IT Portfolio Management:
A Banker's Perspective on IT

by Bert Kersten and Chris Verhoef

In 1996, the US Congress passed the Clinger-Cohen Act, which compels government decisionmakers to adopt a portfolio approach to IT investments. The great advantage of this is that it forces these decisionmakers to not only take a short-term perspective, however tempting and understandable this may be, but also to develop an overall vision. Decisionmakers must look at whether the IT portfolio is balanced in terms of risk, technology, payback period, capital allocation, distribution, and so on. This portfolio approach is expected to cross the ocean to Europe, but as yet there are few handles that can be grasped to give the portfolio approach a more concrete form.

The financial sector has great potential for developing the knowledge and instruments needed for IT portfolio management. After all, the examination of submitted proposals from an investment perspective and the assessment of risk and return are common activities in this sector. Furthermore, in addition to labor, information technology plays a significant role in this sector as a production factor — a necessary enabler without which organizations simply cannot produce anything.

The total IT costs for Dutch banks are estimated at around 20%-22% of the total operational costs.[1] Exact figures are difficult to obtain, partly because of the problem of definition — that is, precisely which costs should be included in the total IT costs? In addition to labor costs; software, hardware, and outsourcing costs; and R&D and innovation projects, there are the costs of training personnel, failure, fallback activities, and so on. Dividing the total IT costs by total operational costs yields the so-called *IT intensity*. This figure could be used as a benchmark for comparing similar organizations.

RISING IT COSTS

In the financial sector, information technology has historically generated huge efficiency advantages. For instance, non-cash payments in the Netherlands are almost fully automated, and this system is seen as the most advanced in the world.[2] It is difficult to fully illustrate and

[1] At a national congress organized by the Dutch variant of *ComputerWorld*, ING Group board member A. Rinnooy Kan declared that the IT expenditure of the ING Group in 2001 amounted to □2.5 billion, which is around 18% of the company's total operational costs. Taking economies of scale into account, we can assume that this percentage will be higher for smaller banks and conglomerates.

[2] See the International ICT survey on electronic payment in 2000, commissioned by the Dutch Ministry of Economic Affairs (www.ez.nl/publicaties/pdfs/05r125.pdf, in Dutch). The researchers recognize the excellent relative position of the Netherlands but also point out the danger of the dialectics of progress: other countries have more new (promising) initiatives and can operate on a larger scale than the Netherlands.

Table 1 — IT Expenditure of Western European Banks 1999-2004, in Billions of Dollars (Source: IDC)

	1999	2000	2001	2002	2003	2004
Hardware	13.2	14.7	16.2	17.7	19.5	21.4
Package software	5.5	6.3	7.3	8.4	9.8	11.4
IT services	19.2	22.0	25.0	28.1	31.5	35.1
Total IT	37.8	42.9	48.4	54.3	60.9	67.9

Note: Due to rounding, the sum of the categories may not equal the total.

quantify the return on IT expenditures. However, it is clear that IT costs are still rising. In the US, *CIO* magazine predicts an average increase in the IT budget of 5.1% in 2003 [5]. Where the ceiling is for IT intensity in the Dutch financial sector is not yet evident.[3]

The trend in the Western European banking sector is depicted in Table 1 on the previous page. Actual IT expenditures in 2001 and 2002 may have been lower than the prognoses drawn up at that time by IDC [2] on the basis of the replies from their respondents, but the general trend is clear. In order to tackle this monotonic growth in IT costs, many banks and companies are adopting a business-case approach in which the costs and benefits of a (new) initiative are evaluated and in which the risks are also taken into consideration. This is a positive development, but it is not enough.

