THE PRACTICE OF INVESTMENT APPRAISAL:

AN EMPIRICAL ENQUIRY?

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BIBLIOGRAPHIC DATA AND CLASSIFICATIONS		
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The practice of investment appraisal:
An empirical enquiry

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Abstract

This case study examines the capital budgeting practices of four companies operating in different industry. The findings indicate that most companies follow decentralised project decision-making. Despite the use of DCF techniques, there is a tendency to combine with the newly crafted value management tools, which shows a trend shift in the capital budgeting methods. In addition, firms are found trying to modify the original DFC tools so as to accommodate their needs. However, firms don't use the same technique from project inception to completion.

Key words: Investment appraisal, DCF methods, Project, Value Management Techniques, Shareholder Value Analysis

1. Introduction

1.1   Background

The search for a reliable method of project appraisal method dates back to decades. The issue not only continues to be a matter of concern for academics or managers, but is also becoming more and more important to investors and shareholders. A number of tools are available to determine the extent of profitability of a project (Akalu, 2001; Remer and Nieto, 1995a, 1995b). However, some of these methods are unable to accommodate the current changes in business environment, especially, where increasingly shareholder value is of importance. In addition, their continuous application reveals significant limitations in their capacity to address the basic problems of investment appraisal (Akalu, 2001, P.379; Dramodaran, 2000; Laitinen, 1997). And some of these methods requires complex decision making Processes. Thus, the choice of appropriate appraisal method is becoming a difficult task for project managers, which requires critical analysis of various tools.

Scholars propose various options to solve this basic problem of investment management. The traditional discounted cash flow (DCF) methods are the most commonly mentioned technique (Arnold and Hatzopoulos, 2001; Graham and Harvey, 2001). In addition, some researchers propose the real option method (Dixit and Pindyck, 1995; Boer, 2000), while others prescribe the value management tools (Rappaport, 1986; Stewart, 1991). However, most of these proposals have got their own demerits. For instance, DCF method is condemned for its inadequacy to appropriately appraise soft projects, such as R&D, which leads the management to select such projects on intuition, experience and rule of thumb methods (Tam, 1992; Tyrrall, 1998). On the other hand, the Real Option method is found complex, demands enormous computational work and requires additional data. Furthermore, the value management tools, such as the economic value added, are criticized for its inability to measure the shareholder value creation (Fernandez, 2001).

Companies run different type of projects. The nature and type of project is partly determined on the type of industry, in which they are operating. For instance, in the financial sector, Banks undertake various projects, ranging from information technology to real estate. In its IT part, projects may range form installing ATM to Internet banking, including office automation. In this industry, both the DCF and qualitative techniques predominate the appraisal process (Akalu and Turner, 2001a).

On the other hand, companies operating in the Chemicals and Oil & Gas sectors are well focused on research and development (R&D) type of projects. R&D play a critical role and generate a higher return on investment for such companies (Hess, 2001). As a result, such companies focus on qualitative measures to evaluate R&D projects (Akalu and Turner, 2001b).

Similarly, Retail industries, particularly, shopping centre projects are closely related with the workings of the real estate industry. In addition, the value of a retail project is a function both tangible and intangible assets or business values (Benson, 1999; Owens, 1998). The appraisal model for such projects is found to be the accounting based income

capitalisation, DCF and qualitative approaches (Akalu and Turner, 2001c).

1.2 The Research

The authors are undertaking a series of case studies that describes the practice of project management from appraisal to commissioning. Our goal is to perform an in-depth analysis on the current practice of capital budgeting in selected companies. In particular, we are interested as to how these companies perform investment appraisal, subsequent follow-up and measurement of project success or failure. We hope that the research will reveal the gap, if any, between academics and practice; and look into the extent of use of the new generation value management models.

