



## Return on Investment – Indicator for Measuring the Profitability of Invested Capital

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### **Abstract**

*The decision of investment is a strategic decision and it is an integral part of the general policy of the company. The purpose of this paper is to present the manner in which the ROI (Return on Investment) indicator can be used in the analysis of investment projects.*

*Understanding the concept of investment is the first issue addressed. Then ROI is analyzed, highlighting the advantages and limitations of its use. They are addressed the aspects related to the manner in which the size of the ROI indicator is influenced by the method of valuation of assets, but also by the method of calculation of the working capital. The research results can be used by any investor to select based on ROI indicator, an investment project of several possible. As well, ROI may serve after completion of the investment to measure its profitability.*

**Keywords:** *capital, investment, profitability, net present value, working capital*

**JEL Classification:** M41, O22

### **Introduction**

Investments are means to secure the company's development on medium and long term. The term of investments has been defined by many authors over time. Note that investments are considered „resources deployed in the hope of achieving benefits during a long period of time” [Bierman & Smidt, 1971, apud Mieilă, 2009: 9] or „money or other resources expended in the hope that in the future they will bring higher amounts of money or other benefits will occur” [Merreet & Sykes, apud Mieilă, 2009: 9].

In an investment program are established the objectives, actions and means to achieve the objectives, performance, and how to combine and use the resources. Financial effects of the investment will be felt for several years. The success of an investment project requires achieving its objectives. The objectives of an investment are multiple: increasing profit, customer satisfaction, increasing the share market etc. An important role in

assessing management performance is the profits earned on the asset used. By comparing profit with assets we can appreciate the extent to which profits generate an adequate return on invested capital. Among the most commonly used indicators in measuring the return on invested capital is Return On Investment (ROI).

We began the research starting from the following question: is ROI able to properly assess the return on an investment? The research hypothesis considered is: ROI is an indicator that cannot be fully controlled from a single department of a company.

We used both the theoretical research on concepts, theories and existing regulations so far and the empirical research by presenting a case study in which we highlighted the issues posed by measuring the return on invested capital.

### 1. Definition, calculation, interpretation

ROI (Return on Investment) is a concept of performance in any form of investment. For shareholders the ultimate goal of the company is expressed in ROI. ROI is an indicator that shows to which extent a specific business produce gain from the use of capital. It shows the extent to which the amount invested in a particular action returns as profit or loss. Thus, it enables efficiency assessment of an amount invested or, in other words, ROI allows measuring the result in relation to the means used to obtain it.

ROI is calculated as the ratio between operating profit obtained after the action of investment and the total amount invested (or the total investment costs). The result being a percentage the relation obtained is multiplied by 100. The calculation formula is:

$$\text{ROI} = \frac{\text{Revenues after investment} - \text{Amount invested}}{\text{Amount invested}} \times 100$$

In other words,

$$\text{ROI} = \frac{\text{Profit (after investment)}}{\text{Invested capital}} \times 100$$

It is a formula that can be applied to all types of investments. ROI is used by investors to select an investment project of several possible. As well it can be used after completion of the investment, to measure its profitability. ROI is an indicator frequently used in performance analysis and decision making.

ROI tells us every time if the investment is profitable or not. As simple rate, two types of data are needed to calculate ROI:

- the cost of the investment project (resources consumed for the investment);
- the profit of the project (when ROI is calculated before starting work), the current profit (when ROI is calculated during the operation) and total profit of the project (when ROI is calculated after expiry of the operation of investment). Profit used in ROI calculation is the operating result before interest and tax registration.

#### Example of calculation:

Within a project, the investment made was 20.000 lei. The gain realized by exploiting this investment was 25.000 lei. ROI of the investment project is:

$$\frac{25.000 - 20.000}{20.000} \times 100 = 25\%$$

Apparently, this indicator is quite simple to calculate. In fact the calculation may be complicated when taking into account the effects of inflation. In this regard, for the investment projects in which their operation is spread over several years, updating figures is mandatory. Also, ROI cannot be used to compare investment projects having different economic durations.

