readiness of an organization for future IT investments.

Organizations need to regularly assess their IT architecture and improve where necessary to prevent that the architecture becomes a bottleneck for future investments and a disabler for realizing strategic goals of the business.

The same goes for IT human resources. There should be regular training of the IT workforce to make sure the right knowledge and skills are available. This, together with proper recruiting and retaining of personnel should make sure that IT resources do not become a bottleneck for

future investments. Most organizations are quite flexible in this area also by hiring people with specific knowledge or skills when necessary. But the last comes with a cost, of course.

Opinions about *Knowledge management* differ and in general there are no formal (IT) systems to facilitate knowledge sharing, as it is difficult show the benefits of such a system. Also a lot of effort is required to get relevant data in such a system. Often there is some kind of central storage of project documents available, but searching for relevant documents is difficult. The interviews and research data did not provide clear best practices in this area. Although regular meetings where best practices and lessons learned are shared by project / programme managers seem to work quite well.

Concerning *Research into emerging technologies*, most organizations seem to have no formal processes and most organizations prefer to follow the market. In some organizations assessment of new technologies is done by the architecture group. Formal processes for researching emerging technologies are particularly important for organizations that want to use IT to differentiate themselves from competitors as a competitive advantage.

5.3 Recommendations on issues

To overcome or prevent issues in the design, implementation and use of performance measurement of IT investments, different practices were identified. These were already covered to some extent in chapter 4, but are described more elaborate here. Also best practices identified in literature are described.

5.3.1 Best practices in design

- **Do not start from scratch**
  In their overview of existing literature Franco-Santos & Bourne (2005) describe the need for a performance measurement framework to make sure the system of performance measurement is complete and structured. Based on this thesis, the IT Investment BSC seems to be a good starting point for performance measurement of IT investments.

- **Have a clear business strategy and approach**
  The basis for the specific design of a performance measurement model for an organization is the strategic goals of the business. If these are not clearly defined or if there is no agreement between different stakeholders it is difficult to design a system of performance measures for performance measurement of IT investments. Besides agreement on clear goals, commitment of top-management is identified by Franco-Santos & Bourne (2005) in this stage to increase the level of commitment and willingness to take the lead, critical for setting up performance measurement.

5.3.2 Best practices in implementation and use

- **Standardize and formalize**
  A lot of issues seem to be caused by a limited "project-management culture", limited formalization of procedures and limited standardization. Standard project management methods (like PRINCEII which was often mentioned) may be implemented across the organization to support a formal and standard way of working in projects and programmes. Also standardized and formalized reporting processes and reporting templates will reduce the number of problems and speed up reporting processes.

- **Empower, enable and encourage stakeholders**
  Franco-Santos & Bourne (2005) give general indications for the "three E's". Based on findings in my research, for performance measurement of IT investments this comes down to the following. Empower stakeholders like project /programme managers by involvement in the design and definition of, for example, performance measures, reporting templates, reporting procedures etc.. Enable them by education about and training on performance measurement and by providing extra "hands" to facilitate reporting and reduce administrative tasks for managers. Encourage them by activities that actually motivate people to cooperate, like clear top-management commitment or, more formal, a rewarding system.

- **Communicate advantages to stakeholders**
  The research showed that it is important to clearly communicate benefits of all governance practices to stakeholders to reduce resistance and increase cooperation. Project / programme managers should be shown that regular reporting on the different measurement topics is beneficial, for example because interdependencies are early spotted.

- **Act pragmatically**
  What also came forward is that in measuring the performance of IT investments, one should act pragmatically. If it is not possible to measure, do not force to still deliver the information. One has to prevent a "report-driven culture" in the "programme management office". It should not be a "policing unit" with a culture of measuring for the sake of measurement

5.3.3 Internal Context

- **Create a professional culture**
  As the maturity in governance and measurement of IT investments grows, the culture in an organization changes. In the beginning a lot is arranged informal and the way of working will differ from project to project, depending on the project manager. But as maturity in governance and measurement grows, the culture has to change along.

Formal procedures for making important decisions, a standard way of working and regular reporting to provide clear insight have to become a generally accepted way of work. It must be understood that this change does not happen over night. The previous recommendations on issues provide different good practices to facilitate this change-process.

5.4 Specific recommendations for the cases

The previous recommendations on governance practices, internal processes, future orientation and issues apply to all organizations. The recommendations on performance measurement of course apply to the mentioned category.

Based on the case analysis, and where possible, specific recommendations are now given for the individual cases, based on their current measures, internal processes and issues.

As the analysis of cases was based on the survey and a one-hour-interview, it is not possible to give a lot of detailed specific recommendations. Only the most striking aspects that were noticed and deviations from the norm are discussed. For the two cases were no interview was conducted no specific recommendations are given, as these can not be based solely on the survey.

5.4.1 Starters

Case 3

In this organization the culture is quite informal; things often take place ad-hoc. There needs to be specifically a lot of attention for creating a more professional culture by educating and standardizing the project management approach, formalizing and standardizing reporting procedures and creating standard templates for reporting.

It is unclear what the current role of executive management concerning IT is and what is there opinion about IT and the performance of IT investments. Before starting to improve governance of IT investments (based on the general recommendations before), it has to be identified what priorities of executive management are in this area.

Concerning the four perspectives of the IT Investment BSC, the general recommendations apply. But especially the involvement of business is a point of interest in this organization. It is unclear to what extent business participates, for example in definition of the IT strategy and in initiating new projects and programmes.

The recommendations on issues, especially concerning implementation & use and context, are very relevant for this organization.

Case 7

In this organization the large size of the portfolio, the complexity of the organization and the recent changes in the organization make it extra difficult to implement governance practices and performance measurement of IT investments.

The current changes in the organization are already a big step in the right direction. Governance structures and processes and measurement of the portfolio of IT investments are being improved.

Concerning the four perspectives of the IT Investment BSC, the general recommendations apply. Some specific points of interest:

- Concerning *Strategic alignment* it may be useful to do an initial mapping of current portfolio on the business strategy to see how well the portfolio is strategically aligned. The current IT strategy may be revised based on this analysis to achieve high-level strategic alignment.
- There should be extra focus on the **Operational Excellence perspective**, especially on the efficiency of projects and programmes. This because almost all the work is outsourced and it needs to be clear if this delivers the promised value. Perhaps benchmarking the costs of some projects and programmes with comparable ones in other organizations is useful in this context.
- The future readiness of the *IT architecture* seems to be an issue. And since this is a main driver for future readiness, the IT architecture may become a disabler for future IT investments.

This organization is one of the few with a tool for supporting governance of the IT investment portfolio. They are currently using different versions but are now working towards one single version, which will reduce issues. Very important in this context is to ensure also the right processes & responsibilities are designed to make optimal use of the tool and to guard the quality of data.

In general the organization should take into account the recommendations on issues described before as all are very relevant.

5.4.2 Followers

Case 2

For case 2 no interview was conducted. Therefore no specific recommendations are given.

Case 4

For case 4 no interview was conducted. Therefore no specific recommendations are given.

Case 6

This organization is well underway in improving current governance practices and performance measurement of IT investments. Governance structures and processes have been implemented and are being improved; the same goes for performance measurement. The general recommendations and specific recommendations for followers are well applicable to this case.

Concerning governance structures, monitoring of the budgets of IT investments is done separately now by financial control. It is totally clear to what extent financial aspects are monitored in the tactical and strategic meetings, but financial measures have to be discussed in these meetings also. Furthermore, the organization should continue implementing standard project management and additionally pay special attention to the standardization of reporting templates and formalization of reporting processes.