The case study focuses on ten companies, which are drawn from six industries: Banking & Finance, Chemicals, Oil & Gas, Printing & Publishing, Utilities, and Retails; and from two counties, the Netherlands and the United Kingdom. This grouping will enable us to analyze the practice both within and across industry and country. For the purpose of investigation, the case analysis is done on firm-by-firm basis, but reports are produced on industry groupings.

In this paper, we present the findings four companies operating in the Energy, Oil & Gas, Printing & Publishing and Communication industries.

Since much of the collected information is proprietary, companies prefer to be anonymous. For simplicity of the discussion, however, we give codes as CO-01, CO-02, CO-03, and CO-04 respectively for Energy, Oil & Gas, Printing & Publishing and Communication companies.

The remaining part of this paper is structured as follows. Section two deals with the method of data collection. Section three analyzes the practice of investment appraisal process. And section four concludes the case study.

2. Methodology

Data is collected from two sources: face-to-face interview and archives. From the structured outline, interview questionnaires are developed on the following four main themes: company history, investment appraisal process in the company, problems of the standard investment appraisal methods, and on the prospects of other methods, such as, SVA, EVA, etc., as investment appraisal tool.

The above four topics are sent, one-week in advance, to the participant companies, in order to give enough time for the discussion. The interview took from 90 to 150 minutes with a possible extension of the discussion (via telephone line or e-mail) during case analysis. The whole discussion is tape recorded for further analysis and documentation. In addition, relevant company documents are also collected where available.

The financial data is fetched from the Henley Management College (UK), databases, and RIBES[1] archives which comprises the published annual accounts and reports. Furthermore, the data stream is also used for market related information.

In addition, the draft report is sent to the participant companies for comments and further improvements. All suggested comments and

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[1]Rotterdam Institute for Business and Economic Studies.

improvements are incorporated in this paper.

3. Appraisal Process

3.1 Background

In order to give an overview, selected financial information is presented in this sub section. This analysis is not meant to compare and contrast the performances of companies. The purpose is just to provide a venue and background information before discussing their investment appraisal practices.

Resource profile of the case study companies is presented in Table 1. In terms of manpower, a total of 196,320 persons are employed in these companies.

Table 1
The Median value 1995-1999 ($ billion)

Description	CO-01	CO-02	CO-03	CO-04
Total Assets	10.71	70.85	1.49	3.97
Total Liabilities	0.66	3.26	0.19	0.85
Net Sales	3.27	65.96	1.94	2.87
EAIT^2	0.3	4.73	0.25	0.59
Employees (Th)	5.67	165	19.6	6.05

Table 2 below portraits the distribution of sales value across countries. Hence, more than 50% of sales of CO-04 and CO-03 are collected outside their respective home markets.

Table 2
Sales value 2000 (%)

Description	Domestic	Other
CO-01	100	0
CO-02	46*	54
CO-03	28	72
CO-04	35	65

 * Europe

Three major returns are computed over five-year period (Table 3). Although

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[2] Earning After Interest and Taxes.

there is no common yardstick to compare their performances, communication and media industries have shown greater return on investment (ROI) than Energy, Oil & Gas industries. The same is also true with regard to returns on equity capital (ROE).

Table 3
Five Year Returns 1995-1999 (%)

Descript-ion	CO-01**	CO-02	CO-03	CO-04
ROA^3	3.69	6.58	17.36	22.88
ROI	12.11	12.38	33.35	34.57
ROE	13.76	12.20	50.26	77.46

** 1996-2000

Similarly, growth in Chemical and Energy groups is lower than the communication and media industries.

Table 4
Five Year Growth 1995-1999 (%)

Descript-ion	CO-01†	CO-02	CO-03	CO-04
Assets	0.34	19.35	50.22	28.16
Revenue	5.13	8.25	33.35	31.62
EAIT	11.7	NA	50.26	21.04

†1996-2000

3.2 The Practice

The practice of investment appraisal varies from company to company. However, the major technicalities, tools and decision processes remain similar across all firms.

