

## **XII.RATE OF RETURN**

### **1. Introduction**

1.1. We need a means of determining the areas in which a problem lies, that is, whether it is a question of manufacturing efficiency, technology, or the price or marketing of our product. A yardstick that has been developed to measure performance and profitability of the operations is Rate of Return (also known as Return on Investment).

1.2. The analytical tool that is in use is operating return on operating investment (capital employed), with margin of profit on sales and turnover of investment as corollaries. This is one of the most effective, yet simple, techniques conceived to aid both decision making and performance evaluation.

1.3. ROR is the supreme, ultimate and inevitable measurement to which all other measures are subordinate, and into which the results from using other measurements should be converted.

### **2. Formula**

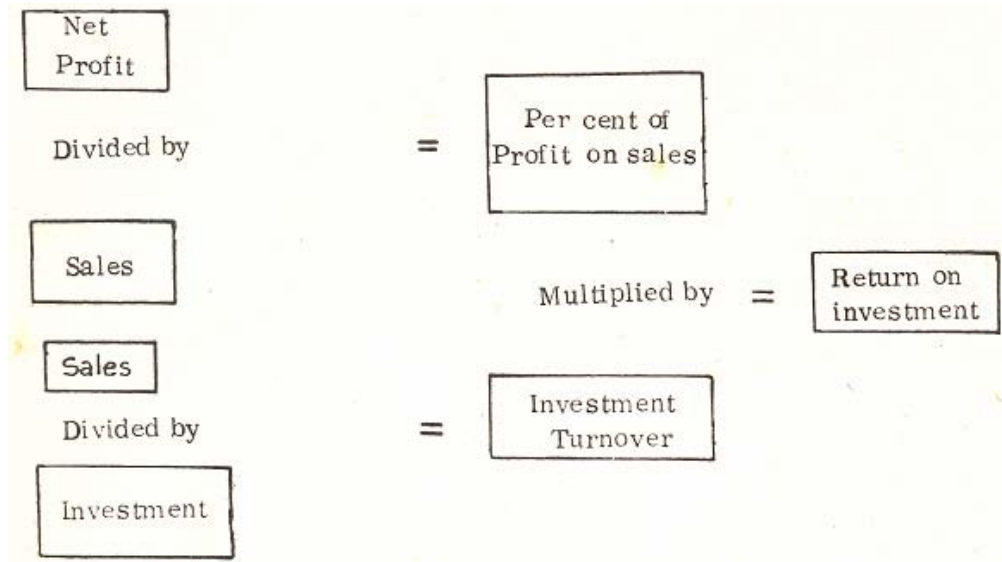
2.1. The formula for ROR is:

% of profit on sales X Capital turnover = Rate of return

OR

$$\frac{\text{Net profit}}{\text{Sales}} \times \frac{\% \text{ Sales}}{\text{Capital employed}} = \text{Rate of return}$$

This may expressed in graphic form as follows;



**Graphic representation of formula used to calculate ROR**

2.2. The final return-on-investment figure is obtained by multiplying a derived per cent of profit on sales by a derived investment turnover. The result is the same as though profits have simply been divided by investment, but the use of the formula adds a factor which is always informative. Any important change in return on investment can be identified as resulting from a variation in return on sales or a change of substance in investment turnover.