Concerning the four perspectives of the IT Investment BSC, the general recommendations apply. Some specific points of interest:

- For *Strategic alignment*, there has to be more attention for alignment with strategic goals, possibly by mapping the investment portfolio on strategic goals.
- There needs to be special attention for monitoring the availability and use of *IT resources* as these are often a bottleneck for new projects and programmes.
- There has to be special attention for the post-implementation review / *evaluation* of projects and programmes. Reporting on this is important and needs to receive priority. For evaluation, key metrics should be defined in the initial business case.

Case 8

Since about half a year this organization is improving governance structures and processes and performance measures.

Currently there is a separation in the governance of IT-programmes and business programmes. There should be more central coordination of both types of investments, especially to identify interdependencies in resource use. But also since often the combination of both types of programmes delivers the actual business value and required results. Additionally this would improve the strategy planning and alignment of the overall investment portfolio with strategic goals.

Concerning the four perspectives of the IT Investment BSC, next some specific points of interest are described.

- For *Risk control*, improved transparency is needed. Currently the organization relies on the experience of the project / programme managers. But as central insight in risks and issues is one of the baseline measures the transparency need to be improved. As

described in the general recommendations, there also needs to be more attention for monitoring and mitigating risks for business operations during and after projects / programmes.

- To be able to measure *Business value*, the monitoring of business and IT programmes has to be combined, as described before.

The organization uses a tool for supporting governance of the IT investment portfolio. As for case 7, very important in this context is to ensure also the right processes & responsibilities are designed to make optimal use of the tool and to guard the quality of data.

In this organization there also needs to be more attention for standardization of programme and project management methods and for formalizing and standardizing reporting procedures.

5.4.3 Leaders

Case 1

In general this organization is performing quite well. Some small points for improvement:

- Most aspects of the IT Investment BSC are covered. But there needs to be more attention for monitoring planned, actually needed and available human resources for projects and programmes in the IT investment portfolio. As this may be a bottleneck in a lot of projects and programmes.
- It is not clear if there is formal evaluation of projects and programmes results. If there actually is no evaluation of the results, this is a point for improvement.
- There should be a regular reprioritisation of the IT investment portfolio during the year. Currently only once a year a reprioritisation takes place.
- It is unclear what the current state of the IT architecture is. Also the alignment of new projects with IT architecture is not performed. As the IT architecture is one of the key drivers of future readiness, this may become a bottleneck for future investments. IT architecture needs to receive more attention in this organization.
- The organization should consider using an IT application to support portfolio management, as performance measurement is quite mature and complete. Together with proper processes and responsibilities this will make it easier to obtain the required and reliable data for monitoring.

Case 5

This organization seems to be the best performing organization in this research. A lot of best practices were derived from this case. Some small possibilities for improvement are discussed below.

- It is unclear what the efficiency of programmes and projects is. And since currently much of work is done by internal employees, it may be interesting to compare some projects with other organizations that do and do not outsource the work.
- Knowledge management can be better supported by IT. One could think about a simple web-based application that shows past projects with related documents and contact persons and provides a good search function. Although the organization is rather small, this may reduce re-inventing the wheel and improve learning from the past.
- It is not totally clear what is the current state of the IT architecture and IT architecture management. But as the IT architecture is one of the most important drivers of future readiness and can be an important bottleneck for new projects and programmes (and thus a threat for realizing business goals), there needs to be more attention for this subject.
- As performance measurement is quite mature and is currently mainly done manually, the organization may consider using a tool for facilitating portfolio management (besides project level tools like MS project). The tool should support collecting, analyzing and reporting the data and can make the reporting process more efficient.

5.5 Conclusion

5.5.1 Changes to the IT Investment BSC (I)

In general the IT Investment BSC proved to be relevant, with high ratings for importance for all measures. Only small improvements should be made. *Human resource capacity* should be added to the **Corporate Contribution perspective**. It is unclear if measuring the performance drivers in the **Operational Excellence perspective** and **Future Orientation perspective** is a next step in maturity or not very useful at all. But still the perspectives proved to be useful and important for organizations. The IT Investment BSC proves to be a good starting point for discussing about performance measurement of IT investment, forcing management on different levels to develop a complete, clear and shared view on performance measurement of IT investments.

5.5.2 General recommendations performance measurement (II)

Overall

Organizations should primarily focus on establishing complete measurement of the outcomes in the **Corporate Contribution** and **User Orientation perspective**. Concerning the **Operational Excellence** and **Future Orientation perspective**, some key performance drivers that are particularly important for an organization may be measured. Initially there does not have to be focus on measurement of these perspectives. Though organizations should make sure the internal processes in the **Operational Excellence perspective** are well

implemented and that attention is paid to the important aspects in the **Future Orientation perspective.**

Governance practices

It makes no sense to measure if there are no right structures and processes to use these measures. Therefore some general recommendations about the governance of the IT investment portfolio are provided.

Three layers of governance have to be implemented:

- strategic level committee;
- tactical level committee;
- operational level committee.

For reporting, standard templates should be used, i.e. for reporting the progress of programmes / projects and for the business case of a new programme / project request. Also project management methods should be standardized, for example by requiring all projects and programmes to work according to the PRINCEII method.

Measurement

The recommendations are summarized in the maturity model on the next page.

	Starters	Followers	Leaders
Corporate Contribution	• Complete picture of all projects and programmes in the portfolio. • Insight in costs and risks of major programmes and projects. • Cost control: budgets. • Risk control: major issues.	• Complete insight for all projects and programmes in Cost control, Risk control and Human resource capacity. • Cost control: budgets, actuals and progress • Risk control: major issues. • Human resource capacity: planned, needed & available resources. • Strategic alignment is realized by making long-term IT strategy plans	• Complete insight in Cost control, Risk control, Human resource capacity, Business value and Strategic alignment. • Cost control: budgets, actuals and progress • Risk control: major issues, impact on business operations. • Human resource capacity: planned, needed & available resources. • Business value: financial benefits. • Strategic Alignment with business goals monitored & balance monitored i.e. risk vs. benefit, short vs. long-term.
User Orientation	• Insight in internal customer satisfaction but not formally measured.	• Annual measurement of internal customer satisfaction.	• Annually measured internal customer satisfaction of business managers & end-users concerning IT operations & IT projects/ programmes. Follow-up actions via plan-do-check-act cycle. • Formal evaluation of large / important projects & programmes.
Operational Excellence	• Business involved in IT strategy planning & high-level portfolio budgeting & monitoring. • Budget approval by executive management for new IT investments required.	• Regular meetings for evaluation, prioritization and selection of (new) investments in portfolio based on qualitative analysis. • Planning of human resource capacity across portfolio. • Basic business case and business owner required for new initiatives. • Programme management based on regular basic performance reports. • New initiatives are reviewed by IT architecture board.	• Evaluation, prioritization and selection of (new) investments based on quantitative analysis. • Detailed business case required with clear metrics for tracking, on which is regularly reported. • Standardized project / programme management (i.e. PRINCEII). • Post-implementation review of large projects. • Formal quality management of IT investments. • Effectiveness and efficiency of implementation and design monitored.
Future Orientation	• The existing IT architecture may not support future IT investments. • The capabilities of IT human resources may not be sufficient for future IT investments. • Knowledge management is not formally implemented. • There is limited insight in emerging technologies.	• Up-to-date IT architecture, ready for future investments. • Stable base of capable IT human resources for future IT investmens.	• Up-to-date IT architecture, ready for future investments. • Stable base of capable IT human resources for future IT investmens. • Formal procedures for Knowledge management, facilitated by an KM-application. Lessons learned, project deliverables and contact persons (of finished projects) are available. • Knowledge about emerging technologies is kept up-to-date.

Figure 33: Maturity model of performance measurement of IT investments

Internal processes

The internal processes defined in the IT Investment BSC are considered very important, showing that standards like CobiT and especially Val IT are a good basis and can be used for comparing and improving existing processes in an organization.

