

THE ANALYSIS OF LIQUIDITY FLOW ASSOCIATED TO AN INVESTMENT PROJECT

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Key words: the liquidity flow, the necessary working capital, the net actualized value of the investing project (NAV)

Abstract. It is well known that the decisional process involves three fundamental stages: the identification of the opportunities, the evaluation of the liquidities and the application of the selected choices criteria (the calculations of the efficiency indicators). For the first stage, there are three important investment projects:

- opportunities for increasing the activity: drafting a project aimed at increasing the existing activity, either in the present domain of the firm's activity, or in a new one.
- projects meant to improve the productivity.
- projects associated to legal restrictions, institutional or even social requirements, projects urged by the law, public opinion, etc

This first stage in identification of an investment project it is frequently decentralized, whilst the decisional process is most frequently located at the management level.

This study focuses on the second and the third stage of the decisional process.

The objective of evaluating the liquidity flow is to find out an estimate of the total cash-flow imposed by the future investment objective. To answer these questions, we consider following rules:

- the cash-flows will be estimated for the entire project duration. Some of the investments projects involve objectives with a long fulfillment period. In the calculations of the investment decision, the optimum calculation period is between 5-10 years. For the accuracy of the calculations, in that situation, for the last year of project period, a liquidation value will be considered. This rule is supported by the fact that later liquidity flows are hard to predict.

- all indirect effects linked to the project realization have to be considered. For example, if the project leads to the realization of a new product, or in services rendering that compete with other products or services in the company's portfolio, it is imperatively necessary that the liquidity flow includes an estimation of these negative concurrent effects. In the circumstances in which the project has already incurred costs, that will not be recuperated, those costs will not be considered for the calculation of the liquidity flow;

- it is necessary to include in the liquidity flow the whole cashing and expenditures linked to the firm changes, in the eventuality of the project realization.

The above mentioned rules focus on the obtaining of general rational decision, but in the analyzing process will consider the financial arguments. Thus, we will first examine for whose benefits the acceptance decision for the project will be taken. The realization of an investment project will modify the situation of the incoming financial resources of the company. The share holders will find that their wealth will be affected by the acceptance or

rejection of a project. As far as the creditors are concerned they will always request their interest and return of investments.

If the firm is listed at the stock exchange, the shareholders wealth will be at a maximum point, when the price of the firm shares reaches its maximum.

Because the share holders are the owners of the firm, they would like to notice an improvement of their situation as a following of the project realization. If the managers are at the same time the owners, their objective is to maximize the wealth of the share holders. If the managers are simply warrants, there are inciting mechanisms put in place for them to follow the same objective: the maximization of the share-holders wealth, and thus, the maximization of the shares prices. It is well known that, on the stock market, the price of the shares depends on the actualized dividends value to be given to the share holders in the future. In situations characterized by certain conditions, share holders have the same interest in receiving the dividends or reinvest them, the only condition is that the firm's rentability to be equal with the future rentability of the shares. The reinvested profit, will lead to an increased shares price at the stock exchange. There is some indifference between the cashing of the shares and the amount of money earned by the share holders, basically caused by the possibility of the share holders to cash the dividends in a different manner, leaving the shares on the market. The share holder, won't be indifferent if the monetary flow is actual or in the future year. As a consequence, at the moment when the generated flows of the investments projects are analyzed, it is very important to examine the potential results on the entire duration of the project. Thus, we must estimate the entire liquidity flow, focusing on the ones who generate cash and expenditures during the considered period, taking into account that the net flows must be actualized in time. In consequence, it is not necessary to take into consideration the calculated expenditures like capital depreciation, provisions, in estimating the flows. As a result, we could accept the notion of account net result of the project only taking in consideration the following two corrections:

- knowing that the account result is calculated started not from the investment but from the accounted depreciation, with the sinking it must be revised the amortization. The investment generates a pay not an amortization. The capacity of auto financing is giving a result measure of this correction.

- is very important to reconsider the debts in order to remain to the stage of revenues and expenditures. This kind of correction could be done in a global manner by decreasing the auto financing capacity of the working capital.

As a following, in the moment when the liquidity flows generated by a project investment are analyzed, we have to consider not only the lifetime period of the project, but even the occasionally liquidity flows generated by the revenues and expenditures, knowing that the net flows must to be actualized in the future time.

