Chapter 1

The food industry

This chapter looks at the food manufacturing industry and begins by looking at some of the reasons behind Lean Manufacturing.

Pressures in the food manufacturing industry

As you begin to read this book, it is important that you spend a few minutes putting your work into the bigger picture, so that you can appreciate the reasons behind some of the issues you have now or could have in the future. This will also help you come up with better solutions that will sustain you for longer.

Reasons why the food manufacturing industry is unique

Political food

The food industry is very important to a lot of people in this country. The supply of safe, affordable and plentiful food is essential to the well-being of the nation, as well as to the political success of the people running the country.

There is hardly a week goes by without a food story hitting the headlines. This could be a food safety scare, an increase in prices, food retailers making massive profits or even a secret camera being taken inside a food factory. Add to that the public’s concerns over packaging and waste, food miles and obesity, and you can see just how big a part of people’s everyday life is impacted by the food industry.

Governments know that people are interested in the safety and price of the food they eat. Everyone also appears to be increasingly interested in where their food comes from, how it is reared or grown and if it has the required nutritional content. Because of this need to deliver food safety and value, the food industry is heavily regulated to ensure that nothing goes wrong.

The food business

The food industry is a massive business. In order to keep the nation fed, a huge quantity of food has to be shipped each day from the farms to factories and then to the retailers and ultimately the consumers. The need for reliability in this supply chain is paramount for
the consumer to be satisfied at a price they are willing to pay. Food retailers know that their shoppers are very sensitive to issues in the supply chain. If a food product is unavailable in a store, the consumer may well look elsewhere and the store will have lost business, not only for that product but for the rest of the shopping basket as well. Availability of products in store is therefore a very important factor in food factories; ensuring that deliveries are made “on time” and “in full” is a major task.

The food retailers also compete in terms of the prices of the products on sale in their stores. This pressure on prices is passed back to the food factories in the form of small profit margins. Low margins and high delivery performance will place stress and strain on food businesses and the people that work in them. In order to perform well in the food business, costs have to be controlled and minimised, and performance has to be at a high level and consistent. A food factory that under-performs in any of the areas of its activity will soon run into difficulties with its customers, as in any other businesses. The difficulty in the food manufacturing industry is that the level of high performance has to be maintained day in, day out, with low profit margins meaning that slacking and duplication in the systems cannot be afforded. A food factory cannot afford to have a spare production line, “just in case of a breakdown”. It cannot afford to have spare raw material stocks, “just in case we have a process fault and have to reject some products”. It cannot usually afford to have spare anything! The work of a food factory has to be right first time, every time (see Figure 1.1).

**Food fashion**

**Consumers of food** – that is everyone, are constantly being tempted to buy new and exciting foods. There are launches of new food products on an almost daily basis, from companies trying to persuade consumers to buy their products. A large number of food

**Figure 1.1** Food factories can be highly complex, high performing and deliver what the customer wants when the customer wants it.
products do not survive for long in the marketplace, as they are constantly replaced by a “new improved” version, or the sales decline because the consumers have moved on to a new product. For the food factories, this constant stream of new products has its own set of demands and pressures that need to be controlled. The food retailers are constantly trying to excite their customers with new products and an every increasing range of foods. The massive variety of foods available in retail outlets has a big impact on the work of food manufacturers. The number of different raw materials and processes that are needed to manufacture the products means that food factories are becoming increasingly complex places to work. The warehouses for raw materials and packaging need to be well managed, to maintain control of the quantity and location of the stock. There is nothing more frustrating in a food factory than the words “I know we have got some … now where did I see it?”

The complexity of the factory will also have an impact on the methods of production. The rapidly changing fashions in food mean that no one in the food supply chains want to get caught with excess stock. There is nothing worse than having a large stock of a specialist raw material when the fashion changes, except perhaps having a large stock of packaging material! As a result, manufacturing operations have to be set up to be very flexible to meet demand. The way that food manufacturers have responded to the food fashion aspect of the business is to make little and often. This has always been a feature in short shelf-life foods, such as chilled products, bread and fresh produce, but is increasingly used in factories that manufacture long-life products, such as frozen and canned foods, biscuits and preserves.

Food fashion has taken food manufacturers into the area of low stocks and flexible manufacturing. This appears on the shop-floor as short production runs, multiple line changeovers, complex material controls and a need for precise, right-first-time production (see Figure 1.2).

