The Institute of Finance Management

Accounting and Finance Department

Lecture Notes

Decision-making Under the Condition of Certainty

BACC 3 and BAIT 3

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Learning aims

Students should be able to

- Select an appropriate technique where there is one limiting factor
- Determine the optimal production plan where a firm is restricted by a single limiting factor
- Select an appropriate technique where there are several limiting factors
- Explain the practical issues surrounding make versus buy and outsourcing decisions
- For given data, calculate and compare ‘Make’ costs with ‘Buy in’ costs
- Explain and prepare an analysis showing whether a special order should be accepted
- For a given data apply relevant costing rules in situations of shutdown decisions

1.1 Decision-Making Under Certainty

Definition:

- Decision-making under certainty refers to situations where all relevant information is known, and there is no uncertainty about the outcomes associated with different alternatives.
- It is a situation where the decision-maker has completed and accurate information about the outcomes of various alternatives. In such scenarios, the future events and their probabilities are known with certainty

Characteristics:

- Complete Information: Decision-makers have access to all the information needed to evaluate and compare alternative courses of action.
- Predictable Outcomes: The consequences of each alternative are known with certainty, allowing for accurate prediction of outcomes.
- No Risk or Ambiguity: There is no element of risk or ambiguity in the decision-making process since all future events are known.

1.2 Planning with limiting factors

Managers are often faced with a short-term lack of resources. This is a factor which is a binding constraint upon the organization, the factor which prevents indefinite expansion or unlimited profits

Hence liming factor is any factor which is in scarce supply and which stops the firm from expanding its level of activities indefinitely. The limiting factor for many firms is demand for their products because they cannot sell as much as they would like. However, other factors may also be limited, especially if the period is too short, that is in the short-run period.

These other liming factors may include;

- Availability of finance,
- A restricted supply of an item of raw material or components
- A maximum capacity of machine time

- A maximum amount of available labour hours for a particular grade of labour

The resource is scarce if the organization does not have enough to undertake every available opportunity for making more contribution towards profit. From a management accounting point of view, the assumption would be that a firm faced with a problem of one or more scarce resources would select a product mix or service mix that could maximize its overall profitability and so maximize its total contribution

Note that the word scarce is potentially misleading because it does not necessarily mean that there is a worldwide shortage it simply means that the firm cannot in the short term obtain all the resources it needs to carry out a particular task

1.3 Planning with the Single Limiting Factor

If a firm is faced with only one limiting factor, such as labour hours or machine capacity, Then the management must ensure that a production plan is established that maximizes the profit of the firm from the use of the available resources.

Assuming that the fixed costs are constant, and then the management decision should be directed to the products or projects, which show the highest contribution margin per unit per limiting factor. Therefore, as there is more than one product that uses the scarce resource, the approach to determining the optimal production plan is as follows:

1. Identify the scarce resource (limiting factor).
2. Establish the units of the scarce resource used by each product.
3. Calculate the contribution (sales less variable costs) per unit of each product. It should be noted that any product which has a negative contribution per unit should be ignored
4. Calculate the contribution of each product per unit of the scarce resource consumed.
5. Establish production priorities by ranking products according to the contribution per unit of the scarce resource
6. Allocate the available scarce resources according to the ranking

Worked example

Jambo Ltd makes two products, the XL and the XK. Unit variable costs are as follows.

	XL	XK
	Shs	Shs
Direct materials	1,000	3,000
Direct labour (Shs 3,000 per hour)	6,000	3,000
Variable overhead	1,000	1,000
	8,000	7,000

The sales price per unit is Shs 14,000 per XL and Shs 11,000 per XK. During July the available direct labour is limited to 8,000 hours. Sales demand in July is expected to be as follows.

XL	3,000 units
XK	5,000 units

Required:

Determine the production budget that will maximize profit, assuming that fixed costs per month are Shs 20,000,000 and that there is no opening inventory of finished goods or work in progress.

