3 Different Cost Types as a Function of Different Decision-Making Situations

3.1 Introduction

General variability

In any given company there are a number of typical cost types which vary in tact with specific decisions: time horizon, product type, and production conditions, just to name a few.

- For a hotel, the cost calculation for a vacant room per night, depending on the decision-making occasion, could result in numbers as different as DKK 20 and 400.
- For an airline the calculation of costs per seat between Oslo and Copenhagen result in numbers as different as DKK 80 and 460.
- For Carlsberg the cost calculation of producing one premium pilsner result in numbers as different as DKK 0.80 and 2.20.
- For TDC the cost calculation for one minute of calling on the cellular net in numbers as different as DKK 0.15 and 0.65.

The decision-making occasion has to be specifically defined.

Cost types

Different cost types are composed of different integral aspects when examined from the perspective of specific decision-making occasions. Below, are a number of typical cost specifics:

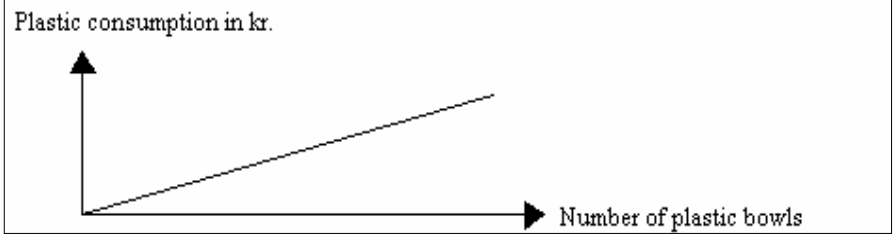
Raw materials
Blue collar (hourly paid workers employed on short notice)
Production costs, direct
Production costs, indirect
Depreciation factors
Interest
Administration
Research
Management, consulting, and accounting

3.2 Examining Different Cost Types

Raw materials

In regards to a specific decision-making situation, raw materials are a direct variable cost, i.e. the size of the costs are dependent on the size of production. For instance, plastic is a raw material when manufacturing plastic bowls, and the amount of plastic used varies directly with the production of the plastic bowls. This relationship is illustrated in figure 3.1:

Figure 3.1: Consumption of raw materials in production

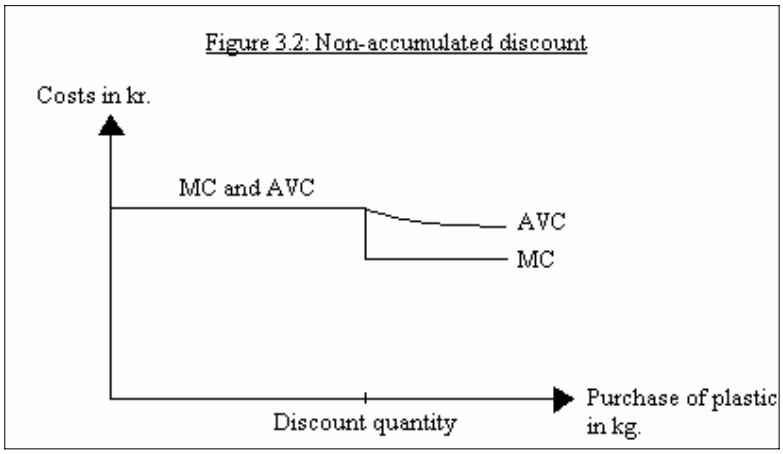


Purchasing discounts

When a firm plans production, the cost of raw materials are partially dependent on whether or not purchasing discounts (quantity discounts) have been achieved, which generally appear in two different forms:

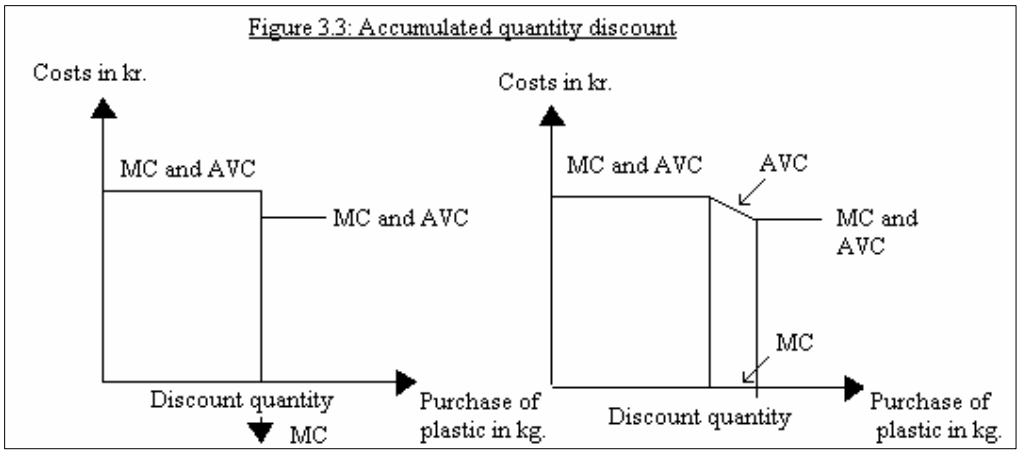
- **Non-accumulated discount (normal discount):** In this case, the firm only receives a discount for the part of the purchase that exceeds the discount boundary quantity. A normal discount could, for instance, be structured so that the plastic bowl manufacturer obtains a 15% discount on the portion of the purchases that exceed the discount boundary quantity of 1 metric ton per month. This situation is shown in figure 3.2:

Figure 3.2: Non-accumulated discount



- **Accumulated quantity discount:** In this case the firm receives a discount for the entire amount purchased, provided that the purchase equals or exceeds the discount boundary quantity. A 15% accumulated quantity discount could be structured so that the plastic bowl manufacturer obtains a 15% discount on all plastic purchased, provided that a minimium of 1 metric ton is purchased every month. This scenario is depicted in figure 3.2:

Figure 3.3: Accumulated quantity discount



- The first of the two figures shows the accumulated quantity discount provided, which is regarded as a bonus sum, paid when the discount quantity is reached. Here, MC has a negative value, i.e. a negative cost (read: an income).

- The second figure shows the accumulated quantity discount where the last quantity purchased before the discount quantity is reached, is free of charge. This discount format should be understood in terms of the following example: if the plastic bowl manufacturer obtains an accumulated quantity discount of 15% when buying 1 metric ton, then the amount of the discount can be explained by the purchase quantity between 850 kg and a ton, being free of charge.

Under certain rare circumstances, it is possible to buy more product than needed, with the purpose of obtaining the discount limit. In these cases, though they seem somewhat unthinkable, the cost of destroying or transporting the excess quantity complicates the model to some degree. This situation is highly academic and will not be discussed in-depth here. For a theoretic explanation, albeit in Danish, is available found in "Opgaver i Erhvervsøkonomi – med supplerende noter" af Michael Havsteen og Ove Hedegaard, DJØF's Forlag 2003.

Raw materials – opportunity costs

If a firm utilizes raw materials that experience price fluctuations (e.g. silver for Georg Jensen), it is the rebuy-price, at the time of the decision that should be integrated into the cost calculations. A possible profit or loss based on the difference between the original cost price and the cost price at the time the decision is made should be defined as a speculative profit or loss.

Under specific circumstances, the firm can build up raw materials as a "last production." In these situations, it is possible to do a cost estimate. This estimate should use the price the raw materials could be sold for, which is often well below the cost price. A fence manufacturer having bought wood cut to a specific length, could represent a hypothetical example. These pieces of wood could only be resold at a substantial price reduction. Other examples include: companies ceasing production of a certain item, or who are going bankrupt, etc.

Hourly wages – blue collar

Blue-collar workers, or employees with an hourly wage, have traditionally been people that could be hired and laid off on a short notice. In the traditional industrial perception these people have a relatively limited knowledge and represent low training costs.

The reality in the industrial world is though quite different. The following circumstances are some of those which affect this scenario:

- There are very few jobs that do not have a required training-period, with attached training costs.
- For many jobs, the training of new employees constitutes a significant investment, which increases the repercussions of time horizon layoff decisions.
- Most hourly paid employees have a mandatory giving notice period, varying from days to weeks.
- Many hourly paid employees have competencies which are expensive for companies to replace. These competencies are often even more crucial for the firm than those possessed by white collar workers.
- Most of the job functions can be carried out in a more or less correct manner, with more or less confidence, and with a variable quality of production as a result. Therefore, employees should be ranked so that the ones most valuable to the firm are the first to be employed and so on. In this way, the wage costs per unit produced will increase with the size of production as a direct consequence of employees having different qualifications.