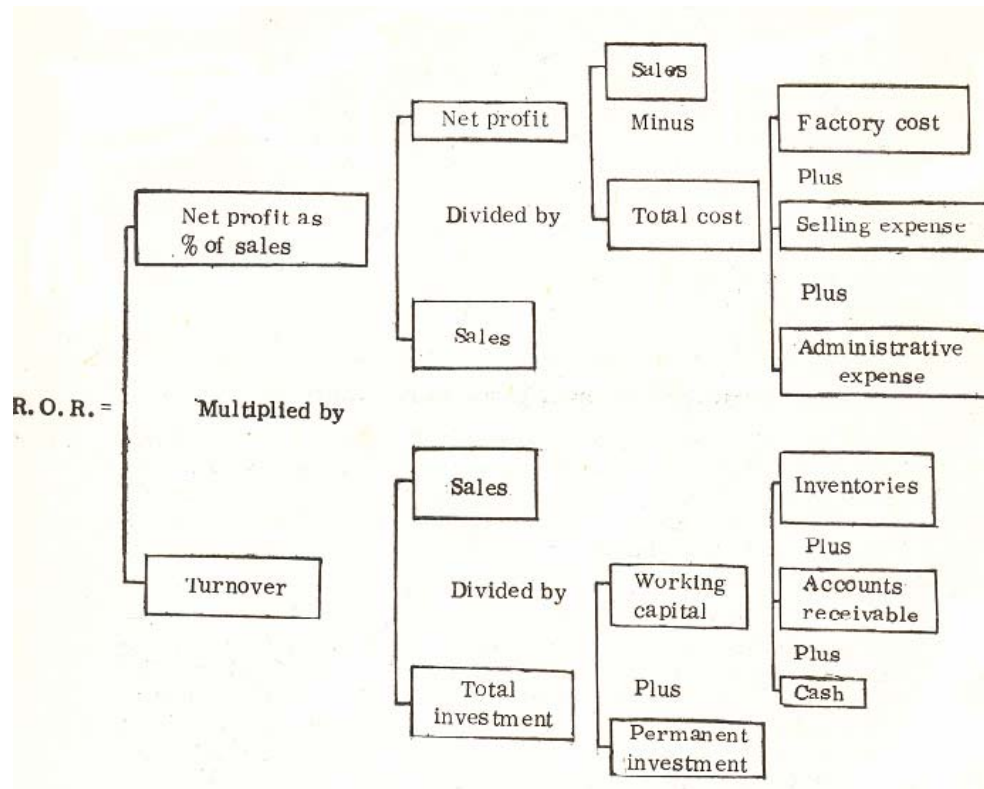
2.3. Considering the three relationships separately, there are three yardsticks: return on sales, investment turnover, and return on investment. The different divisions are measured against them individually, because any other practice might be unfair and unrealistic. Some divisions may have large volumes of comparatively low profit defense work; some have large capital investments, and others may lease their plants; some may compete in tight markets, while others may have developed proprietary items that are more or less noncompetitive. Another division may be subject to a cyclical demand for its major products over which it has little or no control, or may concentrate on research and development projects which promise much for the future, but return little now. Each division must be judged separately and rated as an entity in its own field of industry.

2.4. Much has been written on the subject of ROR, and there are a number of different definitions and applications in use, particularly with respect to what shall

constitute the investment base. For determining ROR, investment is taken to be operative investment.

### 3. Analysis of ROR

3.1. The diagram given below shows the relationship of the operating factors that affect ROR:



3.2. -A study of the diagram suggests four ways to do this. First, total cost can be reduced. This will increase the operative earnings, and thus return on investment.

3.2.1., Second, selling prices can be increased, assuming that the price increase will not result in a proportionate drop in sales volume, and this will increase opera-

tive earnings. It will also have the effect of increasing the turnover of total investment with a consequent rise in operative return.

3.2.2. Third, the volume of sales can be increased. This will have the same effect on ROR as will increasing the sales price. The proviso here, of course, is that the increase in sales volume is not the result of a disproportionate increase in promotional or manufacturing costs.

3.3.3. Four, both working capital and permanent investment can be reduced. A decrease in either means a smaller investment base; and, therefore, a higher operative return on that investment. ROR is thus calculated in terms of the money invested in plant and working capital (total capital employed) rather than on equity capital. ROR is simply a technique that top management finds useful in helping it see that operations are properly conducted.