**Why do we bother?**

“Why don’t we make something else for a living?”

The food industry has great rewards, if you get it right. The food industry is a massive business and if a factory performs well it will grow. The food industry is seen as “recession proof”; people have got to eat! Indeed, during periods of economic downturn, the food that people eat has been know to increase in value, as they look for comfort and shelter from the economic storm.

**Questions**

Have a think about your factory – answer the following questions:

- How many new products have you launched in the last year?
- When was the last time your factory failed to deliver what your customer wanted?
- When was the last time you saw a food story on the TV?
The major retailers can be very demanding of their suppliers in terms of technical standards, delivery performance and price, but they do give a manufacturer access to a massive customer base. The volume of product sold through the major retailers allows the manufacturer to run a large-scale operation and as a result they benefit from lower costs. The economies of scale in the food business mean that the more you manufacture, the cheaper each item becomes. The price, to the manufacturer, of raw materials and packaging materials will reduce as the volume increases. The costs of energy and distribution are also related to the quantity bought, therefore, the bigger the business, the lower the prices.

Well, at least that is the theory. The food business is very complex so sometimes the normal rules do not apply for short periods, but in the medium and long term the rules will have to be applied if businesses are to make a reasonable profit and thrive.

There follows some more reasons why the food industry is unique.

**Food materials**

The raw materials used in the manufacture of food are natural products that are either grown or reared on a farm. Occasionally, manufactured or artificial ingredients are used, but this is becoming increasingly rare as the industry caters for consumers that want their food made...
without these ingredients and so regulations control their use. If the material is meat for a sausage or flour for a loaf of bread, sugar for a biscuit or vegetable oil for pastry, the vast majority of raw materials originate on the farm. These natural materials are not often uniform, so variation will occur from crop to crop or animal to animal. The variation will also occur from season to season and year to year as the growing conditions change due to rainfall, temperatures or if the practices on the farm alter. The food industry tries to produce products to meet the specification, but variation in raw materials means that the processes used will rarely be static and often need to be altered to compensate for the raw material variation. That said, a focus on your raw material suppliers will allow you to minimise the variation that hits your process and at the very least, with careful management, predict the effect of that next batch of flour or consignment of strawberries.

What all this means to a food factory, and those trying to manage the process, is that even if your process today is identical to your process yesterday, it does not necessarily follow that the same quality, yield, efficiency and waste levels will be achieved. For this reason, one aspect of Lean Manufacturing focuses on monitoring and control of process performance, so that corrective actions can be taken before a raw material variation becomes a rejected product (see Figure 1.3).
For all the above reasons, the use of Lean Manufacturing techniques in a food factory is different to those same techniques used in a car plant or a factory making mobile phones!

24/7

Pressure on profit margins and the need to supply large quantities of food has lead to the growth of increasingly large food factories, which are often running for 24 hours a day, 7 days a week. This high intensity of manufacture often means that those managing the shop-floor are part of a shift system and that their performance is reliant on the performance of others who they rarely meet. The need for teamwork in the food industry is vital to its success and that teamwork has to extend to people who are in a different department, on a different shift or even on a different site. Add to this the demands posed by the need for high performance and it can be seen that managing a food production operation is a highly demanding role that needs to be done well if performance is to be maintained, and is even more demanding if performance is to be improved. Later in this book, costs of manufacture are discussed in more detail. It is very important that all members of a team in such a demanding industry have knowledge of the pressures on the business, their role in the team and that the overall aims and objectives are clear. In a factory that is implementing Lean Manufacturing techniques, everyone must be given the opportunity to contribute to the improvement of the business. This is particularly the case in the food manufacturing industry, where high performance and low cost is not just demanded by the retailers, but is the only way that a business will survive and grow in such a competitive market.

Alternative methods of lowering costs

First, you should spend some time looking at the way that a food manufacturing business works from a financial point of view. An understanding of the costs of the business, and how they are monitored and controlled, will help in the application and understanding of Lean Manufacturing techniques.

In a food business, costs are the one factor that needs to be considered alongside each and every decision. Food safety, quality and service level are also vital in the day-to-day running of the business, but unless the costs are under control the business will have a big problem.

Keeping costs at, or better than, the predicted levels will allow the business to make good decisions and remain in control of all aspects of that business. The business will remain balanced, with decisions made for the short, medium and longer term each having their place. Businesses that lose control of costs can end up making decisions based just on short-term survival, with little or no spare resources to be able to plan for the future or ensure long-term performance.