- Concerning **Portfolio level processes**, organizations should make sure there is good business participation in the *definition of the IT strategy* and in *financial management*. The *management of IT human resources* should be a main topic in governance meetings on operational, tactical and strategic level. And concerning the *evaluation, prioritisation and selection of (new) investments* there should be emphasis on a formal approval process with a well defined business case with a clear goal, costs and benefits, resource planning and specific metrics for tracking the benefits. There also needs to be attention for regular review of the investment portfolio and possible reprioritisation.
- On the **programme level** there has to be more attention for definition of the business case in the *definition of candidate programmes*. There need to be more attention for *programme management*, concerning the regular delivery of performance information, the implementation of a standard for project / programme management and implementing formal procedures for the post-implementation review of investments.
- On the **project level** *IT architecture management* is essential, there should be an IT architecture board that defines the target architecture and monitors if projects and programmes are in line with the defined architecture. Concerning *acquisition of solution* and *implementation of solution* there needs to be attention for efficiency, comparing the costs in these areas with other organizations to see how efficient the processes are.

Future readiness

For future readiness, the state of the existing *IT architecture* and the state of *IT human resources* are by far the most important. Therefore organizations need to regularly assess their IT architecture and improve where necessary to prevent that it becomes a bottleneck for future investments. There should be regular training of the IT human resources and there needs to be attention for recruiting and retaining IT personnel to make sure the right knowledge and skills are available.

Knowledge management and *Research into emerging technologies* are less important. In general there are no formal (IT) systems to facilitate knowledge sharing, but regular meetings where best practices and lessons learned are shared by project / programme managers seem to work quite well. Concerning new technologies most organizations prefer to follow the market. In some organizations assessment of new technologies is done by the architecture group.

5.5.3 Recommendations on issues (III)

The identified best practices in **design** are now summarized.

- **Do not start from scratch**
  Use a performance measurement framework to make sure the system of performance measures is complete and structured. The IT Investment BSC seems to be a good starting point for performance measurement of IT investments.
- **Have a clear business strategy and approach**
  Have clear strategic business goals as a basis. Also commitment of top-management is essential to increase the level of commitment and willingness to take the lead in setting up performance measurement.

Best practices in **implementation and use** are the following.

- **Standardize and formalize**
  Use standard project management methods (like PRINCEII) across the organization and use standardized and formalized reporting processes and reporting templates to reduce the number of problems and speed up reporting processes.
- **Empower and Enable and Encourage**
  Empower stakeholders like project /programme managers by involvement in the design and implementation phase. Enable by education about and training on performance measurement. Also providing extra "hands" to facilitate reporting and reduce administrative tasks. Encourage with clear top-management commitment or a rewarding system.
- **Communicate advantages**
  Clearly communicate benefits of all governance practices to stakeholders.
- **Act pragmatically**
  Prevent a "report-driven culture" of measuring for the sake of measurement.

Best practice for the **internal context** is to create a professional culture.

- **Create a professional culture**
  The culture has to grow with the governance and measurement practices from informal to more formal and professional. There have to be generally accepted formal procedures for making important decisions, a standard way of working and regular reporting to provide clear insight.

5.5.4 Case-specific recommendations (IV)

Recommendations on governance practices, internal processes, future orientation and issues apply to all organizations. The recommendations on performance measurement apply to the mentioned category.

Additionally some specific recommendations have been provided for the individual cases, based on their current measures, internal processes and issues.

5.6 Recommendations for further research

This research has given a good insight in current governance practices and performance measurement of IT investments. But as time was scarce, interesting topics had to be scoped out. Also the number of participants in the field research was limited. Some recommendations for future research are now given.

- To be able to draw more reliable conclusions, one should investigate a larger group of organizations. This may also give more insight in a next maturity level for the identified leaders, to find out if measurement of performance drivers and the linking with outcomes play an important role in that next level.
- The focus in this research was on IT investments. It would be useful to analyze what the relation is between the IT investment BSC and a BSC focused on IT operations.
- The emerging IT services organization will be a mix of internal and externally provided resources. Interesting would be to research what is the impact of this on performance measurement and governance and what are best practices in this context.

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Appendix I – Definition of concepts

Balanced Scorecard	Performance measurement method, including non-financial as well as financial measures, relating the measures to an organization its strategy.
Board and executives	The board is a group of individuals who govern the affairs of a corporation (Wikipedia, 2005). Executives are the highest ranking officers, steering and managing a corporation in a certain area. Areas can be overall (CEO), finance (CFO), operational (COO), IT (CIO), Technology (CTO) (Wikipedia, 2005).
Business value (of IT investment)	The end business outcome(s) expected from an IT-enabled business investment where such outcomes may be financial, non-financial or a combination of the two.
Cost control (of IT investment)	Insight in budgets, actual costs and progress of IT investments
Information Technology (IT)	IT in this thesis is understood to encompass the information technology infrastructure as well as the capabilities and organization that establish and support it (ITGI, 2003).
IT business value	The end business outcome(s) expected from an IT-enabled business investment where such outcomes may be financial, non-financial or a combination of the two.
IT governance	Information Technology Governance is the responsibility of the Board of Directors and executive management. It is an integral part of enterprise governance and consists of the leadership and organizational structures and processes that ensure that the organization's IT sustains and extends the organization's strategy and objectives (ITGI, 2003).
IT investments (change)	(processes involved in) Significant business investments in sustaining, growing or transforming the business with a critical IT component, where IT is means to and end, the end being to contribute tot to process of value creation in the enterprise.
IT operations (run)	(processes involved in) Running and maintaining the existing IT
IT portfolio	A grouping of programmes, projects, services or assets selected, managed and monitored to optimise business return.
IT programme	A structured group of interdependent projects that is both necessary and sufficient to achieve the business outcome and deliver value. These projects could include, but are not limited to, changes to the nature of the business, business processes, the work performed by people, as well as the competencies required to carry out

	the work, enabling technology and organisational structure.
IT project	A structured set of activities concerned with delivering to the enterprise a defined capability (that is necessary but NOT sufficient to achieve a required business outcome) based on an agreed schedule and budget.
IT resources	People, applications, technology, facilities and data (ITGI, 2003).
IT stakeholders	Anyone who has either a responsibility for or an expectation from the enterprise's IT, e.g. shareholders, executives, business and technology management, users, employees, governments, suppliers, customers and the public (ITGI, 2003)
Performance measurement	The use of a multidimensional set of performance measures for the planning and management of a business.
Performance measure	A metric used to quantify the efficiency and/or effectiveness of action.
Performance Measurement system (PMS)	A multi-dimensional set of performance measures.
Regulatory Compliance	Regulatory compliance refers to systems or departments at corporations and public agencies to ensure that personnel are aware of and take steps to comply with relevant laws and regulations (Wikipedia, 2005).
Risk control (of IT investment)	Insight in risks and issues related to IT investments and accompanying mitigating actions
Strategic alignment (of IT investment)	When IT investments are in line with the vision, consistent with business principles, contributing to the strategic objectives of the organization, providing optimal value at affordable costs and acceptable risks

Appendix II – List of abbreviations

BSC	Balanced scorecard
PMS	Performance measurement system
PM	Performance measurement
BU	Business Unit

Appendix III – Survey

Section 1. Introduction

Welcome to this survey of performance measurement of IT investments.
It will take you about 20 minutes to complete the survey. Your responses will be treated anonymously. Only the aggregated results of all surveys will be used in our report.

The goal of this research is to gain knowledge and insight into the performance measures required for controlling and directing IT investments at CxO level. Also, we would like to identify possible issues in designing, implementing an using such a performance measurement system.

IT investments are IT-enabled business change programmes, including projects that form the IT investment portfolio ("change the business"). In this research, running and maintaining existing IT ("run the business") is not considered part of IT investments.

