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December 2006

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Easy Up-front IT Investment Appraisal Using the Balanced Scorecard: Example with a Portuguese Organization

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ABSTRACT

Many organizations still invest in information technology (IT) without a clear picture of what, how and when benefits will materialize. In fact, only twelve to seventeen percent of companies measure them. This is due, partly, to the complexity of most evaluation approaches and to the difficulty in choosing from a vast number of dissimilar alternatives. On the other hand, the Balanced Scorecard enjoys rising interest as a framework that enables the continuous assessment of the organization as a whole, using a small number of key performance indicators distributed across four perspectives: financial, customers, internal business, and innovation and learning. We suggest that the Balanced Scorecard can also be used as a valuable tool for the neglected up-front assessment of IT investments. We propose a comprehensible and light process, applicable even if the organization does not use this instrument for its everyday management. An illustration is provided.

Keywords

Balanced Scorecard, emerging economies, IT investment evaluation, SMEs.

INTRODUCTION

Information Technology investments have been rising steadily over the last decades. In 1965 American companies spent less than 5% of their capital expenditure in IT, but this percentage grew to 15% by 1980, toped 30% by the early 1990s, and it came close to 50% by the end of the decade (Carr, 2003). According to a recent IDC report – "IT Market: Portugal vs. Europe, Analysis and Projection 2005-2009" – IT spending doesn't appear to be ceding (IDC, 2006). For the considered five year period, the accumulated growth of IT investment will reach 40% in Portugal and 30% in the whole of Europe. Just during 2006, Portugal alone will spend 3.19 billion dollars, while Europe as a whole will total 351.91 billion dollars.

Surprisingly, in spite of these figures, studies show that IT investments are not being properly evaluated. Most Managers and Chief Information Officers (CIOs) are not using any of the available techniques. The Butler group reveals that while companies generally quantify costs of IT investments, only 12% to 17% measure their benefits (Fielding, 2003).

In truth, the evaluation of IT investments is considered to be a serious problem for management (Dos Santos, 1991). It's difficult to demonstrate conclusively the links between spending and financial and non-financial returns. In emerging economies, there is the added uncertainty in social, political, and economic infrastructure (Roztocki and Weistroffer, 2004). But the problem persists even in established economies, such as Europe's. Micro, small and medium-sized companies – see characterization in Table 1 – represent 99 % of all enterprises in the European Union and provide around 65 million jobs and contribute to entrepreneurship and innovation. Taken individually, however, most of these companies possess limited resources. Setting up teams to assess and follow through IT investments is frequently seen as a waste of scarce time and financial resources that could be better used elsewhere.

Enterprise category	Headcount	Turnover	/	Balance sheet total
Medium-sized	< 250	≤ €50 Million	/	≤ €43 Million
Small	< 50	≤ €10 Million	/	≤ €10 Million
Micro	< 10	≤ €2 Million	/	≤ €2 Million

Table 1. Characterization of European Enterprises Relative to Size (European Commission, 2005)

Adding to the challenges described so far, most IT investment evaluation techniques are highly complex and hard to comprehend and apply by the average manager of a small or medium-sized enterprise (SME). In fact, even choosing a

suitable technique from the vast number of dissimilar alternatives represents a significant problem for a non-specialist in the domain.

Despite all these difficulties, the pressure to perform evaluations increases, as large investments fail to deliver evidence of its benefits (Keen and Digirus, 2003). Furthermore, evaluations must be credible, disciplined and perceptible by a wide range of stakeholders, since IT competes with other departments for a part of the available budget (Devaraj and Kohli, 2002).

We propose a simple, light, structured process to perform the much neglected up-front analysis of new IT investment projects based on the Balanced Scorecard (Kaplan and Norton, 1992, 1993, 1996). Due to the intrinsic characteristics of this instrument, we get a mixed financial and non-financial evaluation.

We mainly target small or medium-sized enterprises, which require a simple, quick, understandable and inexpensive approach.