A FOUR-PRONGED PORTFOLIO APPROACH

The broad field of quantitative and financial IT portfolio management consists in effect of four partially overlapping fields:

- **IT portfolio management** works with "Markowitz-like" models[4] for IT, introduces balance to the IT portfolio, and works with IT portfolio assessment models and payback models.
- **IT investment management** takes a more investment-based approach, with the emphasis on return on investment (ROI), net present value (NPV), contribution to profit, substitution effects, and so on.
- **IT performance management** deals with the assessment of the operational IT. Relevant subjects include IT dashboards, benchmarks, market conformity, the quantitative aspects of insourcing and outsourcing, and service-level agreements (SLAs), among others.
- **IT due diligence** focuses on the concrete quantification and realization of synergy, reduction of the "time-to-harvest," predictability and risk reduction of the integration, reduction of the "morning-after costs," and so on.[5]

IT portfolio management is a total approach that can be applied to an entire portfolio of activities in order to establish a balance between the (expected) risk and the (expected) return. The payback period and the capital allocation constitute part of the underlying approach. It is also important to know whether the portfolio is well balanced in terms of technology, distribution, company strategy (alignment), and markets. In Figure 1, we give a fictitious example of an IT project portfolio. The horizontal axis represents the

[3]For an interesting impression of the developments in the US in this field, see "IT Spending and Lessons Learned," *CIO* Research Reports, 30 August 2001 (www2.cio.com/research/surveyreport.cfm?id=22).

[4]We will further discuss Nobel laureate Harry Markowitz's modern portfolio theory later in the article.

[5]In a mergers and acquisitions (M&A) context, "time-to-harvest" signifies the time by which an organization will see a return on the endeavor. "Morning-after costs" are all the hidden costs that delay the time-to-harvest, which the organization did not foresee when the M&A was in progress.

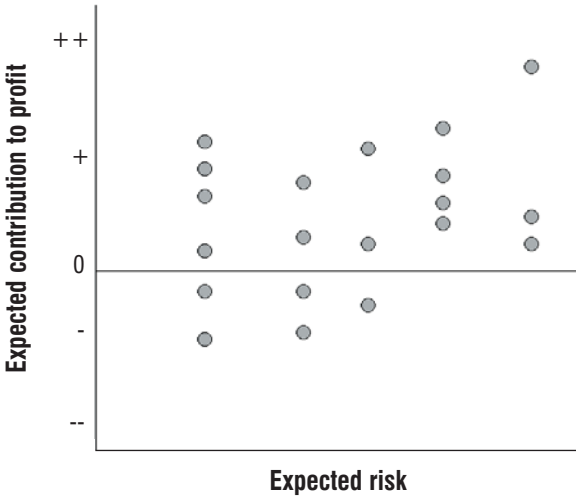

Figure 1 — Fictitious example of an IT project portfolio analysis: expected contribution to profit versus expected risk.

expected risk, and the vertical axis represents the contribution the project is expected to make to company profit. The 20 most important projects are analyzed here. This figure illustrates a typical aspect of measuring risks in IT projects: the risk is not expressed as a continuous variable but as a discrete variable on an ordinal scale. This means that the risk in the figure only has five values.

Projects that are not in line with the overall strategy attract immediate attention — after all, a dollar can only be spent once.

It is self-evident that management's attention should be drawn to the projects below the horizontal axis, which are projects with a negative contribution to profit, and to the projects in the extreme right of the figure. The projects below the horizontal axis would then be assessed on the basis of their necessity. Some projects may be unavoidable, either being imposed by some supervisory body or enforced in a national or international context (Euro; Y2K; Basel guidelines on risk assessment for market risk, credit risk, operational risk; and so on). However, this portfolio analysis also highlights projects that cannot be justified for these reasons. These projects may include legacies from the past, someone's pet subject, or a "me too" project. IT portfolio management can help organizations weed out projects that are redundant or not aligned with the mission of the organization. It is therefore not surprising that companies that adopt an IT portfolio approach have substantially lower costs.[6] Furthermore, the portfolio approach generates concrete improvements in IT performance and creates far greater value.

Following this analysis, the projects with a high risk and (sometimes) a high expected return would arouse the interest of the CIO and the CEO. An appropriate operational model for these projects could be imposed, whereby good IT governance is a sine qua non for proceeding, necessary in order to avoid the risk of damage.

Figure 1 is just a simple example of the analysis of an IT project portfolio. Things become more interesting when alignment is shown on the vertical axis (see Figure 2). Alignment refers to the extent to which an activity is in line with the strategic course of the company. The horizontal axis depicts the expected payback period of the projects.

