Chapter **3**

Segmental, productivity and ratio analysis

3.1 Learning objectives

When you have read this chapter you should be able to:

(a) understand how cost analysis can be applied to marketing segments;
(b) appreciate the role of marketing experimentation in improving the allocation of marketing effort;
(c) recognize the value of segmental productivity analysis;
(d) perceive critically how ratio analysis can be used in order to appreciate the current position;
(e) appreciate the relevance of strategic benchmarking.

3.2 Introduction

In relation to the question 'Where are we now?', it is useful to know how resources have been utilized and with what returns. To this end, it helps to think of the organization as a bundle of projects or activities. This is relevant whether the organization is large or small, commercial or non-commercial, engaged in manufacturing or service rendering. Typical projects might be defined as:

➡ Reformulation and relaunch of product X
➡ Continued market success with service Y
➡ The successful development and launch of project Z.

One might go further and define projects or activities in terms of *missions*: a mission in this context represents the provision of a product or range of products at a particular level of service to a particular customer or customer group in a particular area. Figure 3.1 illustrates this (see also Chapter 7).

An organization's mix of projects – or missions – will be constantly changing, and each has resource implications and profit consequences. For example, the scarcity of resources inevitably means that choices must be made in rationing available resources (whether in the form of funds, management time, etc.) among competing activities. It may be that new activities can only be adopted if old ones are deleted, thereby freeing resources. But how might a manager know which activities are worth retaining, which should be added to the portfolio and which should be deleted? One starting point is to establish the cost of each of the organization's existing activities.

We can think of cost as being equivalent in broad terms to *effort*, so what we are initially seeking to establish is how the available effort has been applied to the various activities in which the organization is engaged. Before we can really get to grips with this, however, we need to clarify our understanding of some important categories of cost.
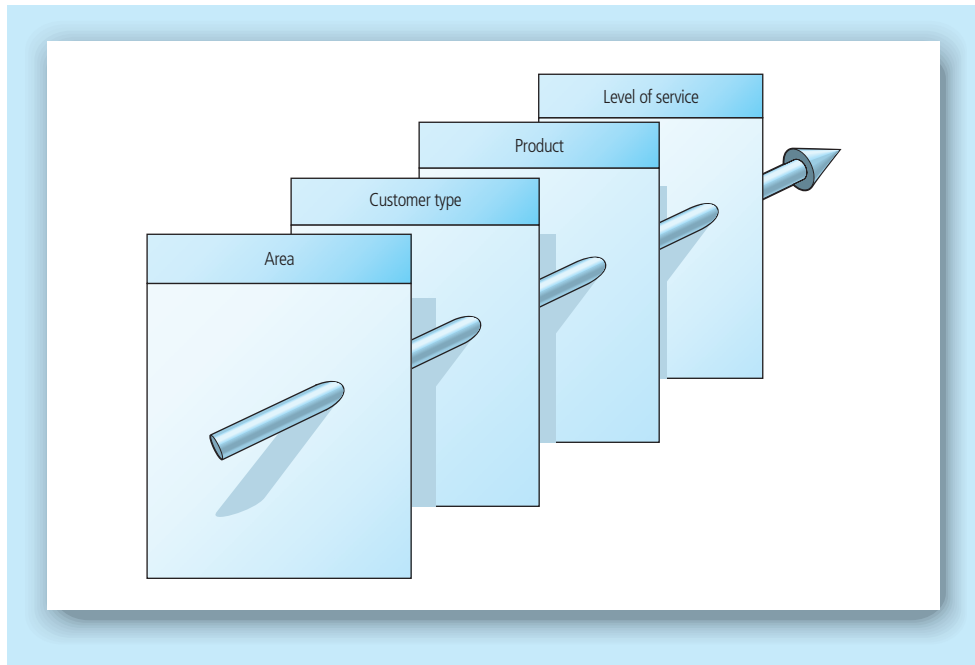
Figure 3.1   Multidimensional mission characteristics (source: Barrett, 1980, p. 143)

3.3 The clarification of cost categories

Many of the costs of marketing are not satisfactorily identified, since marketing *functions* are not always carried out by the marketing *department*. (It could be argued that any members of an organization who deal with customers, for example, are carrying out a marketing function even though they may not be recognized in any formal sense as members of the marketing staff.) This is one definitional problem, but not the only one.

Another definitional problem concerns the traditional focus that accountants have adopted, which puts product costing at the centre of their costing systems. This traditional preoccupation with the manufacturing costs of products and factory processes emphasizes the attributes of whatever is currently being made. Such an orientation fails to deal with patterns of consumer preferences and competitive positioning by market segment. The attributes of market segments – from which profit is derived – are fundamentally different from those attributes that characterize production processes. Any analysis based on product costing will generate insights that are limited by their origins, thereby failing to support marketing orientation.

Whatever cost object (or activity) is selected as the focus of attention, some costs will be *direct* (in the sense of being traceable to the activity – such as direct labour, and direct material inputs into a unit of manufactured output, or a salesperson's salary and expenses in relation to the sales territory), while others will be *indirect*. By definition, indirect costs cannot be traced directly to cost objects, so any procedure whereby these costs are assigned to cost objects will mean that the resulting full (or 'absorbed') cost is

inaccurate to an unknown extent. The assigning of a 'fair share' of indirect costs, along with direct costs, to cost objects is at the heart of *absorption costing*.

A particular cost item can only be termed direct or indirect once the cost object has been specified. This could be, for example, a particular product, a product range, a brand, a customer or customer group, a channel, a sales territory, an order, and so on. Thus, a salesperson's salary will be indirect in relation to the individual product lines sold (assuming the salesperson carries a range of products), but it will be a direct cost of the territory in which that individual is operating. In the same way, the costs of distributing various products to wholesalers may be indirect with regard to the goods themselves, but direct if one is interested in costing the channel of distribution of which the wholesalers are part.

