

## Project Appraisal: A reflection

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**Abstract.** We present project evaluation approaches that should be used as a basis for decision. We try to find what aspects must be taken into account in project analysis, acknowledging the need to consider intangible aspects that are impossible to measure and that lead to subjective analysis to project evaluators. We also wish to understand if firms have adequate tools and methods that incorporate and quantify all non financial aspects. We have identified several other aspects that influence projects' evaluation and decision-making. This is not a mere financial activity, but involves a diversity of behavioural and organizational factors, and business perception, which should be adequately adjusted to invest with success.

**Keywords:** Real Investment Projects, Non-Financial Analysis, Decision-making

### 1. Introduction

The decision making in investment projects is not difficult when we only use financial knowledge. Traditional financial theory uses NPV, IRR and Payback period techniques in investment decisions. We can also analyse a project's risk using sensitivity analysis and probability analysis. However, cash flow based analysis has some limitations. Chen (1995) shows that when knowledge about new future investment is limited, when operational environment forecasts are weak, or when we analyse investments with many intangible and uncertain factors (difficult to measure), the uncertainty and risk increase, affecting the operational cash flow forecasts. The discounted cash flow criterion frequently underestimates investment opportunities and does not consider any strategic and other variables, creating myopic decisions and potential competitive losses. Lopes and Flavell (1998) refer that the decision can be much more difficult to take when we consider other aspects in addition to financial ones. In order to take the best investment decision, information is required about all areas that can influence this decision. It is vital to understand how all non financial aspects can be used in project appraisal, knowing that these could not be easily measured in monetary terms.

There are many aspects to be analysed in a project to take a decision. Skitmore et al. (1989), Adler (2000), Chen (1995), Meredith and Mantel (2000), Love et al. (2002) and Lopes and Flavell (1998) present some non financial aspects, in addition to financial aspects, that have to be considered in project appraisal. Moutinho and Lopes (2011a) have summarised the aspects to be analysed in an evaluation investment process as the following: financial, strategic, technical, commercial, organizational, human resource, management, political, social and environmental. Indeed, considering all these areas of analysis, Moutinho and Lopes (2011b) have appointed a list of about 400 items that we must consider in the decision to invest. On the one hand, each of these non financial areas can influence a project's financial analysis. On the other hand, these areas can provide additional relevant information to the decision making and affect the implicit risk reflected in the discount rate. To analyse all these areas together it is important to know and understand some methods and tools that allow us to decide which projects to undertake. Moutinho and Mouta (2011) show that the importance of each of these areas of analysis and critical success factors for each area depends on the companies, projects, management and project manager characteristics.

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The best way to analyse an investment project is to take into account all previously mentioned non financial areas. However, these financial and non-financial aspects may not take into account information and incentive problems that can emerge in a firm, because decision-making depends on reports filed by people, with their own interests and private information about the project. There are other aspects that have to be considered in an investment decision making: management and governance. Thus, in a project appraisal decision, we should study the project's capital structure, the agency problems, the governance and the postponement options.

Our study has two objectives. The main goal is to understand what we have to consider in project analysis, knowing that there are many aspects that are impossible to measure. The idea is to identify the important aspects to be considered in decision-making. The second goal is to understand if companies have adequate tools and methods to correctly analyse and to make a decision on a project.

## **2. Decision-making Considerations**

### **2.1. Evaluation of Financial Aspects**

Investment decision is done at the beginning of a project and it depends on the final value being superior to the total investment. Gitman and Forrester (1977) refer that evaluation methodologies can be divided into two groups. On the one hand, project performance is measured with accounting data. Payback period and accounting profit rate are also considered in this group. However, these evaluation methods are inadequate because of problems associated with accounting data. On the other hand, we have to consider cash flow criteria in project evaluation. The investment decision is taken based on NPV and IRR. This second group of evaluation criteria tend to be more used than the criteria based on accounting data (Pike, 1996; Arnold and Hatzopoulos, 2000).