It is when the costs of manufacture become inconsistent, or rise above what was predicted, that the issues start. One of the main areas of Lean Manufacturing is in cost control, and its application in the food industry is very important because of the tight profit margins. Corrective actions need to be taken very quickly to get costs back under control.

Before costs can be controlled and reduced, the different types of costs in your business and the way in which those costs behave must be considered.
The theory of costs

Costs have been traditionally divided into three types for the purpose of analysis. This is a simple way of gaining an understanding of costs in a manufacturing business and will allow you to better understand what is happening in your factory. You will know from your own experience that nothing in business is simple, so you need to start with a simple look at costs and how they work.

Variable costs

Variable costs are normally associated with production labour, raw materials and packaging materials. The money paid out by the business goes up as more product is made and goes down if the orders are low and the factory is less busy. The costs vary with the activity level of the business.

For example, in a bakery the more bread that is made the more flour is required. Thus, the size of the invoice from the flourmill will rise as more bread is made and fall when the factory is less busy. The same will go for packaging costs. The money paid out by your business varies with the activity level of the factory.

Fixed costs

Fixed costs do not change with the activity level (over a normal range of trade) and are generally associated with factory services, management and so-called overhead costs. The monthly rent paid for the forklift trucks does not change if the sales are down a bit or up a bit, though the factory may consider renting an extra truck to help cope with a big volume increase associated with a special promotion. In the normal range of trade, the cost of the trucks is said to be “fixed”. The salary of the human resources manager is the same each month, even if the factory volumes are down by 10%. There are many fixed costs associated with running a manufacturing business, but as was said earlier in this chapter, the retailers and the consumers demand flexibility in terms of product type and also product volumes. The last thing a food manufacturing company needs is for the fixed overhead costs to be too big a proportion of the overall costs of the business. Fixed costs need to be minimised to ensure that the company can survive if sales volumes drop. The combination of high fixed costs and low profit margins will result in the business finding it difficult to survive a period of low sales.

Semi-variable costs

In practice, most costs are semi-variable. This means the costs do change as activity level changes, but that change is not even.

For example, labour cost will increase as the factory gets busier but there will come a point where people will be paid enhanced pay rates to encourage them to work extra shifts or work night-shifts or maybe weekends. Some factories have an agreement with their workers that overtime rates are not paid and the worker gets the same rate for all hours worked; this is an attempt by the factory to keep labour costs as variable as possible and to prevent costs escalating when the factory is busy. The semi-variable nature of labour costs is also shown when the factory is quieter. As business slowly falls, worker’s hours
will start to fall but there is nearly always a tendency for new tasks to be found to keep people busy until the end of their shift. If production is taking six hours instead of eight, there is always a temptation for one of two things to happen:

1. The six hours of work is stretched to make it last eight hours. This is often not a deliberate action but is the result of a lack of urgency in overcoming small hitches in the process.
2. The required work is finished in six hours but additional work is created to build up finished product or work in progress stocks. As stated earlier, increasing stock levels is not always a good idea in a food factory (see Figure 1.4)!

Another semi-variable cost is that of materials, food and packaging. When volumes increase over an extended period, it is possible for the company to negotiate with suppliers and to gain volume related discounts. For example, carrots are £300 per tonne, but if you take 20 tonnes, the price drops to £250 per tonne. The semi-variable nature of the costs of materials is also shown when the full cost of obtaining them is considered. For a food factory to buy materials, it has to place an order. The cost of raising the order (the time and effort of the buyer) is the same if the order is for 1 kilo or for 1000 kilos. The same applies to delivery costs. One pallet on a lorry is going to cost roughly the same as 26 pallets to deliver.

The final example of a semi-variable cost is one where the cost for something is made up of a fixed element and a variable element. For example, the costs for telephone services will often have a fixed equipment charge or line rental and then a variable cost of the calls made. The costs of compressed air in your factory will follow a similar pattern; there are fixed costs associated with the provision and maintenance of the compressor and pipelines, but a variable cost for the electricity to run the compressor. The same goes for refrigeration (see Figure 1.5).
Now that you know a little more about costs and the way they work, look at some of the ways in which costs can be reduced. Try looking at some typical costs for a food factory; to understand what might be required to reduce them.