The same basic problems arise in attempting to determine the full cost of a cost object in every type of organization, whether a service company, a retailing enterprise, a factory or a non-commercial entity. For example, a garage (as one type of service organization) will treat the servicing of each customer's car as a separate job (or cost object), to which will be assigned the direct cost of the mechanic's time, materials and parts, plus an allowance (usually applied as an hourly rate and associated with the utilization of mechanics' time) for the use of indirect factors (which will include power, equipment, rent, rates, insurance, salaries of reception, supervisory and stores staff, etc.). A similar approach is applied by firms of solicitors or accountants, by consulting engineers, architects and management consultants. Non-commercial organizations typically provide services (such as health care, defence, education and spiritual guidance) and use resources in carrying out their various activities in much the same way as do commercial undertakings. The logic of absorption costing is equally applicable to non-commercial as to commercial enterprises.

3.4 Marketing cost analysis: aims and methods

Establishing a baseline for marketing planning can be seen to be concerned with the allocation of total marketing effort to cost objects (also known as segments), along with the profit consequences of these allocations. It is generally found, however, that companies do not know the profit performance of segments in marketing terms. Useful computations of marketing costs and profit contributions in the multi-product company require the adoption of analytical techniques which are not difficult in principle but which are not widely adopted in practice on account of, inter alia, the preoccupation with factory cost accounting that exists.

The fact that most companies do not know what proportion of their total marketing outlay is spent on each product, sales territory or customer group may be due to the absence of a sufficiently refined system of cost analysis, or it may be due to vagueness over the nature of certain costs. For instance, is the cost of packaging a promotional a production or a distribution expense? Some important marketing costs are hidden in manufacturing costs or in general and administrative costs,

including finished goods inventory costs in the former and order-processing costs in the latter.

Since few companies are aware of costs and profits by segment in relation to sales levels, and since even fewer are able to predict changes in sales volume and profit contribution as a result of changes in marketing effort, the following errors arise:

1 Marketing budgets for individual products are too large, with the result that diminishing returns become evident and benefits would accrue from a reduction in expenditure

2 Marketing budgets for individual products are too small and increasing returns would result from an increase in expenditure

3 The marketing mix is inefficient, with an incorrect balance and incorrect amounts being spent on the constituent elements – such as too much on advertising and insufficient on direct selling activities

4 Marketing efforts are misallocated among missions and changes in these cost allocations (even with a constant level of overall expenditure) could bring improvements.

Similar arguments apply in relation to sales territories or customer groups as well as to products. The need exists, therefore, for planning and control techniques to indicate the level of performance required and achieved, as well as the outcome of shifting marketing efforts from one segment to another. As is to be expected, there exists great diversity in the methods by which managers attempt to obtain costs (and profits) for segments of their business, but much of the cost data is inaccurate for such reasons as those listed below:

➡ Marketing costs may be allocated to individual products, sales territories, customer groups, etc., on the basis of sales value or sales volume, but this involves circular reasoning. Costs should be allocated in relation to causal factors and *it is order-getting marketing expenditures that cause sales to be made* rather than the other way round: managerial decisions determine order-getting marketing costs. A different pattern typically applies to order-fitting (e.g. logistics) costs, since sales volume will cause (or *drive*) order-filling costs: order-getting → sales volume → order-filling. Furthermore, despite the fact that success is so often measured in terms of sales value achievements by product line, this basis fails to evaluate the efficiency of the effort needed to produce the realized sales value (or turnover). Even a seemingly high level of turnover for a specific product may really be a case of misallocated sales effort. (An example should make this clear: if a salesman concentrates on selling Product A, which contributes £50 per hour of effort, instead of selling Product B, which would contribute £120 per hour of effort, then it 'costs' the company £70 for each hour spent on selling Product A. This is the *opportunity cost* of doing one thing rather than another and is a measure of the sacrifice involved in selecting only one of several alternative courses of action.)

➡ General indirect and administrative costs are arbitrarily (and erroneously) allocated to segments on the basis of sales volume.

➡ Many marketing costs are not allocated at all as marketing costs, since they are not identified as such, but are classified as manufacturing, general or administrative costs instead.

Marketing cost analysis has been developed to help overcome these problems and aims to:

1 Analyse the costs incurred in marketing products (embracing order-getting and order-filling aspects), so that when they are combined with product cost data overall profit can be determined
2 Analyse the costs of marketing individual products to determine profit by product line
3 Analyse the costs involved in serving different classes of customers, different territories and other segments to determine their relative profit performance
4 Compute such figures as cost per sales call, cost per order, cost to put a new customer on the books, cost to hold £1's worth of inventory for a year, etc.
5 Evaluate managers according to their actual controllable cost responsibilities
6 Evaluate alternative strategies or plans with full costs.

These analyses and evaluations provide senior management with the necessary information to enable them to raise questions regarding which classes of customer to cultivate, which products to delete or encourage, which channels may be preferable, and so forth. Such analyses also provide a basis from which estimates may be developed of the likely increases in sales volume, value or profit (i.e. outputs) that a specified increase in marketing effort (i.e. input) might create. In the normal course of events, it is far more difficult to predict the outcome of decisions that involve changes in marketing outlays in comparison with changes in production expenditure. It is easier, for instance, to estimate the effect of a new machine in the factory than it is to predict the impact of higher advertising outlays. Similarly, the effect on productive output of dropping a production worker is easier to estimate than is the effect on the level of sales caused by a reduction in the sales force.

The basic approach of marketing cost analysis is similar to that of product costing. Two stages are involved (see Figure 3.2):