Based on risk analysis, we can obtain information about aspects that affect projects. Ho and Pike (1991) consider that the use of probability analysis and simulation analysis approaches can offer a higher level of confidence in final decision. The risk analysis is, very often, included in adjustments to the discount rate or cost of capital or in adjustment to cash flows and use of a risk-free discount rate (Ho and Pike, 1991). Freeman and Hobbes (1991) show that 47% of firms use the same discount rate for all projects. This is a signal that companies do not pay any attention to project evaluation risk. On the contrary, Poterba and Summers (1995) assure that companies adjust the discount rate according to project type.

### **2.2. Evaluation of Non Financial Aspects**

The analysis and the incorporation of non financial aspects in decision making can be explored through three perspectives. Firstly, how are non-financial elements of the project evaluated? Lopes and Flavell (1998) demonstrate that decision-makers' experience in other projects is important for risk evaluation, a technique that includes maintaining records of past evaluations to verify the credibility of management opinion. Alternatively, to avoid a qualitative evaluation that heavily depends on people, their experience and comprehension, companies must create a register of their own past experience and generate checklists of analysis of all aspects. These analyses should be systematic, rigorous and incorporate people from several backgrounds. The examination can be done using external advisors in project appraisal. The qualitative project appraisal should not have a standard-format, but be a free-format qualitative evaluation. If projects are incorrectly analysed by management, it is important to define alternative strategies and consider all risks. Nardini (1997) suggests that for non financial aspects companies can use a multi-criteria analysis of projects.

Secondly, which method is used to quantify non-financial qualitative aspects in project evaluation? Lopes and Flavell (1998) state that these methods are greatly dependent on personal opinions and perspectives, which provides support information to decisions and influences risk probabilities and their consequences. It is essential to maintain common sense to assess and identify risk factors, as well as to assess their effects and risk probabilities. The decisions are justified through the discussion of arguments for all aspects analysed in inter-relation. Although it is not well understood in practice, companies can create lists of risk indices, attributing a qualitative weight to each item. The success of these processes depends on the personal experience, the feedback of past projects, the systematic and detailed analysis of expert support and

the inclusion of people from several backgrounds and the relation with decision making. Companies can also create checklists as risk warnings to decision-makers.

Nardini (1997) refers that the ideal appraisal process should contemplate: a strength and weakness balance sheet, knowing that the decision is a trade-off between conflicting criteria; comparing alternatives as a prerequisite to obtain a negotiated solution; scenario creation about the future allowing the choice of “the alternative that, in the most probable scenario, has the best performance”; evaluation indices as a way to represent quantitative and qualitative impacts (that should permit the construction of an alternative top ranking); an analysis of all different impact categories and of each alternative, connecting all affected people, and making all aspects as quantitative as possible; negotiation as a process of conflict resolution; cost-benefit analysis; and public participation. As a process leading to decisions, Ghotb and Warren (1995) present two methods that study qualitative and quantitative aspects together: Analytic Hierarchy Process is a simple way to combine qualitative ratings with quantitative measures to obtain priorities for the alternatives; Fuzzy Decision Methodology uses common words to construct the rating and transform these linguistic variables into fuzzy sets to subsequent operations. On the other hand, Lefley (2000) presents the Financial Appraisal Profile model that includes the main aspects of investment decision: financial aspects, risk features and strategic concerns.

Thirdly, the trade-off policy. Lopes and Flavell (1998) refer that all risks should be balanced and the company has to verify which can be faced. All great identified risks should have solution, and companies should have established minimum requisites with the goal to maximize the viability of all areas. In this way, the trade-offs have maximum limits (risk company capacity) and practical limits (it is not possible to have the best standards in all areas). Companies must take great care in the trade-offs related to lowering costs (it is necessary to combine the best solution with price, using a price-quality analysis).