First, the variable costs:

**Questions (see fig 1.6)**

Think about the variable costs in your department or factory:

- Do they match the ones in the chart?
- How about the cost of each item on the list?
- The chart contains four questions marks – what costs would these be in your area?
- See if you can think of four more costs of production that vary with the amount of product made.

You can see from the pie chart (see Figure 1.6) that the variable costs in a food factory are centred on the materials and labour. The efficient use of these resources will reduce costs to a minimum level, but before considering the use, think about the prices paid for these things.

**Food materials**

The price paid for food materials will vary, depending on the material and the negotiating skills of the person doing the buying. There are two ways of reducing the price of food materials, you could choose to buy materials of a different specification or you can negotiate a better price for the same material.
Different specification

Could be that the material you are currently using is too good (and expensive) for the job you are asking it to do. Would a different and cheaper cheese work just as well on our pizza? If the onions were changed from their current type to cheaper ones, would that make a difference to the quality of the ready meal? A great deal of care has to be taken with this kind of decision. The consumers of your products are a very valuable part of your business. Changing a material could have a detrimental impact on the product and sales volumes could reduce as a consequence.

Another aspect of working with a different specification is to change the recipe of your product by reducing the quantity of the expensive raw materials. Again this process needs to be well controlled by the business. Not only are there customers’ views to consider, but there are also legal aspect to the contents of the food. Packaging will contain ingredients listings and nutritional values that must be met.

The final impact of changing material specification is on the process of making and packing the food. For example, it may have been decided to reduce the thickness of a packaging film to reduce its costs. A good idea, except when the new packaging was used in the factory for the first time it was apparent that the performance of the wrapping machine dropped. There were more rejected packs and more line stoppages. The cost saving on the packaging material was negated with increased cost in waste and poor productivity. This is an aspect of cost saving that will be considered again later.

Reducing costs is a bit like trying to put a tonne of marshmallows into a pillowcase. You squeeze in one part and it pops out somewhere else!

Questions

- Is there an opportunity in your business to use a different specification of materials?
- Would changing have any negative effect on performance?
Negotiate better prices

It is possible to negotiate better prices from your suppliers and reduce the costs to your business as a result. In the negotiation there may be a need to increase the quantity of product purchased from that supplier to secure the better deal. “If I was to buy all of my cheese from you, what is the best price you could give me?”

Better prices can also be negotiated by helping your supplier to reduce their costs. “If I buy my vegetable oil in 1 tonne tanks instead of 25 litre drums, you can reduce the price by 5%? If I take one delivery per week instead of three per week, you will reduce price by 9%?”

There are many mechanisms in place to reduce price of food materials; this is a specialist area of the food business, but people from the manufacturing areas can often suggest improvements that allow the negotiations to start. The trick here is to make sure that the reduced price does not cause increased cost elsewhere in the business. For example, buying very large quantities of materials will reduce the price of the materials (unless you try to buy so much it causes a shortage and the price rises)! But once you have purchased the material, you will have to store it and that will add to your costs in the warehouse. There is also the risk in the food industry of falling victim to food fashion and being landed with a stock of raw material for a product that is no longer wanted by the consumer. The final risk to the business is that in paying for the materials the business becomes short of money. The company has got loads of raw materials but no cash in the bank to pay the electricity bill! Both large and small companies have to keep a very close eye on the use of cash in their business, to ensure that the business remains solvent and able to meet its obligations.

Questions

It is a well-known fact that production managers always think that they could buy the materials used in their factories cheaper that the buyer! It is also well-known that buyers think they could run the factory better than the production managers!

• Is there any opportunity in your factory for the price paid for materials to be reduced?
• Make a note of three materials it would be worth investigating.

Packaging materials

The prices paid for packaging materials are often based on the complexity of the design and the weight of material in the packaging. The techniques used for food materials can also be applied to packaging materials, but in a slightly different way.

Questions

• When did your factory last have a good look at the packaging used on your products?
• Is your packaging dictated by your customers?
• Is there any scope in your business to reduce cost here?
**Packaging redesign**

By looking at the packaging format used for the food product, it is often possible to change the shape, size or design to reduce the cost. This is a method that is currently applied across a wide range of food sectors, as consumers want to see less packaging around their food products. The technique of light-weighting is one where the mass of packaging materials is reduced by making bags smaller, making trays thinner or reducing the gauge of cardboard. Light-weighting also looks to reduce the number of layers of packaging used for some products. A bag inside a box, then over-wrapped, is a great opportunity for packing cost reduction.