1 Marketing costs are initially reclassified from their *natural* expense headings (e.g. salaries) into *functional* cost groups (e.g. sales expenses) in such a way that each cost group brings together all the costs associated with a particular marketing activity
2 These functional cost groups are then apportioned to the cost object/segment of interest (e.g. product lines, customer groups, channels of distribution, etc.) on the basis of measurable criteria that bear as close an approximation as possible to a causal relationship with the total amounts of the functional cost groups.
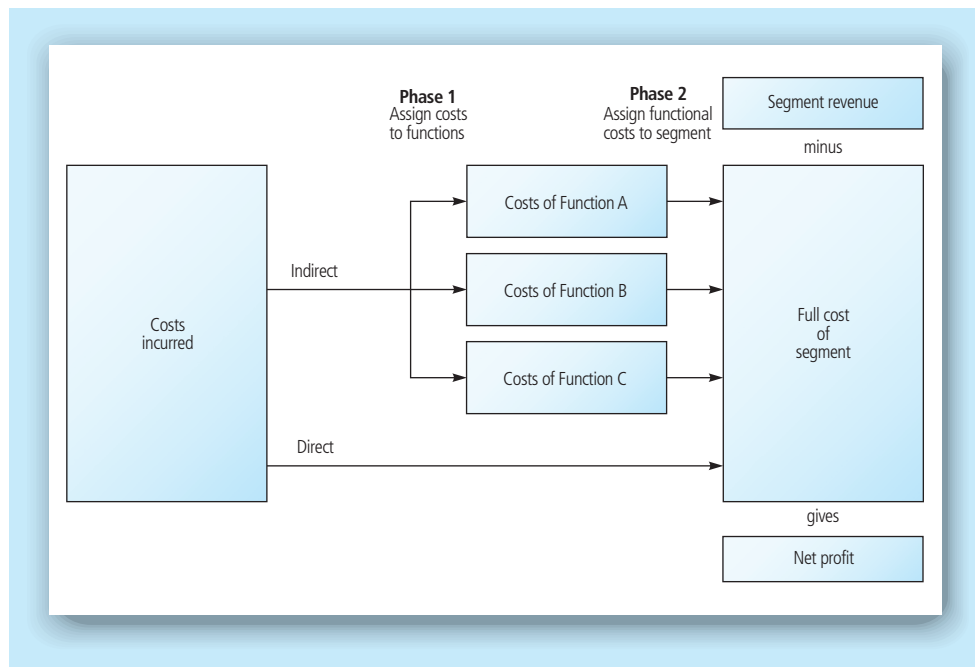
Figure 3.2 Determining segmental costs (source: Wilson and Chua, 1993, p. 87)

Once the natural indirect expenses have been reclassified on a functional basis, they are then charged to the segment in line with the usual benefit criterion (i.e. the segment is only allocated with that portion of each functional cost group that can be related to it on some approximation of a cause and effect basis). The logical basis of allocation may be apparent from an analysis of the underlying data, but it is important to observe that some costs vary with the characteristics of one type of segment only. Thus, inventory costs depend on the characteristics of products rather than on those of customers, whereas the cost of credit depends on the financial integrity and number of customers rather than on regional factors. Accordingly, not all functional costs should be allocated to products, customers and territorial segments. Allocation should only be made when an actual or imputed cause and effect relationship between an underlying activity and some resultant cost which is relevant to the segment(s) can be identified.

It must be remembered when using marketing cost analysis that any cost allocation involves a certain degree of arbitrariness, which means that an element of approximation is inevitably contained within the allocation. Furthermore, it remains necessary to supplement the analysis of marketing costs with other relevant information and with managerial judgement.

Marketing cost analysis is the joint responsibility of the controller and the marketing manager, with the controller supplying most of the information and the marketing manager supplying most of the judgement. Nevertheless, the marketing manager must be fully aware of the method and limitations of marketing cost analysis. The high cost of establishing and maintaining a marketing costing system is justified by the benefits derived from increasing the efficiency of marketing effort. The risks involved in adopting

marketing cost analysis before the benefits have been demonstrated can be reduced by initially confining the analysis to a sample of products, customers or territories, and by making periodic rather than continuous analyses.

Since a fundamental objective of marketing cost analysis lies in increasing the productivity of expenditures and not necessarily in their reduction, the manager who wishes to introduce marketing cost analysis must emphasize the desire to make better use of existing resources rather than reducing future budgets. The integration of marketing costing with marketing research can assist in this matter. Confining any costing system to data provided from accounting records risks forcing that system to be historical, but marketing research can provide estimates of future outcomes resulting from variations in marketing effort (with or without experimentation and the building of complex models) which enable the efficiency of alternate expenditure patterns to be predetermined and evaluated in accordance with corporate aims.

See Illustration 3.1.

Illustration 3.1 My biggest mistake (David Bruce)

(David Bruce, 42, failed his maths 'O' level five times before leaving school to work for a brewery. In 1979, he came off the dole queue to open the Goose and Firkin pub in London after raising a loan against his home. By 1988, he had built a chain of eighteen pubs, which he sold for £6.6 million, intending to retire with his £2 million share. But he could not resist going back into business and is now trading as Inn Securities and building up a chain of Hedgehog and Hogshead pubs outside London.)

My biggest mistake was not paying proper attention to my accounts in the early days of the Firkin pubs. We had opened the Goose and Firkin in London in 1979 and I was working eighteen lousy hours a day, seven days a week, brewing the beer in the cellar and surviving on adrenalin. I had eight staff and a part-time book-keeper.

Everybody said the pub would not work, but people were queuing to get in. It was tremendously exciting and I was on a com-plete high. The tills were ringing, my break-even point was £2500 a week, but the pub never did less than £4500.

So why, I thought, if one has created this extraordinary thing, should one scuttle back home to Battersea and spend hours doing boring old paperwork? The turnover was so good I did not even bother with profit and loss accounts. (And you have to bear in mind that I did not have a natural aptitude for figures.)

In May 1980, I opened the Fox and Firkin in Lewisham. I trained a brewer to look after the Goose, but he promptly broke his leg, leaving me to deal with both pubs. There was even less time to do paperwork.

Then I opened another pub in London, and because the experts doomed us to failure I thought it would be easier if the pubs traded under separate companies. Each one had a different accounting year – it was a good lesson in how not to run a business.

By the time we had opened our fourth pub in 1981, our solicitors, Bishop and Sewell, had watched our progress with great interest and assumed we were incurring a hideous tax bill, so they suggested we met with accountants Touche Ross. My wife Louise and I went along with what little financial information we had, plus a couple of audits that showed we had traded at a loss from day one.

In fact, while the turnover for the first year was £1 million, we had made losses of £86 000. One of their corporate finance partners said that if I did not appoint a chartered accountant to the board as financial director immediately we would go bust within a couple of months. So I took on someone from a major brewery, who introduced systems such as stock control and weekly profit and loss accounts.

But that did not solve the immediate problems. Touche Ross also said I would have to sell one of the pubs, the Fleece and Firkin in Bristol, because it was costing too much time and money. Reluctantly I put it on the market.