Projects that are not in line with the overall strategy attract immediate attention — after all, a dollar can only be spent once. Especially in times of economic difficulty, it is important to focus the available resources on the realization of strategic objectives.

We have now given two examples of the results of an IT project portfolio analysis. This is just the tip of the iceberg, but these examples should give an impression of the type of issues that can be addressed in a portfolio approach and should demonstrate the importance of an *executive* approach. In order to come to grips with IT expenditure,

[6]Just compiling an IT portfolio database saved one company $3 million and another company $4.5 million, because the holistic IT portfolio view enabled them to spot redundancies [1].

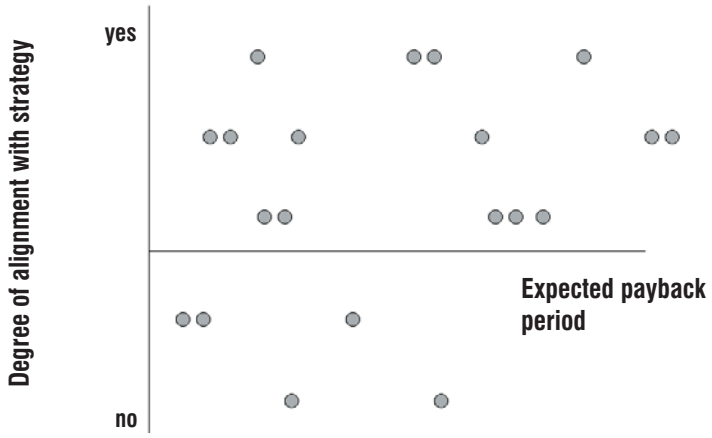

Figure 2 — Fictitious example of an IT project portfolio analysis: degree of alignment versus predicted payback period.

it is important to make a distinction between the various major IT cost components: hardware, software, and IT services (including outsourcing fees).

Hardware Portfolio Management

Industry know-how and experience regarding the management of and investment in hardware have increased considerably over the years. The investment aspects of hardware are more straightforward than for software, as is depreciation policy. Portfolio management offers additional valuable insights. This becomes evident when portfolio management is applied to insourcing and outsourcing operations. Of course, the problem of hardware "antiquity" is often shifted partially to the software, with attempts being made to upgrade functionality in accordance with new requirements. In Figure 3, a sample portfolio from the first author's company provides an example of IT hardware portfolio management.

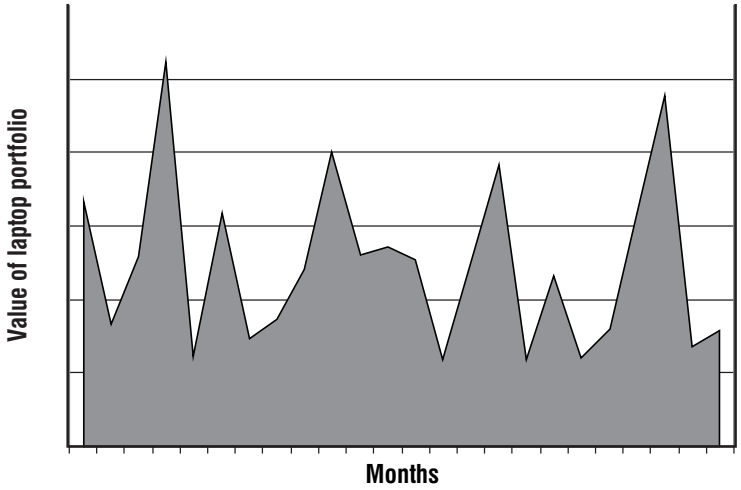

Figure 3 — Actual value of laptop portfolio up to the end of 2002, linear depreciation. (Source: LogicaCMG IT portfolio analysis.)