For measuring the performance of IT investments, an IT Investment Balanced Scorecard (IT Investment BSC) has been developed, based on best practices from Val IT and CobiT, Deloitte's experience and scientific literature. For more background information about the IT Investment BSC, see the elaborate explanation of the survey supplied with the invitation letter you received.

With this survey the aim is to discover:

- what is the relevance of different parts of the developed scorecard for measuring the performance of IT investments;
- to what extent different parts of the scorecard are already used in practice for performance measurement of IT investments;
- what issues will be encountered in developing, implementing and using a performance measurement system.

The survey consists of three parts:

- In section 2 & 3 we ask you some details about your organization.
- Section 4, 5, 6 & 7 pay attention to the four different perspectives of the IT Investment BSC; what do you measure and monitor and how important are measures?
    - Section 4: Corporate Contribution perspective
    - Section 5: User Orientation perspective
    - Section 6: Operational Excellence perspective
    - Section 7: Future Orientation perspective
- Section 8 asks you to rate the relevance of some possible issues in designing, implementing and using performance measures.

Section 2. About your organization

In the next two sections you are asked to provide a few details about your organization, including some financial data. Please note that these details will be treated strictly confidential. Although we provide the end results of this survey to every participating CIO, the results will contain consolidated and anonymous data only.

2.1 What is the name of your organization?

_____

2.2 What is your name?

_____

2.3 What is your e-mail address?
[For feedback of the results of this survey]

_____

2.4 To what part of the organisation do your answers apply?
[E.g. whole organization or business unit name/ department name]

_____

Section 3. Context

To be able to position your answers in this survey in the specific context of your organization, we would like to know some details about your organization. Your answers will be treated confidentially and will only be used for this research.

IT Governance maturity

The table below describes the five levels of IT Governance maturity; the maturity of the management and control of the IT function within an organization.

(0) Nonexistent	(1) Initial / adhoc	(2) Repeatable but intuitive	(3) Defined process	(4) Managed and measurable	(5) Optimised
No insight if IT activitities: - add value to the organization; - IT risks are managed well.	-IT governance concept not formally recognised. -Responsibility IT gov at IT management, rest organization is not involved - Executive management only involved in big IT issues / successes – Measurement of IT performance based on technical internal measures.	-Regular governance activities like review meetings and performance reporting, initiated by IT management. - Voluntary participation of important business stakeholders. - Identified problems are tackled on project basis by teams formed as necessary.	- Organisational process framework is defined for oversight and management of IT activities and introduced as basis for IT governance. - Board is involved in guiding IT, by regular target-setting, review of performance and projectplanning & funding for any necessary IT improvements.	-Organization's management team working together for common goal of maximising IT value delivery and managing IT-related risks -Projects delivered realising real improvements -Relation between outcome measures in business terms and IT process improvement measures. -Communication of results with BSC -Service definitions and agreements used	- True transparancy of IT activities, board in control of IT strategy - IT activities directed on business priorities, delivered value measured, timely corrections possible. - IT management activities streamlined and where possible automated. - IT activities continuously improved, regularly benchmarked.

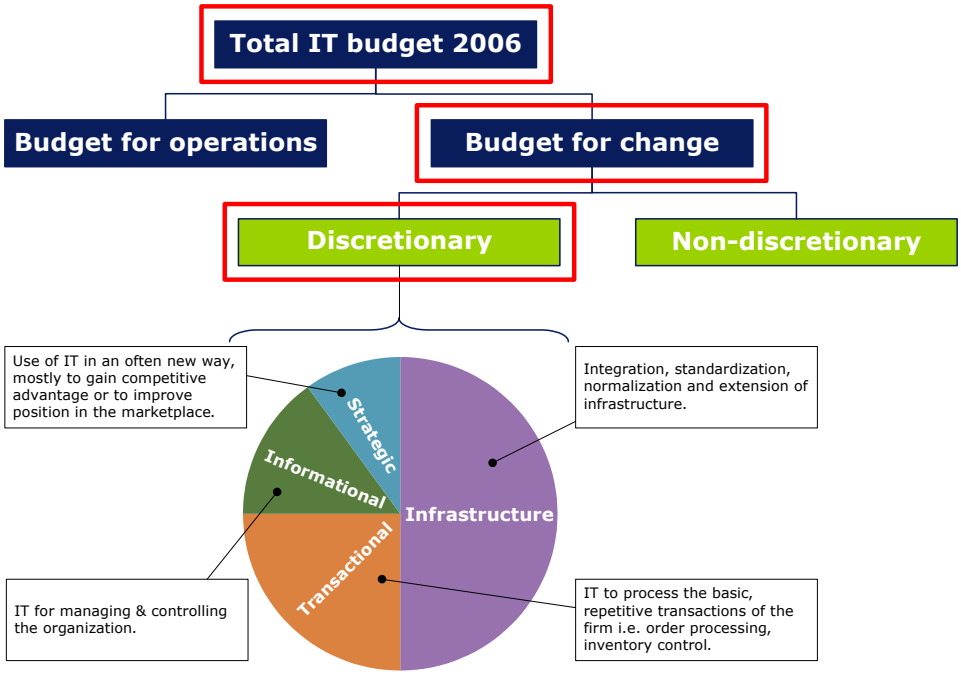
IT governance maturity. Source: IT Governance Institute

3.1 What level describes the situation in your organization the best?
Please estimate your current maturity level

(0) Nonexistent ☐
(1) Initial / ad-hoc ☐
(2) Repeatable but intuitive ☐
(3) Defined process ☐
(4) Managed & measurable ☐
(5) Optimised ☐

IT Budget composition

In most organisations, an annual total IT budget is defined. A part of this budget is allocated for 'keeping the lights on' (operations and support of IT), while another part of the budget is allocated for new investments (budget for change). A part of this budget for change can be used for improvements (discretionary budget). Besides discretionary investments, the other portion of the investment budget is used for mandatory improvements (e.g. to meet regulatory obligations). This we call non-discretionary budget.
Within the discretionary investments, four subtypes can be distinguished. The budget composition described is illustrated in the figure below.



3.2 Considering the above figure, please indicate your:

3.2.1 Total IT Budget 2006 (x EUR 1,000)		3.2.2 Budget for Change 2006 (x EUR 1,000)		3.2.3 Discretionary Budget 2006 (x EUR 1,000)	
0 < 250	☐	0 < 250	☐	0 < 250	☐
250 < 500	☐	250 < 500	☐	250 < 500	☐
500 < 1,000	☐	500 < 1,000	☐	500 < 1,000	☐
1,000 < 5,000	☐	1,000 < 5,000	☐	1,000 < 5,000	☐
5,000 < 10,000	☐	5,000 < 10,000	☐	5,000 < 10,000	☐
10,000 < 25,000	☐	10,000 < 25,000	☐	10,000 < 25,000	☐
25,000 < 50,000	☐	25,000 < 50,000	☐	25,000 < 50,000	☐
50,000 < 100,000	☐	50,000 < 100,000	☐	50,000 < 100,000	☐
100,000 < 150,000	☐	100,000 < 150,000	☐	100,000 < 150,000	☐
150,000 < 250,000	☐	150,000 < 250,000	☐	150,000 < 250,000	☐

> 250,000 ☐	> 250,000 ☐	> 250,000 ☐

3.5 Considering the description in the figure before, please indicate how your discretionary budget is divided into the four sub categories?

Infrastructure	_____%	Informational	_____%
Transactional	_____%	Strategic	_____%

Introduction: KPIs of the IT Investment Balanced Scorecard

In the following four sections, you will successively encounter the four different perspectives of the IT Investment Balanced Scorecard.