By now it was obvious that I should have appointed a finance director at the beginning. The bank was getting nervous, my borrowings were rising and I was not producing a profit.

If the bank had pulled the rug we would have gone down personally for £500 000. Touche Ross advised me to sell a small percentage of the equity, which of course I did not want to do.

Eventually I struck a satisfactory deal with 3i (Investors in Industry), which bought 10 per cent of the business and gave us a loan. Better cash control enabled us to turn a loss into profit, and the following year, on a turnover of £1.6 million, we showed a profit of £47 000.

Touche Ross, who charged us under £5000 to sort the problem out, have done my audits ever since. Paul Adams, our managing director, is the resident chartered accountant. He has kept costs down and introduced budgets which the staff can stick to.

In hindsight the solutions were obvious, but I was a victim of my own success. If the turnover had not been so good, I would have realized a lot sooner how close I was to bankruptcy.

Source: As told to journalist Corinne Simcock, *The Independent on Sunday: Business*, 16 December 1990, p. 20.

3.5 An illustration of segmental analysis

As discussed above, a segment is any cost object which is of interest, and is synonymous with the notion of activity, project or mission as appropriate. Thus, for example, marketing segments may be one – or a combination – of the following:

➡ Product line or range
➡ Channel of distribution
➡ Sales representative or territory
➡ Customer or customer/industry group
➡ Size of order.

It is possible to vary the degree of aggregation of segments, as shown in Figure 3.3.

Initially one must select the segment in which one is interested (e.g. territory, customer, etc.). Then one must select the approach to costing that one prefers. Essentially, there are two major alternatives:

1 Absorption (or full) costing
2 Variable (or direct or marginal) costing.

Our earlier discussion dealt with the first of these, and we saw that this approach involves charging both direct and a portion of indirect costs to the segment in question. When set against the segment's revenue the result is a net profit figure.

Figure 3.4 shows an example of the net profit picture in an organization operating through three different channels of distribution.

The net profit figure reflects the result of the allocation of effort as shown by the total of:

➡ Cost of goods sold
➡ Direct marketing costs
➡ Indirect marketing costs.

Once this allocation has been set against the revenue figure, channel by channel, it is evident that the validity of the net profit figures that emerge depend critically upon the adequacy of the means by which indirect costs are apportioned.

Level	Segment		
Corporate		ABC Ltd	
Division	Machine tools		Electronics
Territory	North		South
Market	Home Computers		Calculators
Product	Business		Scientific
Customer	Wholesaler		Retailer
Size of order	Large		Small
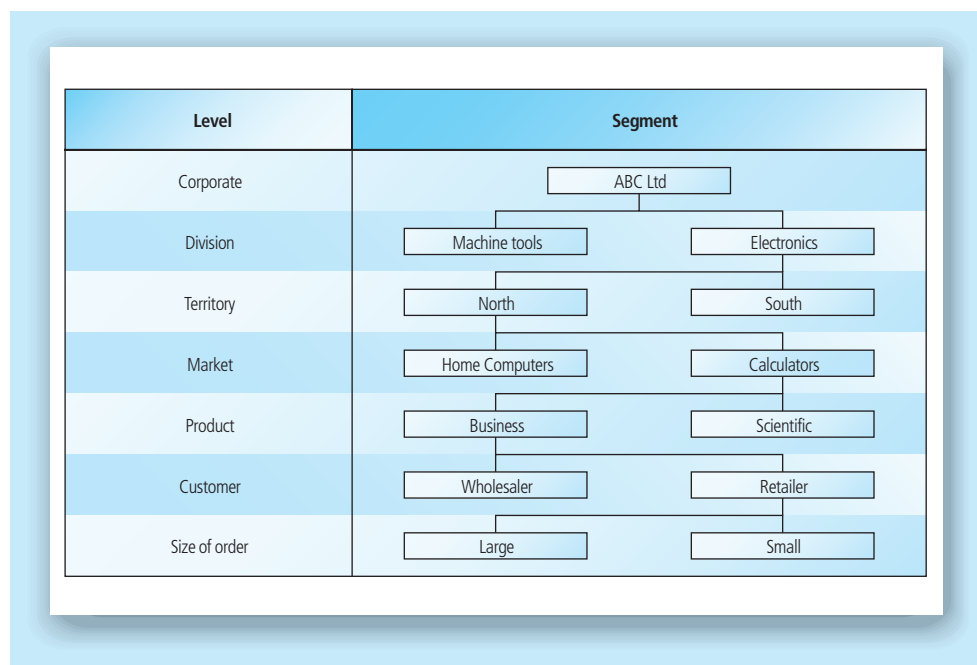
Figure 3.3 Segmental levels (adapted from Ratnatunga, 1983, p. 34)

£'000s	Channel			Total
	A	B	C	
Revenue	875	950	1,225	3,050
Cost of goods sold	325	285	490	1,100
Gross Profit	550	665	735	1,950
Direct marketing costs	265	245	450	960
Indirect marketing costs	330	275	250	855
Total marketing costs	595	520	700	1,815
Net profit	(45)	145	35	135

Figure 3.4 Profit analysis by channel

3.6 An alternative approach to segmental analysis

The alternative approach to segmental analysis is the variable costing approach, in which only direct costs are allocated to arrive at a measure of profit known as *marketing contribution*. Using the data from Figure 3.4, this has been reworked in Figure 3.5 to illustrate the variable costing approach.

It has been assumed that the cost of goods sold figures in Figure 3.4 included £700 000 of variable manufacturing costs and £400 000 of fixed manufacturing costs;

£'000s	Channel			Total
	A	B	C	
Revenue	875	950	1,225	3,050
Variable COGS	225	175	300	700
Manufacturing contribution	650	775	925	2,350
Variable direct marketing costs	115	105	190	410
Variable contribution	535	670	735	1,940
Fixed direct marketing costs	150	140	260	550
Marketing contribution	385	530	475	1,390
Indirect costs				855
Fixed manufacturing costs				400
Net profit				135

Figure 3.5 A direct costing profit statement

that the direct costs are all of a marketing nature and can be split into fixed and variable components as shown in Figure 3.5; and that the indirect costs are all non-allocable to channels. The result is a clear statement that sufficient revenue is being generated via each channel to cover the variable costs and the directly allocable fixed costs. Moreover, there is sufficient total contribution to cover the indirect costs and the fixed manufacturing costs while still making a net profit of £135 000.