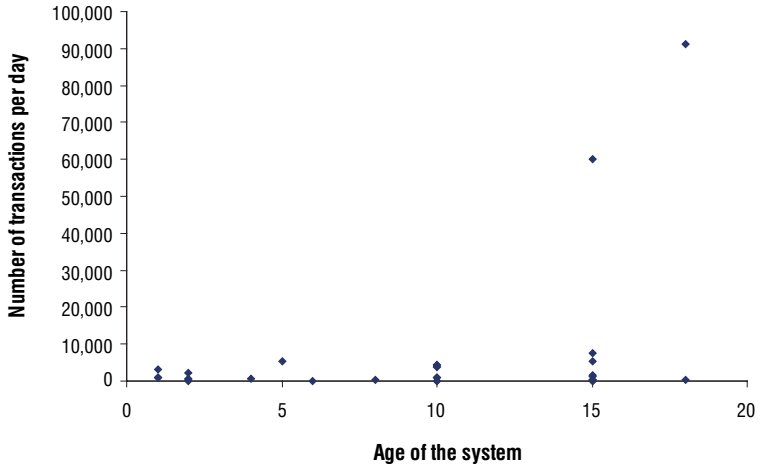

Figure 4 — Example of a software portfolio of a medium-sized Western European bank.

Software Portfolio Management

The greatest challenge lies in software portfolio management.[7] Management and development costs are extremely high, diversity is huge, and many of the complex investment decisions taken by managers concern investments in software. We firmly believe that this is the main area in which successes can be achieved in the coming years with a good portfolio approach.

It is often noticeable that mature systems still function perfectly. This is indicated in Figure 4, which shows the age of the systems of a medium-sized Western European bank and the number of daily transactions processed by those systems. We can clearly see that the heaviest load is on systems that are over 14 years old. Mass data processing does not rest on new technology but on solid foundations.

[7]We are not talking here about software packages. These are addressed in license portfolio management, where good results can be achieved with optimization techniques. Software portfolio management focuses on tailor-made software.

In cases where adequate data is available, the long payback time of IT investments is conspicuous.

IT Services Portfolio Management

The outsourcing of IT operations to third parties is strategically an excellent option, but only under certain conditions. One condition is the thorough and sound monitoring and management of the services executed by the new party providing the services. It is also important to agree on the fundamental principles of the outsourcing — in other words, does it take the form of a partnership (in good and bad times) or a client-supplier relationship (dominated by an SLA and a long-term contract)? Nowadays, we hear more and more about "backsourcing" (i.e., the practice of bringing formerly outsourced IT activities back inhouse), indicating that the projected benefits are not always reaped.

Portfolio management is relevant to IT services because it assesses the features of the service, the maturity of the service provider, quality, risk, costs, and financing.

VALUE FOR MONEY: ROI, NPV, AND PAYBACK PERIOD

In order to assess the ROI, the (net) return generated by an investment is examined on the basis of "hard" costs and benefits. Although investments in IT inarguably have an impact on working conditions and productivity, these "soft" costs and benefits are often not taken into account.

One of the reasons for this is, of course, that such factors are difficult to quantify. According to a survey commissioned by Xerox [6], over 50% of the respondents measure the return on IT investments partly on the basis of the influence of these investments on their employees and not solely on delivery time and costs. The respondents declared that "an investment is successful if the personnel are satisfied and if working conditions are improved." However, the survey also revealed that one-third of the respondents do not measure the ROI and that one in four of the respondents who do claim to measure the ROI describe this ROI measurement as "weak."

The notion that an investment is successful if the employees are satisfied and working conditions are improved leads us away from a business economics approach in which the main issue is the payback period of the investment. After all, capital is allocated, the investment involves risks, critical milestones might require new (investment) decisions, and so on.

In [4], the ROI of IT projects is examined extensively. This measure takes into account not only the initial IT costs (which due to their nature are sometimes referred to as a *seismic IT impulse*) but also the maintenance costs incurred by these IT projects. In an analogy with the seismic IT impulse, the latter are known as *operational cost tsunamis*. The enormous sea wave that follows an underwater earthquake is called a tsunami, and its wavelength is many times greater than the original earthquake in terms of magnitude and momentum. The calculations for the payback period are based on both these components.

Making use of public benchmarks, the minimum ROI threshold as a function of time can be calculated. So, for a given time, you can calculate the amount of return you need in order to meet the company's preset return, plus the money to keep the IT investment up and running. Such an analysis (which is partly based on benchmarks, as there is a great lack of adequate internal data) often reveals that large investments in new IT almost never pay off. In cases where adequate data is available, the long payback time of IT investments is conspicuous.