#### 4. An Illustration

4.1. An illustration to show as to how ROR can be improved by a change in factors affecting ROR is given below:

*First year*

Operating results:

	Rs.
Annual sales	2,80,000
Total cost	2,40,000
	-----
Net profit before taxes	40,000
Permanent Investment	3,00,000
Working capital	1,00,000
	-----
Total investment	4,00,000

The ROR formula is

Net profit as per cent of sales X Turnover = ROR

$$\frac{\text{Rs. 40,000 (Net profit)}}{2,80,000 \text{ (sales)}} \times \frac{\text{Rs. 2,80,000 (sales)}}{\text{Rs. 4,00,000 (Total investment)}} = \text{ROR}$$

$$14 \times 0.7 = 9.8\% \text{ (say 10\%)}$$

*Second year*

	Rs.
Annual Sales	5,60,000 (100% increase)
Total Cost	4,20,000 (75% increase)
Net profit (before taxes)	1,40,000
Permanent investment	3,00,000 (no change)
Working capital	1,70,000 (70% increase)
Total investment	4,70,000
$\frac{\text{Rs. 1,40,000 (Net profit)}}{\text{Rs. 5,60,000 (Sales)}} \times \frac{\text{Rs. 5,60,000 (Sales)}}{\text{Rs. 4,70,000 (Investment)}} = \text{ROR}$	
25%      ×	1.19      =      29.75%, (say 30%)

4.2. Comparing the figures, for the second year with those of the first year, it is found that turnover has increased from 0.7 to 1.19, and net profit as per cent on sales has increased from 14 per cent to 25 per cent, and the important yardstick of performance-ROR-has increased from 10 per cent to 30 per cent, or three times its former level by putting in an additional sum of Rs. 75,000. Such an improvement is not fantastic in chemical industry.

4.3. The following example would explain the application of the ROR formula, and, in the process, its usefulness too:

	Company 'A'	(Value in Rupees) Company 'B'	Company 'C'
<b>Factors</b>			
1. Capital	50,000	5,00,000	5,00,000
2. Income	10,000	5,000	5,000
3. Value of sales	1,00,000	50,000	10,00,000
<b>Ratios</b>			
1. Margin of sales Income Value of sales	10%	10%	0.5%
2. Turnover Value of Sales Capital	2	0.1	2
Rate of Return on Capital	20%	1%	1%

4.3.1 From this analysis we know that:

- (i) Company 'A' has a high margin of sales, a high rate of turnover, and a high rate of return, though the amount of capital is small.
- (ii) Company 'B' has a high margin of sales, a very low rate of turnover, and an equally low rate of return, though the amount of capital is ten times that of 'A'.
- (Hi) Company 'C' has a very low margin of sales, its rate of turnover is as high as that of 'A', and its rate of return is as low as that of 'B', though the amount of capital is as big as that of 'B' and we are able to conclude that-
  - (a) as regards Company 'B', it is either having a much larger stock of inventories than is necessary for its sales, or that its receivables are not collected promptly, or that it had acquired its fixed assets at a much higher price than Company 'A', and
  - (b) as regards Company 'C', its operations are either very inefficient, or that its location is bad and entails high transportation costs.

4.4. By using the ROR analysis, one is, thus, in a position to discover those factors in the production process which finally determine the actual rate of return; the analysis provides the opportunity for an examination of the various segments of the Company concerned, and for devising suitable adjustments or corrections wherever required.

## **5. Uses of ROR**

5.1. ROR is influenced by a variety of aspects like pricing, the speed of circulation of current assets, suitable and economic choice of fixed assets, productivity levels, cost reduction, and technological impact. It would be very difficult for us specifically to categorize each of these factors individually contributing to the ROR, but it must be appreciated that they make their impact either individually or collectively.

5.2. It is very important to appreciate and correlate the two factors, viz., return on capital and corresponding increase in output measured by a suitable parameter like output/capital ratio. It should not be considered futile and unimportant to give a detailed thinking regarding the suitable choice of fixed assets. Approaches to improvement in ROR would necessarily differ from industry to industry.

5.3. In the case of a multi-product industry, the most profitable products should be selected, and while deploying capital for the acquisition of fixed assets capital rationing should be adopted.

5.4. Practical reasoning requires not only a ranking to projects according to .3 ladder of profitability, but also a rejection rate-of-return standard to separate projects that are not sufficiently profitable to merit funds from those that are. (Theoretically this cut-off rate of return is automatically determined by the demand and supply schedules for capital. In practice, however, cut-off rates must be determined by management from 'the frail information available).