For each perspective, we would like to know what KPIs you use to measure the performance of you IT investments. Please indicate at a 0-5 scale to what extend you measure & monitor each KPI, and how important the KPI is for your organization.

Actively measured and monitored?	**How important would you rate the KPI for managing your IT investments?**
1. Not measured at all	1. Not important
2. Limited measurement	2. Limited important
3. Neutral	3. Neutral
4. Measured to some extend	4. Important
5. Actively measured and monitored	5. Very important

In case you feel the question / KPI is not applicable, please select 0.

Please note that it is **not the goal of this survey** to find out **what is the value of the different KPIs in your organization**. We only would like to know to what extent you **measure and monitor** the KPIs and how **important** you think a KPI is for controlling and directing your IT investment portfolio.

Furthermore, **please note that we do not suggest that all KPIs have to be measured and monitored**. The specific situation in your organization and your priorities determine what should be measured and how often things should be measured.

Section 4. Corporate Contribution perspective (Outcomes)

The **Corporate Contribution perspective** represents a business view on the performance of IT investments. Do you measure what benefits are realized by the portfolio and programmes? How well the portfolio is aligned with the business strategy? What the costs are? What the risks are and if (and how) they mitigated?

Please give your overall opinion about your measures in this area and after that consider the different possible measures.

4.1 Overall

	How **satisfied** are you in general with your current measures of the business contribution of IT investments?	Very dissatisfied ○ ○ ○ ○ ○ ○ Very satisfied
	How would you rate the **overall performance** of your current performance measurement system regarding the Business Contribution perspective of the IT BSC?	Very low performance ○ ○ ○ ○ ○ ○ Very high performance
	How would you assess the **usefulness** of having knowledge and insight into the business contribution of your IT investments?	Not at all useful ○ ○ ○ ○ ○ ○ Very useful
	How would you rate the **need** of your organization for having knowledge and insight into the business contribution of IT investments?	Very limited ○ ○ ○ ○ ○ ○ Very high

4.2 Business value

KPIs which provide knowledge and insight into what extent IT investments have actually realized value for the business, measured at programme and portfolio level.

	Business value	Actively measured and monitored?	Importance?
	Financial KPIs such as increased profitability, productivity, earnings. *This might look like... Monthly financial measures, like EP, NPV, IRR*	○ ○ ○ ○ ○ ○ 0 1 2 3 4 5	○ ○ ○ ○ ○ ○ 0 1 2 3 4 5
	Non-financial KPIs such as improved competitiveness, new product sales, lower development lead times, customer satisfaction. *This might look like... Yearly figures*	○ ○ ○ ○ ○ ○ 0 1 2 3 4 5	○ ○ ○ ○ ○ ○ 0 1 2 3 4 5

4.3 Strategic alignment

KPIs which provide knowledge and insight into what extent programmes and projects contribute to realisation of the business stategy.

	Strategic alignment	Actively measured and monitored?	Importance?
	Contribution of current and future IT investments to IT strategy and business strategy goals. *This might look like... Biannual overview of mapping of IT investments to the IT and business strategy*	○ ○ ○ ○ ○ ○ 0 1 2 3 4 5	○ ○ ○ ○ ○ ○ 0 1 2 3 4 5
	Balance between expected business **value**, required resources and **risks** of investments in portfolio. *This might look like... Biannual value / risk matrix displaying initiatives rated on common risk and value criteria*	○ ○ ○ ○ ○ ○ 0 1 2 3 4 5	○ ○ ○ ○ ○ ○ 0 1 2 3 4 5

4.4 Cost control

KPIs providing knowledge and insight into the management and allocation of the costs of IT investments.

	Cost control	Actively measured and monitored?	Importance?
	Programmes / projects delivered on budget, on time/ *This might look like... Monthly update per programme / project on budget vs. actuals and the status of key milestones (baseline vs. forecast)*	0 1 2 3 4 5	0 1 2 3 4 5
	Allocation of project costs to business / cost centre. *This might look like... Quaterly overview of projects costs to a cost centre of the business*	0 1 2 3 4 5	0 1 2 3 4 5
	% spend of total investment budget during current financial year. *This might look like... Monthly update of ((actual YTD spend) / (total inv. budget) * 100%)*	0 1 2 3 4 5	0 1 2 3 4 5

4.5 Risk

KPIs providing knowledge and insight about the level and to what extent key risks and issues of the IT Investment portfolio are mitigated / resolved.

	Risk	Actively measured and monitored?	Importance?
	Key risks and issues impacting delivery of programmes / projects without CxO intervention. *This might look like... Monthly update on blocking risks/dependencies and issues of in-scope Programmes, including proposed migitating actions and owners.*	0 1 2 3 4 5	0 1 2 3 4 5
	Business incidents caused by programmes / projects. *This might look like... Weekly update about any business disrupting incidents, caused by (any part of the) the IT project portfolio.*	0 1 2 3 4 5	0 1 2 3 4 5
	IT disablers for the execution of the business strategy and IT strategy. *This might look like... Regular overview of the biggest IT obstacles for realising the business & IT strategy.*	0 1 2 3 4 5	0 1 2 3 4 5

4.6 Any other important KPIs?

Are there any other important KPIs not mentioned here which you use to measure/monitor corporate contribution of IT investments?

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Section 5. User Orientation perspective (Outcomes)

The **User Orientation perspective** gives an internal customer view on the performance of your IT investments. Do you measures if you are getting the investments done well, delivering in such a way that you satisfy the internal customers, the business manager and end users, with the current portfolio of programmes and with realised improvements?

Please give your overall opinion about your measures in this area and after that consider the different possible measures.

5.1 Overall

	How **satisfied** are you in general with your current measures of (business) user satisfaction with IT investments?	Very dissatisfied ○ ○ ○ ○ ○ ○ Very satisfied
	How would you rate the **overall performance** of your current performance measurement system in measuring the internal customer satisfaction with IT investments?	Very low performance ○ ○ ○ ○ ○ ○ Very high performance
	How would you assess the **usefulness** of having knowledge and insight regarding the satisfaction of internal customers with IT investments?	Not at all useful ○ ○ ○ ○ ○ ○ Very useful
	How would you rate the **need** in your organization for having knowledge and insight in internal customer satisfaction with IT investments?	Very limited ○ ○ ○ ○ ○ ○ Very high

5.2 Business executive satisfaction

KPIs which provide knowledge and insight into the satisfaction of managers / decision makers of the various business units / divisions with the current portfolio of IT investments and programmes.

	Business executive satisfaction	Actively measured and monitored?	Importance?
	Satisfaction with current IT investment portfolio. *This might look like... Biannual or annual satisfaction survey within the population of decision makers.*	○ ○ ○ ○ ○ ○ 0 1 2 3 4 5	○ ○ ○ ○ ○ ○ 0 1 2 3 4 5
	Satisfaction with direction of portfolio, with choices (priorities) following from the IT strategy. *This might look like... Biannual of annual survey.*	○ ○ ○ ○ ○ ○ 0 1 2 3 4 5	○ ○ ○ ○ ○ ○ 0 1 2 3 4 5
	Satisfaction with programmes and projects meeting expectations (on time & on budget, delivering required functionality). *This might look like... Biannual or annual survey.*	○ ○ ○ ○ ○ ○ 0 1 2 3 4 5	○ ○ ○ ○ ○ ○ 0 1 2 3 4 5
	Satisfaction with IT personnel skills (understanding of business, relevant solutions etc.) *This might look like... Biannual or annual survey within the population of decision makers.*	○ ○ ○ ○ ○ ○ 0 1 2 3 4 5	○ ○ ○ ○ ○ ○ 0 1 2 3 4 5

5.3 End user satisfaction

KPIs which provide knowledge and insight into the satisfaction level of End Users with the delivered IT applications and services.