Project initiation for all case study firms is continuous. However, the authority and responsibility to approve such projects varies from company to company. For some companies this authority is decentralised across various units and regions. For others, the activity is highly centralised. For instance, at the CO-01 the authority and responsibility of project decision

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[3] Return on Assets.

4

making is shared based on the size of a project (size is defined by the project capacity).

At the CO-02, large projects are approved at the Board level, while smaller projects are left for lower level management. The experience of CO-04 is also similar. Small projects are appraised and executed at lower levels, while large projects may pass through the Project Review Board (PRB). On the other hand, all project decisions of CO-03 is made at the Board level. The size of spending is the method of sharing the decision responsibility in CO-2, CO-3 and CO-4.

When we look into the methods of project appraisal, similar variation is found. For instance, CO-01 applies two classes of methods based on the life span of a project. Accordingly, short-lived projects are gauged using payback period, while long-lived projects are appraised using the discounted cash flow techniques of net present value (NPV) and internal rate of return (IRR).

In addition to the above methods, some companies modify the DCF methods to suit their purpose. A good example is CO-02, which applies value improvement ratio (VIR) in addition to the NPV and the IRR. The VIR is computed as follows:

$$VIR = \frac{Capital\ Employed}{NPV}$$

CO-03 applies the NPV for non-IT projects, while IT projects are evaluated using non-quantitative methods. Similarly, CO-04 uses the traditional tools of NPV and IRR.

Once projects are executed, evaluation is important in order to assure the achievement of objectives. Firms do use various tools to measure such process. For example, CO-01 applies the industry standard, the best practice principle. CO-02 applies ROI and return on average capital employed while CO-03 uses the net present value method. On the other hand, CO-04 measures its achievement by computing various ratios such as ROI and profit per unit of investment.

Another most important issue in investment decision making is project progress evaluation. This issue can be dissected into timing and method of evaluation. In this process, companies vary as well. CO-01 checks the health of its project whenever there is an odd performance during the project life cycle; and it applies the DCF tools. Both CO-02 and CO-04 do evaluate every month by collecting cost, time and schedule data. On the other hand, CO-03 does not have a custom of project progress evaluation, but regular reporting using cost, time and schedule information.

During progress evaluation, some projects may show discrepancies when compared to the expected values. This discrepancy may differ from project to project. The average variation is within 10% and 15% range for CO-02 and CO-04 respectively. However, CO-01 doesn't have records of such irregularity.

Research and Development projects are among the many types of projects that companies run during their life. There are three types: basic, applied and developmental. Most companies' R&D project falls into the last two categories and large sum of money is allocated to such projects. The following table shows the amount of R&D investment by the case study companies.

Table 5
Investment in R&D (1996-2000)

Company	$ Million
CO-01	131.9
CO-02	1514.4
CO-03	NA
CO-04	284.8

The issue in the R&D project is the method of appraisal. Some companies apply quantitative tools, while others tend to use qualitative and non-standard methods. For instance, at the CO-01 (mainly safety related R&D projects) there is no formal appraisal procedure for R&D projects. On the other hand, at CO-02 (mainly for commercial application and new product development) an open and non-quantitative approach is followed.

Similar technique applies at CO-03. Its R&D projects (mainly for commercial application and new product development) are evaluated based on, open approach, qualitative and scenario analysis methods. The R&D project at CO-04 comprises all the three types. And the appraisal process is the same as the normal routine projects, i.e., using DCF methods.

Risk analysis is one of the ingredients of project management. However, the degree of concern for project risk varies from company to company as it does from project to project. In this problem, companies are assessed on their method of risk analysis and ways of incorporating into the project. CO-01 has a package called PRIMS (Project Risk Appraisal Management System) where both qualitative and quantitative approaches are used to assess project risk. The assessed risk is adjusted to the cost of the project. Different from CO-01, CO-02 uses different risk assessment mechanism for different class of risk, and classifies risk into high, medium and low

categories. The final estimate is added to the cost of a project.