The paper is organized as follows: after the present introduction, section two provides some common-ground on the Balanced Scorecard, so that we can explain, in section three, the modified use that we propose. An illustration with a real example of a Portuguese organization is presented in section four. Finally, the last section is reserved for discussion and conclusions.

THE TRADITIONAL USE OF THE BALANCED SCORECARD

The Balanced Scorecard was proposed by Robert Kaplan and David Norton as a way for companies to more effectively assess their situation in an increasingly complex environment (Kaplan and Norton, 1992). Recognizing the limitations of excessively relying on financial measures, the new instrument proposed a mixed collection of indicators, distributed across four perspectives: financial (focus on revenue, costs and other economic metrics); customers (focus on customer relationship, satisfaction); internal business (focus on improvement of efficiency and effectiveness of internal processes); and innovation and learning (focus on employee's skills, motivation, knowledge management, product development) (Kaplan and Norton, 1992). Table 2 exemplifies typical indicators used in a Balanced Scorecard.

	Financial	Internal business	Innovation and Learning	Customer Perspective
Indicators	• Return-on-Capital-Employed • Cash Flow • Project Profitability • Profit Forecast Reliability • Sales Backlog	• Hours with Customers on New Work • Tender Success rate • Rework • Safety Incident Index • Project Performance Index • Project Closeout Cycle	• % Revenue from New Services • Rate of Improvement Index • Staff Attitude Survey • # of Employee Suggestions • Revenue per Employee	• Pricing Index (Tier II Customers) • Customer Ranking Survey • Costumer Satisfaction Index • Market Share (Business Segment, Tier I Customers, Key Accounts)

Table 2. Example of Indicators Used in a Balanced Scorecard for Rockwater, a Global Engineering and Construction Company (Kaplan and Norton, 1993)

Besides the apparent balancing of financial and non-financial issues, the Balanced Scorecard also emphasized the importance of balancing lagging measures (such as turnover, that give account of past performance) with leading measures (such as number orders for next quarter, that help envisioning the future), and, finally, of balancing also inwards facing indicators (such as cycle time) and outward facing indicators (such as customer satisfaction index). The selected measures can range from basic data to aggregated indexes using different weights, and they can be either short-term (down to real-time, if needed) or medium/long term (such as quarterly or annual). Generally, four to five indicators are selected for each perspective. It is important to note that while the financial perspective essentially gives an account of the past, the three operational perspectives provide information to act in time to change the future.

Although the initial emphasis of the Balanced Scorecard was on measures and reporting, it evolved into a methodology capable of facilitating the communication of the strategy throughout the organization and its translation into operational objectives. The strategy thus implemented is then continuously monitored. Managers can observe cause-effect relations between performance indicators and objectives, even across the four perspectives (Kaplan and Norton, 1996). For instance, in (Kaplan and Norton, 1996) a positive correlation was found between employee's satisfaction (innovation and learning perspective) and the number of their suggestions (innovation and learning perspective), which resulted in business process

improvement (internal process perspective), leading to reduced operational costs (financial perspective). This example also illustrates how the Balanced Scorecard is capable of handling intangible benefits. During the process of strategy translation it is usual for a high-level corporate scorecard to be "decomposed" into departmental scorecards and even project or personal scorecards. This cascading process allows for top-down and bottom-up tracing of objectives and measurement indicators. Also, each party knows how to contribute effectively to the overarching strategy.

The success of the Balanced Scorecard lead to the emergence of a variation, called IT Balanced Scorecard, for ongoing control of IT departments, by interpreting the four perspectives according to their reality: financial became corporate contribution; customers became users of IT services; internal business became operational excellence; and innovation and learning became future orientation. Using this framework, IT departments manage to get a permanent outlook over their performance. Other proposals, such as (Martinsons, Davison and Tse, 1999; Stewart and Mohamed, 2003) customize the original scorecard by adding a fifth perspective and suggesting specific indicators for continuous measurement. Our proposal, however, revisits the original Balanced Scorecard and uses its four perspectives as a framework to guide systematic thinking about possible benefits of the planned system before the investment is made.