Printed packaging materials are expensive to manufacture. Simplification of the print design will reduce the price of the packaging. For example, moving from a full colour photographic image of the product to a simple three colour graphic design will reduce the price of the pack.

In some ways packaging has become more complex recently with the advent of Shelf Ready Packaging (SRP), sometimes called Retail Ready Packaging (RRP). A simple box has been replaced with one that has a more complex structure and often has quality graphics printed on it. These cases are often more expensive than the plain cartons they replaced. They also cause extra complexity when they are specific for a particular product and therefore cause a factory to have four or five stock items instead of one plain box. “Why were these SRPs introduced?” The answer is a piece of “whole supply chain thinking”. The additional costs at manufacture are more than compensated for at the retail outlet by the system of “one-touch replenishment”. Staff and efficiency savings in store save more than the additional cost of the SRP.

SRP can add cost and complexity to a manufacturing operation and save cost in the retail outlet. The retailer may be willing to pay more for a product in SRP.

**Negotiate better packaging prices**

Packaging, especially printed packaging, is very dependant on volume. The price per pack will tumble as volume increases, but there are risks associated with placing orders for large quantities of printed packaging simply to get the lower price.

There is a risk that the food fashion will change and the product stops selling or has to be changed. As a result, the printed packaging become redundant and has to be disposed of. The second risk is that a large packaging stock will have to be stored, looked after and kept in good condition prior to its use. There is a risk that the packaging material may deteriorate in store and not perform correctly when brought into the factory for use. The final risk is a financial one; the packaging material in your warehouse will have been paid for and that money is then tied up in large stock levels when it could be invested elsewhere in the business for a better return.

This chapter will now look at one of the major costs in the manufacture of foods that is within the control of the business and the production team.

**The price of labour**

This vital ingredient in the manufacture of food products is often missed when cost reductions are required. The price paid for labour is a large proportion of the variable costs for many food businesses. The usual way to reduce labour costs is to make the labour more efficient, so more is achieved with less labour. Automation of processes, improved planning and efficiency
improvements are a way of reducing the overall costs of labour and these will all be covered in greater depth later. However, let’s consider the price of labour for the moment.

The total price of an hour of labour is made up of:

**The rate of pay**

This is the rate per hour worked. This can sometimes be variable for an individual, such as they get extra money for working unsocial hours, for overtime, or special responsibility pay for a certain task such as forklift truck driving or first-aid responsibilities. The reasons for increasing a pay rate are many and varied and have often been the subject of negotiations over many years.

Once the rate of pay has been decided, the factory price is not complete, because there are extra costs to be paid to arrive at the final price per hour.

**Employer costs**

These costs include items such as National Insurance payments, holiday pay and sick pay provisions. All of these costs add to the true price of labour. However, there are still other costs that need to be considered.

How about the cost of overalls and safety shoes and other personal protective equipment (PPE), the costs of subsidised canteens and of providing a secure well-lit car park?

Therefore, the price of labour in your factory is not simply the wage bill but includes a large range of costs that can often add up to a substantial sum. This makes the sections in this book that look at labour efficiency even more important to the profitability of your factory (see Figure 1.7).

You can see from the pie chart that the total cost of labour in a factory is made up of many parts.

**Questions**

- How do these categories compare with the price of labour at your factory?
- Are there other costs of employing people?
- Do the percentages shown reflect the picture at your business?
How do companies react to the price of labour? Indeed, is it ever possible for a company to reduce these costs? There are several options open to companies to try and reduce the price of labour within their business. Each method is fairly difficult to carry out and often meets with resistance of one kind or another.

**Off shoring**

Perhaps the most radical method is to relocate manufacturing operations to a part of the world with a lower labour price. This is unusual in food businesses, but examples of this technique hit the press every once in a while. The reduced price of labour in a new location has to be balanced with any additional costs associated with transport and storage of the raw materials and the final products. Off shoring in the food industry has been most popular with the multi-national food groups that have the ability and the resources to manufacture products almost anywhere in the world. Often the activity in the multi-nationals is centred on filling up the most efficient plants rather than just chasing the cheapest labour price.

