

## Decision Making

***Able to make effective decisions in a variety of situations***

The choice between two or more alternatives, decision making normally considers only the short term consideration of maximising profitability at this point in time. It may also include use of discounted cash flows when considering investment appraisal. We base our decisions on relevant costs.

**Relevant cost:** *Future cash flow arising as a direct result of the decision*

**Relevant costs include:**

- **Opportunity cost**
- **Avoidable cost**
- **Variable cost**
- **Incremental cost**

**Non-relevant costs**

- **Sunk costs** - costs incurred (not future, not arising from decision).
- **Committed costs** - future expenditure which will/cannot be affected by the decision.
- **Non cash flows** - any cost which does not reflect cash flow eg depreciation.
- **Overheads absorbed** - does not necessarily reflect cash flow, only overheads incurred may be relevant.

### Opportunity cost

The benefit foregone by choosing one alternative in preference to the next best alternative. In many decisions there is more than a simple “do nothing” alternative. In such circumstances the benefit/cost of one course of action will be determined by other possible courses of action.

Opportunity costs only apply to the use of scarce resources. Where resources are not scarce, no sacrifice exists from using these resources.

### Example

A firm rents a warehouse for \$500 per week and currently sub-let it for \$600 per week. They have the opportunity to undertake a new project, which would involve using the warehouse themselves.

In assessing the new project, what is the appropriate cost for the warehouse?

**Avoidable costs**

Costs attached to a part or segment of a business which could be avoided if that part or segment ceased to exist. Variable costs are normally considered avoidable, fixed costs normally not. Fixed costs may be considered avoidable if they arise within the single part or segment of the business that is relevant. They are particularly applicable in shutdown decisions.

**Variable costs**

Those costs which vary proportionately with the level of activity. As seen above the variable nature of the cost often makes it more likely to be relevant. We should already know that the variable cost is useful for break-even analysis or any other form of contribution analysis.

**Incremental costs**

Those additional costs (or revenues) which arise as a result of the decision. This classification is particularly useful for further processing decisions, but may be used as a basis for tackling any relevant cost analysis.

**SOME RULES***Relevant cost of Materials*

- Material is not in stock – relevant cost is the purchase cost
- Material is already in stock –
  - ◆ If there is no alternative use then the relevant cost is its scrap value (or zero if it has no scrap value)
  - ◆ If it is in constant use the relevant cost is the replacement cost (or the opportunity cost if in short supply).

*Relevant cost of Labour*

- Where the labour is used on a daily basis and cannot be used on other tasks the relevant cost is the direct labour cost incurred.
- If there is spare capacity and the labour force is maintained in the short term then the labour cost is in effect a fixed cost and will be irrelevant.
- Where the labour force is working at full capacity, and there is no overtime permitted and no available additional labour, then the only way that labour resources could be obtained for a specific order would be to switch workers from a different product. This would lead to a loss of contribution from the existing product. The relevant cost of the labour would be the actual labour rate and the opportunity cost of the lost contribution.

**Relevant cost analysis**

The application of relevant cost analysis to a question. The questions tend to be pricing questions or accept or reject an order decisions. There are a range of costs including materials and labour which must be analysed separately to identify whether they are relevant. The relevant elements are then added up to calculate the total relevant cost. The key to all relevant cost questions is a sound understanding of the definition of a relevant cost.

**Example**

JB Ltd is a small specialist manufacturer of electronic components and much of its output is used by the makers of aircraft for both civil and military purposes. One of the few aircraft manufacturers has offered a contract to JB Ltd for the supply, over the next 12 months, of 400 identical components.

The data relating to the production of *each component* is as follows:

**(1) Material requirements**

3 kg material M1 – see note (i) below  
2 kg material P2 – see note (ii) below  
1 part no. 678 – see note (iii) below

**Notes:**

- (i) Material M1 is in continuous use by the company. 1,000 kg are currently held in stock at a book value of \$4.70/kg but it is known that future purchases will cost \$5.50/kg.
- (ii) 1,200 kg of material P2 are held in stock. The original cost of this material was \$4.30/kg but, as the material has not been required for the last two years, it has been written down to \$1.50/kg scrap value. The only foreseeable alternative use is as a substitute for material P4 (in current use) but this would involve further processing costs of \$1.60/kg. The current cost of material P4 is \$3.60/kg.
- (iii) It is estimated that the part no. 678 could be bought for \$50 each.

**(2) Labour requirements**

Each component would require three hours of skilled labour and five hours of semi-skilled. An employee possessing the necessary skills can be hired for \$8/hour. The semi-skilled workers are at present idle through lack of work and there is an agreement with the union that in such circumstances they be paid their normal rate of \$5/hr.

**(3) Overhead**

JB Ltd absorbs overhead by a machine hour rate, currently \$20/hour, of which \$7 is for variable overhead and \$13 for fixed overhead. If this contract is undertaken, it is estimated that fixed costs will increase for the duration of the contract by \$3,200. Spare machine capacity is available and each component would require four machine hours.

A price of \$145 per component has been suggested by the large company which makes aircraft.