	End user satisfaction	Actively measured and monitored?	Importance?
	Satisfaction after project delivery (with functionality, quality, usability etc.) *This might look like... Survey conducted some period after project closure and the delivery of the application(s)/services.*	0 1 2 3 4 5	0 1 2 3 4 5
	Internal service quality (customer satisfaction) for IT services delivered. *This might look like... Annual end user satisfaction survey for IT services.*	0 1 2 3 4 5	0 1 2 3 4 5

5.4 Any other important KPIs?

Are there any other important KPIs not mentioned here which you use to measure and monitor internal customer satisfaction of IT investments?

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Section 6. Operational Excellence perspective (Perf. drivers)

The **Operational Excellence perspective** gives a view on the performance of internal processes involved in IT investments. Do you measure how effective and efficient internal processes are to support doing the right investments? To support realizing benefits? To support getting the investments done well? If they are done in the right way, in line with the architecture, applicable standards and policies?

Note: if you have secured the effectiveness of a process mentioned, but do not actually measure this with a KPI, please rate this as actively measured and monitored!

6.1 Overall

	How **satisfied** are you in general with your measures of the effectiveness and efficiency of processes involved in IT investments?	Very dissatisfied ○ ○ ○ ○ ○ ○ Very satisfied
	How would you rate the **overall performance** of your current performance measurement system in measuring the effectiveness and efficiency of processes involved in IT investments?	Very low performance ○ ○ ○ ○ ○ ○ Very high performance
	How would you assess the **usefulness** of having knowledge and insight into the effectiveness and efficiency of processes involved in IT investments?	Not at all useful ○ ○ ○ ○ ○ ○ Very useful
	How would you rate the **need** of your organization for having knowledge and insight into the effectiveness and efficiency of processes involved in IT investments?	Very limited ○ ○ ○ ○ ○ ○ Very high

6.2 Portfolio level processes

Do you measure effectiveness and efficiency of the following (or comparable) processes involved in portfolio management?

	Portfolio level processes	Actively measured and monitored?	Importance?
	Define IT strategy and portfolio characteristics		
	% of IT Strategy meetings where business representatives have actively participated. *This might look like... Annual update on involvement of business representatives / decision makers in IT meetings regarding planning and defining the IT Strategy.*	○ ○ ○ ○ ○ ○ 0 1 2 3 4 5	○ ○ ○ ○ ○ ○ 0 1 2 3 4 5
	IT Investment HRM		
	Frequency of resource utilisation and requirements reviews. *This might look like.... (Bi)monthy update about available vs. required resources (gaps) across the IT Programme Portfolio as a whole.*	○ ○ ○ ○ ○ ○ 0 1 2 3 4 5	○ ○ ○ ○ ○ ○ 0 1 2 3 4 5
	IT Investment Financial Management		
	Frequency of overall portfolio budget reviews *This might look like... quarterly financial update on the status of the budget of the IT Investment Portfolio as a whole.*	○ ○ ○ ○ ○ ○ 0 1 2 3 4 5	○ ○ ○ ○ ○ ○ 0 1 2 3 4 5
	Evaluation, prioritisation and selection of (new) investments		
	% of Portfolio planning meetings where business representatives have actively participated. *This might look like... Annual update on involvement of business representatives / decision makers in IT meetings regarding prioritisation of IT initiatives / programmes.*	○ ○ ○ ○ ○ ○ 0 1 2 3 4 5	○ ○ ○ ○ ○ ○ 0 1 2 3 4 5

	% of new IT investments championed by business owners. *This might look like... (Bi)annual update about what IT initiatives / programmes have a dedicated business sponsor.*	0 1 2 3 4 5	0 1 2 3 4 5
	Alignment of **new** investments to IT Strategy and defined Portfolio Characteristics. *This might look like... (Bi)annual overview of mapping of new IT investments to IT strategy.*	0 1 2 3 4 5	0 1 2 3 4 5
	% of programmes approved **without** a clearly defined business case (costs, benefits, risks & availability of resources defined). *This might look like... (Bi)annual update on the above.*	0 1 2 3 4 5	0 1 2 3 4 5
	Frequency of review and reprioritisation of the running programmes in the investment portfolio. *This might look like... (Bi)annual report evaluating the existing portfolio in the context of changes in the business environment.*	0 1 2 3 4 5	0 1 2 3 4 5

6.3 Programme level processes

Do you measure effectiveness and efficiency of the following (or comparable) processes

	Programme level processes	Actively measured and monitored?	Importance?
	Definition of candidate programmes		
	% of new programmes which have a detailed Business Case (feasibility study, benefits, costs, risks, required resources etc.) **defined upfront**. *This might look like... (Bi)annual update on the above.*	0 1 2 3 4 5	0 1 2 3 4 5
	% of new programmes which have the detailed Business Case **signed-off by the Business Owner**. *This might look like... (Bi)annual update on % of programmes not having a signed-off Business Case.*	0 1 2 3 4 5	0 1 2 3 4 5
	% of Programmes where key metrics are defined upfront for tracking the Business Case. *This might look like... (Bi)annual update on the above.*	0 1 2 3 4 5	0 1 2 3 4 5
	Assignment of programme accountability and ownership		
	% of programmes which have clear accountability and ownership. *This might look like... (Bi)annual update if programmes have a clear accountability for achieving benefits, controlling costs, managing risks etc.*	0 1 2 3 4 5	0 1 2 3 4 5
	Programme management		
	% of programmes subject to internal / external compliancy reviews. *This might look like... (Bi)annual update to what level programmes are subject to internal (e.g. internal audit) and extrernal (e.g. regulatory) compliance reviews.*	0 1 2 3 4 5	0 1 2 3 4 5
	% total vendors evaluated per year. *This might look like... (Bi)annual update on the performance of vendors contracted in programmes.*	0 1 2 3 4 5	0 1 2 3 4 5
	% of programmes & projects where performance information (budget status, risk/issues, milestones, benefits) is regularly available. *This might look like... Monthly progress update / status report per programme (for several stakeholders).*	0 1 2 3 4 5	0 1 2 3 4 5
	% of programmes & projects following applicable standards and best practices. *This might look like... (Bi)annual update if programmes follow project / programme management and tooling standards*	0 1 2 3 4 5	0 1 2 3 4 5
	% of programmes & projects receiving post-implementation review. *This might look like... (Bi)annual report of programmes reviewed on the business case, targets etc. after implementation.*	0 1 2 3 4 5	0 1 2 3 4 5

6.4 Other relevant processes

Do you measure the effectiveness and efficiency of the following processes (or comparable processes) involved in IT investments?

	Other relevant processes	Actively measured and monitored?	Importance?
	IT Architecture Management		
	% of projects / initiatives reviewed by IT architecture board *This might look like... (Bi)annual update of the above.*	0 1 2 3 4 5	0 1 2 3 4 5
	Quality Management		
	% of projects receiving Quality Assurance review. *This might look like... (Bi)annual update of the above.*	0 1 2 3 4 5	0 1 2 3 4 5
	Acquisition of solution		
	Average time and costs to deliver required solution. *This might look like... (Bi)annual update on the productivity of the IT processes involved in realization of solution, i.e. application development and technology infrastructure maintenance.*	0 1 2 3 4 5	0 1 2 3 4 5
	Implementation of solution		
	Availability, completeness and accuracy of user and operational documentation. *This might look like... (Bi)annual update on the quality and quantity of documentation mentioned above.*	0 1 2 3 4 5	0 1 2 3 4 5
	% of applications with adequate user and operational support training *This might look like... (Bi)annual update on quality and quantity of training mentioned above.*	0 1 2 3 4 5	0 1 2 3 4 5

6.5 Any other important KPIs?

Are there any other important KPIs not mentioned here which you use to measure andmonitor the effectiveness and efficiency of internal processes involved in IT investments?

