

# AN APPROACH TO PRACTICAL TEACHING OF INVESTMENT PROJECTS

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**Adalmiro Pereira**

Iscap P. Porto, Portugal

**Ângela Vaz**

U. VIGO, Spain

**Eduardo Sá Silva**

Iscap P. Porto, Portugal

financial study is based on a forecasting process based on assumptions in order to estimate the effects resulting from the implementation of the business plan.

**KEYWORDS:** Finícia, IAPMEI, Investment Projects.

### ABSTRACT

With the current times of computerization, the need for a new approach to teaching the evaluation of investment projects has become paramount. This work seeks to present the Finícia spreadsheet, an excel file available IAPMEI website in that belongs to one of the most prestigious organizations in Portugal and is seen as a fundamental support tool. Its introduction took place in the Financial Management curricular unit at ISCAP – P Porto and this paper aims to present its advantages and challenges to teachers. Students will then have their focus directed to the interpretation of results and will not spend energy in the construction of spreadsheets. The economic and financial study of the business plan makes it possible to analyze the feasibility of your initiative. The construction of an economic and

### INTRODUCTION

According to the Finícia website (IAPMEI) “a business plan is a base plan, essential for structuring and defending a new business idea. It must be a plan that focuses on the essential lines of the project, that defines the allocation of the various types of resources, that is designed to implement the idea that is intended to be implemented and to solve the problems that will inevitably arise.”

Likewise, the Finícia website states that a business plan should not only be drawn up “when starting a business or when applying for funding. However, they are also vital to running the business, whether or not it needs some kind of loan or financing. Businesses need plans that optimize their growth and development, in

line with priorities”.

## PREPARATION OF FINANCIAL FORECASTS

The financial forecasts to be included in the business plan must include break even projections (critical point), sales projections, cash flow projections, which will require the financial treatment of some forecast documents. In addition, there must be documents justifying the expenses with personnel necessary for the investment, as well as the projection of financing and other essential external services (Mações e Ramos: 2017).

According to the “Entrepreneur’s Manual” taken from the Internet, on July 14, 2016, the analysis of an Investment project must be supported by a set of conditions that, in general terms, must be met so that the investment decision can be taken. Those who make investment decisions generally do not address, at least systematically, these conditions. This posture is negative because the importance of the investment decision (taking into account, namely, its known, greater or lesser degree, irreversibility and its effects on the company’s future) justifies that its preparation be surrounded by every care. There are basic conditions that must be analyzed before making the investment decision:

- The project must be subject to a profitability study, in order to verify whether the revenues, net of expenses associated with the investment project, compensate or not the amount initially spent. This condition is clearly related to a definition of investment of a markedly financial nature. Thus, investment is “the sacrifice borne today in the expectation of obtaining, in the future, income net of expenses that compensate for the sacrifice borne”.
- As a result of the aforementioned definition, investment analysis is, of course, a forecast analysis and, therefore, characterized by the uncertainty inherent in all medium and long-term forecasts.
- It is not possible to carry out investment projects without taking into account financial constraints. It is, in fact, necessary to gather the capital (own and/or third parties) necessary for the execution of the project, which may also imply (namely in times of restrictive credit policies) the hierarchy of the various existing projects with the objective of, for example, not to exceed a certain level of indebtedness or to maintain a certain capacity for indebtedness or self-financing, in order to avoid inadequate financial costs or future incidences that could jeopardize the company’s financial balance.

**General Assumptions**

*Validate the assumptions given here and adjust them to your project*

currency unit	Euros		
Project start year (Year 0)	2021	= year in which the investment starts and there may or may not be explorat	
Average Receipt Period (days) / (months)	0	0,0	To be defined according to the practice of the company and the sector
Average Payment Term (days) / (months)	30	1,0	
Average Stocking Period (days) / (months)	15	0,5	
VAT payment term (trim = 4; monthly = 12)		4	
VAT rate - Sales	13,00%		Depending on the type of products and services
VAT rate - Provision of Services	13,00%		
VAT rate - CMVMC	13,00%		
VAT rate - FSE	23,00%		
VAT rate - Investment	23,00%		
Social Security Rate - entity - corporate bodies	23,75%		Effective in the base year
Social Security Fee - entity - employees	23,75%		
Social Security Rate - staff - corporate bodies	11,00%		
Social Security Rate - staff - employees	11,00%		
Average personal income tax rate	15,00%		To be defined according to the Law and the value of income from work.
IRC rate	21,00%		Defined by Law - take into account Location and specific conditions of the acti
Short-Term Financial Investment Rate	0,00%		See market conditions and company risk from a banking perspective
Short Term Loan Interest Rate	3,00%		
Loan interest rate ML Term	2,00%		
Risk-free asset interest rate - Rf (Treasury Bond)	8,73%		NOTE: When Beta does not apply, put:
Market risk premium = (Rm-Rf) or p <sup>a</sup>	5,00%		A value for the risk premium (p <sup>a</sup> ) appropriate to the project
Beta U of reference companies	81,00%		Beta = 100% if you do not know or use a reference company
Growth rate of cash flows in perpetuity	0,00		In most projects, consider 0% and use Not perpetuity, but residual value, the value of Fixed Assets Not Amortized and the Residual Value of the Management F in the last year. SEE Evaluation Sheet where the 2
* Expected market return (understands the reference stock market)			
<b>Assessment methods considered:</b>			