Solution:

1. Determine the limiting factor

	XL	XK	Total
Labour hours per unit	2 hrs	1 hr	
Sales demand	3,000 units	5,000 units	
Labour hours needed	6,000 hrs	5,000 hrs	11,000 hrs
Labour hours available			8,000 hrs
Shortfall			3,000 hrs

Labour is the limiting factor in production.

2. Identify the contribution earned by each product per unit of scarce resource, that is, per labour hour worked

	XL	XK
	Shs	Shs
Sales price	14,000	11,000
Variable cost	8,000	7,000
Unit contribution	6,000	4,000
Labour hour per unit	2 hrs	1 hr
Contribution per labour hour (= per unit of limiting factor)	Shs 3,000	Shs 4,000
Ranking	2	1

3. Determine the budgeted production and sales.

Product	Units	Hours needed	Contribution per unit	Total
			Shs	Shs
XL	5,000	5,000	4,000	20,000,000
XK (Bal.)	1,500	3,000	6,000	9,000,000
		8,000		29,000,000
Less: fixed costs				20,000,000
Profit				9,000,000

Conclusion:

(1) Unit contribution is not the correct way to decide priorities.

(2) Labour hours are a scarce resource; therefore, contribution per labour hour is the correct way to decide priorities.

(3) The XK earns Shs 4,000 contribution per labour hour, and the XL earns Shs 3,000 contribution per labour hour. XK therefore make more profitable use of the scarce resource and should be manufactured first.

1.4 Make or buy decisions

Management sometimes is faced with the decisions, of whether to make or to buy the components. The decisions on whether to make the components or provide the services within the company or to buy them from external suppliers are known as make or buy (outsourcing) decisions.

There has been much greater interest in outsourcing in recent years, firms are focusing on their ‘’core competencies’’ and this means that Make or Buy decisions must be taken before any change in policy is adopted,

For example, many airlines buy food from hotels rather than own catering facilities of their own. Now Tanzania many organizations outsource some of their activities

Make-or-buy decision is the act of making a strategic choice between producing an item internally (in-house) or buying it externally (from an outside supplier).

The buy side of the decision also is referred to as outsourcing. Make-or-buy decisions usually arise when a firm that has developed a product or part—or significantly modified a product or part—is having trouble with current suppliers, or has diminishing capacity or changing demand

1.4.1 Deciding on financial grounds

A product should be made in-house if the relevant cost of making the product in-house is less than the cost of buying the product externally

1. **Spare capacity exists:**

- When there is excess capacity unless stated otherwise in the question, then the relevant cost of making the product in-house is the variable cost of internal manufacture plus any fixed costs directly related to that product.

Relevant cost = Variable cost + any fixed cost directly related to that product

2. **No spare capacity exists**

If there is no excess capacity, then the relevant cost of making the product in-house is the variable cost of internal manufacture plus any fixed costs directly related to that

product plus the opportunity cost of internal manufacture (e.g. lost contribution from another product).

Relevant cost = Variable cost + any fixed cost directly related to that product + opportunity cost

1.4.2 Other Important Qualitative Factors

Apart from the short-term quantitative factors which were discussed above which favour the buying option from external suppliers, there are other qualitative factors which should be considered and which also might affect the operating results of the company. Some of these factors are as follows

- The organization should consider the quality of the products of the external supplier and make sure that the company will get the same quality or better throughout the period of the contract of buying option.
- The organization should make sure that the products from the external supplier are delivered at the right time. i.e. the right time of delivery of the items
- The outside supplier's price could be temporary, for example, he needs to get rid of surplus stocks or penetrate a new market, and then after that, the supplier may increase prices. Hence the management should make sure that those prices given by the external supplier are persistent and constant in the longer term.
- The decision of the company, to outsource the product which it was previously making, may cause redundant in the company, and this may cause social and behavioural effects within the company
- Confidentiality: is there a risk of loss of confidentiality, especially if the external supplier performs similar work for rival companies?
- Customer reaction: do customers attach importance to the products being made in-house?
- Legal: will outsourcing affect contractual obligations with suppliers or employees?

