

Scale of a business

The term SCALE in business means size. When managers and owners talk about increasing the scale of operations they mean that the business should be bigger. Large-scale businesses use more resources and produce more output. They also have higher turnover, enjoy lower unit costs and generally make larger profits. Consequently there are some strong motives for increasing the scale of operations. Unilever, which produces foods, beverages, cleaning agents and personal care products, is a large-scale operator. It is a multi-national company, employs over 180,000 people and enjoyed a turnover of over \$50 billion and a profit of over \$5 billion in 2006.

Scale and productive efficiency

One objective of production managers is to achieve **productive efficiency**. This occurs when the average cost per unit of output is at its lowest. So if a business produced bolts at 6p per 1,000 when it could produce them at 4p per 1,000, then it would be productively inefficient. It would only be productively efficient if average costs were 4p per 1,000.

There are many reasons why businesses can be productively inefficient. For example, from a production viewpoint, they might:

- not be paying the cheapest price for the materials they buy in;
- be employing more workers than is necessary;
- be using outdated technology;
- hold too much stock;
- have badly organised or inappropriate production methods.

Inefficiency can also be caused by failing to manage human resources effectively. For example, workers might:

- be demotivated and not be working as hard as they could;
- not have received sufficient training;
- apply for a job, but fail to get it despite being the best candidate because of poor recruitment procedures;
- suffer from weak leadership and be less productive;
- be in a poorly organised business where the organisational structure is a barrier rather than a help to efficient working;
- be underemployed and have too little to do because of over recruitment due to poor workforce planning;
- be unable to do their jobs fully because poor workforce planning has led to under-recruitment of staff.

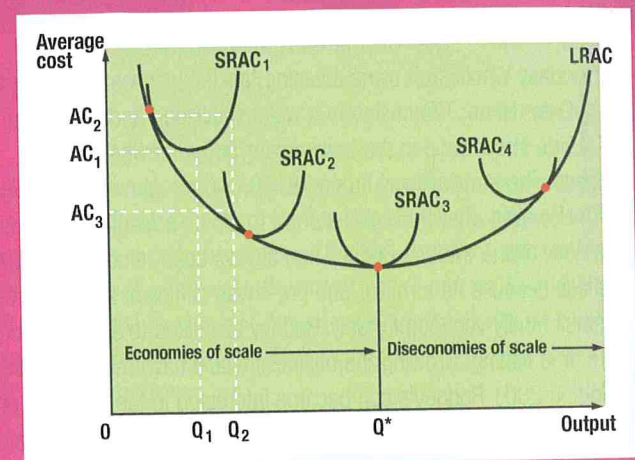
Productive efficiency and economies of scale

The size of a business has a major impact on average costs of production. Typically, there is a range of output over which average costs fall as output rises. Over this range, larger

businesses have a competitive advantage over smaller businesses. They enjoy **ECONOMIES OF SCALE**. In the long run, a business can build another factory or purchase more machinery. This can cause the average cost of production to fall.

In Figure 1 a firm is currently producing in a small plant and its short-run costs are $SRAC_1$. When it produces an output equal to Q_1 its average cost will be AC_1 . If it raises production to Q_2 , average costs will rise to AC_2 . This is the result of the **law of diminishing returns**.

Figure 1: The long-run average cost curve and the effect of economies of scale



If the firm expands the scale of its operations (which it can do in the long run) the same level of output can be produced more efficiently. With a bigger plant, represented by $SRAC_2$, Q_2 can be produced at an average cost of just AC_3 . Long run average costs fall due to economies of scale and will continue to do so until the firm has built a plant which minimises long run average costs. In the diagram this occurs when a plant shown by $SRAC_3$ is built. This is sometimes called the **MINIMUM EFFICIENT SCALE** of plant. When output reaches Q^* in this plant, long run average costs cannot be reduced any further through expansion. The business is said to be **productively efficient** at this point.

