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PERFORMANCE AND INCENTIVE MANAGEMENT IN IT BUSINESS SUPPORT

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Abstract

Information Technologies (IT) is a fast evolving area and, having started as a technology provider, it is progressively becoming a strategic partner in a lot of organizations. It is then important to see it as a business support activity and find new management methods to face these changes.

IT Governance started to be discussed in the mid nineties and focuses concerns like the alignment of IT with business goals and assessing its value contribution to the organization. Though there isn't a single definition of what IT Governance really is and different frameworks are used to implement governance structures.

The problem discussed in this thesis is the fact that many companies are failing in implementing sustainable governance models despite all the existing frameworks. The incentives area is then approached because of the importance they have in the way people behave inside an organization. A good incentive system can then contribute to the success of IT Governance initiatives but it must be aligned with these new management concerns like the alignment with the business.

Since incentives are increasingly based in performance management systems, this thesis proposes a model that includes an IT Balanced Scorecard to perform the performance management and uses the resulting data to assess the distribution of incentives. A proper definition of the performance indicators will then assure the wanted alignment.

Keywords

IT Governance, Business Support, Incentives, Performance Management, IT Balanced Scorecard

Resumo

A área de Tecnologias de Informação (TI) tem um ritmo de evolução elevado e, se no início era considerada como fornecedor de tecnologia, tem-se tornado progressivamente num parceiro estratégico para muitas empresas. É pois necessário que se entenda a sua importância como área de suporte ao negócio e que se encontrem novas metodologias de gestão.

O tema "IT Governance" começou a ser discutido nos anos noventa e tem como foco a importância de alinhar as TI com objectivos de negócio e a determinação do seu contributo para o negócio. Não existe no entanto apenas uma definição para "IT Governance" e diferentes metodologias têm sido utilizadas para implementar os seus conceitos.

O problema discutido nesta tese, é o facto de muitas empresas não estarem a conseguir implementar modelos de gestão sustentáveis apesar de todas as metodologias existentes. A área dos incentivos é também abordada devido à importância e impacto que estes têm no comportamento das pessoas. Um sistema de incentivos pode por isso contribuir para o sucesso das iniciativas ligadas a "IT Governance" mas é necessário que esteja alinhado com estas novas preocupações de gestão como o alinhamento com o negócio.

Uma vez que os incentivos são cada vez mais calculados com base em sistemas de gestão de performance, esta tese propõe um modelo que inclui um "IT Balanced Scorecard" para a gestão da performance e usa os dados resultantes para determinar a distribuição dos incentivos. A correcta definição dos indicadores de performance assegurará pois o tão desejado alinhamento.

Palavras-Chave

Gestão da Informática, Suporte ao Negócio, Incentivos, Gestão da Performance, Balanced Scorecard

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Definitions and Acronyms

BSC - Balanced Scorecard

BSD - Business Support Division

COBIT - Control Objectives for Information and related Technology

HR - Human Resources

IT - Information Technology

ITIL - Information Technology Infrastructure Library

KPI - Key Performance Indicator

1. Introduction

1.1. Context

IT Governance is a concept that started to be discussed in the mid nineties and became an important issue in the information technology area. Today, IT governance is on the agenda of many organizations, and high-level IT governance models have been created, however a shared view on important concerns and how they should be handled is missing. The large number of IT Governance definitions found in the literature is an example of that and as a result a lot of different frameworks have been used to support the implementation of IT Governance. E.g. COBIT is a framework based on best practice, focusing on the processes of the IT organization and how their performance can be assessed and monitored. The IT Infrastructure Library (ITIL) provides useful best practice in the field of service management and service delivery. Weill & Ross, on the other hand, have presented a framework for IT governance evaluation, assessing how well the organization achieves its desired performance goals.

But even if there are different views on IT Governance, the importance of aligning IT with business goals and assessing its value contribution to the organization are basic principles shared by all.

1.2. Motivation

Having developed a high-level IT model does not necessarily mean that governance will work. Conceiving a model is the first and necessary step but implementing it into the organization as a sustainable solution is the big challenge [1]. And as it is deeply recognized, people are the most important factor of success in any kind of initiatives promoted by organizations. For the creation and delivery of IT services to the business, as well as for an effective governance, Human Resources then need to acquire, maintain and motivate a competent IT workforce. But HR departments are facing new challenges in accomplishing this task. The IT as undergone a big evolution across the years, growing from a simple Technology Provider to a complex Strategic Partner, and as a result new strategies are required.

A possible strategy, proposed in this thesis, is the use of incentives. For a long time, firms have designed compensation contracts to induce employees to operate in the firm's interest. Hence a well designed incentive system can be an important ally in implementing IT Governance and aligning the business with IT.

1.3. Outline

Chapter 2 introduces the concept of IT Governance and includes different definitions found in the literature. The most important IT Governance-related frameworks are also presented in this chapter. An overview of the incentives area is then made and its relation with performance management is established. This brings to a brief analysis of corporate performance management.

Chapter 3 defines the scope of this thesis by explaining the problem that it tries to solve. This is done by analyzing and exposing some of the challenges that IT is facing today.

Chapter 4 proposes a model to help face the challenges mentioned in the previous chapter, thoroughly explaining its different components and the links between them.

This model was used to implement an information system in a Portuguese private bank, serving as a case study. This project is described in chapter 5 while the details of the implementation come in chapter 6.

2. IT Governance

Over the last years, we have seen the rise of a new paradigm in the relations of the Business with IT. While in the beginning, IT was considered a technology provider, the tendency is to evolve into a strategic partner.
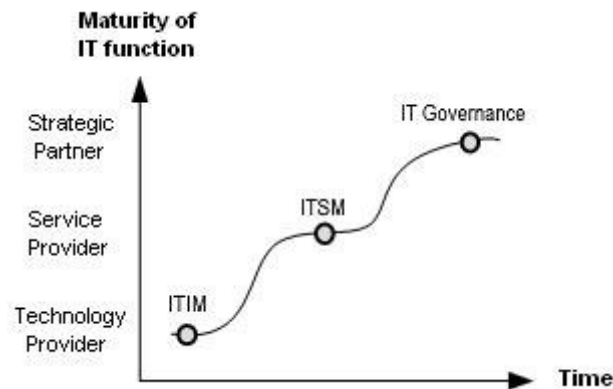
Figure 1. Evolution of the IT Function within organizations (source: [2])

In this evolution, IT organizations typically follow a three-stage approach as shown in Figure 1. During the IT infrastructure management (ITIM) stage, the IT focuses on improving the management of the enterprise infrastructure. The next stage, IT service management (ITSM), sees the IT organizations actively identifying the services its customers need and focusing on planning and delivering those services to meet availability, performance, and security requirements. Lastly, when IT organizations evolve to IT business value management (IT Governance), they are transformed into true business partners enabling new business opportunities [2].

IT governance is then seen as a top management concern of controlling IT's strategic impact, and its value delivery to the business. Still, it is approached in different ways by different authors:

• "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 organizational structures and processes to ensure that the organization sustains and extends its strategy and objectives." [3]

• "Whereas the domain of IT Management focuses on the efficient and effective supply of IT services and products, and the management of IT operations, IT Governance faces the dual demand of (1) contributing to present business operations and performance, and (2) transforming and positioning IT for meeting future business challenges." [4]

- "IT governance describes the distribution of IT decision-making rights and responsibilities among different stakeholders in the enterprise, and defines the procedures and mechanisms for making and monitoring strategic IT decisions." [5]

- "We define IT governance as specifying the decision rights and accountability framework to encourage desirable behavior in the use of IT." [6]

- "IT Governance is the strategic alignment of IT with the business such that maximum business value is achieved through the development and maintenance of effective IT control and accountability, performance management and risk management." [7]

- "IT governance is the preparation for, making of and implementation of IT-related decisions regarding goals, processes, people and technology on a tactical or strategic level." [8]

This last definition was based in the analysis of 60 publications related to IT Governance so it is a fairly complete one.

Goals include strategy-related decisions and control objectives to be measured against. Processes include the implementation and management of IT processes, e.g. acquisition, service level management, and incident management. People includes the relational architecture within the organization, and the roles and responsibilities of different stakeholders. Technology represents the physical things that the decisions consider, such as the actual hardware, software and facilities. The tactical or strategic level differentiates two types of scopes within the decisions. There are detailed, rapidly carried out, Tactic decisions but there also exists long term business oriented Strategic decisions, made by the top managers. One of the most important strategic scopes in IT Governance is the alignment between business and IT.

Finally, a decision's implementation must be followed up and monitored. By implementing control points for each process we are able to determine its real performance and outcome.

2.1. COBIT

Two major organizations are actively involved in IT Governance: ISACA (Information Systems Audit and Control Association) and the IT Governance Institute. Together they promote the use of COBIT (Control Objectives for Information and related Technology) model [9], today considered one of the most important IT Governance frameworks.

The business orientation of COBIT consists of linking business goals to IT goals, providing metrics and maturity models to measure their achievement, and identifying the associated responsibilities of business and IT process owners.

2.1.1. COBIT Focus Areas

The COBIT framework covers five areas in order to support the IT Governance concepts (as shown in Figure 1).

Figure 2. COBIT'S vision of IT Governance (source: [9])

• Strategic alignment focuses on ensuring the linkage of business and IT plans; on defining, maintaining and validating the IT value proposition; and on aligning IT operations with enterprise operations.

• Value delivery is about executing the value proposition throughout the delivery cycle, ensuring that IT delivers the promised benefits against the strategy, concentrating on optimizing costs and proving the intrinsic value of IT.

• Resource management is about the optimal investment in, and the proper management of, critical IT resources: applications, information, infrastructure and people.

• Risk management requires risk awareness by senior corporate officers, a clear understanding of the enterprise's appetite for risk, understanding of compliance requirements, transparency about the significant risks to the enterprise, and embedding of risk management responsibilities into the organization.