1.5 Accepting or Rejecting Special Orders Decision

Management must often assess and evaluate whether a special order should be accepted or rejected, and if the special order is accepted, the management should consider the price at which the order is charged.

The special order is a temporary order which is not considered as a part of the organization's normal selling activities. Normally the special-order price is lower than the normal selling price. In general terms, an order will probably be accepted if it increases contribution and profit and rejected if it reduces profit.

In the special-order decisions, the management can be faced with the following two scenarios

1. Where the organization has spare capacity and the order could be met from the available excess capacity of the organization. I.e. the order would not have to turn away the existing business.
2. Where the organization has no sufficient spare capacity and therefore does not meet the order result, the existing business is to be turned away.

Therefore, for the manager deciding, whether to accept the special order or reject the following points should be noted

1. If the organization has excess capacity and can meet the order, without disrupting existing sales, hence the order should be accepted
   - If the price offered makes some contribution margin to fixed costs and profit,
   - That are variable costs of marking the order are less than the price offered by the order.
   - Remember that the fixed costs are not relevant to such a decision since they will be incurred regardless of whether the order is accepted or rejected.
   - However, the additional fixed costs incurred as a result of accepting such an order should be considered

2. If the organization does not have sufficient excess capacity and accepting the order would disrupt the existing sales, the order should be accepted only
   - If the contribution margin from the order is greater than the contribution margin from the business it must be sacrificed.
   - That the order will be accepted only if, the price of the order is greater than the variable costs of making the order and loss on the contribution margin of sacrificed business,
   - However, any additional fixed costs incurred as a result of accepting such an order should be considered

1.5.1 Generally Rule of Accepting the Special Order

So when do a Company Accept or Reject a Special Order?

Generally, the rule is to accept the order as long as the incremental revenue is MORE than the incremental costs since this will result in incremental profit

Incremental Revenue = Special Order units x Special Order price

Incremental Costs = Variable costs + extra fixed overheads + opportunity costs that relate to the production of that special order

Incremental Profit =Incremental Revenue - Incremental Cost

1.5.2 Other Important Factors

There are other qualitative factors which should be considered by the management before the final decision of accepting or rejecting the special order is taken. The factors which should be considered are as follows;

- Normally the special order price is lower than the normal selling price, so accepting the order at a lower price, could result in other customers demanding the lower prices as well.
- If the company has sufficient excess capacity, then accepting the special order is the best way of utilizing the excess capacity of the company

- Maybe the company has excess capacity due to variations of business such as economic recession, then the management should ask that, accepting of special order now, will it lock up the capacity which could be used for the future, during a period of economic boom of the business?

1.6 Shutdown Decisions

Sometimes in the organization, the management can be faced with the problem, of whether to continue or shut down the activities of the organization, such as closing down a factory, department, product line or any other activity

1.6.1 The quantifiable cost or benefit of closure

The relevant cash flows associated with closure should be considered. Such as:

1. The lost contribution from the area that is being closed (= relevant cost of closure)
2. savings in specific fixed costs from closure (=relevant benefit of closure)
3. known penalties and other costs resulting from the closure, e.g. redundancy, compensation to customers (=relevant cost of closure)
4. Any known reorganization costs (= relevant cost of closure)
5. Any known additional contribution from the alternative use for resources released (= relevant benefit of closure).

- It should be noted that, if the relevant benefits are greater than the relevant costs of closure then closure may occur.
- However, before a final decision is made the business should also consider the non-quantifiable factors discussed below

1.6.1 Non-quantifiable costs and benefits of closure

Some of the costs and benefits discussed above may be non-quantifiable at the point of making the shutdown decision:

1. Penalties and other costs resulting from the closure (e.g. redundancy, compensation to customers) may not be known with certainty.
2. Reorganization costs may not be known with certainty.

3. Additional contribution from the alternative use for resources released may not be known with certainty