Usually, the principle of actualization of the values refers to a correspondent flow in a determined year to be effectively paid by the end of that year. From this point of view, the variation of the working capital taken into consideration at the calculation of the liquidity flow must be gaped with a year to be as close as possible to the effective date of the flow.

The liquidity flow estimation by the difference from auto financing capacity and the needs of the working capital is related to the consideration of the financial cost of the financial resources calculated in the beginning of the project financing.

The actualization rate used in calculation, measure the rentability called by the owners. This problem it will be consider relatively to the two types of the financial resources: loans and own capitals. These two kinds of resources must be actualized with different rates (interest rate, respectively return rate asked by the owners). In an early presentation [2] it was

demonstrated that is easy to obtain the same actualized value of the liquidity flow, if the calculations are done using the average rate of the medium capital cost.

EXAMPLE: S.C. Ploiesti Industrial Park as administrator of the Industrial Park proposed, that one of the strategic objectives, is to diversify the entire range of services offered to the commercial societies. In this manner, the firm focused on the alimentation services and to hotels, restaurants and other activities, including the catering activities. The realization of this strategic objective could be reached by making investments. Thus, in the near future it is planned to build a mini hotel of three stars with a 70 rooms capacity, bar, restaurant for 100 activities related to public alimentation and production of 2000 meals a day. The place for the construction on the hotel belongs to the firm, and is considered auto financed. In the pre-feasibility study there are more dates focusing the investment. The financial analyze considers 5 years.

1. Value and the structure of the investment

Table 1

Expenditures	Value in euros (including VAT)	Value in RON (including VAT)	Value in RON (without VAT)
1. Land	-	-	-
2. Utilities	154.275	512.532	430.699
3. Projects	150.789	500.951	420.967
4. Constructions and plumbing	2.349.429	7.805.273	6.559.053
5. Other expenditures	210.031	697.765	586.357
6. Furniture, TV sets	650.000	2.159.430	1.814.647
7. Production line for food industry	250.000	830.550	697.941
TOTAL	3.764.524	12.506.501	10.509.664

It is to be mentioned that the values from the pre-feasibility study excluded VAT, to not denaturate de calculations. The investment execution period is almost 36 months as follows:

Table 2

Year	2008	2009	2010
Annual investment value in lei (without VAT)	2.000.000	4.000.000	4.509.664

At the same time, the capacities (in physical units) are dimensioned as follows: built layout area: 5000 s-m; vacancies : 36 (31 rooms, 5 apartments); public alimentation : 100 places; food factory: 2000 meals.

2. The calculation of the annual amortization

We reorganize the expenditures capitols which composed the investment value by considering the amortization period and account the linear amortization system for all kind of expenditures, in order to calculate the following annual rate of amortization:

Table 3

Expenditures	Investment value (RON)	Amortization period (years)	Annual amortization rate (RON)
1. Utilities	430.699	15	28.713
2. Projects +Other expenditures +furniture, TV sets	420.967+586.357+ 1.814.647=2.821.971	5	564.394
3. Constructions and plumbing	6.559.053	30	218.635
4. Production line for food industry	697.941	10	69.794
TOTAL			881.554

3. The necessary working capital

To perform a better activity, after the initialization of the investment, it is imperious necessary to dispose of a working capital. The year over year variation of the working capital is integrated in the investment flow as a part of the liquidity flow generated with the project realization. Starting with the estimated turn over the necessary working capital, should be considered as the equivalent of 10 days out of the turn over:

Table 4

Indicators	2011	2012	2013	2014	2015
Turn over (RON)	4.926.340	5.418.984	6.231.832	7.478.198	9.347.747
Necessary working capital (NWC) – RON-	136.843	159.527	173.106	207.728	259.660

Note. Taking in discussion that the three types of activities need different working capitals, the calculations could differ along with the respective necessary working capital.

4. The annual expenditures

In the traditional approach, the annual expenditures calculation starts with the product and services costs. An exact determination of costs, for the prognosis purposes is a very laborious activity and always opened for errors. Thus, a reversal process could be the solution: predicting the revenues level of market prices and including a profitability level, a decreased value will be obtained for the maximal level of expenditures. In our case, this was the preferred approach. Our interest is to determine the liquidity flow of the investment project and to also to evaluate the economic efficiency indicators.