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Section 7. Future Orientation perspective (Perf. drivers)

The **Future Orientation perspective** measures the readiness (and improvement) of the IT function for future investments. Do you measure to what extent your IT organization is ready (and improving) to make sure demanded future investments will be supported? That you can keep doing the right investments, keep getting the benefits? That you can keep doing them in the right way and can keep getting them done well?

Please give your overall opinion about your measures in this area and after that consider the different possible measures.

7.1 Overall

	How **satisfied** are you in general with your current measures of the readiness of the IT function for future IT investments?	Very dissatisfied ○ ○ ○ ○ ○ ○ Very satisfied
	How would you rate the **overall performance** of your current performance measurement system in measuring the readiness of you IT function for future IT investments?	Very low performance ○ ○ ○ ○ ○ ○ Very high performance
	How would you assess the **usefulness** of having knowledge and insight in the readiness of the IT function for future IT investments?	Not at all useful ○ ○ ○ ○ ○ ○ Very useful
	How would you rate the **need** of your organization for having knowledge and insight in readiness of the IT function for future IT investments?	Very limited ○ ○ ○ ○ ○ ○ Very high

7.2 IT HRM

Do you measure the readiness and improvement of your IT human resources for future investments? Please consider the following KPIs

	IT HRM	Actively measured and monitored?	Importance?
	% of satisfied IT personnel (not including end users). *This might look like... (Bi)annual update on job satisfaction of IT personnel*	○ ○ ○ ○ ○ ○ 0 1 2 3 4 5	○ ○ ○ ○ ○ ○ 0 1 2 3 4 5
	Average # of days to fill IT vacancies. *This might look like... (Bi)annual update on shortages in IT personell and average times to fill in vacancies.*	○ ○ ○ ○ ○ ○ 0 1 2 3 4 5	○ ○ ○ ○ ○ ○ 0 1 2 3 4 5
	IT training and development budget as % of total IT budget. *This might look like... (Bi)annual update on professional development of IT staff.*	○ ○ ○ ○ ○ ○ 0 1 2 3 4 5	○ ○ ○ ○ ○ ○ 0 1 2 3 4 5

7.3 Knowledge management

Do you measure the readiness and improvement of your knowledge management? Please consider the following KPIs

	Knowledge management	Actively measured and monitored?	Importance?
	% of projects that have important project docs & lessons learned on knowledge management system. *This might look like... (Bi)annual update on # and quality of project evaluations uploaded in KMS.*	○ ○ ○ ○ ○ ○ 0 1 2 3 4 5	○ ○ ○ ○ ○ ○ 0 1 2 3 4 5
	Use (contributions, pageviews) of knowledge management system. *This might look like... (Bi)annual update on usage statistics of KMS.*	○ ○ ○ ○ ○ ○ 0 1 2 3 4 5	○ ○ ○ ○ ○ ○ 0 1 2 3 4 5

7.4 IT architecture

Do you measure the readiness and improvement of your IT architecture (applications portfolio & infrastructure) for future investments? Please consider the following KPIs.

	IT architecture	Actively measured and monitored?	Importance?
	% of architecture considered flexible and modular. *This might look like... (Bi)annual survey among relevant business and IT stakeholders about the IT architecture.*	0 1 2 3 4 5	0 1 2 3 4 5
	% of current architecture compliant to target architecture. *This might look like... (Bi)annual update on IT architecture status vs. target architecture*	0 1 2 3 4 5	0 1 2 3 4 5

7.5 Research into emerging technologies

Do you measure how well you analyze emerging technologies (which may become IT investments in the future)? Please consider the following KPIs

	Research into emerging technologies	Actively measured and monitored?	Importance?
	% of IT investment budget allocated to IT innovation. *This might look like... (Bi)annual update on used / required budget and project results for IT innovation.*	0 1 2 3 4 5	0 1 2 3 4 5
	Perceived satisfaction of top management with the reporting on how specific emerging technologies may or may not be applied in the organization. *This might look like... (Bi)annual results of satisfaction survey among top management about reporting on emerging technologies.*	0 1 2 3 4 5	0 1 2 3 4 5

7.6 Any other important KPIs?

Are there any other important KPIs not mentioned here, which you use to measure/monitor the readiness of the IT function for future IT investments?

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Section 8. Issues in designing, implementing and using performance measures

Below is a list of possible issues (derived from existing research) in **developing**, **implementing** and **using** a **Performance Measurement System (PMS**) **like the Balanced Scorecard**.

Please indicate at a 1-5 scale to what extent these issues are / were applicable in your organization.

8.1 Possible issues in design			
Linking strategy to measures *Issues in the integration, linkage and cascading of mission, vision and strategy in the PMS, reaching consensus on the various performance measures. Difficulties especially arise if there is not a clear business strategy.*	Irrelevant	O O O O O	Very relevant
Defining non-financial measures *Defining the non-financial measures in the PMS is often experienced to be difficult.*	Irrelevant	O O O O O	Very relevant
Cause-and-effect relationships *Difficulties in identifying cause-and-effect relationships between specific performance drivers and outcome measures and how performance drivers will improve performance. This has to be identified before a PMS is implemented.*	Irrelevant	O O O O O	Very relevant

8.2 Possible issues in implementation			
IT to support PM *An IT system to support collecting, analyzing and reporting data seems to be crucial. Often difficulties exist in the integration of a PMS with other key management. Also, using information systems to measure non-financial measures seems to be difficult.*	Irrelevant	O O O O O	Very relevant
Top management support *Top management is recognized as a critical success factor for a PMS project. But top management commitment often changes (decreases) during a PMS project, as the perceived benefits decrease compared to the effort (increase) required during the project. The priority of the PMS project among other initiatives / projects often decreases.*	Irrelevant	O O O O O	Very relevant
Getting the required data for measures	Irrelevant	O O O O O	Very relevant

Obtaining the data for the measures in the PMS and designing and implementing new processes to facilitate this has proven to be complex. Also, data collection for non-financial measures can require a lot of work (surveys) compared to data for financial measures, which can be taken for example from the financial statement.			

8.3 Possible issues in use			
Resistance *A PMS can result in a lot of resistance. This can be in applying the system in a specific business unit or for example by employees in delivering the (right) data.*	Irrelevant	O O O O O	Very relevant
Misunderstanding *Measures of a PMS are often poorly defined which can lead to misunderstanding in delivery of data & interpretation of outcomes.*	Irrelevant	O O O O O	Very relevant
Relevance of measures diminishes over time *As time goes by, previously defined measure become irrelevant, requiring regular review of the measures used.*	Irrelevant	O O O O O	Very relevant
Performance measures results in data, but not in insight *Difficulties in interpreting the measurement results shown by the PMS*	Irrelevant	O O O O O	Very relevant
Reliability of data *Research found out that close to 50 percent of executive managers place no confidence in the numbers presented to them.*	Irrelevant	O O O O O	Very relevant

8.4 Other issues?

Are there any other important issues not mentioned here, which you encountered in designing, implementing and using performance measures?

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Thank you!

We would like to thank you for your time and effort in completing our survey. We look forward to the upcoming interview.

When the research is finished, we will send you a report with the conclusions, general recommendations and specific recommendations for your organization.