• Performance measurement tracks and monitors strategy implementation, project completion, resource usage, process performance and service delivery, using, for example, balanced scorecards that translate strategy into action to achieve goals measurable beyond conventional accounting.

To address the different issues of the mentioned areas, COBIT provides guidelines for managers and auditors to implement and control the management processes. These guidelines

are based on best practices, focusing on 34 information processes of the IT organization and how their performance can be assessed and monitored.

2.1.2. COBIT domains

The COBIT processes are divided across four different domains:

•   Planning and Organization: This domain covers strategy and tactics, and concerns the identification of the way IT can best contribute to the achievement of the business objectives. Furthermore, the realization of the strategic vision needs to be planned, communicated and managed for different perspectives. Finally, a proper organization as well as technological infrastructure must be put in place.

•   Acquisition and Implementation: To realize the IT strategy, IT solutions need to be identified, developed or acquired, as well as implemented and integrated into the business process. In addition, changes in and maintenance of existing systems are covered by this domain to make sure that the life cycle is continued for these systems.

•   Delivery and Support: This domain is concerned with the actual delivery of required services, which includes service delivery, management of security and continuity, service support for users, and management of data and the operational facilities.

•   Monitoring and Evaluation: All IT processes need to be regularly assessed over time for their quality and compliance with control requirements. This domain addresses performance management, monitoring of internal control, regulatory compliance and providing governance.

The relationships between the four different domains are presented in Fig. 2.
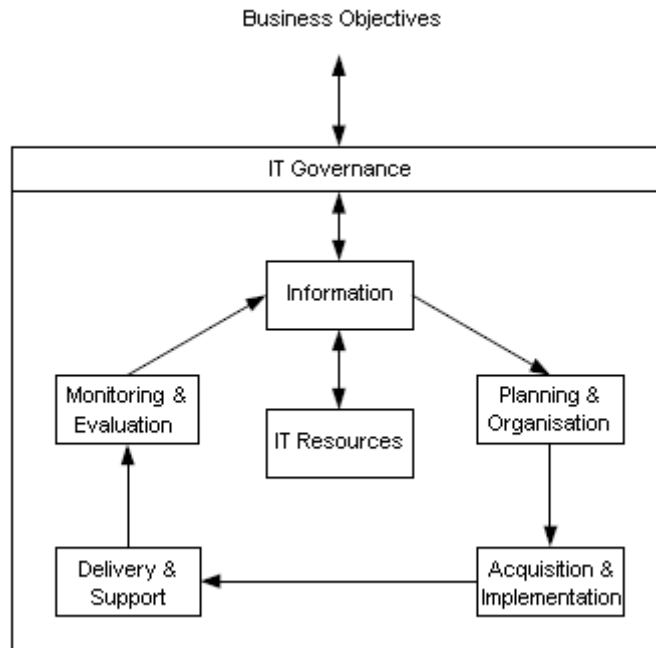
Figure 3. The COBIT model (source: [2])

Along with the conceptual framework, COBIT also provides a set of Management Guidelines to a correct implementation and control of every process. These guidelines are composed by a set of suggested activities, goals, metrics, Key Performance Indicators, Key Goal Indicators and maturity models.

Incentives are not discussed in depth but are mentioned in "IT Human Resources Management" (a Planning and Organization process), as part of the solution to acquire, maintain and motivate a competent workforce. Incentives systems are also part of the requirements to attain the highest levels of some maturity models.

2.2.   Other IT Governance Frameworks

Other frameworks are used to implement some of the concepts of IT Governance.

The Information Technology Infrastructure Library (ITIL) is a world-wide known standard in Service Management. ITIL provides a comprehensive collection of best practices drawn from the experience of thousands of IT practitioners around the world [10]. ITIL focuses on critical business processes and disciplines needed for delivering high-quality services providing useful best practices in the field of service management and service delivery, but does not cover the strategic impact of IT and the relation between IT and the business [8]. Out of the ITIL framework, the British Standard BS15000 has emerged. BS15000 is the world's first standard for managing IT services. This approach defines IT quality as the level of alignment between IT services and actual business needs [11].

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SAC [12] is a tool for internal auditors to use when auditing information systems and technology, COSO [13] provides information for those seeking to assess and provide feedback about control systems and SAS 55 and 78 [14] deals with external auditors and the effect of internal controls on financial statements.

Some other frameworks were designed to evaluate existing IT Governance structures rather than providing control or implementation processes. The one developed by Weill & Ross [15] is well known.

This framework focuses the importance of who makes decisions and how decisions are made by identifying five IT governance archetypes that describe the people who are involved in making these decisions: (1) business monarchy, (2) IT monarchy, (3) feudal, (4) federal and (5) anarchy.

• Business Monarchy: the senior leadership of the firm has decision rights. These rights are often exercised within an executive committee or a similar mechanism. The CIO can be part of the group and is involved in decision-making, but will not act independently from the senior leadership. This archetype is normally used in organizations for decisions about IT investments and the IT infrastructure strategies.

• IT Monarchy: the CIO individually or groups of IT executives have decision rights. These rights are often exercised within the various IT steering committees and the IT organization. In most cases, the IT monarchy is used for IT principles and IT architecture.

• Feudal: the business unit leader or his or her delegates have governance rights. The mechanisms for exercising these governance rights are localized and include the authority of the business unit leader and the budgeting process.

• Federal: governance rights are shared by some combination of senior executives, business unit leaders, business process owners, IT executives and end users. Mechanisms designed to exercise federal governance rights include firm-wide business process teams, service level agreements, IT investment approval processes and IT working committees.

• Anarchy: individual business process owners or end users have decision rights. There are no formal mechanisms for exercising rights with decisions being made locally on an ad-hoc basis.

This decision-making analysis is then made in four critical domains of IT: (1) principles, (2) infrastructure, (3) architecture and (4) investment and prioritization.

- IT principles are high-level statements about how IT is used in the firm. IT principles capture the essence of a firm's future direction and how IT will be used.

- IT infrastructure strategies describe the approach to building the IT foundation for the firm. IT infrastructure is made up of the shared and standard IT services that are centrally coordinated. Decisions about IT infrastructure strategy include requirements for infrastructure capability as well as the location of capabilities within the firm (e.g., firm-wide or business unit). IT infrastructure capability is a critical factor in determining the speed with which new business initiatives can be implemented.

- IT architecture provides an integrated set of technical choices to guide the organization in satisfying business needs. The architecture is a set of policies and rules that govern the use of IT and plot a migration path to the way business will be done. The architecture includes the standards and guidelines for technology, use of data, design of applications and change management processes necessary to exploit the new technologies.

- IT investment and prioritization covers the whole decision-making process of IT investment. This includes prioritization of where IT investments should be focused and describes the procedures for IT project proposals, justification, approval and accountability.

2.3. Incentive Management

A thorough understanding of internal incentives is critical since they largely determine how individuals behave in organizations.

Incentives are considered to be the base of economics [16] and as so they play an important role in Human Resources (HR) management. Since the interests of workers and their employers are not always aligned, firms design compensation contracts to induce employees to operate in the firm's interest. Incentives are also used extensively as a motivation method for workers to increase their productivity.

The way incentives are distributed completely differs from organization to organization. The most common scenario is where managers have an important part of their salary indexed to the achieved performance. This will probably always exist and is a good way of getting more involvement and sense of responsibility from the managers but a growing number of companies are now offering incentives for all employees, usually based in the organization profits.

For the creation and delivery of IT services to the business, as well as for an effective governance and internal control, HR need to acquire, maintain and motivate a competent IT workforce. But even if this is what HR departments were designed for, they are facing new challenges in successfully accomplishing these tasks in IT.

IT professionals are now increasingly asked to assume a proactive role in innovation by seeking new ways to serve business needs though the deployment of information technology. This requires an extremely motivated and empowered workforce, but how can we achieve it? Bowen and Lawler [17] defined empowerment as comprised of four essential ingredients: increased information availability about organizational performance, rewards based on such performance, knowledge that enables richer employee contributions to performance and the power to make decisions that influence performance.

This is where a good incentive management system can make the difference. When properly designed, compensation systems promote desirable employee behaviors, which are a key factor in the successful implementation of business strategies [18].

Also, incentive-based compensation is believed to contribute for better-informed and more motivated workers [19].

And what about basing rewards on performance?

Perhaps explained by the growth and evolution of business performance management, incentives are increasingly based on performance [20].

Having said this, performance-based incentives seem to be a good ally to face today's IT Human Resources challenges. But how are organizations assessing their performance? What types of indicators are they using, and are they a good choice to "feed" the incentives system?

2.4. Corporate Performance Management

"To achieve sustainable business success in the demanding world marketplace, a company must use relevant performance measure." [21]

Managers and executives have a need to understand how their businesses are performing. Corporate Performance Management is a designation frequently used to describe the management processes and business systems that top managers use to improve performance and accountability. In general, performance management refers to the use of performance measurement information to help:

- define organizational goals and objectives in clear, tangible, and quantified terms

- develop activity plans designed to attain the goals and objectives

- monitor actual performance against plans

- analyze significant performance deviations

- advise key managers of situations requiring attention

- formulate corrective action plans to remedy performance deviations or modify plans

A good monitoring process is essential to make sure that the right things are done and are in line with the policies and defined goals. Applying this to IT will lead to more transparency and understanding of IT cost, benefits, and strategy in accordance with governance requirements.

Also, in an effective performance management approach, measures are not used for assigning blame or to simply comply with reporting requirements. Instead, they are used to create and facilitate action to improve performance [22]. This is why measures and performance information must link to strategic management processes.

Finally, according to a research [23] made in the largest organizations of the United States of America, 46 percent followed some kind of performance measurement methodology. Of those, three quarters used the Balanced Scorecard as their main methodology.

2.4.1. Balanced Scorecard

The Balanced Scorecard (BSC) [24] was introduced by Robert Kaplan and David Norton in the early 90's as a new approach to strategic management. The concept was widely adopted around the world and became the most popular measurement framework in business. The traditional financial performance measures worked in the past and were considered enough to assess business performance but as Kaplan and Norton stated:

"These financial measures are inadequate, however, for guiding and evaluating the journey that information age companies must make to create future value through investment in customers, suppliers, employees, processes, technology, and innovation." [25]

A key assumption of the balanced scorecard approach is that non-financial measures can be leading indicators of future financial results.

