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Cost benefit analysis: A tool for individuals to make an optimum choice

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Abstract

Due to unlimited wants and limited resources the problem of choice occurs and to make efficient decisions, people do cost benefit analysis. In cost benefit analysis, both direct (i.e., internal) and indirect (i.e., external) costs of a project to the society as well as its direct and indirect benefits to the society are estimated. Thus, the main objective of this paper is to study cost benefit analysis from the view point of individuals for making optimum choices. Initially, cost-benefit analysis was developed to evaluate public sector investment project but is now being used by decision making by the individuals as well as private sector. It is also a method of evaluating public projects and expenditure programmes for making decisions regarding the desirability of the projects to be undertaken.

Keywords: Cost benefit, human wants, individuals, resources, scarcity.

1. Introduction

An economy exists because human wants are unlimited and resources are limited which also have alternative uses. It means people do not ever have enough everything. It is called scarcity of resources. People always face trade-offs because human wants exceeds resources. A decision maker is confronted with various options and needs to find the best choice. Doing so means balancing benefits and costs. Due to unlimited wants and limited resources the problem of choice occurs and to make efficient decisions, people do cost benefit analysis. When we give up something to get another thing due to scarcity of resources is called trade-offs. While choosing any product or making any decision people face trade-offs. In other words, trade-off is a process of deciding whether to give up some good to obtain any other good. The value of trade-off is represented by the opportunity cost. The opportunity cost of studying economics is the amount of next best alternative foregone. When you think of any alternative, you are thinking of trade-off. Trade-off is a conflict of policy objectives with the result that one objective can be attained only at the cost of moving away from another. Thus, the main objective of this paper is to study cost benefit analysis from the view point of individuals for making optimum choices. The paper is divided into six sections. Following introduction, second section explores the concept of cost benefit analysis. An example of cost benefit analysis is presented in section three. Various stages of cost benefit analysis are discussed in section four. Section five summarizes the importance of cost benefit analysis and the final section concludes.

2. Cost Benefit Analysis: The Concept

An analytical model called cost benefit analysis is used to analyse the wider impact of resource allocation and investment decisions especially by public enterprises. In cost benefit analysis, both direct (i.e., internal) and indirect (i.e., external) costs of a project to the society as well as its direct and indirect benefits to the society are estimated. Because people face trade-offs, making decisions requires comparing the costs and benefits of alternative courses in action. According to Prest and Turvey (1965) ^[3], “cost benefit analysis is a practical way of assessing the desirability of projects where it is important to take a long view and a wider view i.e. it implies the enumeration and evaluation of all relevant cost and benefit.” It is noteworthy that for the measurement of indirect costs and benefits the concepts of shadow price and surrogate market are used.

Shadow Price: It is a concept applied to situations in which actual prices cannot be charged or where actual prices charged do not reflect the real sacrifice made when some activity is

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pursued. There are many positive and negative social benefits which cannot be calculated in money terms like loss of wildlife, natural beauty etc. so their price cannot be determined. But there are some prices of these social benefits which are called shadow prices (Pearce, 1995) [2]. So, specially devised prices are called shadow prices which reflect the opportunity costs or true scarcity values of the resources used.

Surrogate Market: There are many things which do not have any market, for example, quietness, noise, clean air etc. (Pearce, 1995) [2]. It is necessary to discover what would be the price of these things if their market exists. So, specially devised prices are called shadow prices. The market in which shadow price is determined is called surrogate market. The cost benefit analysis is timeless (Pearce, 1995) [2]. Then question arises how much you think about benefit? The answer is that benefits may be for short time and long time but not for the whole life time. In practice, future costs and benefits may not get counted if the discount rate is relatively high. Cost benefit practitioners therefore tend to ignore any costs and benefits which occur at far distant dates in the future.

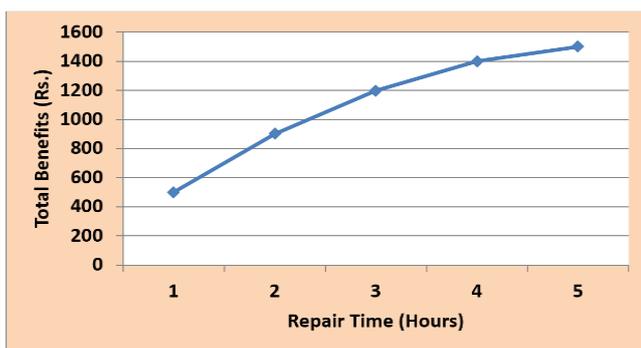
3. Example of Cost Benefit Analysis

Suppose an individual wants to get his television repaired. For the sake of simplicity, let assume that the mechanic of television charges for his time in one-hour increments, so that the amount of time an individual choose must be a whole number. Also let assume that the mechanic has at most five hours of available time. Let first focus on benefits. Table 1 shows how much more benefit (in terms of money) the individual will get for television for each number of hours the mechanic works on it. Notice that more the repair time, more the worth of television is. For example, as explained in Table 1, the television will be worth Rs. 900 more if the mechanic works on it for two hours, Rs. 1,200 more if the mechanic works on it for three hours, Rs. 1,400 more if he works on it for four hours, and Rs. 1,500 more if he works on it for five hours. Figure 1 shows that total benefits curve from repair time is increasing at diminishing rate.