At any output level higher or lower than Q^* , the business is productively inefficient because average costs could be lower. For example, if the firm continues to grow it will experience rising average costs due to **DISECONOMIES OF SCALE**, as in $SRAC_4$ in Figure 1. This is dealt with later in the unit.

Internal economies of scale

What are the different economies of scale a firm can gain? **INTERNAL ECONOMIES OF SCALE** are the benefits of growth

that arise within the firm. They occur for a number of reasons.

Purchasing and marketing economies Large firms are likely to get better rates when buying raw materials and components in bulk. In addition, the administration costs involved do not rise in proportion to the size of the order. The cost of processing an order for 10,000 tonnes of coal does not treble when 30,000 tonnes are ordered.

A number of marketing economies exist. A large company may find it cost effective to acquire its own fleet of vans and lorries, for example. The cost to the sales force of selling 30 product lines is not double that of selling 15 lines. Again, the administration costs of selling do not rise in proportion to the size of the sale.

Technical economies Technical economies arise because larger plants are often more efficient. The capital costs and the running costs of plants do not rise in proportion to their size. For example, the capital cost of a double decker bus will not be twice that of a single decker bus. This is because the main cost (engine and chassis) does not double when the capacity of the bus doubles. Increased size may mean a doubling of output but not cost. The average cost will therefore fall. This is sometimes called the **principle of increased dimensions**. In addition, the cost of the crew and fuel will not increase in proportion to its size.

Another technical economy is that of **indivisibility**. Many firms need a particular item of equipment or machinery, but fail to make full use of it. A small business may pay £400 for a laptop computer. The cost will be the same whether it is used twice a week by a part time clerical worker or every day. As the business expands, more use will be made of it and so the **average cost** of the machine will fall.

As the scale of operations expands the firm may switch to mass production techniques. Flow production, which involves breaking down the production process into a very large number of small operations, allows greater use of highly specialised machinery. This results in large improvements in efficiency as labour is replaced by capital.

Businesses often employ a variety of machines which have different capacities. A slow machine may increase production time. As the firm expands and produces more output, it can employ more of the slower machines in order to match the capacity of the faster machines. This is called the **law of multiples**. It involves firms finding a balanced team of machines so that when they operate together they are all running at full capacity.

Specialisation and managerial economies As the firm grows it can afford to employ specialist managers. In a small business one general manager may be responsible for finance, marketing, production and personnel. The manager may find her role demanding. If a business employs specialists in these fields, efficiency may improve and average costs fall. If specialists were employed in a small firm they would be an indivisibility.



Question 1.

Premier Foods, the owner of Branston Pickle, bought the Campbell Soup Company for £450 million (\$830 million) in 2006. Premier Foods said the purchase would give it control over well-known brands including Oxo, Batchelors, Homepride and Fray Bentos in the UK and Ireland. After the purchase, Premier Foods said it planned to continue its strategy of acquisitions. The purchase of these brands should help Premier Foods to further exploit economies of scale. 'The Campbell's UK business fits Premier like a glove,' said Robert Schofield, chief executive of Premier foods. 'This acquisition will bring an excellent portfolio of powerful and iconic brands which we intend to drive forward with increased resource and innovation,' he added. The cost of the transaction was met in large by issuing new shares to existing shareholders.

Source: adapted from <http://news.bbc.co.uk>.

- (a) Explain why Premier Foods may be able to exploit (i) marketing economies and (ii) purchasing economies as a result of the acquisition.

Financial economies Large firms have advantages when they try to raise finance. They will have a wider variety of sources from which to choose. For example, sole traders cannot sell more shares to raise extra funds but large public limited companies can. Very large firms will often find it easier to persuade institutions to lend them money since they will have large assets to offer as security. Finally, large firms borrowing very large amounts of money can often gain better interest rates. In the past the government has recognised the problems facing small firms. A number of schemes have been designed to help small firms raise funds.

Risk bearing economies As a firm grows it may well diversify to reduce risk. For example, breweries have diversified into the provision of food and other forms of entertainment in their

public houses. Large businesses can also reduce risk by carrying out research and development. The development of new products can help firms gain a competitive edge over smaller rivals.