Hence, the Balanced Scorecard is designed to translate strategy into well defined goals across four different perspectives: Innovation and Learning, Internal Business Processes, Customer and Financial.

The objective is to answer four important questions:

- Can we continue to Improve and Create Value? (Innovation and Learning)

- What must we excel at? (Internal Business Processes)

- How do Customers see us? (Customer)

- How do we look to shareholders? (Financial)

When defining the goals for each of these perspectives, the business vision, mission and strategy should of course be the key elements to consider. The achievement of those goals is then determined by a set of measures.

By setting only four perspectives, the Balanced Scorecard minimizes the information overload by limiting the number of used measures and forces the managers to focus on the ones that are most critical [24].

Each measure is then incorporated in a chain of cause-and-effect mapping that connects the desired outcomes from the strategy with the drivers that will lead to those outcomes.

Finally, through the monitoring of those measures, the Balanced Scorecard is able to provide important feedback from the different areas of the business and help to continuously improve strategic performance and results.

Has we have seen, this framework is a very important tool in performance management but the question is, can it be used in IT?

2.4.2. IT BSC

The possibility of adapting the Balanced Scorecard to the IT functions as been the subject of numerous researches that have converged into a well defined model proposal.

Initially conceived by Gold [26] and Willcocks [27], this concept has been further developed by Van Grembergen and Van Bruggen [28] and Van Grembergen and Timmerman [29].

Preserving the main ideas behind the Balanced Scorecard concept, this new approach proposes the following perspectives: Future Orientation, Operational Excellence, User Orientation and Business Contribution.

Figure 4 shows the different perspectives and generic missions for each of them and Figure 5 presents a generic model of an IT BSC.
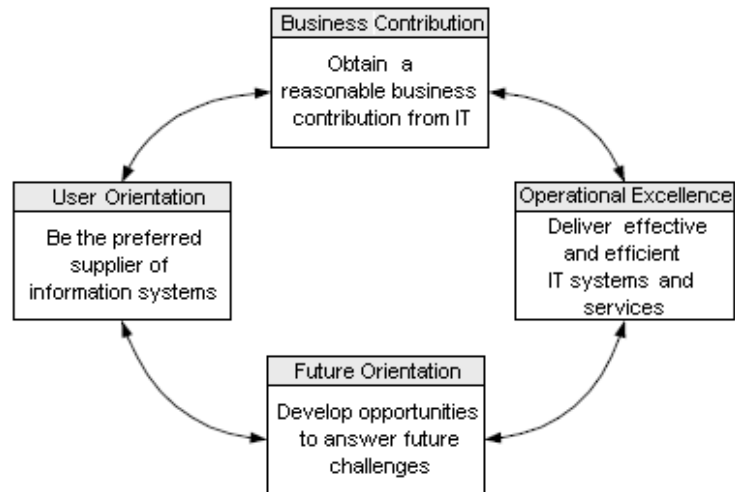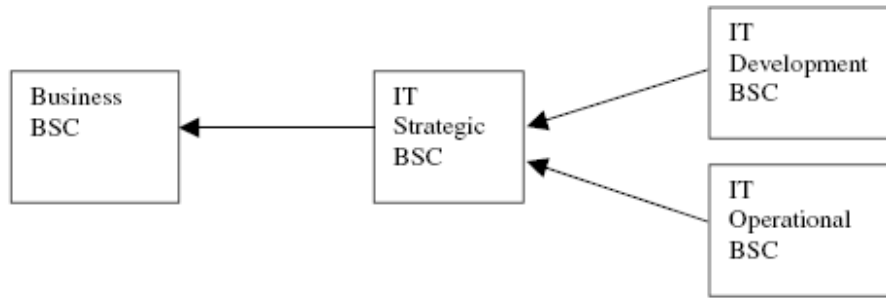
Figure 4. IT Balanced Scorecard Perspectives and Missions (source: [2])

USER ORIENTATION	BUSINESS CONTRIBUTION
Perspective question How do users view the IT department? **Mission** To be the preferred supplier of information systems. **Objectives** • Preferred supplier of applications • Preferred supplier of operations • Partnership with users • User satisfaction	**Perspective question** How does management view the IT department? **Mission** To obtain a reasonable business contribution from IT. **Objectives** • Control of IT expenses • Business value of IT projects • Provision of new business capabilities
OPERATIONAL EXCELLENCE	**FUTURE ORIENTATION**
Perspective question How effective and efficient are the IT processes? **Mission** To deliver effective and efficient IT systems and services. **Objectives** • Efficient and effective development efforts • Efficient and effective operations	**Perspective question** How well is IT positioned to meet 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

Figure 5. Generic IT Balanced Scorecard (source: [30])

This proposed standard for IT BSC, links with the business through the business contribution perspective. But the relationship between IT and business can be more explicitly expressed through a cascade of Balanced Scorecards as shown in Figure 6.

Figure 6. Balanced Scorecard Cascade (source: [30])

As in the business BSC, each of the perspectives has to be translated into corresponding metrics and measures that assess the current situation. And these assessments need to be of course repeated periodically and aligned with pre-established goals. But in this cascade of Balanced Scorecards, the cause-and-effect relationships between measures are the essential component. By establishing these relations across the different scorecards it can be determined how business value is created through information technology.

When properly focused, performance measure should reward behavior that contributes to business success [19] and the IT BSC model is a suitable performance measurement system for the IT function [31].

3. Problem

A common problem that arises in IT governance is the misalignment of incentive and reward systems with the behaviors IT Governance encourages.

"If well-designed IT governance is not as effective as expected, the first place to look is incentives" [32]

As we have seen, top leaders are demanding that IT play the role of a business partner and a strategic enabler. And in such environment, IT human capital has assumed another dimension. A transformation of the IT organization so that it is more closely aligned with the business and can serve strategic ends has wide-ranging implications for the skills, behaviors and orientations of IT staff [33].

But this is not an overnight project. For a long time companies had to face inflexible IT solutions and in most cases they actually had to adapt their business processes to be able to use those solutions. This happened because the focus of IT divisions or software development companies wasn't creating business support applications. They were more concerned in using the technology to build solutions with the features that they thought would be best. More importance was given to technology than to user/organization needs.

This mentality is not easy to change and that is why incentive systems should make part of the necessary evolution. Incentives should reward the activities, projects or people who effectively contribute to the achievement of the company goals and the IT can't be an exception.

Also, as we have seen, an increasing number of organizations have been using business performance systems to support and assess the attribution of incentives. Basically the rewards are distributed based in a set of performance indicators.

In this case, since the incentives system is directly dependant on the performance indicators, the prime concern should be the correct design and use of business performance systems. If these indicators are oriented to achieve the organization strategy then we'll have incentives that go in the right direction, rewarding those who manage to make this crucial alignment.

4. Proposal

Bonuses based solely on profits and other financial indicators have been criticized for encouraging managers to sacrifice long-run performance to increase short-term financial results, and thereby maximize their bonuses. To overcome the short-run orientation of these reward systems, many firms are implementing compensation plans that include non-financial measures [34]. These additional measures can take a variety of forms, ranging from quantitative metrics, such as employee and customer survey results, to qualitative assessments of performance by the top managers [35].

Hence, this proposal consists of an IT BSC-based performance monitoring system where the indicators values are used to determine the distribution of incentives. The BSC promotes the definition of non-financial measures which avoids the short-term orientation problems mentioned above. Also, as we have seen, this framework focuses the importance of business goals and strategy of the organization and that the performance measures are defined according to those. Since our prime goal is the alignment of the IT workforce with the business, the IT BSC seems to be a good candidate. As long as the performance measures or key performance indicators (KPIs) are well defined, we will have an IT Human Resources practice that rewards those who contribute to the company goals while helping to motivate and empower the employees.

Past experience also indicates that one of the keys to the successful implementation of the BSC is the linkage to incentive compensation [36]. But although the balanced scorecard literature acknowledges that linkages to reward systems are required for the scorecard to create cultural change and improve economic performance, the specific form of these linkages has not been much discussed or studied [37].
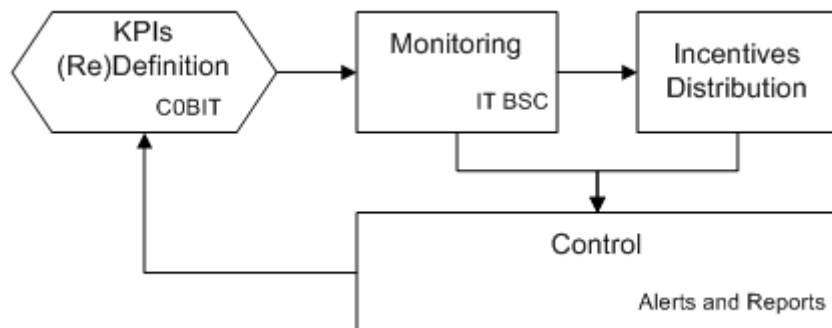
A simple model of the proposed system is shown below.

Figure 7. Proposed model

4.1. KPIs Definition

As we have seen, the IT BSC suggests that the indicators should cover four major areas but how to define the right indicators and which ones will ensure that the IT is aligned with the business? The indicators should be defined according to the different organizations and there is no magic recipe to find the ideal KPIs but we can use existing researches and literature as a base. One good example is the COBIT framework; as previously mentioned this framework provides a set of indicators to measure the 34 proposed processes and, being an IT Governance tool, it strives to align the IT with the company strategy (see tables below).