### **2.3. Project's Capital Structure**

With regard to the way a corporation finances its activity, it is important to consider that the company's value is affected by the capital structure employed. In this way, we can analyse if there is an optimal capital structure: the one which maximizes the value of the firm. Ultimately, beyond the importance of investment decision, it is essential to acknowledge that the way projects are financed is also of extreme importance. Therefore, debt policy and financing decisions are essential to the project's viability.

### **2.4. Agency Problems**

Investment decision analysis does not usually consider incentives and information problems that can emerge by the fact that the decision depends on the reports of people, with their own interests and private information about the quality of the project. Investment decisions can be influenced by agency problems and asymmetry of information between the decision makers (management) and capital owners (shareholders). Investment decision distortion can happen because of the misalignment of management and shareholder interests (Jensen and Meckling, 1976; Jensen, 1986), and because of information asymmetry between insiders and outsiders (Myers and Majluf, 1984). Both motives make the investment sensitive to the available resources in the firm. Jensen (1986) notes that companies with more cash flow have more propensity to invest, sometimes in non lucrative projects – managers over-invest for private benefits. The over-investment increases the agent's power since it increases the resources under his control and often arises linked to higher manager reward.

Management investment decisions in the presence of imperfect information and short term management goals – due to compensations and the fear of loss of control – lead to under-investment in long term projects and to over-investment in short term projects (Bebchuk and Stole, 1993; Bohlin, 1997). The threats of hostile takeover and subsequent management unemployment also tend to increase myopic investment decisions (Knoeber, 1986). On the other hand, Noe and Rebello (1997) refer that managers prefer long term instead of short term projects because of their long-standing influence in the company and their importance for the success of the project. Bernardo et. al. (2001) show that managers with investment projects of higher quality will receive more incentive based payments than managers of projects with lower quality.

The study of project analysis brings another perspective to the agency problem. According to Turner and Muller (2003), the company's management (management) faces, basically, two problems in its relationship with the project manager (manager): on the one hand, there is asymmetric information because managers have private information about the project; on the other hand, as manager possess his own objectives, he can incur in opportunistic behaviours that lead to conflicts of interests with management.

As a way to minimize agency problems and for managers to make efforts and really reveal their private information, incentives should be created to align managers' objectives and control mechanisms adopted to prevent opportunism. With respect to incentives, contracts can be based on results and on behaviour. Incentive contracts can include sharing ownership and stock options (Jensen and Meckling, 1976). It is also important to improve the circulation of information through the implementation of a complete information system, to increase managers' actions and results under monitoring (Turner and Muller, 2003) and to impose penalties for lower performances, as manager unemployment and/or reputation reduction has a negative impact on the manager's future career opportunities (Jensen, 1986).

## **2.5. Governance**

Apart from agency problems, governance can also drive investment decisions. Malmendier and Tate (2005) show that CEO characteristics can create distortions in a company's investment policy. Heaton (2002) shows that distortions can be the result of overconfident management and the overestimation of project's returns by managers, mainly when there is excess free cash flow. There are some CEO characteristics that can pressure investment decision making: education, experience (career area), birth generation and position accumulation (CEO and chairman). Chakraborty et al. (1999) also show that CEO compensation uncertainty has a negative effect on the level of investment of companies.

Jensen and Meckling (1976) argue that ownership structure affects firm value through its effects in investment. Mork et. al. (1988) refer that the owner takes management functions because of the firm value. Although ownership structure influences investment and firm value, Cho (1998) concludes that shareholders may not have an effective incentive mechanism as a way to encourage management to take investment decisions that increase firm value.

## **2.6. Real Option Use**

One of the main elements that influence expectations in investment decisions is the available information and its interpretation. Sometimes it is necessary to wait for more information because we need to reduce investment uncertainty and risk and because of the possible net present value of future volatility. Carruth et. al. (2000) refer that uncertainty increases the value of the postponement real option. The investment decision can be postponed to wait for new information about market conditions.