External economies of scale

EXTERNAL ECONOMIES OF SCALE are the reductions in cost which any business in an industry might enjoy as the industry grows. External economies are more likely to arise if the industry is concentrated in a particular region.

Labour The concentration of firms may lead to the build up of a labour force equipped with the skills required by the industry. Training costs may be reduced if workers have gained skills at another firm in the same industry. Local schools and colleges, or even local government, may offer training courses which are aimed at the needs of the local industry.

Ancillary and commercial services An established industry, particularly if it is growing, tends to attract smaller firms trying to serve its needs. A wide range of commercial and support services can be offered. Specialist banking, insurance, marketing, waste disposal, maintenance, cleaning, components and distribution services are just some examples.

Co-operation Firms in the same industry are more likely to co-operate if they are concentrated in the same region. They might join forces to fund a research and development centre for the industry. An industry journal might be published, so that information can be shared.

Disintegration Disintegration occurs when production is broken up so that more specialisation can take place. When an industry is concentrated in an area firms might specialise in the production of one component and then transport it to a main assembly car plant. In the West Midlands a few large car assembly plants exist, while there are many supporting firms.

Diseconomies of scale

If a business expands, the scale of its operations beyond the minimum efficient scale, diseconomies of scale may result. This is where average costs rise as output rises. There is a variety of sources of diseconomies of scale. As shown in Figure 1, long-run average costs start to rise once the output of a business passes Q^* on the diagram.

Internal diseconomies of scale Most internal diseconomies are caused by the problem of managing large businesses.

- Communication becomes more complicated and co-ordination more difficult because a large firm is divided into departments.
- The control and **co-ordination** of large businesses is also demanding. Thousands of employees, billions of pounds and dozens of plants all mean added responsibility and more supervision.

- Motivation may suffer as individual workers become a minor part of the total workforce. This can cause poor relations between management and the workforce.
- Technical diseconomies also arise. In the chemical industry, construction problems often mean that two smaller plants are more cost effective than one very large one. Also, if a business employs one huge plant and a breakdown occurs, production will stop. With two smaller plants, production can continue even if one breaks down.

External diseconomies of scale These may occur from overcrowding in industrial areas. The price of land, labour, services and materials might rise as firms compete for a limited amount. Congestion might lead to inefficiency, as travelling workers and deliveries are delayed.

Factors influencing the scale of operation

The scale of operation differs widely from industry to industry. In industries like leather making and furniture manufacture, economies of scale tend to be relatively small. In car assembly or the chemicals industry, they tend to be large. The reasons why they differ are related to the sources of economies of scale.

Technical economies In some industries, there are considerable technical economies. In car manufacturing, for instance, plants need to be a certain size to reach the lowest average cost scale of production. In leather manufacturing, however, even quite small businesses can be highly efficient because the machinery required is relatively little and relatively cheap.

Specialisation In car manufacturing, the organisation of production is complex and there are considerable opportunities to exploit specialisation of labour and capital. In leather manufacturing, the organisation of production is relatively simple with far fewer opportunities to gain the benefits of specialisation.

Purchasing economies Car manufacturers buy billions of pounds of components each year. So there is scope for a large business like Ford to negotiate large discounts compared with a small manufacturer like Morgan cars. In leather manufacturing, the market is much smaller. So no business would ever approach the size of orders that are common in car manufacturing. Hence the difference in purchasing power between small and large firms in the industry is greatly reduced.

Marketing economies In marketing, Ford markets models which sell in their millions around the world. The cost of marketing per car is therefore likely to be far less than, say, for Morgan Motor Company which sells only a few hundred per year. In leather manufacture, it is difficult to mass market any product because leather goods tend to be produced in small quantities to individual designs which are constantly changing. So larger manufacturers are unlikely to have much lower marketing costs per unit sold than small manufacturers.

Economies of scale and resource mix

Because of these factors, leather manufacturers tend not to be large. On the other hand car manufacturers are among the larger companies in the world.