		Business Goals	IT Goals							
Financial Perspective	1	Expand Market Share	25	28						
	2	Increase Revenue	25	28						
	3	Return on investment	24							
	4	Optimise asset utilisation	14							
	5	Manage business risks	2	14	17	18	19	20	21	22
Customer Perspective	6	Improve customer orientation and service	3	23						
	7	Offer competitive products and services	5	24						
	8	Service availability	10	16	22	23				
	9	Agility in responding to changing business requirements	1	5	25					
	10	Cost optimisation of service delivery	7	8	10	24				
Internal Perspective	11	Automate and integrate the enterprise value chain	6	7	8	11				
	12	Improve and mantain business process functionality	6	7	11					
	13	Lower process costs	7	8	13	15	24			
	14	Compliance with external laws and regulations	2	19	20	21	22	26	27	
	15	Transparency	2	18						
	16	Compliance with internal policies	2	13						
	17	Improve and mantain operational and staff productivity	7	8	11	13				
Learning and Growth Perspective	18	Product/business innovation	5	25	28					
	19	Obtain reliable and useful information for strategic decision making	2	4	12	20	26			
	20	Acquire and mantain skilled and motivated personnel	9							

Table 1. Linking Business Goals to IT Goals – COBIT (source: [9])

IT Goals

1	Respond to business requirements in alignment with the business strategy.
2	Respond to governance requirements in line with board direction.
3	Ensure the satisfaction of end users with service offerings and service levels.
4	Optimise the use of information.
5	Create IT agility.
6	Define how business functional and control requirements are translated in effective and efficient automated solutions.
7	Acquire and maintain integrated and standardised application systems.
8	Acquire and maintain an integrated and standardised IT infrastructure.
9	Acquire and maintain IT skills that respond to the IT strategy.
10	Ensure mutual satisfaction of third-party relationships.
11	Seamlessly integrate applications and technology solutions into business processes.
12	Ensure transparency and understanding of IT cost, benefits, strategy, policies and service levels.
13	Ensure proper use and performance of the applications and technology solutions.
14	Account for and protect all IT assets.
15	Optimise the IT infrastructure, resources and capabilities.
16	Reduce solution and service delivery defects and rework.
17	Protect the achievement of IT objectives.
18	Establish clarity of business impact of risks to IT objectives and resources.
19	Ensure critical and confidential information is withheld from those who should not have access to it.
20	Ensure automated business transactions and information exchanges can be trusted.
21	Ensure IT services and infrastructure can properly resist and recover from failures due to error, deliberate attack or disaster.
22	Ensure minimum business impact in the event of an IT service disruption or change.
23	Make sure that IT services are available as required.
24	Improve IT's cost-efficiency and its contribution to business profitability.
25	Deliver projects on time and on budget meeting quality standards.
26	Maintain the integrity of information and processing infrastructure.
27	Ensure IT compliance with laws and regulations.
28	Ensure that IT demonstrates cost-efficient service quality, continuous improvement and readiness for future change.

Table 2. IT Goals – COBIT (source: [9])

The above tables present the possible alignment of IT goals with the business through the traditional BSC but it can be easily adapted to an IT BSC. The IT BSC fits better the IT functions and can be more easily mapped to today's IT departments and that is why it makes part of this proposal.

The list of proposed indicators is very extensive and covers the different areas of the IT but the use of a large number of performance measures may cause managers to spread their efforts over too many objectives, reducing the effectiveness of the incentive plan [37]. Hence, each company has to thoroughly analyze them and choose the ones that best fit the organization structure and goals.

When choosing an indicator, an important factor has to be taken into account: to determine an indicator value, the necessary data has to be available or it must be possible to produce that data. Without it, the indicator cannot be monitored and is useless. While this may seem obvious

it is not always easy to access the different data sources that exist in an organization and determine the quality of the underlying information.

After choosing an indicator, a target or objective has to be set. The objectives are not fixed, i.e. they can be changed according to the organization evolution. But the idea is not to change them every time they are not achieved, that would defeat the whole purpose of having a KPI objective: improve or maintain a good performance. The best option is to perform a regular evaluation, requiring a high involvement from the managers. It can then be determined if the objectives or the KPIs themselves have been correctly defined. Even if there are KPIs that are long-term oriented, it is essential to regularly evaluate them. Organizations in general, and IT divisions in particular, are constantly evolving and that is why a performance monitoring system cannot be static. Hence the system supporting the KPIs must be totally dynamic, providing tools to edit and them and create new ones without much effort.

The next step is to determine the weight of the different indicators. While this is not necessarily required in a normal BSC, it is essential if we want to use the performance data to determine an aggregated score and incorporate that information into the incentives calculation. Kaplan and Norton argue that the effective choice of performance measures and their relative weights has to be aligned with a "business model" of the firm that describes the drivers of the desired business results, and requires an understanding of how the chosen measures are good indicators of the desired strategic objectives [25].

But to be able to calculate an aggregated score we need the KPI values to be normalized. The indicators have very different natures and some of them might not even be numerical. To solve this we need to have a normalized scale for every KPI. This scale can as simple as 1, 2, 3 where the score is considered 1 if the indicator is below the objective, 2 if the indicator is equal to the objective, and 3 if the indicator is above the objective. For a more rigorous evaluation of the performance higher range scales are advised though. A good example is a 1 – 5 scale, (1 = very bad, 2 = bad, 3 = normal, 4 = good, 5 = very good) and will be the one to be used. In more complex scales as this one, thresholds have to be defined for every point in the scale; this means that for each KPI we have to specify the range of values that determine the different scores.

4.2. Monitoring

The principal monitoring tool is a scorecard where it is displayed an overview of the current performance in the different areas or IT BSC perspectives.

While pencil and paper or simple spreadsheet tools may be sufficient to start applying a BSC, automation is necessary to make the method an integral part of the business [23].

Most companies still prefer standard spreadsheet document and presentation software applications (generally, MS Excel and MS PowerPoint). However, such applications lack scalability (desktop capacity is restricted), collaboration (the data is usually stored in individual spreadsheets on different machines) and require more time consuming maintenance (the data should be entered manually, which is typically a very slow and error-prone process). Besides, as the data is stored in individual flat files, it is more difficult to perform analysis across data in different spreadsheets [23].

The benefit of effective automated data and management information systems is that performance information can be effectively and efficiently used to make strategic, managerial, and day-to-day operational decisions.

It is then necessary that all the KPI values are stored digitally, in a relational database for example, and updated automatically whenever it is possible. This also facilitates the access to the KPIs information by centralizing all the data.

A dynamic scorecard can then be implemented. In this scorecard it is displayed the partial score of each perspective and the distribution of the indicators by individual score (i.e. normalized value). An aggregated score is also shown based in the weights of the different KPIs.

To complement the scorecard, other tools are also present. For a more detailed view of the different KPIs, it is provided a complete KPIs list with their current values and scores. Every KPI can also be thoroughly analyzed by consulting the historical data. This can help managers discover performance evolution patterns, identify possible erroneous values or simply assess the indicator evolution in a long term perspective.

4.3. Incentives Distribution

The amount of incentives that are distributed is inevitably dependant on the allocated budget and varies with the company profits but general rules have to be defined so that the performance data provided by the KPI scores can be used. For managers, the incentives can be directly calculated based on the aggregated score of their business unit. In employee-level incentives, the achieved performance is usually complemented with subjective evaluations by their chiefs. In either cases, it must be specified exactly how the performance scores determines the rewards and who receives them.

4.4. Control

A system of alerts allows the users to be automatically informed when a KPI reaches a given value or score. The type of alerts can range from simple e-mails to mobile phone SMSs and brings the attention to managers when an unexpected behavior appears.

Regular reports should also be produced to summarize the performance of the different indicators during a given period and to inform about the outcome of that performance, i.e. the incentives distributed.

These tools, along with the regular monitoring provided by the scorecard, can be used to evaluate the correct definition of the KPIs and give the possibility for managers to act quickly when something is going wrong.

5. Case Study

5.1. Context

The company that served as a case study for this thesis was the Portuguese private bank Millennium BCP. Millennium BCP has an IT Global Division that is responsible for the IT in the bank and it is organized as seen below.
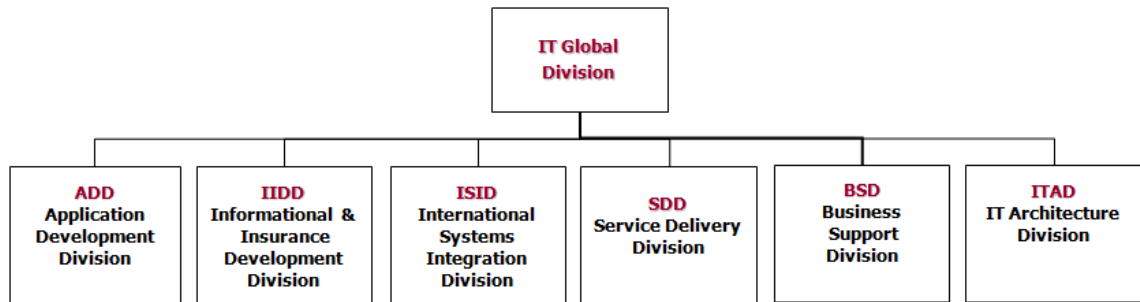
Figure 8. Millennium BCP - IT Global Division

The proposed model was implemented in the Business Support Division (BSD). This Division is responsible for different areas (see Figure 9), each of them being a business unit with its own manager and resources. The project was part of a curricular internship that lasted nine months and had as sponsor the BSD director.
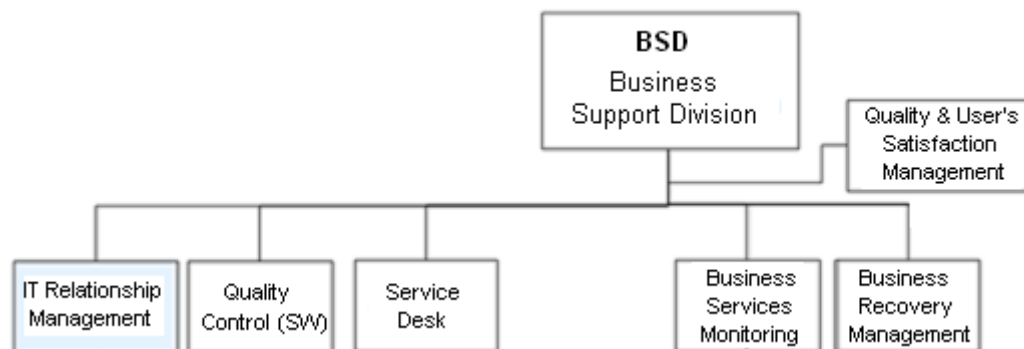
Figure 9. Millennium BCP - Business Support Division

5.2. Project

In order to define exactly the scope of the project and the requirements, several meetings took place with different managers and the person that was in charge of the indicators. This was essential to understand the business and how KPIs were used.