The firm intends to practice a valued added cost between 40-60% for hostelling services and about 30-40% for food factory. Also, we know an annual expensive element constituted by prior determined amortization. In these conditions we could dimension the brut exceeding of exploitation (E.B.E.), a necessary element in the determination of the liquidity flow. Thus, for the first functioning year (2011), the estimated turn over of 4.926.340 RON, made of 2.700.000 RON for the food factory and 2.226.340 RON for hotel services and food services. Considering the average percentages for commercial added values (35%, respectively 50%), we have the result of 945.000 RON, respectively, 1.113.170 RON for the added commercial value. If we account the annually depreciated value of 881.554 RON and a finance costs percentage that might occur (4%), then the exploitation costs, without depreciation, amount at 1.917.151 RON. Predicting these costs up to 2015, by similar means as the prediction for the turn over, the result is:

Table 5

	2011	2012	2013	2014	2015
Exploitation expenditures including amortization (RON)	1.917.151	2.070.523	2.318.986	2.690.023	3.228.028

5. The liquidity flow

The generated liquidity flow of the investment project has two components: the investment flow and the exploitation flow. Taking in consideration the theoretical hypothesis, the project's exploitation flow is presented below:

Table 6

Indicators	2011	2012	2013	2014	2015
1. Turn over	4.926.340	5.418.984	6.231.832	7.478.198	9.347.747
2. Exploitation expenditures (excluding amortization)	1.917.151	2.070.523	2.318.986	2.690.023	3.228.028
3. Brut exceeding of exploitation (1-2)	3.009.189	3.348.461	3.912.846	4.788.175	6.119.719
4. Amortization	881.554	881.554	881.554	881.554	881.554
5. Current result (3-4)	2.127.635	2.466.907	3.031.292	3.906.621	5.238.165
6. Taxation (16%)	340.422	394.705	485.007	625.059	838.106
7. The exploitation flow (3-6)	2.668.767	2.953.756	3.427.839	4.163.116	5.281.613

The investment flow is composed by the main investment, the variation of the necessary working capital and the corporate and uncorporate cession values till the end of the analyzed period. The land, the construction and eventually the newly created commerce can incur conveyance values. In our study, we focused on cession net values accounted of the corporal immobilizations (constructions + plummering + utilities), without the land (because in the investment plan the land has nil value). It was not taken into calculation the eventual fees imposed on the assigned cession values. Thus, the annual amortization of the two investment

chapters, are $218.635 + 28.713 = 247.348$ RON, that means that the investment is amortized in five years $247.348 \times 5 = 1.236.740$ RON. The initialized investment value is $6.599.053 + 430.699 = 7.029.752$ RON, resulting an assigned value of $7.029.752 - 1.236.740 = 5.793.012$ RON. The investment flow values and the liquidity flow are presented in below:

Table 7

Year	Investment	NWC	NWC variation	Cession flow	Investment flow -RON-	Exploitation flow	Liquidity flow (RON)
2008	- 2.000.000				- 2.000.000		- 2.000.000
2009	- 4.000.000				- 4.000.000		- 4.000.000
2010	- 4.509.664		136.843		- 4.646.507		- 4.646.507
2011		136.843	22.684		- 22.684	+ 2.668.767	+ 2.646.083
2012		159.527	13.579		- 13.579	+ 2.953.756	+ 2.940.177
2013		173.106	34.622		- 34.622	+ 3.427.839	+ 3.393.217
2014		207.728	51.932		- 51.932	+ 4.163.116	+ 4.111.184
2015		259.660	- 259.660	5.793.012	+ 5.852.672	+ 5.281.613	+ 11.134.285

6. The calculations of the efficiency indicators (the payback term, the average investment rentability rate, the net actualized value of the investing project –NAV, the internal rentability rate) based on the liquidity flow

The payback term indicator shows the necessary years for recuperating the invested amount of money. Because the liquidity flow it is not constant year over year, we have to multiply the annual flows until the obtained value becomes equal with the invested amount.

The flows sum in the first three years of exploitation is about 8.979.901 RON, which means that we still have to recuperate a difference of $10.509.664 - 8.979.901 = 1.529.763$ RON. As the flow in the fourth year of exploitation is almost 4.111.184 RON that means that the entire amount will be recuperated in 4,46 months. As a conclusion, the entire investment recuperation period is 3 years și 5 months, (or 3, 41 years). The criteria of the recuperating period has the advantage of a simplicity of calculations, and puts in light two important factors in investment decision: the necessity of a rising liquidity and the risk limitation. There are some disadvantages: the liquidity flow after each recuperated period, and the planning of these flows are ignored. The disadvantages could be eliminated, by calculating the actualized recuperating period.