PROPOSED PROCESS

Our proposed process for IT investment evaluation shares some traits with Benefits Management (Ward, Taylor and Bond, 1996). In order to ensure a clear agreement on the return being pursued from a specified IT investment – be it tangible or intangible – this approach calls for an explicit up-front identification of the expected benefits. The proposed benefits are then structured, suitable business measures capable of attesting their realization are developed, and the linkages to technology identified. In spite of being a sophisticated approach, Benefits Management involves significant overhead and costs. Besides, the initial benefits identification stage is considered complex. We also begin with an up-front identification of the expected benefits, but use the Balanced Scorecard as a framework to focus their search on areas of established importance to the organization: the four measurement perspectives – financial, customers, internal business, and innovation and learning. Since these have proven to be adequate for business assessment across a wide range of organizations (Kaplan and Norton, 1996b), then they are good areas to look for positive and relevant impacts of impending IT projects. In other words, how valuable can an IT investment be if its results are not visible in indicators related to these perspectives?

Our four step process, represented in Figure 1, systematically goes through each Balanced Scorecard perspective and, for each, asks which benefits will come from the realization of the investment under consideration. Benefits need not be purely financial, or even convertible to a monetary amount, but they should be visible in indicators fitting that perspective. For instance, recalling the example in Table 2, Rockwater considers an important factor the number of employee suggestions. An IT project that eases those contributions is inherently justified. The impact of such project is visible in indicator #4 of the innovation and learning perspective. Other projects may lead to revisions in the way some indicators are calculated, or even to the addition of new ones. If the company using this approach does not yet use a Balanced Scorecard, the reasoning still holds, but all indicators for the four perspectives are being sought from scratch, instead of impacts being sought in existing ones. In any case, expected benefits, their respective measurement indicators, and enabling technology become linked, thus clarifying its contribution to the business.
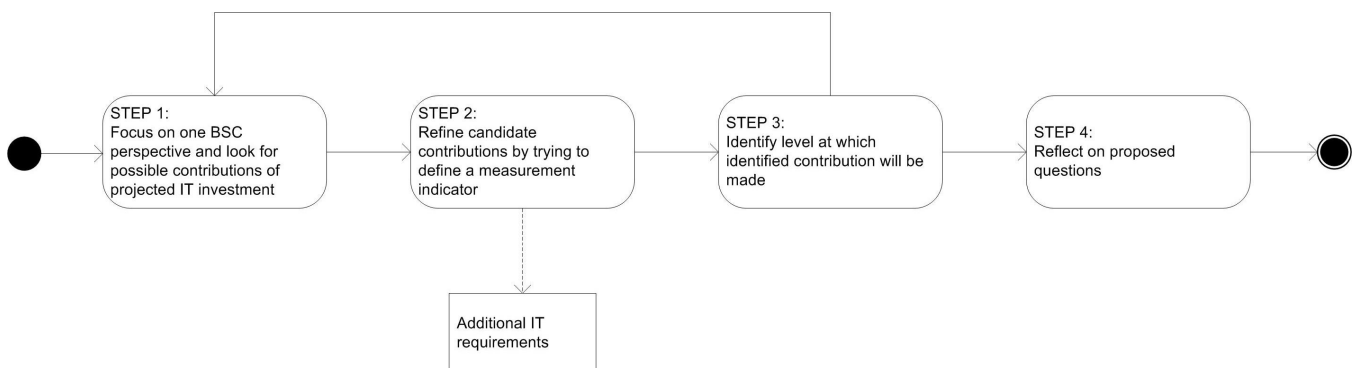
Figure 1. Outline of Proposed Process

