

## **DETERMINING RELEVANT AND ALTERNATIVE COSTS WHILE DECISION MAKING**

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When making a decision, only the costs and revenues, whose values depend on the decision to be made, are considered. Such costs and revenues are called relevant ones. Decision-making process refers to the choice between two or more alternatives. Generally, the decision, which maximizes the revenues of the owners, should be made. Therefore, all the decisions are made based on relevant costs and returns.

The costs and revenues, whose values do not depend on the decision to be made, are considered to be irrelevant and they are not considered in decision making process. Therefore, relevant financial cost, which is analyzed in decision-making process, is future cash surplus, whose value depends on the alternatives to be considered. Thus, only surplus (additional) cash flows should be considered; the ones, which remain unchanged at any alternative, are not relevant. Let us discuss the case when the choice should be made between buying a month railway ticket for travelling and using a private car bought in installments for the same purpose. In such case, monthly expenses related to the monthly payment for the car and its insurance remain unchanged notwithstanding you travel by train or use your own car, but the cost of gasoline is relevant as it changes depending on the kind of transport used.

The following features are characteristic for relevant costs and revenues:

- They are future costs and returns as it is impossible to change what happened in the past; therefore relevant costs and returns should be future costs and returns.
- They are cash flows; i.e. future costs and return should be cash flows, which arise directly as a result of the decision made. Relevant costs do not include the elements that do not include cash flows (for example, depreciation and conditional costs).
- They are growing costs and returns; relevant costs are growing costs and represent the increase in the costs and return which arise as a direct result of the relevant decision making.

While determining the relevant cost for a definite decision to be made, we may find out that some costs are relevant for a definite case and irrelevant for another one. Therefore, determining

how relevant the costs are depends on the situation: in one case the cost is relevant and in another one, it is irrelevant. As a result, it is impossible to represent a list of expenditures that are relevant to all specific cases. In each case, we should follow the principle that **relevant cost** is future cost, which changes depending on the selected option.

When determining how relevant the cost is, we should find out how it affects the decision making process. The manager should know all the circumstances affecting the decision made and all the possible results of the decision taken. Only then, the manager starts to select relevant financial information to present to company's management.

The costs that are not relevant in decision making process are called **irrelevant costs** and they include: sunk costs, unavoidable costs, non-cash expenses, fixed overhead costs and net book value of an asset.

**Sunk costs** are past costs that have already been incurred; for example, scientific research expenses or market research expenses.

**Unavoidable Costs** are future costs, which a company cannot avoid regardless of the decisions it makes.

**Non-cash Expenses** are expenses that are not related to cash flows; such as depreciation or conditional expenses are the expenses that do not cause outflow of cash from the organization now nor in the future. For instance, in some cases the head office can charge its affiliates "conditional" rent. This expense will be reflected in an organization's reports but will not result in "real" cash expenses.

**Fixed Overhead Costs** typically is not relevant to the decision making; however, some of the constant overhead costs may be relevant.

**Net Book Value of an Asset** is not a relevant cost as, like depreciation, it is also determined by accounting policies and not by future cash flows.

### **Case 1**

A company has to make a decision which project, A or B, it should use for producing a product:

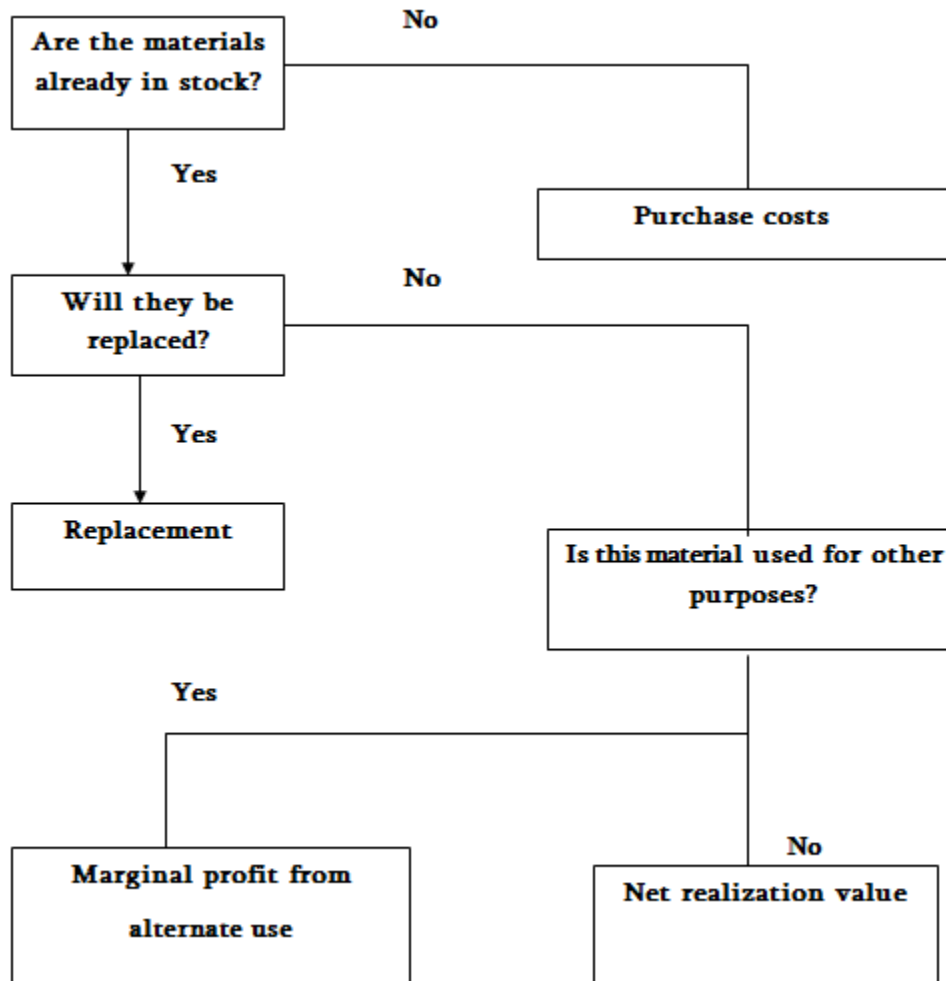
<b>Unit Variable Costs(\$)</b>	<b>Relevant Costs</b>			
	<b>A</b>	<b>B</b>	<b>A</b>	<b>B</b>
Direct material expense	600	600	–	–
Direct labor expenditure	800	750	800	750
Variable overhead production costs	140	150	140	150
Total fixed costs	2000	2000	–	–
<b>Total</b>	<b>3540</b>	<b>3500</b>	<b>940</b>	<b>900</b>

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In the presented case, direct labor cost and variable production overhead cost are relevant costs. Relevant cost for Project B is higher than for Project A. Therefore, from two alternative projects, the project with less relevant cost is more acceptable.

Now, let us discuss cost of relevant materials, labor cost and overhead cost separately. Determination of the relevant costs for each element of the product cost is possible by using the decision tree (see Figure 1):

**Figure 1: Decision tree for determining the relevant cost of materials**



**Case 2**

In its warehouse, the company Alpha has 75 kilos of material P, which has been purchased 5 years ago for \$30 per kg. It is no longer used in production but can be sold 1 kg for \$20. Currently, Alpha is studying the price of one order, which will use material P in the amount of 60 kg.

Relevant cost of material P considered by the contract should be determined.

**Solution:**

Is the material in stock? - Yes;

Will it change? – No (this material is no longer used);

Is it used for other purposes? – No;

Net realization value - \$ 1200 (60 x 20).

**Case 3**

Currently, Alpha is discussing an order, which requires 2000 kg of material P. There are two possible situations:

a) Material P is regularly used in the company to produce various goods. The current reserve amounts to 20 thousand kilos, which was purchased 1 kg for \$15. The cost of replacement of the material in the current period is \$20 per 1 kg.