Regarding the measurement of the volume of invested capital considered in calculating ROI, various alternatives are possible [De Rongé & Cerrada, 2009: 222]: only the own funds are retained; own funds and borrowed funds are considered; the invested capital is defined based on fixed assets used by the profit centre, including the capital of the investment centre assigned to finance current operating activities (working capital).

Another limitation of ROI indicator is the focus on the financial side of investment. Related benefits are ignored: customer satisfaction, employee motivation, improving the image of the market etc.

The value of ROI can be positive or negative. A negative ROI indicates an unprofitable project. When two investment projects have positive but different ROI, at equal risk, the project with higher ROI will be privileged. If two investment projects have positive and about the same value ROI, the project with lower risk will be privileged. The ROI is bigger the investment situation is better. The aim of the company's manager is to ensure maximizing this indicator for a long period, thus increasing the enterprise and shareholder remuneration.

Calculated as the ratio of profit and the means to achieve it (capital invested) this rate is decomposed into objectives assigned to each responsible from the company, expressed through physical and monetary indicators. ROI can be decomposed into two ratios, as follows:

$$\text{ROI} = \frac{\text{Profit}}{\text{Turnover}} \times \frac{\text{Turnover}}{\text{Invested capital}}$$

in which:

$$\frac{\text{Profit}}{\text{Turnover}} = \text{Commercial profitability ratio}$$

$$\frac{\text{Turnover}}{\text{Invested capital (assets)}} = \text{Asset rotation (in number of rotations)}$$

These two rates can be decomposed further into other indicators drawn from the financial statements of the company (Figure 1).

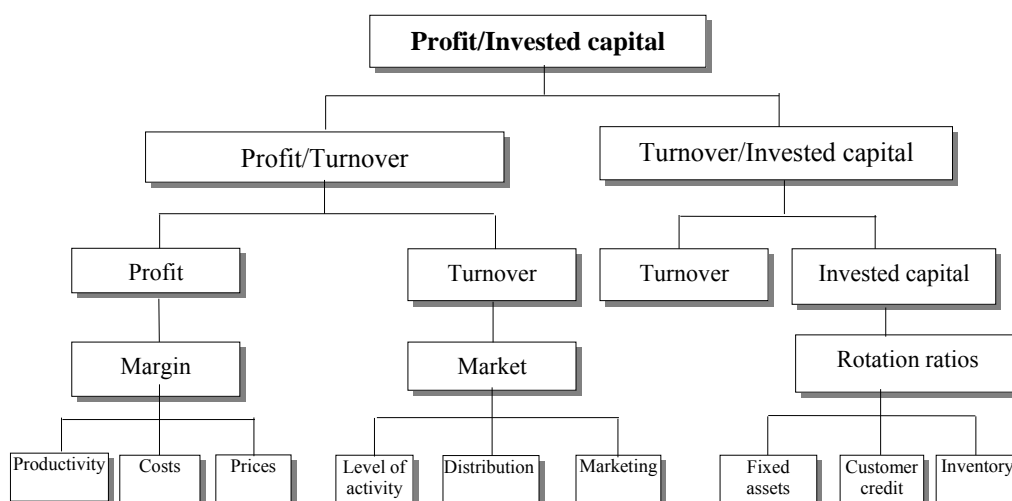
ROI cannot be controlled from a single department of the company. To increase ROI managers should either increase the numerator, meaning to increase revenues and reduce costs or lessen the denominator, meaning to reduce assets. Any of these actions can have both positive and negative effects [N. Albu & C. Albu, 2003: 179]. Thus, some decisions aiming to reduce ROI can improve the economic condition of the company, as some decisions aiming to increase ROI may result in an unsatisfactory activity [Diaconu et al., 2003: 255].

It is tempting for a manager to try to maximize short-term results at the expense of long-term results, for example to reduce advertising spending, but detrimental to the image of the company on long term and hence the ROI during a long period, or to reduce

investments related to the research and development activity, without considering their importance for the future of the company. In management decisions must prevail however, the achievement of the strategic plan objectives.

Figure 1.