Going through the process in detail, in step 1 any of the four Balanced Scorecard perspectives – financial, customers, internal business or innovation and learning – is selected for analysis. Potential contributions of the projected IT investment to that perspective are sought. If a candidate contribution is identified, step 2 is used to stress test the assumption, by trying to

specify an indicator that can measure it. In step 3, the level at which the identified contribution is made – corporate, business unit, project, personal – is identified. The higher the level, the more important the contribution. For the same investment, different contributions can happen at different levels. The above process can be repeated to attempt the identification of further contributions to the perspective under analysis. At any moment, a different Balanced Scorecard perspective may be selected for examination. Already inspected ones can be revisited in light of new insights. All four perspectives must be scrutinized. It is important to note that some perspectives may reveal no benefits as a consequence of the projected IT investment. If fact, not all IT projects will have the capability to provide positive contributions to several perspectives simultaneously.

While in step 2, new IT requirements may emerge: as a particular measurement indicator is defined, specific data may become necessary for its calculation, originating new collection, storage, or computation needs from the system under assessment. For instance, it may become necessary for it to provide counters of specific events or timestamp records taken in various business process phases.

Having gone through the four Balanced Scorecard perspectives and stabilized a set of contribution indicators, in step 4 an additional control can be made by reflecting on the questions shown in Table 3.

Question #1	"Is there a balance of financial and non-financial indicators?"
	"Is there a balance of leading and lagging indicators?"
	"Is there a balance of inwards and outwards indicators?"
Question #2	Are the identified benefits operational, tactical or strategic?
Question #3	"Are there other important perspectives for our business other than the standard four of the Balanced Scorecard?"

Table 3. Questions for Step 4

Question #1 is meant to ensure there is a proper balancing of types of indicators. Question #2 helps reflect on the level of impact of the expected benefits. Finally, question #3 suggests a reflection on whether the specific organization under analysis justifies adding a new perspective to the Balanced Scorecard. In fact, (Kaplan and Norton, 1996b) concede that although the standard four perspectives of the Balanced Scorecard have proven adequate for a wide variety of companies and industries, they should not be considered as a straitjacket.

The proposed IT investment evaluation process uses the Balanced Scorecard as a guide for an immediate up-front assessment, rather than the usual continuous measurement. However, after performing this exercise, we are left with insights regarding the indicators capable of measuring the impact of the proposed IT projects. These insights can be used to fine tune an existing Balanced Scorecard, for companies already using it, or as an embryo of a new Balanced Scorecard, for companies not yet using this instrument.

ILLUSTRATION WITH A PORTUGUESE ORGANIZATION

To illustrate the application of the proposed IT investment appraisal process, we'll use the case of a Portuguese innovation and technology transfer organization undergoing a significant upgrade of its information system. Administration started the project based on the usual "feel" that the project would bring benefits to the organization, although no specific IT investment evaluation methodology was used. Much of the expected return was intangible and hard to measure. Financial gains were theoretically possible but hard to demonstrate. Our close collaboration in the renovation of this information system allowed us to refine the proposed process, by testing it in completed sub-projects and applying it up-front to new modules. We chose as example a typical situation where the opportunity for applying IT is clear, but whose gains are elusive.

The organization has six specialized research and development laboratories that provide services to various industry clients. The labs act as autonomous business units, but all accounting is processed by a central office. One of the IT projects was meant to create a new intranet module to support interactions between the labs and central accounting. Traditionally, signed paper documents were used to communicate to accounting when to invoice the clients after the completion of a service and when to pay supplier's invoices. After requesting either of these tasks, the only way for the labs to know their status (for instance, if a customer already paid) was to call or go to the accounting department, where, time allowing, it would be checked. Dozens of invoices are sent out or paid every month. The new intranet module was aimed at reengineering this process, by allowing digital communication of all invoice-related information. Following the original lab request, central accounting updates the status of the invoice in response to specific events. It goes from pending to emitted as soon as the

invoice is produced and mailed, and it goes from emitted to paid as soon as the corresponding amount is received. At any time the labs now have full visibility over their client and supplier invoices.