The material is in stock and the company uses it regularly. Therefore, it will be replaced at the replacement price of the current period.

Relevant cost of 1 kg material is \$20 and the total relevant cost of the material is \$40000 (20 x 2000).

b) The company has 2 thousand kg in stock, which was purchased two years ago for \$12 per kg, but it is no longer used to produce any of the firm's product. The current market price of the material is \$15, but the company can sell it 1 kg for \$10.

Another best alternative of using the material is to sell it for \$10. Therefore, in this case, the relevant cost is "victimized" benefit, e.g. net realization value of the material in stock. The relevant cost of the material is \$20000 (2000 x 10).

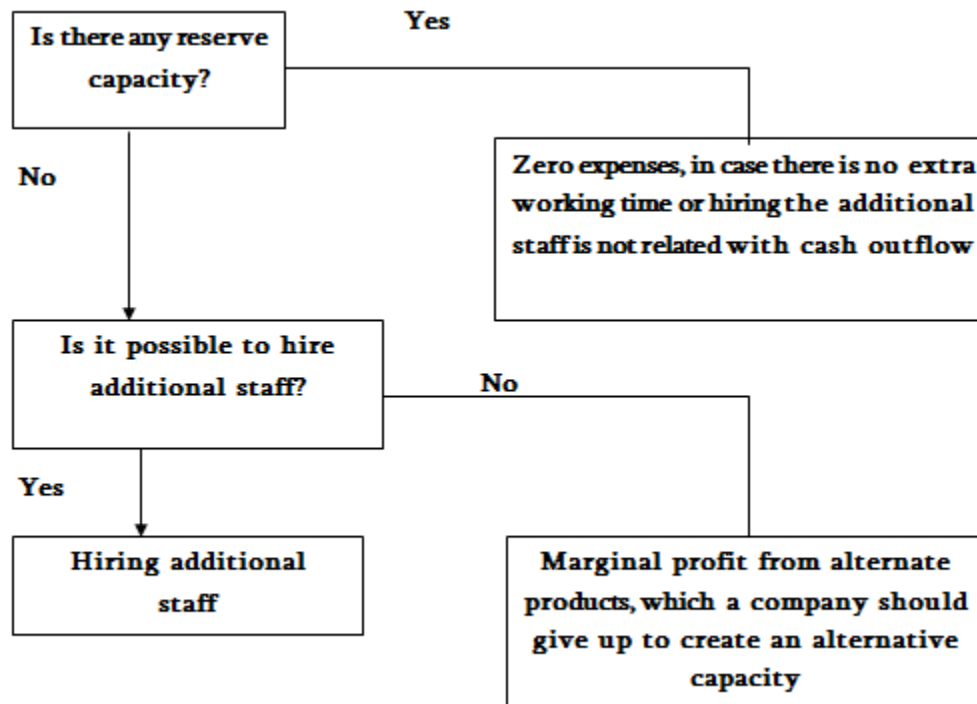
We have a similar problem in determining relevant labor costs. In this case the main question is whether there is free reserve capacity and only after that it is possible to use the given decision tree for determining relevant expenses (see Figure 2):

**Case 4**

The contract requires 300 hours of unskilled labor. Currently, the firm does not have extra (additional) workforce at the moment, but it is possible to hire additional temporary staff for \$12 per hour.

The relevant cost of unskilled labor is \$3600 (300 x 12).

**Figure 2: Decision Tree for Determining Relevant Labor Cost**



**Case 5**

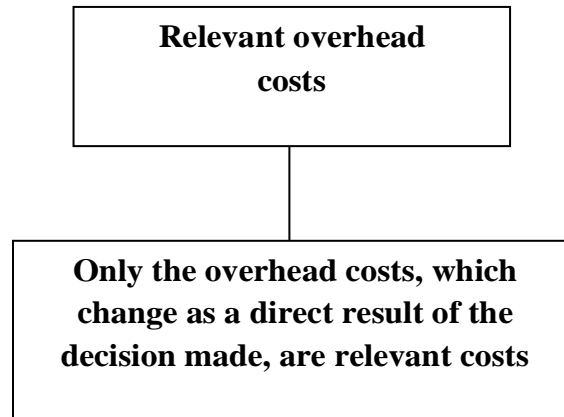
The contract requires 400 hours of semi-skilled labor. Currently, there is about 600 hours of reserve capacity. According to the agreement signed with the labor unions, they were not dismissed from work. The employees are paid \$8 per hour.