3.7 Customer profitability analysis

An approach to segmental analysis that is of increasing interest is customer profitability analysis (CPA). If marketing effort is to be directed at customers or market segments with the greatest profit potential, it is essential that marketing managers have information showing both the existing picture with regard to customer profitability and prospects for the future.

Customer profitability analysis has been defined (Anandarajan and Christopher, 1987, p. 86) as:

" . . . the evaluation, analysis and isolation of:

➡ all the significant costs associated with servicing a specific customer/group of customers from the point an order is received through manufacture to ultimate delivery;
➡ the revenues associated with doing business with those specific customers/customer groups.**"**

The implementation of CPA can be achieved by a series of steps that parallel the steps suggested earlier for other types of segmental analysis. In outline, these steps are:

➡ *Step 1*. Clearly define customer groups and market segments in a way which distinguishes the needs of customers in one group from those of customers in another group.
➡ *Step 2*. For the customer groups or market segments of interest, identify those factors that cause variations in the costs of servicing those customers. This can be done by identifying the key elements of the marketing mix used for each customer group or segment, from which some indication of the costs of servicing each group should be drawn.
➡ *Step 3*. Analyse the ways in which service offerings are differentiated between customer groups. For example, terms of trade may vary between home-based and overseas customers, or between large and small customers, as might the level of service (i.e. speed of delivery) to key accounts.
➡ *Step 4*. Clearly identify the resources that have been used to support each customer group or segment – including personnel, warehouse facilities, administrative backup, etc.

➡ *Step 5*. Determine ways in which the costs of resources (step 4) can be attributed to customer groups.

➡ *Step 6*. Relate revenues and costs to each customer group, with profit emerging as the difference.

The total of the costs for a given customer group is a measure of the effort that has been allocated to that group, and the profit is a measure of the return from that effort. Until the existing pattern of allocation is known, along with its profitability, it is not possible to devise ways of improving that allocation.

See Illustration 3.2.

Illustration 3.2 Evolution

New technologies are beginning to make mass customization feasible and information systems are allowing us to identify the profitability of each customer.

Tower Records recently started offering its customers the top 40 lines of groceries. It was a publicity stunt, of course – a protest at the way supermarkets have started cherry-picking their business by selling records from the Top 40 chart.

Tower's initiative amounts to little more than a puff of hot air, but behind it lies an issue of growing importance. Cherry-picking is hardly new, but its extent and nature are changing. Increasingly, the most aggressive and successful cherry-pickers are coming from 'outside' the industry concerned – and as such these are invaders with a difference. They're changing the nature of the market itself.

To see what's happening we need to take a step back. Consider, for example, how people acquired their clothes, say, 50 years ago. Basically, they had three ways to do so. First, if they were rich, they could go to their tailor. His was a high-quality, high-convenience, high-service offer, with bespoke fitting at a high price. Second, you could buy mass manufactured garments. They offered standard quality and standard sizes at low prices but with low service and low convenience. Thirdly, you could make them yourself, buying cloth and thread and slaving over a hot sewing machine. This way you got bespoke fitting at a very low price, but the service and convenience elements were reduced.

Buying bespoke

Since then, mass manufacturing has swept nearly all before it. Its ongoing technological revolution has forced down prices and improved quality at such a rate that 'Royal' service and DIY have (in most sectors) become tiny niches for the very rich and the very poor respectively. Economies of scale were worth it, but came at a price. Everything was standardized and averaged and there was, to varying degrees, cross-subsidization between customers.

Today, that's changing. New technologies are beginning to make mass customization feasible and information systems are allowing us to identify the profitability of each customer – marketers are rightly questioning the validity of the mass production trade-off. Inspired by the total quality movement ('you can have better quality and lower prices'), they're racing to offer Royal, bespoke products and

services at standard prices – an inspiring agenda that will keep them busy for decades.

At the same time, they're realizing that their customer base usually falls into three groups. The first group (let's call them the Superprofits) actually generates 150 per cent of their profits, even though it only accounts for, say, 60 per cent of customers and makes a crucial contribution to overheads even if its profitability is marginal. The third group actually costs money to serve.

De-averaging is now the order of the day. The big drive now is to 'fire' or otherwise lose the loss makers while going all out to deepen the relationship with the Superprofits.

So far, so good. This is classic segmentation taken to its next, logical, level. But de-averaging has a sting in the tail. In many a company it threatens to set off a chain reaction that unravels the ties that bound it together into a single entity in the first place. Instead of having one mass production business that dominates the market with its brands, de-averaging implies the return of a three-tiered business structure of Royals, standards and DIY, each with their own distinct brands and marketing strategies.

Cherry-picking costs

Without their mass markets and their economies of scale, the advantages that gave mass production its tremendous edge begin to go into reverse. Many of these businesses are, in effect, cross-subsidization businesses and if cross-subsidization falls apart, so do they.

Tower Records' beef is that sales of Top 40 records basically subsidize other titles, allowing it to offer a wider range and therefore a better service. If the Top 40 goes, the whole proposition goes. Ditto credit cards. Heavy borrowers who pay extortionate interest rates on high levels of rollover debt are subsidizing wily users who pay off their debts each month and get an excellent service for free. But a traditional credit card operator cannot cherry-pick its own Superprofits because ending the cross-subsidization would destroy the rest of its business.

Likewise banks. Current account holders whose balances are so low and transactions so frequent that they cost a fortune to serve are being subsidized by affluent customers with higher balances. Banking is ripe for a redivision into Royal, standard and DIY, but it's almost impossible for existing mass players to do so.

Or take insurance. It's all about averaging and cross-subsidization. Clever marketers have made good money by de-averaging – distinguishing high-risk customers from low-risk. But the better the match gets between premium and risk, the less incentive there is to bet: high-risk people won't be able to afford the premium, and very-low-risk types will realize they're better off investing their own premiums.