Table 1: Total Benefits from the Repair Television (Rs.)

Repair Time (Hours)	Total Benefit (Rs.)
1	500
2	900
3	1200
4	1400
5	1500

Source: Author.



Source: Author.

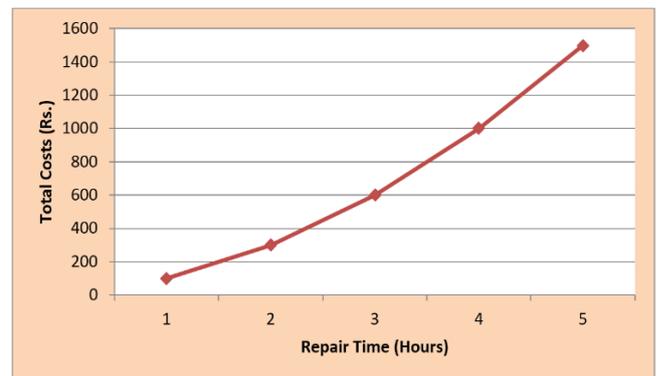
Fig 1: Total Benefits from the Repair of Television (Rs.)

Now let's think about costs. First the individual will have to pay for the mechanic's time and the parts he uses. For example, Table 2 shows that the cost of two hours of repair work is Rs. 200. However, if the individual is present on the television repair shop to monitor the repair work then he has to lose his earnings for these two hours. In other words, he has to bear the opportunity cost for these two hours which is Rs. 100 for these two hours. Thus, the individual has to face Rs. 200 + Rs. 100 = Rs. 300 total cost (Table 2). Similarly, for three hours of repair time, total cost is Rs. 450 + Rs. 150 = Rs. 600, for four hours of repair time, total cost is Rs. 800 + Rs. 200 = Rs. 1,000, and for five hours of repair time, total cost is Rs. 1250 + Rs. 250 = Rs. 1,500. Figure 2 shows that total cost curve of repair time is increasing at increasing rate. The main reason of this pattern of total cost is the *mirror image* nature of cost and output. Since total benefits curve in Figure 1 is increasing at diminishing rate thus, total cost curve in Figure 2 is increasing at increasing rate.

Table 2: Costs of Repairing Television (Rs.)

Repair Time (Hours)	Cost of TV Mechanic and Parts He Used (Rs.)	Opportunity Cost faced by the Individual (Rs.)	Total Cost (Rs.)
1	50	50	100
2	200	100	300
3	450	150	600
4	800	200	1000
5	1250	250	1500

Source: Author.



Source: Author

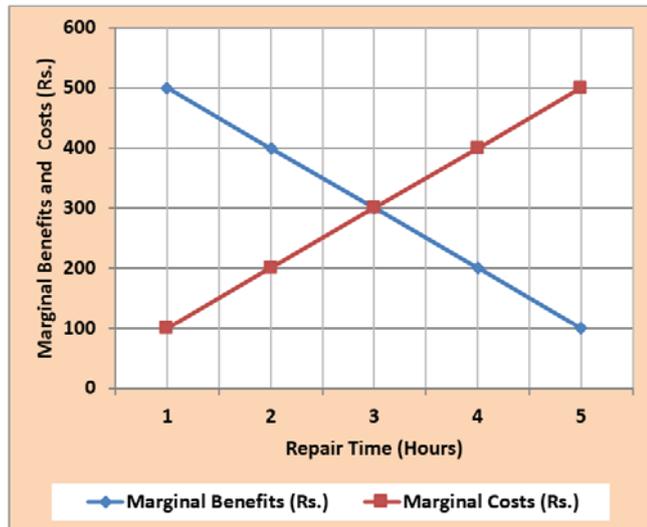
Fig 2: Costs of Repairing Television (Rs.)