Using the proposed process to evaluate the investment in the new intranet module, we started looking for its potential benefits focusing first on the internal business perspective of the Balanced Scorecard. The results can be seen in line one, column one of Table 4. In step 2 we identified measurement indicators that allowed us to assess those benefits – see line one, column two of Table 4. Note that an additional requirement for the intranet module emerges in step 2, when defining the indicators for the internal business perspective, namely average time to receive payments. To be able to calculate this average, dates of mailing the invoices and payment dates must be recorded by the system. Finally, in step 3, we identified the level at which the benefits had impact in the organization – line one, column three. Returning to step 1 and moving on the financial perspective, we noticed how previously identified benefits (decrease in average time to receive payments) could now be clearly related with new financial benefits, such as reduced needs for working capital and reduced interest paid to banks. Second order effects, not apparent when thinking of this project as a mere automation of interactions between business units, reveal themselves when examined under the lens of the four Balanced Scorecard perspectives. For this particular intranet module, we did not identify significant impacts on the customers perspective and on the innovation and learning perspective.

	Step 1 Possible benefits	Step 2 Measurement indicators	Step 3 Level of impact
Internal business	1. Digital information is faster and easily sharable 2. Enables faster invoicing and payment authorization processes 3. Labs gain previously inexistent visibility over status of invoices 4. Labs can call clients when payment is delayed, thus decreasing time to receive 5. Distributing control over non-paid invoices reduces the load and bottleneck in accounting and transfers the task to those with the necessary context information	Average time to receive payments Load on accounting department	Lab (business unit) Global organization (by aggregating lab indicators into a composed measure) Accounting department
Financial	6. Since average time to receive payment decreases, needs for working capital are lower 7. So, less need for bank loans 8. So, less interest paid to banks	Needs for working capital Percentage of loan money in working capital Yearly amount paid in interest	Global organization Lab (business unit) Global organization

Table 4. Application of Proposed Process to Example Organization

Moving on to step 4, and taking the first question in Table 3, we notice that we have arrived at a set of predominantly financial indicators. This is somewhat surprising, since the initial investment case looked like an ordinary interdepartmental communication enhancement process where such gains were not apparent. As it happens, for this particular organization, that enhancement turned out to have an economic impact. This suggests that, in the spirit of the original Balanced Scorecard, each organization should look for its own indicators, since each company will be in a different competitive position due to such factors as its history, strategy, strengths, weaknesses, environmental issues and temporal issues (Rockart, 1979). To conclude the reflection for question #1 we notice that, being mostly financial, the identified indicators are lagging and inwards facing. A second iteration could be initiated to look for leading and outwards facing indicators for this investment. Answering question #2 we notice that benefits 1 to 5 are operational, while benefits 6 to 8 may be considered to have tactical impact. No

strategic benefits originated from this investment. Finally, regarding question #3, we notice that all identified indicators fit existing Balanced Scorecard perspectives, so nothing suggests that a new perspective should be added for this organization.

DISCUSSION AND CONCLUSIONS

We proposed a process for IT investment appraisal based on a different use of the Balanced Scorecard. Although this instrument was originally conceived for continuous measurement of key indicators of organizations, we show how it can be used as a framework to conduct thought in systematic identification of potential benefits before an IT investment is made.

Our main claim is not that the proposal is superior in any particular aspect to any of the various existing specialized techniques, but rather that it is an accessible and balanced solution for non-specialists who must make investment decisions. These represent the norm in emerging economies and even in established ones – such as Europe's – that are highly based on small and medium-sized companies.

Being based on a widely known instrument – the Balanced Scorecard – the proposal can leverage ample existing training and bibliography. It also inherits the balancing of financial and non-financial measures and the capability to handle tangible and intangible benefits, using four analysis perspectives proven adequate for a wide variety of companies and industries. These characteristics also make it perceptible by a wide range of stakeholders, namely from other departments inside the organization who "compete" with IT for a part of the budget.

ACKNOWLEDGMENTS

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