**Renegotiation**

Discussions take place to try and reduce the price by negotiation. This could involve a reduction in shift allowances, overtime premiums or other supplements and would normally be bundled into a package with some wins and some losses for the individuals involved. Various techniques have emerged over the years to renegotiate the price of labour. Annualised hours have been introduced in some companies where the worker is contracted for a number of hours per year, with an element of flexibility in the hours per week worked. In return for the annualised contract, the worker receives a regular monthly salary that does not vary. This technique gives the worker a steady and predictable income in return for flexibility and the loss of premium payments for overtime. During recessions in the economy, when workers are in fear of losing their jobs, it has been possible to negotiate a reduction in the price of labour in some businesses. This is a difficult decision for all concerned, but is often part of a package of changes aimed at saving as many jobs as possible as a factory struggles to survive.

**Pension**

Some companies have looked hard at the costs of their pension schemes and have either shut them down or stopped more people from joining. The life expectancy of people is increasing and as a result the future liabilities of the pension funds have increased also. Companies have done the calculations and have often decided that the cost to the company cannot be sustained and they reluctantly change the pension arrangements for their staff.

**National Insurance**

There is not much a company can do to avoid this cost, but some have been eligible for help in the form of subsidies and payments from governments. Employer’s National Insurance holidays are often used by government and regional agencies to encourage companies to set up or expand operations in an area that has high levels of unemployment.
The use of agency or contract labour

Agency labour is a big feature in many food companies and can often cost less per hour than for an employed person. Agency labour is where a worker is employed by an employment agency and is sent to your factory to carry out the work required on a temporary/casual basis. Agency workers are often employed in low skill jobs in the factory but can also be used as office temps in the administration of the business. The company pays a price per hour but has no responsibility for any other costs (with maybe the exception of PPE). The use of agency labour will be discussed later in this book, but for this section it is enough to know that agency labour is sometimes a useful tool in trying to reduce the price of labour in a business. The costs associated with the recruitment and induction of a new employee are eliminated.

Because of the low skill and low wage nature of a lot of food factory jobs, there is sometimes an issue with high staff turnover rates. Staff turnover is a measure of the length of time a new worker can be expected to stay with a company. The food industry has, traditionally, suffered very high staff turnover and the use of agency or contract labour can reduce the costs incurred in recruiting a person who stays for only a short period of time.

Modern agreements with agency worker providers can mean that the temporary worker arrives having had a full company induction, literacy and innumeracy tests, a medical, hygiene training and sometimes even the required PPE. The agency and not the food manufacturer incur all of that cost. The hourly price paid for the agency worker can, on the face of it, appear quite high but, as will be shown later, can still be a great advantage to a food factory.

Let’s look at the fixed costs

There is no such thing as a fixed cost – some are just a bit more difficult to reduce than others.

This is a real quote from a wise old boss some years ago. He was, of course, perfectly correct; fixed costs are only fixed because no way has yet been found to make them variable.

It is the aim of most food businesses to reduce the amount of their fixed costs and make as much of their costs as they can into variable costs. In that way, the cost goes up when the business is busier and down when the business is quiet.

Remember, the fixed costs have to be paid no matter how busy or not the factory is, and over a normal range of sales volumes the cost stays constant. It is important to know about fixed costs in the application of Lean Manufacturing to the food industry. Companies have grappled with these issues for a long time.

Here are a few ways that food companies have handled the issue of fixed costs:

Fixed cost dilution

This is an effective method that is widely used. The fixed costs are not reduced but the size of the business is increased without the fixed costs increasing. The same fixed cost is diluted over a bigger business and so have a reduced impact on the profit margin. There are several ways in which companies have carried out this fixed cost dilution. They can ensure that the factory is manufacturing to full, or near full, capacity for the entire time. For example, the use of price promotions to increase the volume of product made will make the factory busier and this will help dilute the fixed costs over that bigger business.
A second method of diluting fixed costs is to spread the costs over several businesses. For example, the technical manager now looks after two factories instead of one. The fixed cost of the manager is spread over a bigger business. The final method of fixed cost dilution is sometimes called consolidation or rationalisation. This is a big move for any company and has massive consequences for all concerned. Instead of running two factories with two sets of fixed costs, one of the factories is closed and the work of that factory is transferred to the other. This increases the size of the business in the surviving factory and as a result the fixed costs of that site will be diluted over that bigger business. Examples of this are reasonably common in the food industry, among bigger companies; some examples have been seen of a company buying out one of its competitors to “get hold of the volume”, and then to move that volume and close down the factory that has just been purchased.