The real challenge comes when an outsider who hasn't got the same sort of cross-subsidizing structure targets another industry's Superprofits. Almost by definition, they can make a better offer – like the supermarkets and Tower Records. Or, perhaps, category killers poaching high-profit business from mass merchandisers. Or car companies and charities marketing credit cards. In each case, the victim company is no longer doing the segmenting, it is being segmented.

We can expect more of this as technological development reduces the volume a business needs to cover infrastructure costs (thereby lowering barriers to entry), or as specialist operators see big opportunities in creating cherry-picking platforms for 'outsider' brands.

It's tempting to label the first type a niche player and the second type a brand extender, and to think that's the end of it. But beware: jargon suffocates thought. It may be just the beginning. Behind such brands and marketing strategies there might be much more than meets the eye. A completely new industrial – and brand – landscape may be emerging.

Source: Mitchell (1997, p. 18)

An example, ABC Ltd, follows which illustrates in detail how the above approach might be implemented. This approach has been in existence for over 60 years, but renewed interest in it has been generated over the last 10 years or so under the banner of activity-based costing (ABC).

ABC Ltd: an exercise on segmental analysis

The profit and loss account for last month's operations of ABC Ltd is given in Figure 3.6, showing a net profit of £14 070. (The numbers in this example are only intended to show how the calculations can be done.)

Derek Needham, ABC's chief executive, is interested in knowing the profit from each of the company's three customers. Since this cannot be known from Figure 3.6 as it stands, he asks his management accountant, Philip Randall, to carry out the necessary analysis.

In addition to the five *natural* accounts shown in the profit and loss account, Mr Randall has identified four *functional* accounts:

1 Personal selling
2 Packaging and despatch
3 Advertising
4 Invoicing and collection.

	£	£
Sales revenue		255,000
Cost of goods sold		178,500
Gross profit		76,500
Expenses		
Salaries	37,500	
Rent	7,500	
Packaging materials	15,180	
Postage and stationery	750	
Hire of office equipment	1,500	
		62,430
Net profit		£14,070

Figure 3.6 ABC Ltd: profit and loss account

His investigations have revealed that:

1 Salaries are attributable as follows:
- ➡ Sales personnel £15 000
- ➡ Packaging labour £13 500
- ➡ Office staff £9000.

Salesmen seldom visit the office. Office staff time is divided equally between promotional activities on the one hand and invoicing/collecting on the other.

2 The rent charge relates to the whole building, of which 20 per cent is occupied by offices and the remainder by packaging/despatch.

3 All the advertising expenditure is related to Product C.

4 ABC Ltd markets three products, as shown in Figure 3.7. These products vary in their manufactured cost (worked out on absorption lines), selling price and volume sold during the month. Moreover, their relative bulk varies: Product A is much smaller than Product B, which in turn is only half the size of Product C (see Figure 3.7).

5 Each of ABC's three customers requires different product combinations, places a different number of orders and requires a different amount of sales effort. As Figure 3.8

Product	Manufactured cost per unit	Selling price per unit	Number of units sold last month	Sales revenue	Relative bulk per unit
A	£105	£150	1,000	£150,000	1
B	£525	£750	100	£75,000	3
C	£2,100	£3,000	10	£30,000	6
			1,110	£255,000	

Figure 3.7   ABC Ltd: basic product data

Customer	Number of sales calls in period	Number of orders placed in period	Number of units of each product ordered in period		
			A	B	C
Charles	30	30	900	30	0
James	40	3	90	30	3
Hugh	30	1	10	40	7
Totals	100	34	1,000	100	10

Figure 3.8   ABC Ltd: basic customer data

shows, James received more sales calls, Charles placed more orders and Hugh made up most of the demand for Product C.

Using the data that has been presented, and making various assumptions that we feel to be appropriate, we can apply absorption costing principles in order to determine the net profit or loss attributable to each of ABC's customers. On the basis of our analysis, we may be able to suggest what course of action be considered next.

Among the given data we are told that office staff divide their time equally between two functional activities:

1 Advertising (i.e. order-getting)
2 Invoicing and collections.

It seems reasonable to assume (in the absence of other guidance) that space, postage and stationery, and office equipment are used equally by these two functions. The calculations that follow are based on this assumption, but any other reasonable (and explicit) basis could be acceptable.

Rent is payable on the basis of:

➡ 20 per cent office space (i.e. £1500)
➡ 80 per cent packaging and despatch space (i.e. £6000).

All packaging materials are chargeable to packaging and despatch (which is a clear-cut example of a direct functional cost). Since packaging costs will vary with the bulk of the products sold rather than with, say, the number of units sold or sales revenue, we need to take note of the causal relationship between the bulk of sales and packaging costs (see Figure 3.9).

This can be done by computing (as in Figure 3.9) a measure termed 'packaging units', which incorporates both the number of units and their relative bulk. Even though only 10 units of Product C are sold during the month, the relative bulk of that product (with a factor of 6) ensures that it is charged with a correspondingly high amount of packaging effort (hence cost) per unit relative to Products A and B.

Product	Number of units sold		Relative bulk per unit		Packaging units
A	1,000	×	1	=	1,000
B	100	×	3	=	300
C	10	×	6	=	60
	1,110				1,360

Figure 3.9 ABC Ltd: packaging units

The bases for determining the rates to apply functional costs to segments can be built up in the following way:

1 *Assign natural expenses to functional activities* (see Figure 3.10).
2 *Select bases for assigning functional costs to segments.*
   ➡ Sales calls can be used for personal selling expenses (although this assumes all calls took an equal amount of time)
   ➡ The packaging costs vary in accordance with the number of packaging units handled, so a rate per product can be established by taking bulk and the number of units handled into account
   ➡ Advertising can be related to the number of units of Product C sold during the period (which assumes that advertising was equally effective for all sales, and that all its benefits were obtained during the period in question)
   ➡ The costs of invoicing can be assumed to vary in accordance with the number of orders (hence invoices) processed during the period.