In case of an irreversible investment, companies should consider the option to not invest at that moment. The possibility to wait for new information can influence the arrangement or the moment for investment (Dixit and Pindyck, 1995). Considering that the reality faced by companies changes daily, new information obtained can force strategic modification as an adaptation to the market, aiming to maximize cash flows. Thus, companies can choose several kinds of real options: postponement; abandonment; change; dimension alteration; growth; or a combination.

## **2.7. Other Considerations**

Papadakis et al. (1998) present some other factors that influence the strategic decision making process, namely the investment decision. This study identifies the following decision elements: specific characteristics of the decision (nature of strategic decision and characteristics of the decision process); demographic characteristics and CEO personality (need for conquests, risk attitude, CEO tenure and CEO education); top management team characteristics (level of aggressiveness, dynamic or hostile environment); external environmental context (heterogenic, dynamic or hostile environment); and internal environmental context (internal system, performance, dimension and company control).

Bruijn and Heuvelhof (2002) refer the importance of all stakeholders, considering their different views and interests, aiming at improving the quality of the analysis and decision-making. Slattery and Ganster

(2002) show evidence that management decisions are choices where the consequences of subsequent choices are influenced by the results of past decisions. The effect of previous decisions that cause failure (success) can drive to less (more) risky decision-making later. With such uncertain and dynamic environment, risk taking can be determined by an affective process that changes the value of profits and losses and by a cognitive process that determines the manager's level of confidence. It is still important that the project decision maker considers the following factors: creating levels of decision and intermediary trade-offs, avoiding emotional decision-making, promoting rational debates and avoiding the domination of arguments by the people with strong characters. The best decision makers are humble, not presumptuous and conscious that it is difficult not to be emotionally involved (Lopes and Flavell, 1998).

### 3. Conclusions

In this study we identify practices of firms in investment decision-making. Given the limitations of the use of traditional evaluation techniques in project analysis – failure to incorporate subjective, intangible, and qualitative aspects – we maintain that others factors can affect projects' implementation. So, an investment is not a mere financial activity, rather it involves a diversity of behavioural and organizational factors, and business perception, which should be adequately adjusted to invest with success. Non financial considerations have an intangible nature, are difficult to estimate, and cause a subjective analysis to project evaluators. Therefore, the investment decision should rely not only on the traditional evaluation criteria, but also on non financial factors, through the use of tools and methods that incorporate and quantify non financial aspects in project evaluation. In this way, it is important to develop a clear and tangible method that incorporates and quantifies non financial aspects in project appraisal. Therefore, it is essential to analyze various methods and their application to the projects which help in the decision-making, such as the Analytic Hierarchy Process, the Fuzzy Decision Methodology, the Financial Appraisal Profile, the multi-criteria analysis, the ELECTRE method and the cost-benefit analysis. Due to the influence of risks in cash flow adjustment and discount rate, it is important to build a framework that allows the identification and evaluation of non financial risks in a structured way.

There are five other aspects that can influence the feasibility of the project and the investment decision-making. First, the project financing can influence the discount rates, the debt's fiscal advantages, agency and bankruptcy costs, as well as the management and stockholders attitude towards the project. Second, management compensation can influence their efforts towards the project, given that their interests are potentially different from the company's. Third, the decision-maker can have an attitude more or less conformed to the project's goals. Fourth, the investment postponement decision can be important when more information can be obtained. The use of real options methodology can be relevant for project value. Finally, there are diverse critical success factors from several areas.

In this sense, are companies correctly analysing projects? Are companies really making rational investment decisions? Are companies taking all aspects of projects into the appraisal process? Do companies need to change the way they evaluate projects? Maybe companies need to reformulate the techniques that they use to make investment decisions. Maybe real options can help them to understand the non-financial aspects in this context, but is it enough for company's decision? Are the Analytic Hierarchy Process, the Fuzzy Decision Methodology, the Financial Appraisal Profile, the multi-criteria analysis or the ELECTRE method the best evaluation methodologies to analyse an investment project?

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