For example, a business with a fixed cost of £20m per year and an income of £80m has a fixed cost of 25%. The business grows by the acquisition of a competitor that had a turnover of £20m and fixed costs of £5m. The new bigger business was restructured in the first few months and the fixed costs returned to £20m for the new larger company. The fixed costs are now 20%. That is a 5% fixed cost reduction that is sometimes called dilution of overheads. The £5m that has been saved in the new business is additional profit and is often used by acquisitive companies to finance the bank loan that paid for the acquisition in the first place. The structure of the food business is such that this kind of acquisition takes place often. The acquiring company sees an opportunity for rapid growth by using techniques to reduce fixed costs in the target business. A company with high levels of fixed cost can become a takeover target if the economic conditions allow (see Figure 1.8).

**Fixed cost to variable cost**

This is a group of techniques to reduce the fixed costs in a business and to make the cost variable, so that the cost can be controlled depending on the activity level of the factory. There are several ways in which this can be done. Rather than owning a resource that the business needs, it is rented on a short-term agreement or the service is bought in from a supplier. Of several examples, the largest one is probably transport. A few years ago, companies would run their own fleet of delivery vehicles to get their product to their customers. Some still do, but a large number of companies have decided that the fixed costs that are tied up in transport are large and difficult to reduce if the business is a bit slack. The vehicle still has to be paid for, even if it is parked in the yard. This fixed cost can be made a variable one by taking on a transport company to deliver
the food. When the vehicle is needed it is paid for, when the vehicle is not needed it is not paid for; this is perfect variable cost control!

This technique has also been applied in other areas of fixed cost. Computer and telephone systems are often leased based on a usage basis, you pay when you use, you do not pay when the resource is not used. There are also examples of food production machinery rented under short-term agreements, maybe to provide extra capacity at Christmas or for a big promotion. After the busy period, the equipment is sent back, so the cost disappears.

Another method of turning fixed costs to variable costs is in the allocation of labour in the factory. The factory needs to be cleaned, which is part of being in the food business, and this cleaning roll is traditionally carried out by a hygiene team who are separate from the production crews. The factory needs cleaning whatever the activity level; you need to clean a machine whether it has made 100 products or 1000, so hygiene costs for labour and cleaning chemicals are considered fixed in a lot of food businesses.

A method of moving fixed costs to variable costs in a food business is to reallocate the cleaning task to production crews. If the factory is busy, the production crew makes product, if the factory is less busy, the manufacturing process is stopped and the production crew clean the machines. In this way the fixed costs of hygiene can become more variable as the production crews pick up the labour element of the cost, leaving only the chemical cost as a fixed one. It is obvious that the cleaning still needs to be carried out, and be paid for, but by moving the responsibility to the production management, it can be incorporated into the production plans more effectively.

In the old system, the hygiene team would arrive ready to start work but not be able to because the product crew had yet to complete the orders. The hygiene crew would keep themselves busy until the production was finished but would not be working effectively for that time. The new method would see the same crew arrive, and this time as production operatives, they would take over the production process (maybe stopping the original crew from incurring overtime payments) and continue production. At the planned time the production would stop and cleaning would take place. Production would then restart as soon as was required, with no need to wait for a new crew to arrive. In this way, food factory hygiene could be revolutionised and an eight-hour hygiene window in the schedule could be reduced. As a result of this type of thinking, the output of a factory could be substantially increased. Methods to improve the chemical costs of a cleaning process will be described later (see Figure 1.9).

**Fixed cost reduction**

Finally, the fixed cost has to be reduced or preferably eliminated altogether. Again the food industry has been working in this area for a long time and there are tried techniques to use. When you phone up a business you are often greeted by a computer saying: “press 1 for sales, press 2 for accounts, press 3 ...” This automatic system has replaced the telephone answering duties of the receptionist, who used to receive calls and direct you to the correct extension. This is an example of a fixed cost, the receptionist being eliminated and replaced with a relatively low-cost alternative system. Obviously there may be an impact on the customer’s perception of service, but this may be a decision that is deemed to be “worth it”. In some companies, the receptionist still remains but now can be used on higher value work for the company. Fixed costs reductions are sometimes difficult to achieve; that, after all, is why they are called fixed costs. But remember, there is no such thing as a fixed cost.
Questions

How do you get the price down? The simple answer is to look in detail at each cost in turn (normally starting with the biggest) and ask a few questions:

- Do we need it?
- If we need it, do we need all of it?
- Is what we have the right specification?
- Can we find what we need cheaper elsewhere?