The average investment rentability rate is an equivalent indicator known under the definition of "the economic efficiency indicator". It expresses the annual profit obtained with an invested „RON", and it is calculated as a ratio between the annual profit and the investment value. Because only the theoretical cases accept the constant net annual results, we shall calculate the rentability of investment as below: the average net profit (current result) for the analyzed period of 5 years rationed by the average investment.

Table 8

Current result (RON)	2.127.635	2.466.907	3.031.292	3.906.621	5.238.165
Taxation (16%)	340.422	394.705	485.007	625.059	838.106
Net profit	1.787.213	2.072.202	3.421.614	3.281.562	4.400.059

The average net profit in the first 5 years of exploitation is 2.992.530 RON.

The calculus of average investment accounting value is:

Table 9

Accounting value	2011	2012	2013	2014	2015
The investment value at the beginning of the year	10.509.664	9.628.110	8.746.556	7.865.002	6.983.448
The investment value at the end of the year	9.628.110	8.746.556	7.865.002	6.983.448	6.101.894
Annual average value	10.068.887	9.187.333	8.305.779	7.424.225	6.542.671

The average investment for the first five years analyzed has an accounting value of 8.305.779 RON. The average investment rate is: $r = \frac{2.992.530}{8.305.779} = 0,36$

This criterion has the advantage that it uses accounting values, and the disadvantage that the accounting profit is different as compared to the economic profit. At the same time, we are not taking into discussion the investment residual values and the planned liquidity flow.

The calculated investment rentability rate must be compared to the one of the sector's activity or the accounted value of the firm's rentability.

The net actualized value of the investing project –NAV is a very important measurement indicator which shows if the occasionated efforts are covered by revenues. The relation is:

$$NAV = -I_0 - \frac{I_1}{(1+i)} - \frac{I_2}{(1+i)^2} - \dots - \frac{I_d}{(1+i)^d} + \frac{F_1}{(1+i)^{d+1}} + \frac{F_2}{(1+i)^{d+2}} + \dots + \frac{F_n}{(1+i)^{d+n}}$$

where I_0, I_1, I_d is the planned investment; F_1, F_2, \dots, F_n is the exploitation flow; i – actualization rate; d – execution period; n – the project analyzing period.

Actually, NAV is the actualized value at the moment of the beginning of the investment objective execution of the project generated liquidity flow which contained although the investment flow and also the exploitation flow.

The actualization rate used in calculations should be the capital opportunity cost. We should mention that identical results are obtained if we use in calculations the firm's capital moderated average cost. Considering the average value of the capital is 18%, results $NAV = +901.543$ RON. Thus, a project could be accepted if $NAV \geq 0$.

The internal rentability rate is the indicator which shows the minimal efficiency of the investment project. Actually is the actualizing rate for which $NAV=0$, that means that the actualized effects equal the actualized efforts. For determining the internal rentability rate the relation below applies:

$$RIR = i_{\min} + (i_{\max} - i_{\min}) \times \frac{NAV_{(+)}}{NAV_{(+)} + |NAV_{(-)}|}$$

where: i_{\min} is an actualized rate for which NAV has a positive value;

i_{\max} is an actualized rate for which NAV has a negative value.

Because the actualization of the liquidity flow by an actualization rate of $i=0,18$ leads to a positive value for NAV, we chose a bigger actualizing rate and repeated the calculus. Thus, the calculus for $i=0,23$, leads to $NAV=-608.273$ RON

$$RIR = 0,18 + (0,23 - 0,18) \frac{901.543}{901.543 + 608.273} = 0,209$$

The resulted project internal rentability rate of the investment is 20,9%. In the market economy, the internal rentability rate is considered the most important and meaningful criteria for accepting new investment projects.

Bibliography

1. Francis J.C., 1991, Investments, analysis and management, 5th edition, Mc Graw Hill
2. Gheorghiu M., 1998, Un model de analiză a costului mediu ponderat al capitalului, Simpozionul internațional „Investițiile și relansarea economică”, Ediția a II-a, 23-24 mai 1997, publicat în volum, Editura ASE, pp. 153-159
3. Pătărlăgeanu, Simona Roxana, 2006, Managementul proiectelor, Editura ASE, București
4. Stoian M., N.C. Ene, 2002, Practica gestiunii investițiilor, Editura ASE, București
5. Vasilescu I., I. Romănu, C. Cicea, 2000, Investiții, Editura Economică, București