Appendix IV – Survey data

Context factor		1	2	3	4	5	6	7	8
IT Governance maturity		4	3	2	4	4	2	2	3
IT budget	Overall	50<100	10<25	5<10	25<50	10<25	10<25	250	100<150
	For change	5<10	10<25	1<5	10<25	5<10	1<5	150<250	25<50
	Discretionary	5<10	5<10	1<5	1<5	1<5	1<5	150<250	10<25
IT Investment portfolio	% Infrastructure	50	40	40	20	30	10	5	30
	% Transactional	30	10	25	5	30	60	5	50
	% Informational	10	10	25	15	10	20	45	10
	% Strategic	10	40	10	60	30	10	45	10

Measures Corporate Contribution perspective		1		2		3		4		5		6		7		8	
		M	I	M	I	M	I	M	I	M	I	M	I	M	I	M	I
Business value	Financial	4	4	2	4	2	2	1	5	2	4	1	4	1	4	1	5
	Non Financial	3	3	2	4	2	4	3	4	3	4	1	4	1	4	1	4
Strategic Alignment	Contribution strategic goals	4	4	2	4	2	3	1	4	4	4	2	5	1	5	1	5
	Balance	3	4	2	4	2	3	1	4	2	4	3	4	1	5	1	4
Cost control	On budget, on time	5	5	3	3	2	4	4	4	5	4	3	4	3	5	2	5
	Allocation	1	1	3	3	3	3	4	4	4	4	3	4	4	5	3	3
	Overall spent	5	4	3	3	5	4	3	4	3	4	4	4	3	5	3	5
Risk Control	Key risks & issues	4	4	2	5	2	4	4	3	2	3	3	4	3	4	3	4
	Business incidents	4	4	2	4	2	4	2	3	3	3	4	4	2	5	1	3
	IT disablers strategy	3	5	2	3	2	4	3	3	1	2	3	4	1	4	2	4

M = Actively Measured & Monitored"

1 = not measured at all

5 = actively measured & monitored

I = Importance

1 = Not important

5 = Very important

Measures User Orientation perspective		1		2		3		4		5		6		7		8	
		M	I	M	I	M	I	M	I	M	I	M	I	M	I	M	I
Business management satisfaction	Satisfaction with current portfolio	4	4	3	3	3	3	3	3	4	4	4	4	3	5	3	3
	Satisfaction with direction portfolio	4	5	3	3	3	3	3	4	4	4	4	4	3	3	3	3
	Meeting expectations	3	4	2	4	3	3	3	4	3	4	3	4	3	5	3	4
	Satisfaction with IT personell skills	3	4	2	4	4	4	3	4	5	4	3	4	4	4	3	4
End-user satisfaction	Satisfaction with functionality, quality etc.	4	4	3	4	3	3	4	4	2	4	2	3	2	5	4	4
	Overall service quality	4	3	3	4	3	3	4	4	5	4	2	3	5	5	4	4

M = Actively Measured & Monitored"

1 = not measured at all

5 = actively measured & monitored

I = Importance

1 = Not important

5 = Very important

Measures Operational Excellence perspective			1		2		3		4		5		6		7		8	
			M	I	M	I	M	I	M	I	M	I	M	I	M	I	M	I
Portfolio level	*IT Strategy definition*	% Business participation	5	5	2	3	3	4	3	4	4	4	4	4	3	4	5	5
	IT investment HRM	Frequency HRM reviews	3	4	2	4	1	4	3	4	4	4	4	4	1	4	1	4
	Financial management	Frequency budget reviews	5	4	2	2	3	3	4	5	4	4	4	4	2	5	4	5
	Evaluation, prioritization and selection new investments	% business participation	5	5	3	3	2	3	3	5	5	4	4	4	4	5	5	5
		% championed by bus.	5	5	3	3	2	3	2	4	4	4	3	5	3	4	4	5
		Alignment to strategy	5	5	3	3	3	3	3	5	4	4	4	4	3	4	2	5
		% with clear bus case	4	4	2	3	2	4	2	4	3	4	3	4	2	5	2	5
		Freq. review & reprior.	3	4	3	3	2	4	3	4	4	4	3	4	3	5	5	5

M = Actively Measured & Monitored"
1 = not measured at all
5 = actively measured & monitored

I = Importance
1 = Not important
5 = Very important

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University of Twente
Enschede - The Netherlands

Measures Operational Excellence perspective			1		2		3		4		5		6		7		8	
			M	I	M	I	M	I	M	I	M	I	M	I	M	I	M	I
Programme level	*Definition candidate programmes*	% clear bus.case	5	5	2	3	1	4	1	5	4	4	3	4	1	5	5	5
		% bus.case signed off	5	5	1	3	1	3	1	5	4	4	3	4	3	5	5	5
		% key metrics defined	5	5	1	3	1	3	1	5	3	4	2	4	1	5	2	4
	Assignment accountability & ownership	% clear accountability & ownership	5	5	3	4	1	4	2	5	4	4	3	4	3	5	5	5
	Programme management	% compliancy reviews	3	3	3	4	1	2	3	5	2	3	2	4	2	4	1	3
		% vendors evaluated	4	4	2	3	1	3	4	5	2	3	1	2	3	5	4	4
		% regularly perf. report	5	5	3	3	2	4	3	5	5	5	3	4	3	5	2	5
		% following standards	3	3	2	2	1	3	2	5	4	4	3	4	1	4	1	4
		% post impl. review	5	5	3	3	1	4	4	5	2	4	1	4	2	4	3	3
Project level	*IT Architecture management*	% reviewed by architecture board	3	4	2	4	1	3	4	5	4	4	4	4	3	4	4	4
	Quality management	% receiving quality review	3	3	2	4	2	3	4	5	3	4	2	4	1	5	2	3
	Aqcuisition / development	Efficiency	3	3	2	3	2	2	2	5	1	3	2	4	1	4	2	3
	Implementation	% with documentation	3	4	2	3	2	3	3	5	4	4	3	4	4	4	1	3
		% with support & training	3	4	2	3	2	3	3	5	4	4	3	4	3	5	1	3

Measures Future Orientation perspective		1		2		3		4		5		6		7		8	
		M	I	M	I	M	I	M	I	M	I	M	I	M	I	M	I
IT human resources	% satisfied IT personnel	3	5	3	3	3	3	2	5	3	3	2	4	4	5	2	4
	av. # days to fill in vacanc.	3	2	2	3	2	3	3	5	2	4	3	4	1	4	2	4
	training budget	3	4	4	4	2	3	3	5	4	4	3	4	2	4	2	4
Knowledge management	% projects imput in KM	1	5	4	4	2	3	1	5	2	3	1	5	4	4	2	3
	use of KM	1	5	2	3	1	3	1	4	1	2	1	5	2	3	1	3
IT architecture	% flexible & modular	3	5	4	4	2	4	3	3	2	4	4	4	2	5	3	4
	% target architecture	3	5	3	4	2	4	4	4	3	4	4	4	2	5	3	4
Research emerging techn.	budget for innovation	3	3	1	3	1	3	3	5	2	2	2	4	2	4	3	3
	satisfaction with reports	3	2	1	3	1	3	3	5	3	2	3	4	2	4	1	1

M = Actively Measured & Monitored"

1 = not measured at all

5 = actively measured & monitored

I = Importance

1 = Not important

5 = Very important

Issue category	Issue	1	2	3	4	5	6	7	8
Design	*Link strategy to measures*	4	4	2	4	3	3	5	5
	Defining non-financial measures	3	3	5	4	2	3	4	4
	Cause-and-effect relations measures	3	3	3	4	4	4	4	2
Implementation	*IT supporting pms*	4	3	3	4	2	3	5	5
	top management support	4	4	2	4	2	3	3	5
	get data for measures	4	5	4	4	3	4	5	5
Use	*resistance*	2	4	4	4	2	4	4	4
	misunderstanding	2	4	4	4	2	4	4	4
	relevance of measures diminishes	3	4	3	2	3	4	3	2
	no insight with measures but data	2	3	3	3	2	3	3	3
	reliability of data	3	4	5	5	3	4	5	5

1 = irrelevant
5 = very relevant

Deloitte.

Appendix V – Example of deliverable for CIO

This is not a public appendix