5.5. The second use if the rejection rate is to weed out projects that have too Iowa profitability to justify further attention at either divisional or top-management levels. It is thus a tool for economizing executive time.

5.6. The third use is to implement a long-run capital-budgeting plan that seeks to avoid making marginal investment of low productivity in times of .slack investment demand. In this form, the rejection rate, however, required a projection for an integral business cycle of both the total demand curve and the total internal supply curve.

5.7. It is very important that money available with a company is used in productive channels. One of the important factors which contribute to a high velocity of money circulation which is very necessary for improving ROR is the speed of circulation of current assets. In any enterprise, current assets may form items like cash, raw material inventory, work in process stock, finished goods inventory and accounts receivable, etc., and the speed of its circulation will depend noel only on the speed of activities, but also on how effectively the reservoirs of locked up nannies are controlled. In this connexion the illustration on pages 115-116 is self-explanatory, and is valuable to appreciate this aspect.

5.8. Among the many management techniques which contribute in this 'regard, the effective use of the techniques of inventory control, which is a very powerful and potential tool and greatly contributes to the regulation of capital low speed, should be emphasized.

5.9. In recent years, there has been a great deal of interest in finding the 'correct method of calculating ROR. The main methods are the Financial, the Discounted Cash Flow, and the Pay-back. The financial method is the familiar one, and is easy to use. Specifically, ROR accomplishes the following objectives:

- (i) It spells out responsibility for profits;
- (ii) It provides' a way of evaluating the job being done by departmental managers;
- (iii) It gets away from the gross sales or volume phobia;
- (iv) It indicates the need for getting rid of unprofitable items when the return falls below the prescribed minimum;

- (v) It provides a way of deciding on alternative uses of scarce funds in the sense of giving priority to high return items; and
- (vi) It provides a common goal, or measure, which all can agree on.

## **6. How to Increase ROR**

6.1. A step-by-step approach as to how ROR may be increased is discussed below.

*6.1.1. First Step-Study the ROR of the firm, say, during the preceding three years:*

ROR would improve if the capital employed is reduced or utilised more effectively, profit remaining the same, or safes are increased with less percentage increase in variable costs, or capital is reduced by reducing' inventories and investment in accounts receivables and inure effective utilisation of capital assets or both.

6.1.1.1. For effective utilisation of capital, the plant should work to, maximum efficiency arid be utilised to the maximum hours possible, since volume has a great effect on profits improvement, to effective utilisation of capital and utilisation of the plant to the maximum efficiency, and for long hours; either in double or triple shifts, may be expressed not as the reduction of cost, but as the increase 'in profit to have a dramatic, effect, on management. Increase in the use of capital means increasing its effectiveness jailed increasing profits, or reducing costs.

*6.1.2. Second Step-Analysis of Capital Structure:* Analyse the capital structure of the firm, and see whether the funds are deployed in the order of profitability, and according to their relative importance. See that investment in fixed assets and inventories is not excessive, and that the net working capital is in proper proportion to sales.

*6.1.3., Third Step-Arrangement of elements of capital deployment in the order of succession of cost implications:* The various areas of the activities of the enterprise absorbing capital are listed in the order of succession of cost implication to gauge their bearing and ,importance for improving the ROR. For instance, in the case of multi-product industry, all products are classified under 3 categories: Category Ithose earning a relatively high return; Category II-those earning a modest return; and category III-those earning an unsatisfactory return or showing a loss.

*6.1.4. Fourth Step-Rearrangement of elements of capital deployment according to feasibilities of cost reduction:* The (l elements listed in the previous step in their succession of cost implications have now to be examined, in tarps of physical practicability for cost reduction. For example, items in Category II, i.e. those earning a modest return, are studied to seek ways by which they might be moved into the more profitable category through some combination of the following approaches:

- (i) Cost reduction;
- (ii) Sales pressure for increased volume;
- (iii) Higher sales prices;
- (iv) Reduction in capital employed through reduced inventory of finished goods, goods in process and raw materials, simplification of product lines, elimination of obsolete or unnecessary equipment, etc.; and
- (v) Elimination of the least profitable items, especially loss items, if any, within the commodity or product line.