Once these questions are answered, and they may take some time to investigate thoroughly, a decision can be made on the way to proceed. For example, imagine you currently have five forklift trucks at your factory.
Case study

**Looking at a “fixed” resource and exploring options to reduce the cost**

Your factory has five forklift trucks. Two are used by goods-in, two by despatch and one by the hygiene department to carry waste to the skips. Each of the trucks can be considered a fixed cost for the business, as they are all on long-term lease agreements, they are inspected and maintained on a regular basis, and they are all placed on charge for eight hours every day (assuming they are all electric trucks). If the business gets busy, they cope with the workload (but some run out of charge during a shift) and if the business is quieter, they are all still used, inspected, maintained and charged up. They are a fixed cost to the business. How can the fixed cost for our forklift trucks be reduced?

**Questions**

- Before you read on, have a think for yourself and see if you can come up with any ideas.

The simple way would be to call in the company from whom the trucks are leased and tell them that you want to reduce the cost and get them to come up with a proposal. That is a good example of Lean Thinking. “Why should I spend my time (and cost) thinking up a solution when I can get a solution cheaper elsewhere!” But, let’s have a look at what might be possible. Using the four questions above, we might come up with a few options. The first thing we will need is information. How much is each of the trucks used during our busiest periods? How much is each truck used during our slackest periods? From this we could establish the minimum and maximum use of the trucks by the business. How about the maximum number of movements that are possible on one full charge of the battery? What is the minimum time to fully charge a battery? How many pallet and skip movements are projected over the coming days, weeks and months?

All information will take time to pull together and some of the numbers will be estimates rather than definite data, but it is possible to collect enough information to get a complete picture of the job that needs to be done. From this information, the answer to the first two questions will be:

- Do we need it? If we need it, do we need all of it?
- Do we need all of the trucks or could we manage with less? Could we manage for most of the time and only bring extra trucks onto site to help with busy periods?

We could also have information that would help with the third question:

- Is what we have the right specification?
- Are all of the trucks of the correct specification?
- Could we downsize trucks for use on lighter duties; would this reduce the price?

The final question is often the most difficult to answer; assuming we are comparing like with like, it is possible to work out a cost for the trucks that the business requires. This may mean trucks shared between despatch and goods-in or maybe that waste is only moved when trucks are available. But working out exactly what is needed, and then putting a plan together that matches the requirement, is a way of highlighting areas where fixed costs are too high and there is a potential for their reduction.

You will have noticed that during the whole of this case study we have ignored the fact that the trucks we currently have are the subject of a long-term lease arrangement. This was deliberate, as it is important in the process of the reduction of cost in a business that no boundaries are set early in the process. The aim of a lot of the techniques in this book is to release you from the constraints of the current situation and to develop ideas and solutions that are the “ideal future state”. It is then a separate task to make that ideal state a reality in as short a time as possible (see Figure 1.10).
Summary

The first chapter of this book looked at the structure and characteristics of the food industry and how it can respond to the pressures put upon it by its customers, consumers and the regulatory authorities.

As the theme is Lean Manufacturing for the food manufacturing industry, some time must be spent on considering why the industry is unique in the way that it needs to be managed.

There was a basic introduction to the theory behind cost and the areas of Variable, Semi-variable and Fixed Costs.

In the case study at the end of this chapter, some methods of lean thinking often applied to food manufacturing businesses was introduced. The aim of the fork-lift case was not to become expert in that aspect of running a food business, but to introduce some important concepts that will occur throughout the rest of this book.

Information is required for all decisions that are going to be anything but “gut feel”. The collection of information about your business is one of the cornerstones in Lean Manufacturing. The final point in this chapter referred to the concept of the “ideal future state”. It is an important part of Lean Manufacturing that no one feels constrained by what is the current reality, but they equally accept that to get to the ideal future state could be a long journey. They also know that in the food manufacturing industry, with all of its characteristics, pressures and food fashion, that during the journey the ideal future state will change, the goal posts will move and the journey will be subject to many diversions, detours and even the occasional roadblock.