Relevant calculations are given below:

$$\text{Cost per sales call} = \frac{\text{functional costs}}{\text{no. of sales calls}} = \frac{£15,000}{100} = £150.00$$

$$\text{Packaging costs} = \frac{\text{functional costs}}{\text{no. of packaging units}} = \frac{£34,680}{1,360} = £25.50$$

$$\text{Product A} = £25.50 \times 1 = £25.50$$
$$\text{Product B} = £25.50 \times 3 = £76.50$$
$$\text{Product C} = £25.50 \times 6 = £153.00$$

$$\text{Advertising cost} = \frac{\text{functional costs}}{\text{units of C sold}} = \frac{£6,375}{10} = £637.50$$

$$\text{Invoicing cost per order} = \frac{\text{functional costs}}{\text{no. of orders}} = \frac{£6,375}{34} = £187.50$$

Natural expense	Personal selling	Packaging and despatch	Advertising	Invoicing and collection
Salaries	£15,000	£13,500	£4,500	£4,500
Rent	–	£6,000	£750	£750
Packaging materials	–	£15,180	–	–
Postage and stationery	–	–	£375	£375
Hire of equipment	–	–	£750	£750
Total	£15,000	£34,680	£6,375	£6,375

Figure 3.10   ABC Ltd: assigning natural expenses

3 *Assign functional costs to segments.* Before this step can be executed fully, it is necessary to calculate the cost of goods sold (COGS) on a customer-by-customer basis. The data given in Figure 3.7 includes the manufactured cost per unit of each product, and from the data given in Figure 3.8 we can see how many units of each product are bought by each customer. From this, we can calculate the data given in Figure 3.11. We can now turn to the assigning of functional costs to segments. If we take the case of Charles, we know that he can be attributed with a total of £35,370 (see Figure 3.12). A similar computation needs to be carried out for James and Hugh, which gives us the data in Figure 3.13. Finally, the revenue generated from each customer must be calculated as in Figure 3.14.

4 *Compile a net profit statement.* All the pieces can now be put together to show the profit or loss of each customer account with ABC Ltd. The resulting figures (Figure 3.15) show that Charles and Hugh are profitable accounts, while James is marginally unprofitable.

Product	Unit COGS	Customer					
		Charles		James		Hugh	
		Units	COGS	Units	COGS	Units	COGS
A	£105	900	94,500	90	9,450	10	1,050
B	£525	30	15,750	30	15,750	40	21,000
C	£2,100	0	0	3	6,300	7	14,700
			£110,250		£31,500		£36,750

Figure 3.11 ABC Ltd: determining cost of goods sold by customer

30 sales calls @ £150.00		£4,500
30 orders @ £187.50		£5,625
Packaging costs for:		
Product A 900 × £25.50	£22,950.00	
Product B 30 × £76.50	£2,295.00	
Product C	0	
		£25,245
Advertising		0
Segmental marketing cost		£35,370

Figure 3.12 ABC Ltd: Charles's costs

James			Hugh		
40 sales calls @	£150.00	£6,000.00	30 sales calls @	£150.00	£4,500.00
3 orders @	£187.50	£562.50	1 order @	£187.50	£187.50
Packaging			Packaging		
A 90 × £25.50	£2,295		A 10 × £25.50	£255	
B 30 × £76.50	£2,295		B 40 × £76.50	£3,060	
C 3 × £153.00	£459		C 7 × £153.00	£1,071	
		£5,049.00			£4,386.00
Advertising 3 × £637.50		£1,912.50	Advertising 7 × £637.50		£4,462.50
Segmental marketing cost		£13,524.00	Segmental marketing cost		£13,536.00

Figure 3.13 ABC Ltd: costs of James and Hugh

		Customer					
		Charles		James		Hugh	
Product	Unit selling price	Units	Revenue	Units	Revenue	Units	Revenue
A	£150	900	135,000	90	13,500	10	1,500
B	£740	30	22,200	30	22,200	40	29,600
C	£3,000	0	0	3	9,000	7	21,000
			£157,200		£44,700		£52,100

Figure 3.14 ABC Ltd: revenue by customer

	Customer			
	Charles	James	Hugh	ABC Ltd
Sales revenue	£157,200	£44,700	£52,100	£254,000
COGS	110,250	31,500	36,750	178,500
Gross profit	46,950	13,200	15,350	75,500
Marketing expenses	35,370	13,524	13,536	62,430
Net profit	£11,580	£(324)	£1,814	£13,070

Figure 3.15 ABC Ltd: net profit by customer

In productivity terms (see pp. 102–4 below), it is evident that there are significant variations from one customer to another. Taking Charles first, we have:

Inputs	£	Outputs	£
COGS	110,250	Sales revenue	157,200
Marketing	35,370		
	£145,620		£157,200

$$\text{Productivity} = \frac{\text{Outputs}}{\text{Inputs}} = \frac{£157,200}{£145,620} = 1.08$$

This productivity index of 1.08 is better than the figure of 1.06 for ABC Ltd as a whole (as shown in Figure 3.16), and considerably in excess of the figures for James and Hugh. It is in excess of unity, which is, prima facie, a good thing.

Taking James next, we have:

Inputs	£	Outputs	£
COGS	31,500	Sales revenue	44,700
Marketing	13,524		
	£45,024		£44,700

$$\text{Productivity} = \frac{\text{Outputs}}{\text{Inputs}} = \frac{£44,700}{£45,024} = 0.99$$

Since this index is below unity, it follows that a loss is being made, and the loss (£324) is the amount by which the value of the inputs consumed in servicing James exceeds the output generated from his account.

Turning now to Hugh, we have the following picture:

Inputs	£	Outputs	£
COGS	36,750	Sales revenue	52,100
Marketing	13,536		
	£50,286		£52,100

$$\text{Productivity} = \frac{\text{Outputs}}{\text{Inputs}} = \frac{£52,100}{£50,286} = 1.04$$

The index is greater than unity, but not as large as that for Charles, or for that relating to ABC Ltd as a whole. This overall position is given below:

Inputs	£	Outputs	£
COGS	178,500	Sales revenue	254,000
Marketing	62,430		
	£240,930		£254,000

$$\text{Productivity} = \frac{\text{Outputs}}{\text{Inputs}} = \frac{£254,000}{£240,930} = 1.06$$

A summary is provided in Figure 3.16.