6.1.4.1. Any commodity or product group in Category III is a drag on the company, since it represents capital and effort that do not provide an adequate return insure future strength, stability, and growth. Therefore, all products in Category III are kept under close scrutiny in an attempt to achieve, as promptly as possible, either a satisfactory rate of profit or elimination of the commodity.

6.1.4.2. Regarding project planning, the total investment necessary for all projects for inclusion in the capital budget should be carefully screened to weed out those which bear no promise of maintaining or improving ROR. For accomplishing this, the proposals are recorded in two major groups as follows:

- (i) Investments which are required to maintain satisfactory operations on existing products and which normally do not increase the earning power of the fixed assets. These include:
  - (a) Rebuilding and replacement of existing facilities;
  - (b) Projects for general plant improvement; and
  - (c) Projects for safety, health, and working conditions.

Since projects in this group do not add to the earning power, they are to be held to a minimum consistent with good plant operation, so that the largest share of the available capital can be used for projects expected to improve the rate of earnings.

- (ii) Investments made to increase the company's earning power in both existing and new products. These include projects for:
  - (a) Cost reduction;
  - (b) Quality improvement;
  - (c) Additional capacity in existing products; and
  - (d) Manufacture of new products.

Investments in this group can be justified only on the ground that they will improve the company's rate of return, except in those cases where the expenditures are clearly required to maintain the existing rate of return of a commodity which is producing or gives real promise of producing satisfactory results.

*6.1.5. Fifth Step-Location of critical areas/or ·balancing and improving the performance of each element so as to obtain a more favourable ROR:* Various industrial engineering techniques like Work Study, Critical Path Method, Job Evaluation, Preventive Maintenance, Process Control, Inventory Control, and Value Analysis are now applied, as might be relevant, to bring about a more favourable change in the rate of return.

## **7. Case Studies**

1.1. It was noticed that in a rolling mill of an integrated steel plant the mill was left running even while no rolling was in progress. It led the Management Accountant to conclude that economy could be effected by a better utilisation of electric power. He made the suggestions to the Chief Superintendent of the rolling mills who naturally consulted the Chief Electrical Engineer. The latter was, however, of the opinion that frequent snitching on and off of the motors is likely to reduce their effective service life. Supported with such technical arguments, the Management Accountant had no alternative but to find a better way of putting across the same facts in a more dramatic fashion so as to catch the eye of the top management leading to effective action. After a few months he got across an idea of plotting the last 12 months' actual consumption against the standards set up for the plant units concerned. With this type of visual representation the Chief Superintendent felt that he was responsible for wasting electric power which was in short supply. Faced with such strong and clear facts, the Chief Electrical Engineer was led to review his own assessment, and he advised that the switching off and on of the motors will do no serious harm to the motors. The Management Accountant was able to induce achievement of the result in so far as the average consumption per tonne came to approximately 36 kW per tonne, as compared to the earlier average of 40 kW per tonne. The difference between the average actual consumption and reasonable rate of consumption of power should have been approximately 4 kW per tonne, and 3000 tonnes were on the average rolled per day. This, in fact, would mean that there was an avoidable expenditure of approximately Rs 840 per day as the power cost Was 7 paise per unit. An avoidable loss of this dimension, absolutely within the control of the operational personnel, amounting to Rs. 840 per day would have attracted the attention of operators and the top management far more easily.

7.2. This again relates to a case of a plant where frequent hold-up of production used to occur due to shortage of stores. The annual consumption of stores was approximately Rs 6.5 cores. The management had engaged the services of external consultants to aid them, in addition to other items in the organisation of a modern inventory control system. A large volume of work was done by them, but the solution appeared nowhere in sight. The Management Accountant who had been watching with keen interest the progress in this respect during the annual closing of accounts,

noticed that there was a large quality of non-moving and slow-moving items of stores. During the lean season after the passing of the accounts he decided to conduct a detailed review of the inventory control effectiveness. On a cursory examination of a few thousand priced store ledger cards, he gave an arbitrary decision to isolate cards for items of store for which the consumption during the financial year was in excess of Rs 5,000 each, and the closing stock of which was more than Rs 10,000 each. To his pleasant surprise after the investigation was completed, two very clear conclusions were thrown up:

- (i) There were only 283 items of stores out of a total of 60,000 items which accounted for approximately 85% of the total consumption during the year, and 80% of the closing balances at the yearend. Naturally, these 283 items could be segregated and treated as VIPs for inventory control purposes, leaving the others in the queue for later systematisation. In fact, this was the starting point for an introduction of a modern inventory control system on these items, and there was rarely a production hold up due to lack of stores.
- (ii) It was noted that a number of items lying in stores had not been utilised even in parts for approximately 3 years. A detailed investigation was conducted, and it was found that approximately 75 lakhs worth of stores (which were not insurance items) had not been utilised for approximately 3 years. It was also found that they were not likely to be used for quite a few years in the foreseeable future. The Management Accountant did not wish to rest there. He worked out the financial effect.

7.2.1. The plant was operating a bank overdraft to meet the deficit of working capital, and was paying an interest of 5%. It was noted that, apart from the cost involved in the maintenance and upkeep of these non-moving stores, the plant had, in effect, paid an interest of Rs 12 lakhs which it could have avoided if these surplus stores had not been kept in stock. The worst part of the joke was that the plant itself -was manufacturing and selling a certain section of steel of which it was keeping in its store as 'much as 500 tonnes due to difficulty in its procurement. Once the Management Accountant had put across the problem clearly, the management took no time to make up its mind to dispose off these items. It took about 3 months to dispose them off, and effect a corresponding reduction in the overdraft from the bank.

7.3. In an integrated steel plant, the consumption of coke in the blast furnaces for making pig iron constitutes a major part of the material cost. A saving of 50 kg per tonne was assessed to result in the reduction of approximately Rs 3 per tonne in the cost of production of pig iron. The designers of the furnace had suggested that a consumption' of 1000 kg of coke per ton of hot' metal produced could be considered a satisfactory result. The new Superintendent of the blast furnaces a young and bright

metallurgist was, however, not satisfied with the rate of consumption of coke. By organising special studies of the operations and suitable temperature controls of the income blast, he was able to get a lower consumption of 980 kg. per tonne of pig iron produced. In the next report, and during discussion, this point was highlighted by the Management Accountant. A special appreciation of the top management team was conveyed to the new Superintendent and the operators of the furnaces: A word of appreciation was also conveyed to the Superintendent personally by the Chairman. This led to further concentration on this key factor of cost. The average consumption of coke was watched with special care by all those responsible for operations, and calculated in detail, and specially encouraged by the Management Accountant during his frequent visits to this shop. Surprisingly enough, in about 10 months' time, it was physically possible to reduce the coke consumption by improvement in the operating efficiency to approximately 900 kg. Per tonne of hot metal where the production was approximately 4000 tonnes a day. This it self was hailed as a deliberate saving of approximately Rs24, 000 per day.

7.4. A Management Accountant wanted the senior managers of an integrated steel plant to appreciate the extent of responsibility and national trust placed on them. It was a public sector plant. All his methods to make the managers appreciate the quantum of Investment did not appear to register. Everyone appreciated that the total investment of Rs. 200'crores in the million tonnes steel plant was large, but could not appreciate it in terms of intelligible figures of day-to-day life. One day a bright idea occurred to him. The investor, in this case the Union Government, had borrowed the entire share capital from the various sources, and. was paying an average 5% interest. To his utter surprise he found that at this rate the interest on the capital worked out to be an astounding figure of Rs 200 per minute. The depreciation on the plant was provided on the straight line method at 5%. This depreciation worked out at Rs 200 per mimed, and over and above the interest of the plant could appreciate the size of investment quite imaginatively when they were told that the interest and depreciation on the invested capital worked out to" Rs 400 per minute to the share: holder. This had the desired effect in creating appropriate motivation and stimulation on the part of the managers to produce near rated capacity day-in and day-out.