Production costs, direct

Direct production costs vary with production size. Regarding the production of beer, the following examples have relevance:

- Production unit element level (brew, bottle, label, top)
- Series element level (packing, internal transportation)
- Product element level (daily cleaning, power)
- Product line element level (systematic maintenance, product control)

Normally, a product or service unit would be estimated including the direct costs concerning all these element levels. This procedure is due to the decision-making situation connected with production, which also involves decision-making focusing on selling goods, and in this case, all production costs should be included. Read more about this topic in the chapter about calculations, where fixed and variable costs are addressed.

Production costs, indirect

A number of indirect costs are also involved in the produced unit, and can neither logically or unambiguously be attributed to the production – but nonetheless they can be unavoidably connected to production. These costs often include service functions related directly to the production activity, such as:

- Raw materials (control, management, waste, etc.)
- Employees (cleaning, training, illnesses, cafeterias, etc.)
- Production lines (maintenance, repairs, updates)
- Communication

Especially the principles of Activity Based Costing (ABC), examined in the calculations chapter, methodologically treat these areas and their relation to handling of costs.

Administration

In terms of costs, administrative processes are often very difficult to measure because they, in the short-term, are regarded as fixed costs. At the same time, the scope of the processes and thereby the number of employees often varies, partly with the size of production, but also in relationship to a number of decisions made on the management level.

One may be inclined to concentrate more or less on one process, such as sales, communication, IT and/or quality control. This decision is based on a number of considerations centered around increasing sales or savings.

In order to delineate processes in terms of products, or product lines can be very difficult, and it is most often necessary to estimate a percentage to cover these functions when production costs are to be assessed.

- Sales processes
- Production, production management
- Communication
- Controlling and accounting
- Human resources, training, etc.

In most cases the changes in costs, for these processes, are far slower than the changes in sales and production, and therefore they fluctuate much more slowly than the direct production costs.

If changes in production are short lived (1–6 months) adjustments in the costs for these processes can be very small, which is why they resemble fixed costs.

Depreciation

Depreciation, as related to the costs of a given production quantity, is very difficult to handle. Depreciation can be divided into a number of different components:

- Wear and tear of machinery/tools caused by use that has a direct negative impact on the machine.
  This factor applies, for instance, to cars, trucks, tractors, etc. In a situation where other influential factors remain unchanged, it is safe to say that a well used machine is in worse shape than a less used machine.
- Deterioration due to time, caused by the fact a machine getting older, and supposedly not being as technologically, or in other ways as up-to-date, as a new machine.
- Technological deterioration, caused by emerging new technology, better suited for a given job, and as thereby reducing the value of the machinery (IT hardware/software etc.).

Depending on the decision-making occasion, one or more of the above mentioned costs must be considered.

Interest

Interest, in relation to production costs, is to be included to the extent to which the carrying out the production demands capital. If storage or machines could be liquidated, interest would be a part of the costs of carrying out production.

Interest should typically be represented by the most expensive part of the financing, and NOT as the average interest. If any special ways of financing are connected to a specific object, for example, cheaply financed trucks or cars, the interest pertaining to this situation could be included in cost calculations.

Insurance, design, etc.

Insurance, research, development, design, etc., are relevant for many industries focusing of producing goods for sale. Some example products include: cars, medicine, clothes, building materials, etc.

Research can succeed or fail, and of course the cost of research has to be recovered in the long run. If not in the first attempt then in the next.

Research is an investment, and R&D efforts are not to be included in the production price of the product. These expenditures are referred to as sunk costs.

Overhead "by-one costs"

In a given firm, a number of general costs have a certain status. These are:

- Management and work done by the board of directors
- Consulting and accounting
- IT systems

These elements are prerequisites for the firm's ability to take action, and most often they do not change with a smaller or larger production size. Only when using the "full cost" calculation model are these costs integrated in order to cover these costs. In relation to changes in production, and changes in costs, these factors have no significance.