Figure 1. Finicia Calculation Sheet Assumption

Source: Excel Finícia

## INVESTMENTS IN ASSETS DO NOT RUNLOVED

The investment plan consists of the description and time schedule of the planned investments. From this they will make not only the expenditures of tangible fixed capital (tangible fixed assets) and incorporate (intangible fixed assets), but also the Working Capital (dealt with in the following point) (Queirós et al: a) 2020)

Note that the timing of investments is important, since the correct preparation of the financing plan will depend on it. In this way, the dates of order, receipt and payment to suppliers should be harmonized with dates for withdrawal, mobilization of own funds or negotiated credits

Tangible fixed assets are basically buildings, basic equipment, transport, administrative and other related items. In order to determine the cost, quotes must be

requested from several suppliers. On the other hand, all expenses directly related to fixed assets must be considered in the acquisition cost, even if they are sometimes immaterial, such as insurance and duties paid on imports. (Queirós et al: a) 2020)

In intangible fixed assets, we are of the opinion that expenses corresponding to the incorporation of the company, transfers, industrial property and other rights, studies and projects, start-up and testing expenses, recruitment, staff training and advertising should be included. This interpretation contradicts the current SNC, in which a significant part of these expenses are exercise expenses (to be included in “other intangible assets”), but it seems to us more in line with the nature of an investment project that follows in the wake of the former POC (official accounting plan)

Thus, in this table all information on the investments to be carried out must be introduced, namely their nature, value per period in which it is foreseen. It should be noted that Finícia automatically calculates depreciation and amortization, according to pre-defined rates (Regulatory Decree nº 25/2009) . In these projections the method of constant quotas is implicit

## FINANCING

There are basically two types of funds that can be used: equity and debt capital (Adler: 2000).

Equity is basically made up of share capital (monetary or non-monetary resources used by share holders to join the company), supplementary capital payments, self-financing, etc. Self-financing for the year and consists basically of results plus expenses other than expenses, in this case, depreciation, amortization and impairments. Self-financing is confused with the figure of freed means, although there may be some nuances (Silva: 2016).

Debt capital can be divided into two types: medium and long term and short term. The former include, for example, bank financing and leasing loans. Short-term capital includes withdrawals, supplier credits, operating loans. There are also those who identify each of these types of debt capital with, respectively, financing capital and working capital (Adler: 2000)

Thus, in this table the form of financing the project is expressed. The financing of a company or project must, in accordance with good finance rules, comply with the rule of financial balance, that is, medium and long-term needs, such as investments in fixed capital, must be financed by capital from medium and long term, with short term needs being financed by equal term capital.

The framework contemplates several financing alternatives, whether through equity, loans, medium and long term loans. The safety margin deemed adequate for the investment variation and the necessary balance financing, resulting from the working capital needs, must be indicated.

## INCOME STATEMENT (IS)

This map shows the income and expenses resulting from the company's activity. It is of crucial importance, as it is through the IS that the project reveals, in the first approach, whether it is viable or not. Most of the values come from the previous maps.