The indicators were classified from 1 to 5 according to their value. Each area of the BSD had several indicators (some of them were shared) and different weights were attributed to them. With the weight and score of every KPI, the global score of the BSD was then calculated and was used to determine the attribution of incentives to the BSD itself. The incentives were then distributed internally to the different areas.

Each KPI had a definition sheet supported in Word documents, so the KPIs existed and were well defined but there was no monitoring process whatsoever and no centralized management system. The only place where all the indicator values were aggregated and the different scores could be consulted by managers was an Excel spreadsheet. It was obvious that the performance data wasn't being used to its full potential and even a simple application could leverage all this valuable information. Some managers understood this and this is why they had decided to move forward with this pilot project.

Based in the proposed model and the specific requirements of this project, the solution found was to develop a management information system supported by an internal portal and a database. The following list of features would be implemented:

- KPI definition forms, to view, edit or create new KPIs;
- Scorecard, based in a IT BSC to provide a performance overview of the BSD and its different areas;
- KPI lists, complete list of indicators of the BSD and its areas, showing the values, scores, variations and trends regarding the previous values;
- KPI value simulator, a simple tool to test possible scenarios and analyze the impact in the performance scores;
- User-defined alerts, providing a way to define custom alerts for each indicator based in value thresholds.

6. Implementation

The system development went through three main phases, each of them resulting in a functional prototype. Each prototype was presented to the main stakeholders and the received feedback was used to improve or modify the system in the following version. This method attempts to reduce inherent project risks by breaking a project into smaller segments and providing more flexibility during the development process. It also provides quick results that can be validated by the "client".

6.1.   1rst Prototype

The first step was to create a database and the tables that would be needed to store all the KPIs information. This was based in the existing definition sheets and the previous analysis stage (see Figure 10 below).
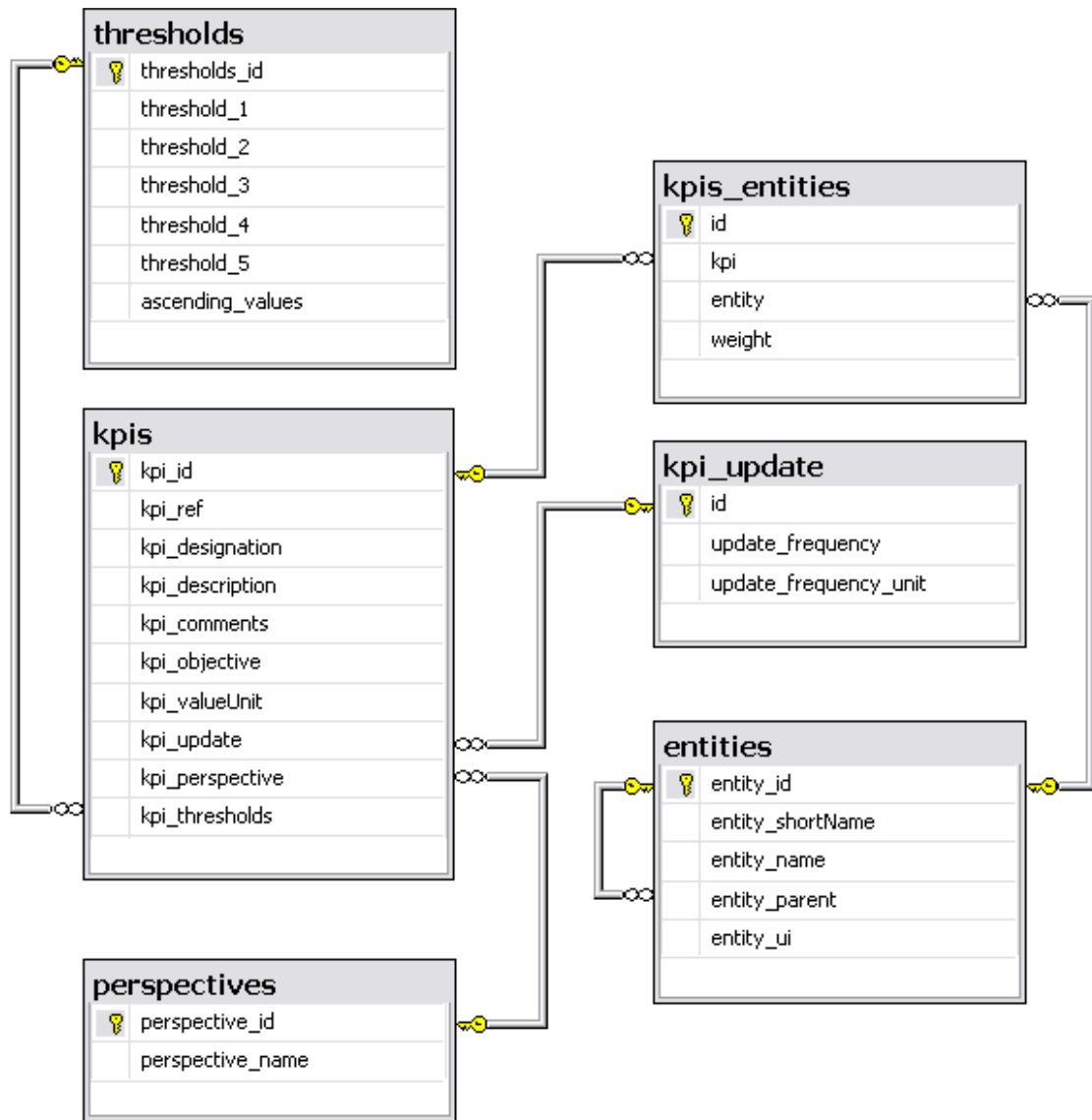
Figure 10. KPI definition tables

With the database in place, stored procedures were made to serve as an abstraction layer. Different c# classes were also created to have *database table ⇔ object* representations and to invoke the stored procedures. All the database related methods were then aggregated into a single class that was also responsible for creating the connections to the database server.

With the data layer in place, the different components could be then implemented. Since each area of the BSD was an individual business unit with its own KPIs, it was decided that they would have their separate section in the portal.

One of the specific features that were asked was the possibility to have a personalized homepage for each user. In that homepage, the user could choose the components that would be displayed, allowing them to focus on what was most important for them. Because of this,

every feature would be implemented as an independent component called "Webpart" (the personalization components of the Microsoft .Net 2.0 framework).

After defining the basic layout and page design, the first thing to be made was the KPI definition web form (see Figure 11 below). As previously mentioned, this would allow viewing all the information from a KPI but also to edit and create new ones. After implementing this component, the existing KPIs started to be inserted into the system. Every field in the form was directly mapped into a table column in the database with the exception of the *ascending_values* column in the *thresholds* table. This column was used as a flag and was filled automatically by testing if the different thresholds (from 1 to 5) were ascending or descending. This would allow to immediately knowing if an increase in the indicator value represented better or worse performance and was used to calculate the KPI score and trend.

Figure 11. KPI Definition form

To have access to this information, the KPI lists were created. Each KPI had a link to the corresponding KPI definition form and was represented by its name, objective, weight and performance thresholds.

After this, a first scorecard draft was created. This contained only static data as example and would allow the managers to give feedback on the way the information was presented. It was of course based in the proposed model and displayed the distribution (both absolute and relative values) of KPIs by threshold for each IT BSC perspective. There were four different tables, one for each perspective. Each table had a field with the aggregated score (based in the weights