To make the optimum decision, the individual needs to find the number of repair hours that maximizes his total benefits. The marginal condition of maximization is that marginal benefits should be equal to marginal costs, i.e. MB = MC. Table 3 (and Figure 3 also) shows that at three hours of repair work marginal benefit is equal to marginal cost equal to Rs. 300. Thus, the individual will chose three hours of repair time which is the optimum choice for him. It is also clear in Table 3 and Figure 3 that at two hours of repair time, marginal benefit (Rs. 400) is greater than marginal cost (Rs. 200). As a result the individual will prefer more hours of repair time (up to three hours). On the other hand, at five or four hours of repair time marginal cost (Rs. 500 or Rs. 400 respectively) is greater than marginal benefit (Rs. 100 and Rs. 200 respectively). As a result the individual will prefer less number of hours of repair time.

Table 3: Total and Marginal Benefits and Costs of Repairing Television (Rs.)

Repair Time (Hours)	Total Benefits (Rs.)	Total Costs (Rs.)	Marginal Benefits (Rs.)	Marginal Costs (Rs.)
1	500	100	-	-
2	900	300	400	200
3	1200	600	300	300
4	1400	1000	200	400
5	1500	1500	100	500

Source: Author.

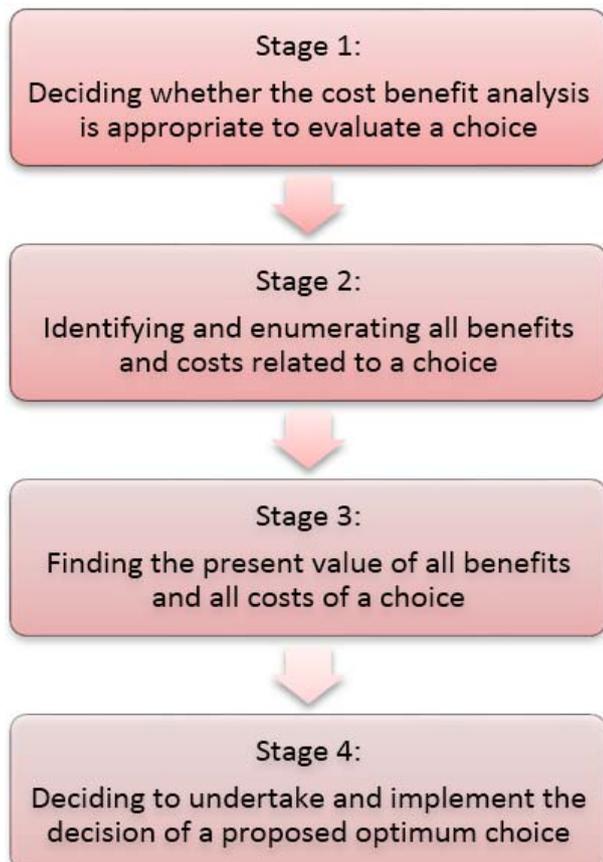


Source: Author.

Fig 3: Marginal Benefits and Costs of Repairing Television (Rs.)

4. Stages of Cost Benefit Analysis

Cost benefit analysis involves four stages as presented in Figure 4.



In stage 1, we are concerned with assessing whether the proposed choice is appropriate from the wider social point of view taking all the beneficial as well as harmful external effects of the choice. Stage 2 requires identifying and enumerating all external benefits and costs many of which may be intangible such as noise pollution, beauty, healthy environment etc. In stage 3, the evaluation of the identified externalities is made. However, such evaluation is quite a difficult task as it involves also evaluating intangible externalities such as noise pollution. All the benefits and costs over the life span of a choice have to be discounted to obtain their present values. On the basis of valuation made in stage 3, decision has to be taken in stage 4 regarding whether to select the proposed choice or it should be rejected. If the present value of all benefits (both internal and external) exceeds the present value of all costs (both internal and external) of the choice, it should be accepted due to its optimality (Ahuja, 2013) [1].

5. Use of cost benefit analysis

Cost benefit analysis is generally used in case when the economic effects of a project or an investment expenditure programme or policy change accrue in future years. It is used to assess whether a particular project or specific public expenditure programme should be accepted or rejected. In order to do so both direct and indirect benefits and costs to be incurred on the project over the years are estimated. It is a method of evaluating public projects and expenditure programmes for making decisions regarding the desirability of the projects to be undertaken. Accordingly, it is used to assess big public expenditure schemes such as buildings dams, airports, planning for defence and safety and spending for health, education and research (Ahuja, 2013) [1].

6. Conclusion

It follows from above that the cost benefit analysis is a method of evaluating investment project or other public expenditure programme by identifying and evaluating all relevant cost and benefits (both internal and external). A proposed project has to be undertaken if the present value of all benefits exceeds the present value of all costs (Ahuja, 2013) [1]. Initially, cost-benefit analysis was developed to evaluate public sector investment project but is now being used by decision making by the individuals as well as private sector.

7. References

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