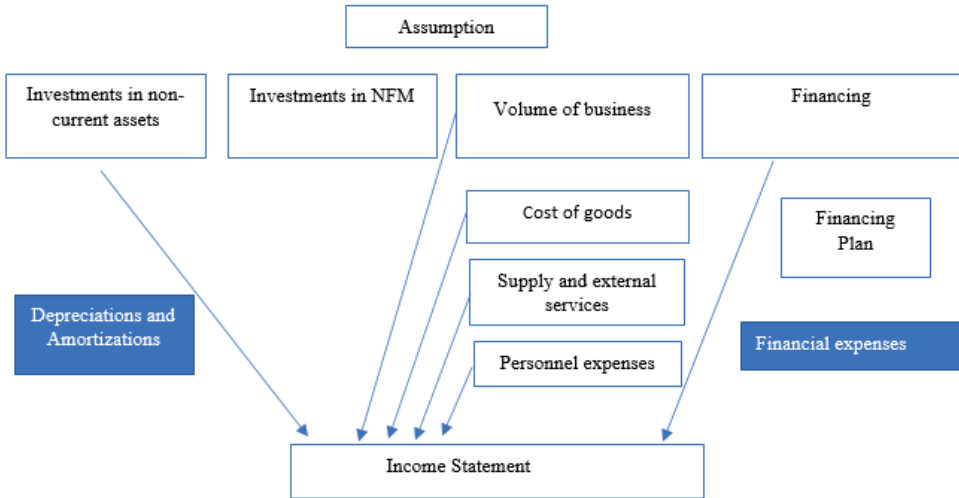


Figure 2. Investment project sequence Source: Own Elaboration

## CASH FLOW

This map highlights the monetary aspect of the company's activity, namely the values released by the activity and its financing needs. This map is automatically built from previous ones (Silva: 2016).

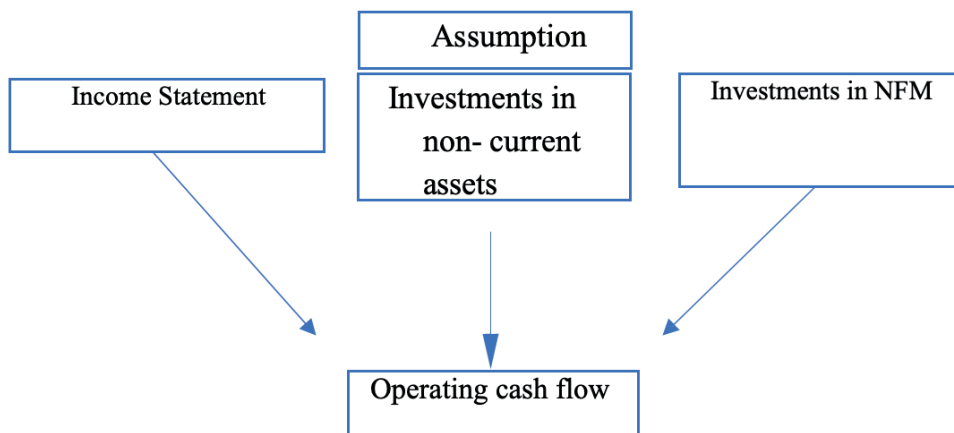


Figure 3 - Maps before cash flow Source: Own Elaboration

## PROJECT EVALUATION

The economic and financial feasibility analysis is the result of the entire plan developed in the previous maps and allows users of information, namely entrepreneurs, to take into account whether the project has the potential to be implemented or not.

Analysis (valuation) is a complex topic that depends on the models that analysts can use.

However, the way in which the FINICIA spreadsheet is built makes it possible to simulate all the situations that entrepreneurs intend to implement and the immediate quantification of the respective effects.

The most common analysis methods are as follows:<sup>1</sup>

- Net present value (VAL);
- Internal rate of return (IRR);
- Recovery period or payback period

VAL basically consists of adding cash flows after making them addable, that is, after they are in the same unit of measure. For this to happen, it will be necessary to report them to the same period of time - update technique (Queirós et al: a) 2020)

This is how it is (for a series of cash flows (CF<sub>0</sub>, ..., CF<sub>n</sub>))

$$VAL_i = , \dots, \frac{CF_0}{(1+i)^0} \frac{CF_n}{(1+i)^n}$$

<sup>1</sup> For a deeper analysis, it is recommended to consult the author's works:  
 Analysis of Investments in Real Assets - Conventional Approach, Economic Life  
 Analysis of Investments in Real Assets - Risk and Uncertainty, Economic Life

Being

$i$  - update rate

The IRR is the discount rate that equals the present value of the investment's expected cash flows and the investment expenses. By definition the IRR is the rate that leads to  $VAL = 0$

The value of the IRR must be compared with the value of the rate of return required by investors for projects with the same risk

The payback period is the time it takes to recover certain capital that has been invested.