and values of the corresponding KPIs), showing a partial score for each perspective. The total score for the current business unit was also displayed (see Figure 12).
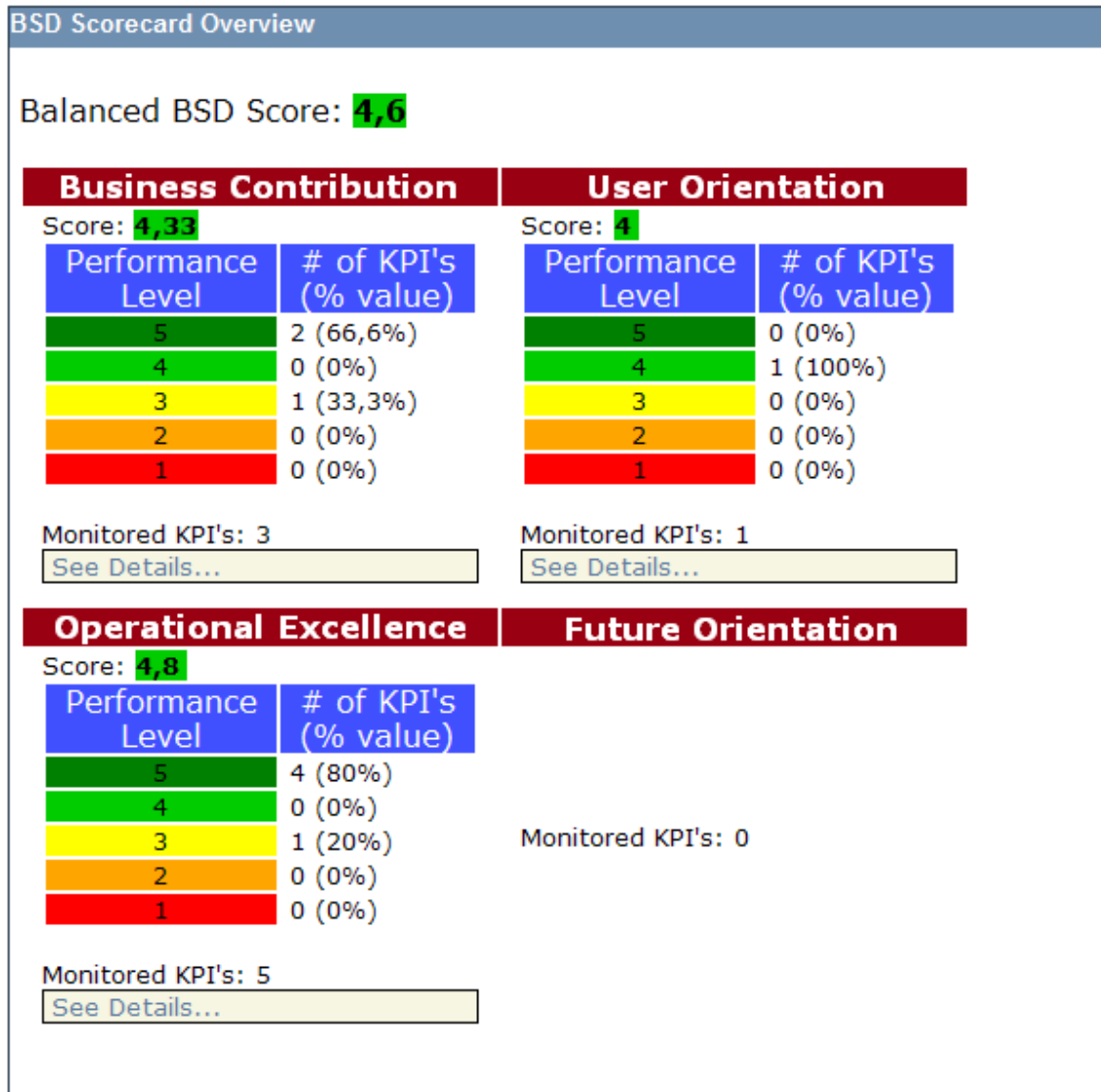
Figure 12. Scorecard Draft

Finally, a back-office section was added, but for now it would only have a link for the creation of new KPIs.

6.2. 2nd Prototype

At this stage, the goal was to create the necessary structure to obtain and store the KPI values. That data could then be used to produce a "working" scorecard and add more valuable information to the KPI lists. A more detailed view of each KPI value could also be obtained with such things as an evolutionary graphic.

To implement an automated process, it would be required to access existing data sources from where the KPI values could be retrieved. This integration phase is difficult in almost every project; either because the legacy systems are very old, and no one knows how to manipulate them, or because they provide poorly documented interfaces. But what happened in this case was yet a different problem. Since most of the indicators values were stored outside the BSD, there were accessibility issues. The sponsor of the project decided that, for the time being, it would not be possible to provide the access to those data sources. The only solution was then to create a web form for manual data entry. This would be a temporary method as the full process automation is one of the principal features that a good performance monitoring system can provide.

Either way, it was necessary to create a database support for the KPI values (see Figure 13 below).
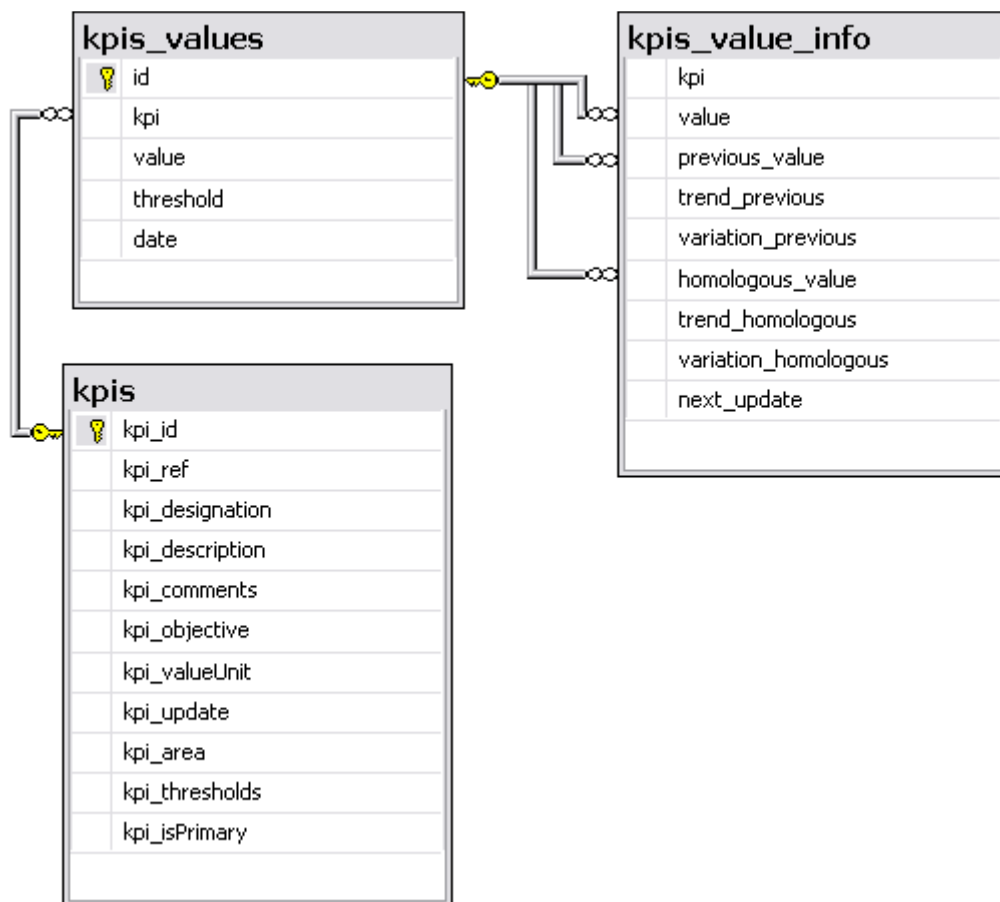
Figure 13. KPI values tables

With this structure in place, most of the features could be implemented. The first step was to calculate the KPI scores. This would be done every time a new value was inserted and was based on each KPI performance thresholds. Besides calculating the score, the system analyzed previous values in order to produce trend and variation information that was then stored in the database. This was produced for both the homologous and previous values.

The variation was a percentage value and was calculated according to the following formula:

$$\% \text{ variation} = \frac{100 \text{ X (current - previous)}}{|\text{ previous }|}$$

The trend assumed five possible values (from -2 to 2) and was based in the percentage variation and the *thresholds ascending_values* flag. This value would then be used to display five different graphic arrows that allowed an immediate perception of whether the indicator was improving or not. The KPI lists were completed by adding this new information and by including a sort option to allow ordering the indicators by perspective, score or weight (see Figure 14 below).

BSM KPI List

Overall Score: 4,94

Sort By Perspective ⌄ Sort

KPI	Weight	1	2	3	4	5	Value	Trend
Business Contribution								
BSD - Cumprimento do Orçamento da Direcção	2,5 %	5%	2,5%	0%	-2,5%	-5%	-5,77 %	↑
BSD - Resultado	2,5 %	-5%	-2,5%	0%	2,5%	5%	2,41 %	↓
BSD - Cumprimento do Orçamento do IT	5 %	5%	2,5%	0%	-2,5%	-5%	-7,39 %	↗
User Orientation								
BSM - Qualidade da informação produzida	10 %	0	25	50	75	100	NA	
Operational Excellence								
BSM - Prazo de fornecimento de relatórios de incidente	20 %	59%	60%	70%	80%	90%	91,46 %	↗
BSM - Tempo despendido no encaminhamento do incidente	30 %	45Min	40Min	30Min	20Min	10Min	1,37 Minutes	↑ -91,58%
Future Orientation								
BSM - Crescimento do número de soluções monitorizadas	20 %	4	5	6	7	8	11	