Choosing the optimal mix of resources

A business has to choose an appropriate combination of materials, tools, equipment, machinery and labour before production can begin. The more complex the product, the more difficult this will be. There is often a variety of materials and equipment to choose from. For example, a small manufacturer of jeans has to consider which type of cloth, cotton, stud, zip, sewing machine and labour to use. What influences the factors of production a business chooses?

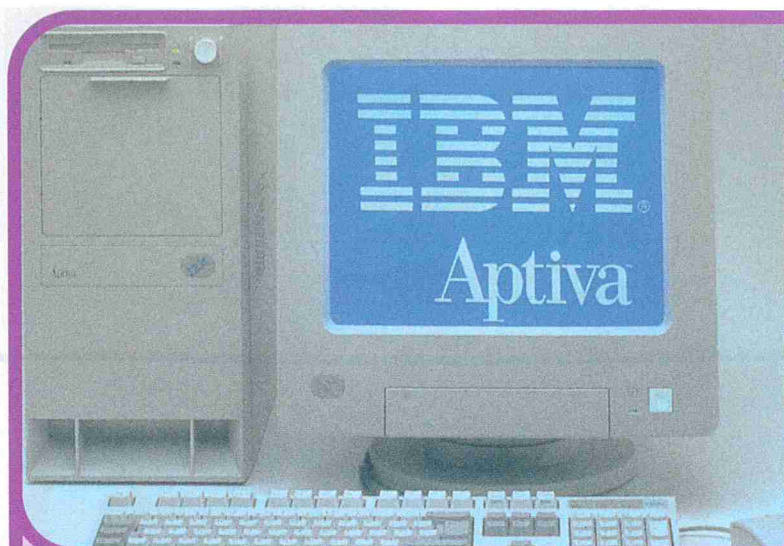
- The actual design itself may specify which materials to use. For example, a new savoury snack will be made to a strict list of ingredients.
- There may be limited amounts of labour, capital or materials. A company recruiting people with specialist skills may find that supply 'runs out'. It may then have to recruit unskilled workers and train them.
- Businesses will aim to use the cheapest factors, assuming that there is no difference in quality. If there is a difference in quality then the firm must decide which factor most suits its needs and budget. For example, when a company buys a new computer there is a wide range of models to choose from, at a range of different prices. It will have to select a model which suits its needs, and also one which it can afford.

Capital and labour intensity

One of the most important production decisions which operations managers have to make is what combination of capital and labour to use. **LABOUR INTENSIVE PRODUCTION** techniques involve using a larger proportion of labour than capital. **CAPITAL INTENSIVE PRODUCTION** techniques involve employing more machinery relative to labour. For example, chemical production is capital intensive, with only a relatively small workforce to oversee the process. The postal service is labour intensive, with a considerable amount of sorting and delivery done by hand.

The optimal resource mix between labour and capital depends on a number of factors.

- The nature of the product. Everyday products with high demand, like newspapers, are mass produced in huge plants using large quantities of machinery. However, in modern economies like the UK an increasing number of the products supplied by businesses are services. Generally, the provision of services is labour intensive.
- The relative prices of the two factors. If labour costs are rising then it may be worth the company employing more capital instead. In countries like China and India where labour is relative cheap, labour intensive production methods are preferred. However, in most developed economies like the UK, labour is more expensive and a



Question 2.

In the 1970s, it was argued that large companies could be very profitable if structures were crystal clear and rational. Through these means, human error or deviance could be minimised. But in the 1990s, a variety of studies were conducted which showed that around 1,000 employees in one location is about the maximum size for any company if it is to retain the advantages of economies of scale and minimise the human diseconomies arising from adding more people.

Take the case of IBM, the world's first large computer company. In the 1970s and 1980s, IBM came to symbolise the success of big business. It had pioneered the manufacture of large mainframe computers. But by 1993, it was in trouble, losing £5.6 billion in that year alone. It had failed to move with the times. Part of the business was saying that the future lay with cheap small personal computers. Part of the business was making a profit from computer software. Those at the top failed to listen and persisted in thinking that the future lay with expensive mainframes.