CO-03, however, doesn't have formal risk analysis procedure. The management decides the probability or the rate of success for a particular project. Then, the chance of success is used to adjust the NPV of the project. Thus, the adjusted project NPV (ANPV) will be computed in the following way:

$$ANPV = (Chance\ of\ Success) * (NPV)$$

At CO-04, the method of risk assessment varies depending on the size of a project. Separate risk assessment workshop is organized for larger projects. For small projects, however, the issue of risk is addressed during project definition. Finally, a comprehensive risk data is compiled and prorated between the cost of capital and the initial investment.

A project work may be completed by the final designation of success or failure. The main issue in here is still the metrics. Normally, success or failure determination is made at the time of post implementation review. This experience differs across firms. The target and actual values are compared at the CO-01. Similarly, CO-02 compares the actual value against the established objectives. CO-03 focuses mainly on financial metrics during such comparison. At CO-04 both financial and non-financial variables are scrutinised to designate project success or failure.

To recapitulate the process of investment appraisal, companies were asked to evaluate the traditional investment appraisal methods. The following information is organized from the discussion.

Table 6
Problems raised by companies on the standard
investment appraisal methods

◇ There is scarcity of information in the part of risk analysis.
◇ The traditional methods lack strategic vision.
◇ The methods don't encompass sufficient information.
◇ The methods provide limited options to the decision maker (inflexible).

In order to curve the above problems, companies are leaning towards to the newly emerged value management methods. For instance, CO-01 uses the shareholder value as analysis (SVA) to support its project decision-making. CO-03 applies both the Economic Value Added (EVA) and the SVA. Although at its infancy, the tendency of CO-04 is also towards to the SVA both as an objective and methodology.

In this study, companies have also proposed characteristics for a superior investment appraisal method. The summary of qualities of a sound model proposed by the companies is listed below:

Table 7
Proposed qualities of a sound model

✔ Structured approach
✔ Easily understandable
✔ Focused on Strategic issues
✔ Provide more options (alternatives)
✔ Indicate rewards/punishments
✔ Applicable at all stages of the project
✔ Rich in information (hard & soft issues)

Note that the above points are suggested in addition to the good qualities of the standard DCF methods, such as, the concept of time value of money.

4. Discussions

In all companies the activity of project work is found continuous. And in most of them, the decision making of this activity is decentralised.

Although the traditional investment appraisal methods are commonly applied across all firms, their role is diminishing. For instance, CO-02 uses the threshold approach in spite of the uses of DCF methods. Furthermore, the use of EVA and SVA, by CO-03, to support the project decision making shows a trend shift in the traditional investment appraisal techniques.

The application of modified models such as VIR and NNPV, based on the DCF methods, indicate the need for an alternative model that can help to solve the demerits of the traditional techniques.

Although presence of immense literature supporting the use of quantitative models, R&D and ICT projects are found appraised using non-quantitative models, particularly, open approaches. The consequence of this approach is extremely serious, specially, if it falls into the wrong side of project decision making. Hence, the effect may reduce the value of shareholders, or even cause a bankruptcy depending on the size of the investment. This result is also similar to the previous findings by the authors (Akalu and Turner, 2001a, P. 6; 2001b, P. 7and 2001c, P.7).

The risk treatment experience of companies is more or less similar. Most of them apply both qualitative and quantitative methods. However, none of them evaluates the intensity of project risk after project execution. Certainly, this will have significant

effect on the end value of the project if one assumes the worst scenario.

Companies don't apply uniform methods from the start to the end of the project life cycle. Under this approach, it is difficult to interpret, at any point in time, whether a project adds value to shareholders or not. It is also very hard to reconcile the output generated by various models such as DCF, time-cost-schedule and success criteria, and frame into a single metric value for analysis.

Acknowledgements

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