Relevant cost of semi-skilled labor for the contract is zero.

In case the company has no reserve of semi-skilled labor and, in addition, it is impossible to hire new one, it will be forced to transfer workers from another job. If the given workforce provides marginal profit of \$4 per hour, the cost to be considered in the contract will be \$1600 (400 x 4), which is an alternative cost.

In addition to determining relevant overhead costs, the managers should also determine relevant overhead costs (see Figure 3):

**Figure 3**



The rate of the fixed overhead cost assignment is not relevant for the decision as fixed overhead cost assignment is not cash flow and does not represent the real cost of money. Although fixed overhead costs, like variable cost, actually belong to the amount of the goods produced, but at the end of the month it is adjusted by the assignment difference.

Variable overhead expenses change in accordance with the number of the goods produced; therefore, it is reliable cost as such expenses are real spending of cash.

### **Case 6**

The company Alpha is assigning overhead costs based on machine hours. Currently, the rate of the fixed overhead cost assignment is planned to be \$20 per hour - \$7 is variable overhead cost and \$13 is fixed overhead cost. The firm is discussing to sign one of the contracts next year. If the contract is signed, according to their forecast, during the contract period fixed costs will increase by \$3200.

Relevant overhead costs need to be determined for that contract.

### **Solution:**

a) Variable cost of one hour from overhead costs is relevant as this cost can be avoided if the contract is not signed. Therefore, the relevant variable overhead costs amount to \$ 7 per machine hour;

b) Fixed cost of one hour is the rate of assignment, which is irrelevant cost. Real fixed cost will not increase by \$13 per hour for all items produced; totally, real fixed cost will increase by \$ 3200. Therefore, the relevant fixed overhead cost is \$3200.

Alternative costs are also considered while decision making. Alternative cost is the value of the benefit (income) “victimized” (lost) due to an alternative decision.

- If there are not enough resources (e.g. labor, materials, machinery) needed for the project, the profit or marginal profit, which can be obtained from the alternative use of these resources should be considered;
- For example, qualified workforce needed for a new project can be transferred from an ordinary production process. The transfer of the workers will result in a loss of marginal profit, which is obviously relevant for project assessment;
- Funds of a separate division or department cannot be considered separately. It always affects cash flow of the whole organization and this should be taken into consideration.

### **Case 7**

The Alpha Company uses qualified labor, which costs \$8 per hour and receives \$3 marginal profit per hour. The project, which requires 5000 hours of skilled labor, is under discussion. Alternative cost should be determined for two different situations:

- a) There is a lack of workforce in the company and skilled workers should be transferred from another job;
- b) In the company, there is surplus of workers, who are regularly paid salaries, which is enough to carry out a new project.

### **Solution:**

In the first case, as the workforce should be transferred from another job, marginal profit in the amount of \$3 per hour will be lost. Consequently, alternative cost (or missed out profit) will be \$15000 (5000 x 3), which will be considered while evaluating the project and the relevant cost will be \$ 55000  $\{(8 \times 5000) + (5000 \times 3)\}$ .

In the second case, if there is surplus of workers in a company, who are paid salaries even in case they do not work due to some independent reasons, if this workforce is employed in a new project, there will be no additional loss and therefore, alternative cost will equal zero.



Therefore, relevant and alternative costs need to be considered when evaluating alternative projects and making a decision. From two alternative projects, the project, the sum of whose relevant and alternative costs is less, is more acceptable.