A new chief executive, Lou Gerstner, was appointed. He reduced IBM's workforce by 50 per cent. The company was refocused on providing e-business services and solutions, research and design and semiconductor architecture. Very importantly, the company was segmented into small operational units. IBM employees were remotivated to develop services, discover solutions and be innovative.

Source: adapted from *The Financial Times*, 4.1.2002.

- (a) Explain what is meant by 'diseconomies of scale' and, using the example of IBM, explain why they occur.

- great deal of manufacturing is capital intensive.
- The size of the firm. As a firm grows and the scale of production increases, it tends to employ more capital relative to labour. For example, in the UK, Morgan cars, a small sports car manufacturer, uses a labour intensive approach to production. In contrast, Honda, which has a huge car factory in Derby, uses capital intensive production.

Table 1: The effect on output as more workers are employed, given a fixed amount of capital

	(Units)							
Capital	40	40	40	40	40	40	40	40
No. of workers	1	2	3	4	5	6	7	8
Total output	4	10	18	30	45	52	55	56

Table 2: The benefits and drawbacks of capital and labour intensive strategies

Capital intensive strategies

Benefits

- Generally more cost effective if large quantities are produced.
- Machinery is often more precise and consistent.
- Machinery can operate 24/7.
- Machinery is easier to manage than people.

Drawbacks

- Huge set up costs.
- Huge delays and costs if machinery breaks down.
- Can be inflexible – much machinery is highly specialised.
- Often poses a threat to the workforce and could reduce moral.

Labour intensive strategies

Benefits

- Generally more flexible than capital – can be retrained for example.
- Cheaper for small-scale production.
- Cheaper for large-scale production in countries like China and India.
- People are creative and can therefore solve problems and make improvements.

Drawbacks

- People are more difficult to manage than machines. They have feelings and react.
- People can be unreliable. They may go sick or leave suddenly.
- People cannot work without breaks and holidays.
- People sometimes need to be motivated to improve performance.

The law of diminishing returns

Combining different amounts of labour and capital can affect the productivity of these factors in the short run. As more units of labour are added to a fixed amount of capital, the output of the extra workers will rise at first and then fall. This is shown in Table 1, where the amount of capital is fixed at 40 units. For example, when the second worker is hired the total amount

produced (total output) rises by 6 units (10-4). When the third worker is employed, output rises by 8 units (18-10), i.e. a higher amount.

The amount added by each extra worker (the marginal output) continues to rise until the sixth worker is employed. Then output rises by a smaller amount (7 units = 52-45). This is called the law of diminishing returns. Output rises at first because workers are able to specialise in particular tasks, which improves the productivity of extra workers. However, there reaches a point where workers are not able to specialise any more and the productivity of the extra worker begins to fall.

The benefits and drawbacks of capital and labour intensive strategies

Whether a business chooses a capital or labour intensive approach to production, there will be some benefits and drawbacks. These are summarised in Table 2.

KEYTERMS

Capital intensive production – production methods which employ a large amount of machinery relative to labour.

Diseconomies of scale – rising long-run average costs as a firm expands beyond its minimum efficient scale.

Economies of scale – the reductions in cost gained by firms as they grow.

External economies of scale – the cost reductions available to all firms as the industry grows.

Internal economies of scale – the cost reductions enjoyed by a single firm as it grows.

Labour intensive production – production methods which rely on a large workforce relative to the amount of machinery.

Minimum efficient scale (MES) – the output which minimises long-run average costs.

Scale (of a business) – the size of the business.

KNOWLEDGE

1. What is meant by productive efficiency?
2. What are the main sources of internal economies of scale?
3. What are the main sources of external economies of scale?
4. Explain the principle of increased dimensions.
5. Why do diseconomies of scale arise?
6. Explain why the oil extraction industry is dominated by large businesses while hairdressing is dominated by small businesses.
7. State two reasons why a business may use a labour intensive approach to production.
8. State two benefits and two drawbacks of capital intensive production strategies.