### Decomposition of ROI in specific objectives



(Source: Bouquin, 2001, apud Berland, 2009: 81)

## 2. The influence of assets value in measuring ROI

A problem with using ROI is raised by the value at which depreciable assets are taken into account: net or gross value. The recourse to the net book value of fixed assets has the advantage of consistency with financial accounting information but lead to distorted results, reflecting incorrectly the profitability of investment projects, leading to wrong decisions (an artificial increase of ROI when fixed assets get older). The recourse to the gross value has the disadvantage of lacking the consistency with the financial statements but eliminates the incidence of depreciation method and allows replacement of assets with little impact on ROI [N. Albu & C. Albu, 2003: 178].

To illustrate the limitations raised by the assessment method of assets in calculating ROI and therefore in measuring financial performance, we start from the following example. Note the following information about the company "Nicol".

Table 1.

**Balance sheet**

ASSETS		LIABILITIES	
Tangible assets	4.950	Capital	1.500
Inventory	450	Reserves	3.840
Trade receivables	375	Long-term debts	450
Cash	525	Short-term debts	510
Total assets	6.300	Total liabilities	6.300

Table 2.

Result account	
INDICATORS	AMOUNT
Revenues	15.000
Raw materials expense	3.000
External charges	4.500
Salaries	5.925
Depreciation	825
Gross result	750

It is intended making a new investment (machinery purchase) of 750 lei, with life duration of 5 years generating savings of external services expenses of 210 lei per year. The machine is linearly depreciated in 5 years. The discount rate considered is 10%.

It is desired the assessment of financial performance driven by the new investment.

### 2.1. Analysis of the investment project based on the net present value

Analysis of investment projects requires the ability to compare different cash flows available on different dates and to equate a flow that will be achieved in the future with its current value. The updating is a method of quantifying the influence of the time on efficiency investments.

We can calculate the net present value of the investment as the sum of discounted net cash flows accumulated during the effective period of functioning of the investment objective, according to the relation:

$$NPV_{ta} = -I_t + \sum_{h=1}^D CF(1+i)^{-h}$$

in which:

$NPV_{ta}$  – total net present value;  $I_t$  – total investment;  $CF$  - cash flow;

$D$  – number of effective periods of functioning of the objective;

$h$  – period;  $i$  – discount rate.

For each period it is calculated the discount coefficient:  $c = (1+i)^{-h}$

The annual cash flow generated by the new investment is limited to the cost savings of 210 lei per year. The present value of these cash flows in 5 years is:

Table 3.

Present Cash-flow			
Year	Cash-flow	Discount coefficient	Present cash-flow
1	210	$(1+0,1)^{-1} = 0,91$	191,1
2	210	$(1+0,1)^{-2} = 0,83$	174,3
3	210	$(1+0,1)^{-3} = 0,75$	157,5
4	210	$(1+0,1)^{-4} = 0,68$	142,8
5	210	$(1+0,1)^{-5} = 0,62$	130,2
Total	1.050	-	795,9

$$NPV_{ta} = -750 + 795,9 = 45,9 \text{ lei}$$

NPV is positive, hence the project is profitable.

## 2.2. Analysis of the investment project based on ROI

In Table 4 ROI is calculated both before and after making the investment.

Table 4.

Calculation of ROI

Crt. No.	Indicators	Before investment	After investment
1	Revenues (lei)	15.000	15.000
2	Expense without depreciation (lei)	13.425	13.215 <sup>1</sup>
3	Depreciation (lei)	825	975 <sup>2</sup>
4	Result (1-2-3) (lei)	750	810
5	Invested capital <sup>3</sup> (lei)	5.790	6.540
6	ROI <sup>4</sup> (%)	12,95	12,38

<sup>1</sup>13.215 = 13.425 – 210 (cost savings)

<sup>2</sup>depreciation of the new machinery is considered:

$$975 = 825 + 750/5 \text{ years}$$

<sup>3</sup>Invested capital IC = Fixed assets FA + Working capital WC

$$WC = \text{Current assets CA} - \text{Short term debts STD}$$

If the fixed assets are considered at their net value, the results are:

- before investment:

$$FA = 4.950 \text{ lei}$$

$$WC = (450 + 375 + 525) - 510 = 840 \text{ lei}$$

$$IC = 4.950 + 840 = 5.790 \text{ lei}$$

- after investment:

$$IC = IC_{\text{before investment}} + \text{New investment} = 5.790 + 750 = 6.540 \text{ lei}$$

<sup>4</sup>ROI = (Profit : Invested capital) x 100

$$\text{- before investment: } ROI = (750 : 5.790) \times 100 = 12,95\%$$

$$\text{- after investment: } ROI = (810 : 6.540) \times 100 = 12,38\%$$

## 2.3. Case study findings

This example illustrates the problems posed by the financial performance measurement. It appears that ROI was diminished after the investment. From the point of view of the general direction, investment must be carried out because it has a positive net present value, the investment project being profitable. From the point of view of the investment centre responsible, there should not be an interest in the investment, as this would lead to lower performance measured by ROI.

During the period of the investment, ROI will increase from year to year because the basis of invested capital will diminish from year to year (the net value of assets will decrease).

If the assets were taken into account at their acquisition cost (gross amount), this would underestimate the return on investment (acquisition cost is greater than the economic value of assets that diminish over time). In order to increase ROI, managers may be tempted to reduce the denominator, by cutting investment or even disinvestment. When

calculating invested capital investments are valued at the acquisition cost, to improve the performance, of investment centres managers may be tempted to use divestment to result in higher ROI [De Rongé & Cerrada, 2009: 225].

### 3. The influence of working capital in measuring ROI

The calculation of the working capital as part of the invested capital can also influence ROI.

In many sectors the operating cycle generates a need for funding, called working capital needs. For example, in industry, the raw materials and processing costs are recovered when customers will pay for what they bought. There is a need for financing the operating cycle when the sum of the average duration of storage and of the average collection of customer is superior to the average duration of payment of suppliers.

Net working capital is measured as the difference between invested capital and fixed assets:

$$WC = IC - FA$$

where:

WC – working capital;                      IC – invested capital;                      FA – fixed assets.

The balance of the invested capital available after financing fixed assets is a funding resource to cover the working capital needs generated by the operating cycle (WCN). Working capital can be also calculated as the difference between current assets and short-term debt.

$$WC = CA - STD$$

where:

CA – current assets;                      STD – short-term debts.

The calculation of the working capital as part of invested capital to measure ROI puts a number of issues. It requires a restatement of elements considered.

Regarding stocks, it should be examined whether their value from the balance sheet is representative for their average value during the year, especially important in companies with seasonal activity. Also the inventory valuation method leaves its mark on the balance sheet value of stocks, under or over- valuating them. It is recommended to use a standard cost or average cost in valuating stocks.

Regarding trade receivables, when the company's activity is seasonal and the value of receivables in the balance sheet is not representative for the whole year, it is preferable to take into account their average value during the year in order to estimate the amount that is immobilized. It also requires effective management of the collection of receivables and the deadlines for cashing them [De Rongé & Cerrada, 2009: 226].

A control and therefore a restatement are recommended to be carried out also on the management of short-term debts in the balance sheet so that they reflect the average value during the year.

Following the restatement of items in the balance sheet the necessary working capital shall be obtained (restated current assets minus restated short-term debts) in order to cover the working capital needs of the operating activity.

It is important that procedures for performance measurement to determine a behaviour on the part of managers of responsibility centres to bear as a consequence achieving strategic goals.

### Conclusions

For a correct calculation of ROI, an important role is assigned to the accountant. The accountant's role in decision-making is to provide timely, accurate information in a useful form. To achieve this, the accountant should collect appropriate information, to restate them where appropriate, and to report them in a relevant way for managers and investors. Even if measuring return on invested capital through ROI can raise several issues, ROI remains one of the indicators most commonly used by investors in decision making.

From researches carried out I found that ROI is an indicator that cannot be fully controlled from a single department of the company. Calculated as a rate, ROI can be decomposed into other indicators drawn from the financial statements of the company, the research hypothesis is thus validated.

Half yearly financial statements carried out in Romanian enterprises can lead business managers to manipulate figures so as to favour short-term performance at the expense of the long term performance. Managers' decisions must take into account their effect on the achievement of objectives from the strategic plan.

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