**Required:**

**State whether or not the contract should be accepted and support your conclusion with appropriate figures for presentation to management.**

**Make or buy decision**

The decision to make a component or product 'in-house' or alternatively to buy it from an outside supplier. The underlying assumption of this decision is that all fixed costs of manufacture are general to the organisation as a whole and hence only the marginal cost of making the component is relevant.

***Decision criteria: Compare marginal cost of making to the purchase price (the marginal cost of buying)***

**Example**

Rindt Ltd produces a number of components, two of which he is considering buying in, components X and Y.

Cost of making (\$)	<b>X</b>	<b>Y</b>
Variable	12	25
Fixed	<u>8</u>	<u>8</u>
Total	<u>20</u>	<u>33</u>
Purchase price (from outside supplier)	15	23

Should each component be made or bought?

**Limiting factor decision**

The factor which limits the level of activity at which the company may operate. In budgeting we would normally assume this to be sales demand. Here the limiting factor will be anything other than sales demand i.e. a factor of production. Examples include:

1. Scarce raw materials
2. Shortage of skilled labour
3. Limited machine capacity
4. Finance (see capital rationing in FM)

***Aim : Maximise the contribution per unit of scarce resource***

Given the limitation it is necessary to generate the most contribution in relation to this resource, this is done by following the steps below:

1. *Calculate the contribution per unit of sale.*
2. *Divide through by scarce resource per unit of sale to identify the contribution per unit of scarce resource.*
3. *Rank this in order - highest first.*
4. *Use up the resource in order of the ranking.*

**Example**

Stewart Ltd produces two products using the same machinery. The hours available on this machine are limited to 5,000. Information regarding the two products is detailed below:

<b>Products (per unit data)</b>	<b>M</b>	<b>N</b>
Selling price (\$)	<u>40</u>	<u>30</u>
Variable cost (\$)	16	15
Fixed cost (\$)	<u>10</u>	<u>8</u>
Profit (\$)	<u>14</u>	<u>7</u>
Machine hours per unit	8	3
Budgeted sales (units)	600	500

Note: Fixed costs are absorbed on a per unit basis calculated at the budgeted sales levels above.

**Required**

Calculate the maximum profit that may be earned.

**Limiting factor and make or buy decisions together**

What if the question allows you to buy in the products that are affected by the limiting factor? How does the analysis change?

**Original choice:** The simplest choice we have above is to produce the product or to do nothing and hence our aim is to maximise the contribution of each unit of scarce resource.

**Revised choice:** Now we have the choice to make a product in-house or to buy it in from an outside supplier. (Presumably the cost of making is less than buying in otherwise there would be no limiting factor).

***Aim: Maximise the additional contribution of making the product, per unit of scarce resource.***

**Example**

Stewart Ltd as above but we are now able to purchase units of M and N in from an outside supplier for \$32 and \$18 respectively.

**Required**

What is the maximum profit that may be earned?

### Shutdown (Discontinuance) Decisions

The decision whether to shut down a part or segment of a business. In normal reporting, it is likely that we would use absorption costing to link costs to products. Using this system it may appear that the product is making a loss and should be eliminated. What we must consider is whether the cost is *avoidable*.

As discussed above we would expect all variable costs to be avoidable and the majority of fixed costs to be general to the business as a whole and hence not avoidable. It is possible for fixed costs to be avoidable if they are specific to the part or segment of the business being considered.

The simplest way to consider such a problem is to re-draft any information in the form of a marginal costing profit statement.

### Example

Fittipaldi Ltd operates three divisions within a larger group. The managing director has been shown the latest profit statements and is concerned that division C is losing money, as below:

<b>Division</b>	<b>A</b>	<b>B</b>	<b>C</b>
	(\$000)	(\$000)	(\$000)
Sales	<u>100</u>	<u>80</u>	<u>40</u>
Variable costs	60	50	30
Fixed costs	<u>20</u>	<u>20</u>	<u>20</u>
Profit/(loss)	<u>20</u>	<u>10</u>	<u>(10)</u>

You are informed that 40% of the fixed cost is division specific, the remainder being allocated arbitrarily to the divisions from head office.

**You are required** to advise the managing director whether or not to close down division C.

**Further processing decisions**

Normally associated with process costing, further processing decisions arise when there is a choice of either selling at one level of completion or further processing to a higher level of refinement. The key to this type of problem is to remember that costs from previous processes are not relevant. The only relevant costs are those incrementally arising from the further processing.

***Aim: Compare incremental costs and revenues*****Example**

Lauda Ltd operates a joint process from which four products arise. The products may be sold at the separation point of the process or can be refined further and be sold at a premium. Information regarding the products and the refining process can be found below:-

<b>Products</b>	<b>E</b>	<b>F</b>	<b>G</b>	<b>H</b>
Selling prices per litre (\$)				
At separation point	12	16	15	18
After refining	20	23	25	22
Costs (\$)				
Joint process (per litre)	8	8	8	8
Refining process:				
Variable (\$ per litre)	5	5	5	5
Specific fixed (\$ in total)	1,000	2,000	3,000	4,000
Budgeted litres	2,000	500	5,000	6,000

The general fixed overheads in the refining process amount to \$20,000.

**Required:**

- (a) **Determine which products should be further processed.**
- (b) **Would your decision in (a) change if the general fixed overheads were \$30,000?**