Figure 14. KPI list

The KPI lists now permitted the managers to have a performance overview of all their indicators, being able to see which ones were improving or which had poor scores. To complement this overview information, individual KPI performance pages were then created. This feature included the display of present, previous and homologous values and scores with the corresponding dates. An evolutionary graphic was also included and permitted to consult all the historical KPI value data by selecting a start and end date (as shown in Figure 15).
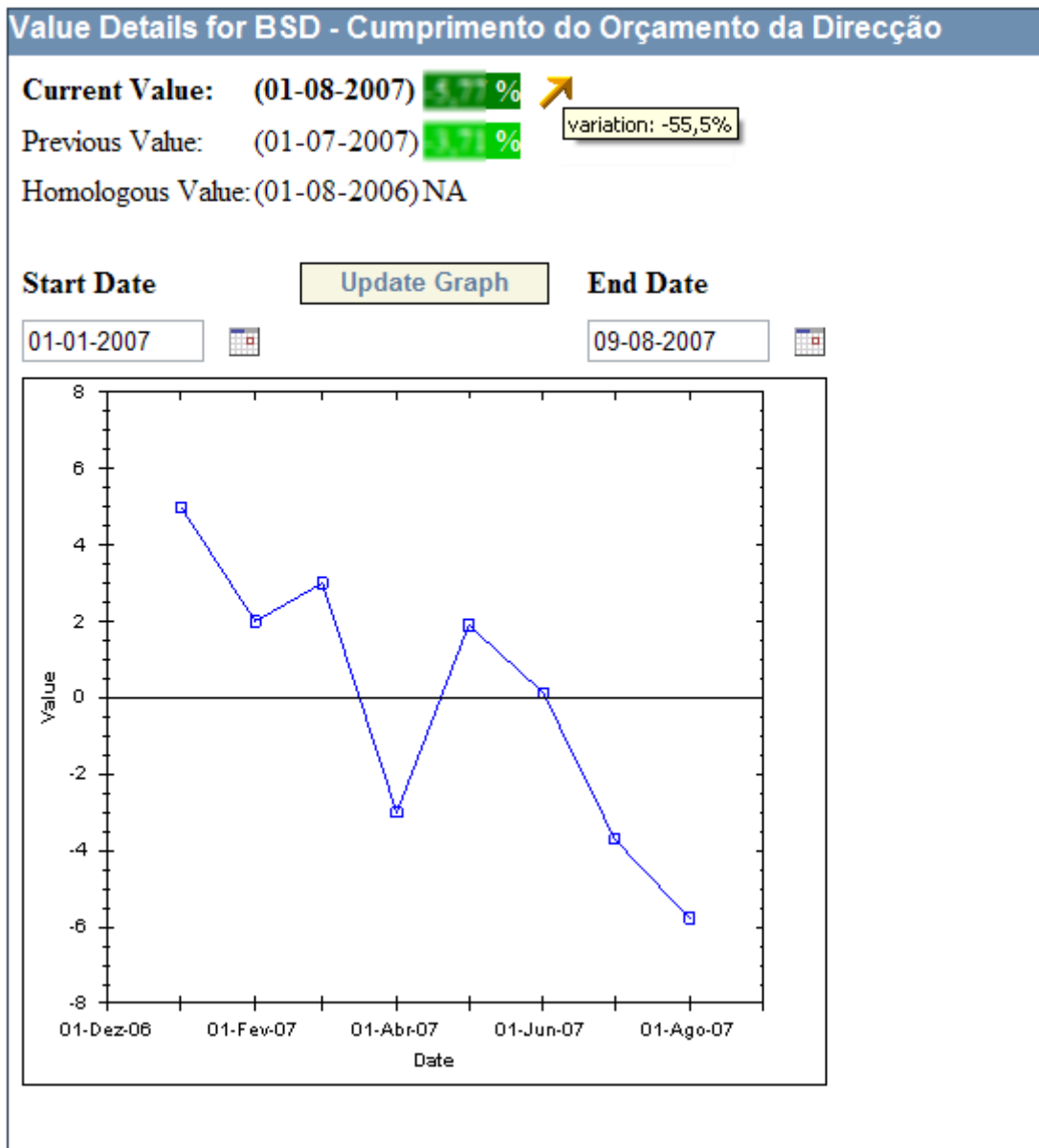
Figure 15. Individual KPI performance (2nd prototype)

The last step in this stage was to fully implement the scorecard, passing from a static draft to a working, dynamic scorecard that pulled the information from the database. Based on the feedback received from the previous prototype, some changes were made. One of the changes was the addition of a fifth table to aggregate the KPIs from all the perspectives, displaying the same type of information as there was for each perspective (i.e. distribution of the KPIs by score). Another change was the creation of a new column in every table that would show the relative weight of each score; this was done by adding up the weights of the KPIs that shared the same score. Having this information was essential for a correct perception of the overall performance. Having only the distribution of the KPIs by score could lead to incorrect interpretations since the weight of each KPI played a crucial role in the performance assessment. For example, a high percentage of indicators with a score of 5 could not

necessarily mean the overall performance was good; this was only true if the summed weight of those indicators was relevant. The result of these changes can be seen below in Figure 16.
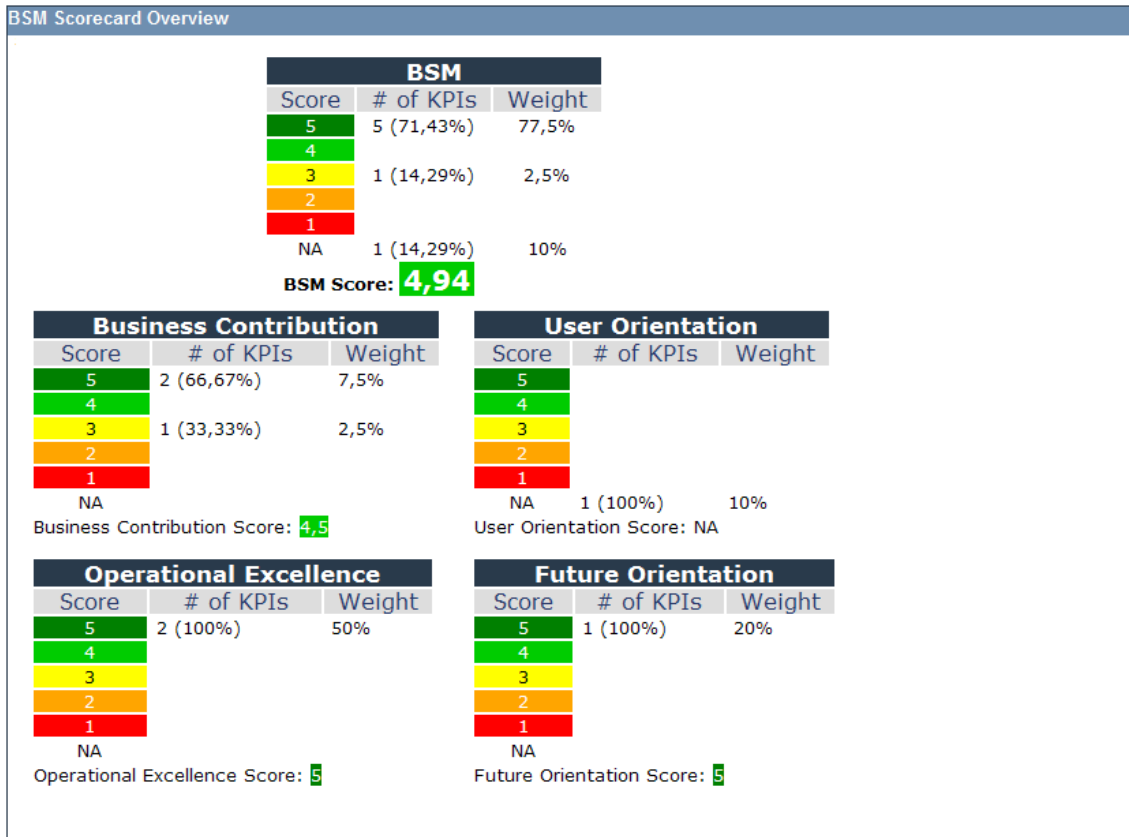
Figure 16. Scorecard

6.3. 3rd Prototype

First of all, a change was made to the individual KPI performance component and it's graphic. It was decided to include the KPI threshold lines to improve the readability of the displayed information (see Figure 17 below). As was previously mentioned, in some KPIs, low values indicated a good score, while others had the opposite behavior. This is the reason why the performance threshold lines were important and would allow an immediate perception of whether or not the indicator was improving. The trend arrows also showed if the indicator was improving but it only took in account the current and previous value.
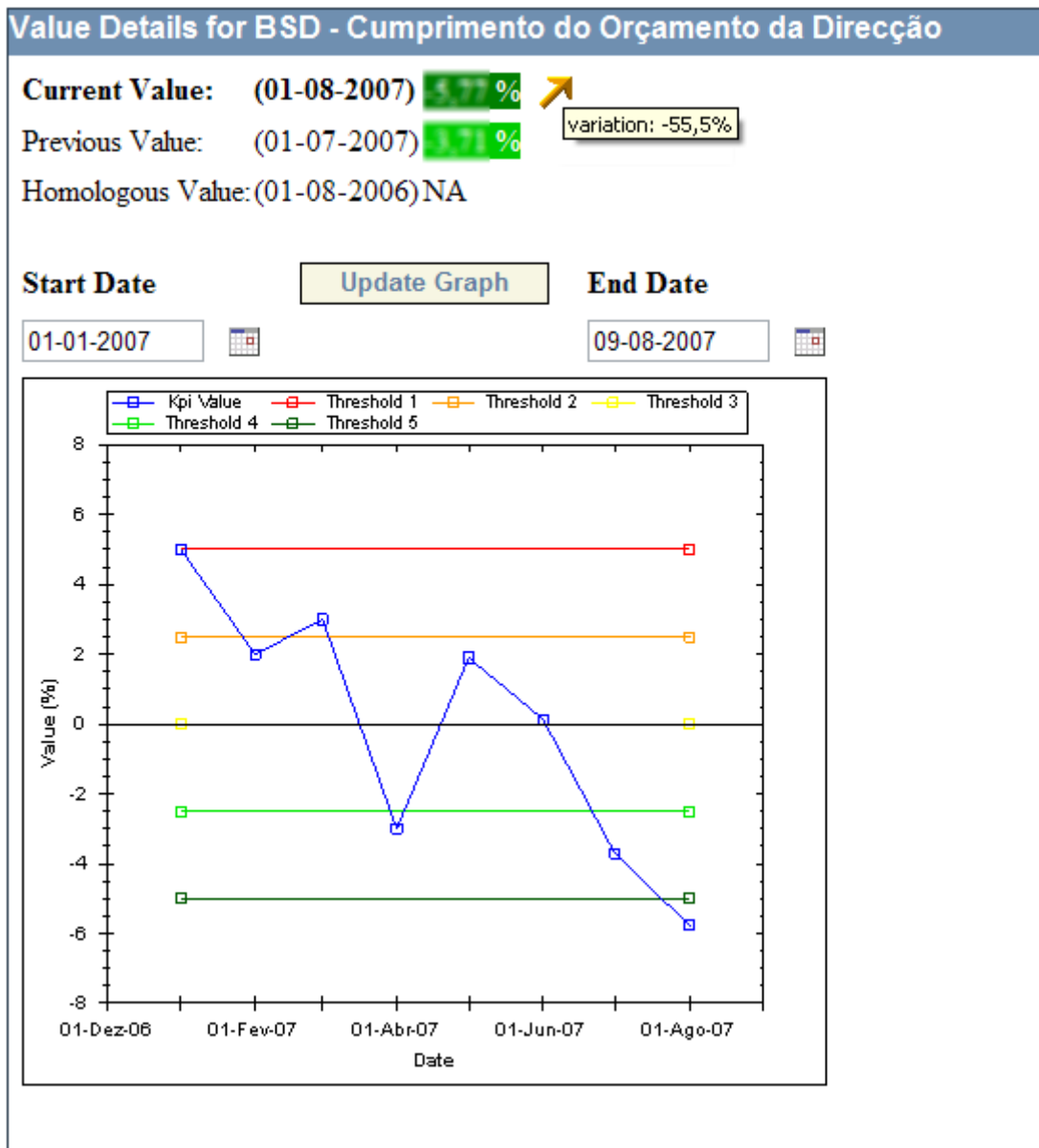
Figure 17. Individual KPI performance (3rd prototype)

The next feature to be implemented was specifically asked by the managers and consisted in a tool that allowed the simulation of different KPI values (see Figure 18 below). The managers of each business unit would have access to it and they could manipulate with ease any value of their indicators and assess the impact in the overall score. The current value of the indicator was displayed and could be used as a reference. This was a simple tool, yet it could provide a valuable help in testing different possible scenarios and identify the best strategies to improve the performance.