WHY MARKOWITZ'S MPT DOESN'T WORK FOR IT

In 1990, Harry Markowitz was awarded the Nobel Prize in economics for his work on portfolio theory for securities, also known as modern portfolio theory (MPT). His portfolio analysis begins with the collection and interpretation of information about individual securities and ends with statements and conclusions about entire portfolios. The aim of security portfolio theory is to meet the requirements of the investor as adequately as possible. For the great majority of IT systems within companies, the situation is similar. We have to understand the

relationships between individual IT projects before we can acquire an overall picture and build an accurate opinion of the IT portfolio.

However, there is a precondition attached to Markowitz's theory that presents problems when the theory is applied to IT portfolios: the marketability of stocks and shares. MPT concentrates on finding the right balance between risk and return. Theoretically, in MPT, there is a curve — *the efficient frontier* — of optimal expected return for a given risk. It is possible to move the portfolio in the direction of the efficient frontier by changing the composition of the portfolio by means of investment or disinvestment. For an IT portfolio in a company, this is not possible, or it is only possible to a very limited extent. This is because as soon as the investments are converted into software functionality, they lose their liquidity (the capability of ready conversion into cash). And this liquidity is a necessary assumption for applying MPT. The Free University of Amsterdam is working on alternatives to Markowitz's theory in order to cater to this specific characteristic of IT investments [4].

BUSINESS CASES ARE GOOD, BUT NOT GOOD ENOUGH

Many organizations now apply a business case approach to the decisionmaking process for new and existing projects. The advantages of this approach are that it draws attention to the business relevance, correlates the costs and benefits, provides insight into the payback period, and, last but not least, places IT investment decisions on the business side of the organization, where they belong. However, business cases alone are not enough, as they often fail to take into account a project's connection with other projects. A portfolio approach creates an overall picture, revealing whether the total portfolio is in balance, whether or not the investments are one-sided, whether the risks are acceptable, and how the risks relate to the return.

The costs of IT must never be viewed apart from the profits generated by its deployment.

REDUCING COMPLEXITY

IT can be very complex, and it is not always easy for managers within an organization to make keen IT investment decisions. In our opinion, it is not necessary for a CIO to be aware of all the finer points of an IT activity, just as it is not necessary to know all the construction details before deciding on the building of a new head office. The thickness of the floors, the composition of the concrete and cement, the color of the pipes — these are details that a CIO does not need for decisionmaking. The CIO has personnel who can help him or her by taking care of such details and by assisting with the management of IT assets. Reducing complexity and gaining an insight into how IT can help a company to achieve its objectives are essential factors in making decisions on the highest level.

RESEARCH AND BEST PRACTICES FOR IT PORTFOLIO MANAGEMENT

At the Free University of Amsterdam, work is currently being carried out on the development of theories and concrete practical methods for IT portfolio management, IT investment management, IT performance management, and IT due diligence. The link between costs and benefits is the central theme. The costs of IT must never be viewed apart from the profits generated by its deployment. Infrastructure, hardware, software, and projects are all subjects of this research, together with the accompanying banking themes of risk, financing, and capital allocation.

Next to IT portfolio management and IT investment management, we consider IT due diligence of major strategic importance. The *time-to-harvest synergy* is one of the most important aspects of mergers and acquisitions. After all, mergers and acquisitions take place in a dynamic world of rapidly changing markets, products, and competitors. Combining and merging business processes, distribution channels, and IT systems and infrastructures can then make a real and positive contribution to the profits of a new company. However, our research shows that the *IT morning-after costs* are often underestimated. This sometimes appears to be the reason total

integration fails to take place, resulting in a weakened competitive position and a deterioration in financial performance [3].

Modern investors, CEOs, and CIOs ask for keen and clear evidence for decisionmaking on IT. They regard IT as becoming a mature production factor in business. Our work on IT portfolio management is a first step in the quest to address the omnipresent five executive issues: cost, duration, risk, return, and financing of IT.

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