Regarding the discount rate ( ) it should be noted that the financial coverage of a project must take into account the future needs of the business. Traditionally, projects are financed through the use of debt and equity capital, with a specific cost associated with these capitals. $i$

Once the percentages, relative to the total, of each of the financing forms and the respective cost (after taxes) are known, it is then possible to calculate the weighted average cost of capital, which will be the discount rate. It should be noted that the opportunity cost required by equity holders tends to be higher than that required by debt holders.

Finícia also allows you to calculate the value according to the following two perspectives updated according to appropriate rates:

1. Investor's perspective (equity) that results from the sum of the cash flows available to the investor, updated at a rate of a risk-free investment plus a risk premium that he understands as his minimum remuneration;
2. Project perspective (total capital) resulting from the sum of the project's cash flows (associated with operational aspects) adjusted to the weighted average cost of capital.

## Project / Company Evaluation

From the perspective of the Project (Pre-Financing = 100% CP)	2021	2022	2023	2024	2025	2026	2027
Free Cash Flow to Firm	-76 287	-43 064	-10 839	52 013	183 864	513 277	-81 838
Update rate $R_u = R_F + B_u \cdot (R_M - R_F)$	12,78%	12,95%	13,13%	13,31%	13,50%	13,69%	13,88%
update factor	1,00	1,130	1,278	1,448	1,644	1,868	-
Updated streams	-76 287	-38 125	-8 482	35 920	111 873	274 703	-43 799
Accumulated updated flows	-76 287	-114 411	-122 893	-86 973	24 900	299 603	255 803
Net Present Value (NPV)	255 803						
Internal Rate of Return	50,79%						
Pay Back period (all year round)	4 Years						
<b>From the perspective of the Post-Financing Project</b>							
	2021	2022	2023	2024	2025	2026	2027
Free Cash Flow to Firm	-76 287	-43 064	-10 839	52 013	183 864	513 277	9 593
WACC	-13,01%	-1129,89%	28,21%	11,31%	4,92%	8,50%	8,50%
update factor	1	-10,299	-13,204	-14,697	-15,419	-16,730	-
Updated streams	-76 287	4 181	821	-3 539	-11 924	-30 680	-573
Accumulated updated flows	-76 287	-72 105	-71 284	-74 823	-86 748	-117 428	-118 001
Net Present Value (NPV)	-118 001						
Internal Rate of Return	53,33%						
Pay Back period	6 Years						

Figure 4. Evaluation

Source: Excel Finícia



### Main indicators

ECONOMIC INDICATORS	2021	2022	2023	2024	2025	2026
Business Growth Rate		5%	107%	107%	107%	107%
Net profitability on sales	-29%	-33%	-9%	3%	9%	11%
ECONOMIC - FINANCIAL INDICATORS	2021	2022	2023	2024	2025	2026
Return On Investment (ROI)	-147%	-332%	2210%	-158%	71%	46%
Return on Assets	-139%	-309%	1945%	-172%	74%	58%
Asset Rotation	500%	994%	-24157%	-5210%	828%	428%
Return on Equity (ROE)	126%	60%	25%	-21%	537%	93%
FINANCIAL INDICATORS	2021	2022	2023	2024	2025	2026
Financial autonomy	-117%	-554%	8707%	748%	13%	49%
Total Solvency	46%	15%	-1%	-15%	115%	195%
Coverage of financial charges	-1671%	-1355%	-735%	1273%	7105%	22390%
LIQUIDITY INDICATORS	2021	2022	2023	2024	2025	2026
Current liquidity	-0,02	-0,14	-0,26	-0,53	1,29	2,09
Reduced liquidity	-0,15	-0,21	-0,38	-0,92	0,90	1,78
BUSINESS RISK INDICATORS	2021	2022	2023	2024	2025	2026
Gross Margin	17 800	18 936	63 234	155 679	347 837	746 485
Operating Leverage Degree	-32%	-29%	-180%	524%	210%	143%
Financial Leverage Degree	94%	93%	88%	109%	101%	100%

Figure 5. Ratios

Source: Excel Finícia

## CONCLUSION

The Finícia spreadsheet functionality demonstrates that its users can focus more on operational aspects (assumptions) and on the interpretation of results. Its use in a context of specialization leads to a greater centralization and focus of students on these points.

From experience, the authors confirm the receptivity of students, especially given that it is an IAPMEI document and formally used in the Portugal 2020 assessments.

The main limitation of this work is associated with the limitations of the spreadsheet itself, which does not allow the use of the EVA (Economic Value Add) methodology.

As a suggestion for future work, a questionnaire can be made asking students to evaluate the functionality of the aforementioned spreadsheet.

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