Figure 18. KPI values simulation

The next step was to finalize the Scorecard, enhancing the information provided by adding a chart view that could be switched with the previous one. This new view provided exactly the same type of information but since it was presented in a graphical way through pie charts, it was easier to perceive an overview of the situation, improving the readability of the Scorecard. This alternative view can be seen below in Figure 19.
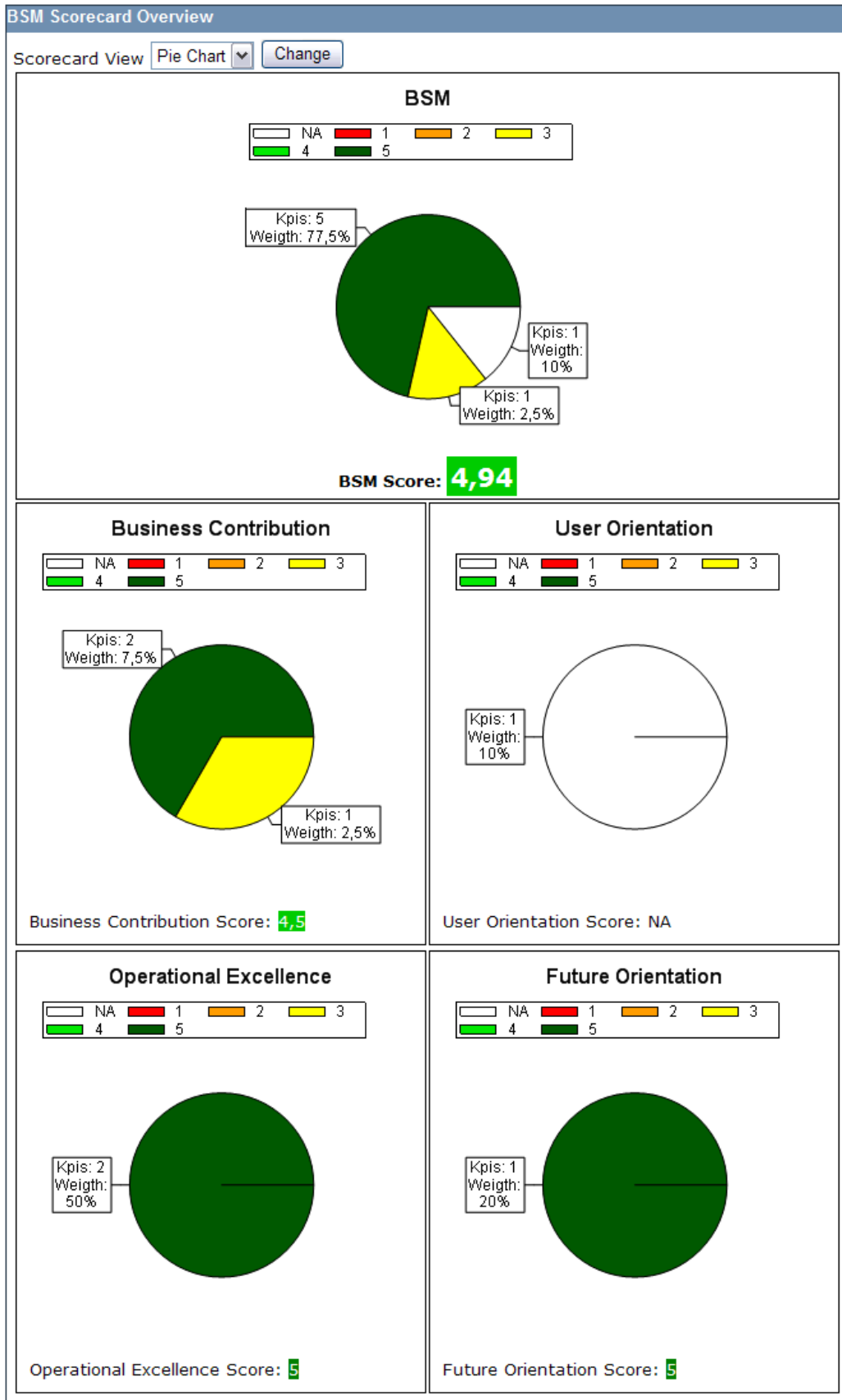
Figure 19. Scorecard - Pie Chart View

The main features of the portal had been implemented and it was time to do the auxiliary functions. The KPI value alerts were created through simple built-in messages, being triggered every time new values were introduced into the system. Each user could define their own alerts, having a configuration panel as shown below.

Figure 20. Alerts Management

If an alert condition was met, the corresponding alert message was issued and shown in the main page of the portal (Figure 21). Even if a specific user did not have any custom alerts, the system would alert him every time a KPI value was updated, this way everyone was informed when a value changed.

Figure 21. Latest Events

By clicking in a message, a page appears with more information about the alert and a direct link to the corresponding KPI value page (see Figure 22 below).

Figure 22. Event Viewer

The only thing that was missing was security-related functions. Since this was an internal portal, the authentication was provided by Windows but the authorization mechanism had to be implemented. Not everyone could access this system and the different users had access to different sections according to their business unit. A user management section was then added

to the back-office, allowing an admin or some managers to add and edit user access permissions.

6.4. Resulting Application

The different components have already been described and here is resulting portal.

Figure 23. Homepage

The figure shown above is the homepage of the portal. In this example, the user has access to the BSM section and its different components: *Scorecard* (Figure 16 and Figure 19), *Simulation* (Figure 18) and KPIs (Figure 14). The last option in the menu opens the *Alerts Management* (Figure 20). On the right side of the page there is two buttons related to the personalization feature. By clicking in the *Customize Page* button, a new dialog box appears and lets the user select the components he wants to add to the homepage (see Figure 24 below).

Figure 24. Homepage (Personalization)

7. Conclusion

Incentives have been used for a long time in different kind of organizations and were traditionally restricted to managers. They are used as a motivational tool and induce people into working in goal-oriented perspective. If they succeed in those goals, they are rewarded for it.

The question is, what kind of impact can incentives have in the IT environment. A growing number of companies are trying to understand and implement IT Governance but many of the initiatives fail no matter how good the model is. One of the reasons for these failures is inexistent or poorly designed incentives systems. Implementing the IT Governance requires an incentive system aligned with its concepts and concerns, like the alignment of IT with the business. Hence incentives need to reward the people, projects or initiatives that really contribute to this alignment. It is frequent to see companies distributing incentives based solely in their profits but this may contribute to having the employees working only to achieve short-term goals. The possible consequences are the decrease of long-term investments that have more risk but are vital for a consistent achievement of the business strategy.

In an attempt to help solving these issues, this document proposes a performance-based incentive system where the performance management is sustained by the well known Balanced Scorecard model (BSC), more specifically the IT BSC. This framework is now broadly recognized and promotes the alignment of performance indicators with the company strategy and goals. The output of a performance management system of this kind can then be used to distribute incentives since the indicators are aligned with the business and so will be the incentives.

One of the most important steps is then the definition of the mentioned indicators. There is no such thing as a perfect set of indicators that suits every organization because it all depends on how the company works, its internal structure, the complexity of the IT… The proposed model suggests the use of COBIT, a reputable IT Governance framework that includes an extensive list of indicators for the different areas of IT, from implementation to delivery and support. Organizations can then choose or adapt the indicators that best fit the company, assuring that the required data is available or can be produced and also that it can be monitored.

The model has been successfully implemented in one of the IT divisions of a Portuguese company, the Millennium BCP private bank. The project was part of an internship that lasted nine months and resulted in an internal portal, directed at the managers of that division, the Business Support Division (BSD).

Based in the proposed model and the specific needs of the managers, a list of requirements was elaborated and implemented iteratively through functional prototypes that were validated in

each phase. This way, the different features were progressively implemented and adjusted according to the received feedback resulting in the full implementation of all the requirements. The final evaluation of the project was very positive and managers now have a new tool that can help them do a better job and, in the end, bring more value to the company.

As future work, this system should be expanded to another level of the company. Using the Balanced Scorecard Cascade seen in Figure 5, the IT BSC should exist at three different levels: (1) Strategic, (2) Development and (3) Operational. Considering the areas that the BSD is responsible for, the implemented system clearly belongs to the Operational level. But as it has been mentioned, COBIT provides measures and goals for the different areas of IT and we can easily map them into this BSC cascade:

BSC Cascade	COBIT domain
IT Strategic BSC	Planning & Organization
IT Development BSC	Acquisition & Implementation
IT Operational BSC	Delivery & Support

Table 3. Mapping between IT BSC cascade and COBIT domains

It is then a matter of going higher in the hierarchy and implementing the link between the different BSCs. As we have seen, the indicators of one BSC can be aggregated into a single score as long as relative weights are assigned to each indicator. This score could then be used as a single indicator in the BSC that is one level above. This more complex structure would allow new features such as drill-down, allowing top managers to start in a high-level business BSC and descend progressively in the organization levels to find the real cause or causes of bad performance in a given area. This would require of course the involvement of the entire organization but it is possible and could be important to have this kind of integration.

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