	Charles	James	Hugh	ABC Ltd as a whole
Outputs (£)	157,200	44,700	52,100	254,000
Inputs (£)	145,620	45,024	50,286	240,930
Productivity index	1.08	0.99	1.04	1.06

Figure 3.16   ABC Ltd: productivity by segment

Interpretation of data

A danger in using an absorption-based approach in segmental analysis is that the 'bottom line' might be taken as a criterion for *action*. It should not be – the aim is to determine the net profit as a criterion for *investigation*. (In a sense, of course, this is one type of action, but the type of action that should be avoided is the eliminating of James's account due to the loss revealed in Figure 3.15.)

Charles's account contributed almost 85 per cent of the total net profit, and he bought three times as much from ABC Ltd as did Hugh, and more than three times the purchases of James. However, the number of sales calls to Charles was fewer than to James, although Charles placed a much larger number of orders than both James and Hugh together.

The mix of products purchased clearly affects the profit performance of different customer accounts. While the COGS does not vary from one product to another (being 70 per cent of sales revenue for each product line), the variation in relative bulk of the product lines caused differences in packaging costs. Thus, Charles (whose orders were for 900 units of A, 30 of B and none of C) was charged with relatively less packaging cost than either James or Hugh due to the smaller packaging bulk of Product A. On a similar basis, since Charles bought no units of C his account was not charged with any advertising costs, so the profit performance of Charles's account would clearly be better than either of the others.

One possible way forward could be to consider calling less often on James, to encourage Charles to place fewer (but larger) orders, and to rethink the wisdom of the advertising campaign for Product C.

It is vital to recognize that this net profit approach to segmental analysis can only raise questions: it cannot provide answers. (The reason for this, of course, is that the apportionment of indirect costs clouds the distinction between avoidable and unavoidable costs, and even direct costs may not all be avoidable in the short run.)

The application of the above steps to a company's product range may produce the picture portrayed in Figure 3.17.

The segment could equally be sales territory, customer group, etc., and after the basic profit computation has been carried out it can be supplemented (as in Figure 3.18)

Product	% contribution to total profits
Total for all products	100.0
Profitable products:	
A	43.7
B	35.5
C	16.4
D	9.6
E	6.8
F	4.2
Sub-total	116.2
G	−7.5
H	−8.7
Sub-total	−16.2

Figure 3.17   Segmental profit statement

by linking it to an analysis of the effort required to produce the profit result. (Clearly this is a multivariate situation in which profit depends upon a variety of input factors – as suggested by Figure 3.1 – but developing valid and reliable multivariate models is both complex and expensive.) As a step in the direction of more rigorous analysis, one can derive benefits from linking profit outcome to individual inputs – such as selling time in the case of Figure 3.18.

Product	% contribution to total profits	% total selling time
Total for all products	100	100
Profitable products:		
A	43.7	16.9
B	35.5	18.3
C	16.4	17.4
D	9.6	5.3
E	6.8	10.2
F	4.2	7.1
Sub-total	116.2	75.2
Unprofitable products:		
G	−7.5	9.5
H	−8.7	15.3
Sub-total	−16.2	24.8

Figure 3.18   Segmental productivity statement

From Figure 3.18 it can be seen that Product A generates 43.7 per cent of total profits, requiring only 16.9 per cent of available selling time. This is highly productive. By contrast, Product E produces only 6.8 per cent of total profits but required 10.2 per cent of selling effort. Even worse, however, is the 24.8 per cent of selling effort devoted to Products G and H, which are unprofitable.

A number of obvious questions arise from this type of analysis. Can the productivity of marketing activities be increased by:

➡ Increasing net profits proportionately more than the corresponding increase in marketing outlays?
➡ Increasing net profits with no change in marketing outlays?
➡ Increasing net profits with a decrease in marketing costs?
➡ Maintaining net profits at a given level but decreasing marketing costs?
➡ Decreasing net profits but with a proportionately greater decrease in marketing costs?

If these analyses are based purely on historical information, they will provide less help than if they relate to plans for the future. One way of overcoming the limitations of historical information is to plan and control the conditions under which information is gathered. This can be achieved through *marketing experimentation*.

3.8 Marketing experimentation

As we saw in Chapter 1 (see also Chapter 15), attempts are made in a marketing experiment to identify all the controllable independent factors that affect a particular dependent variable, and some of these factors are then manipulated systematically in order to isolate and measure their effects on the performance of the dependent variable.

It is not possible, of course, to plan or control all the conditions in which an experiment is conducted; for example, the timing, location and duration of an experiment can be predetermined, but it is necessary to measure such uncontrollable conditions as those caused by the weather and eliminate their effects from the results. Irrespective of these uncontrollable influences, the fact that experiments are concerned with the deliberate manipulation of controllable variables (i.e. such variables as price and advertising effort) means that a good deal more confidence can be placed in conclusions about the effects of such manipulation than if the effects of these changes had been based purely on historical associations.

Studies of marketing costs can provide the ideas for experiments. Questions such as the following can be answered as a result of marketing experimentation.

1 By how much (if any) would the net profit contribution of the most profitable products be increased if there were an increase in specific marketing outlays, and how would such a change affect the strategy of competitors in terms of the stability of, say, market shares?

2 By how much (if any) would the net losses of unprofitable products be reduced if there were some decrease in specific marketing outlays?

3 By how much (if any) would the profit contribution of profitable products be affected by a change in the marketing effort applied to the unprofitable products, and vice versa, and what would be the effect on the total marketing system?

4 By how much (if any) would the total profit contribution be improved if some marketing effort were diverted to profitable territories or customer groups from unprofitable territorial and customer segments?

5 By how much (if any) would the net profit contribution be increased if there were a change in the method of distribution to small unprofitable accounts, or if these accounts were eliminated?

Only by actually carrying out properly designed marketing experiments can management realistically predict with an acceptable degree of certainty the effects of changes in marketing expenditure on the level of sales and profit of each differentiated product, territory or customer segment in the multi-product company.

3.9 The nature of productivity

Productivity can be considered at either a macro level (i.e. in relation to entire industries or whole economies) or at a micro level (i.e. in relation to particular organizations, or in relation to particular activities within organizations). Our interest is in the latter – productivity at a micro level – although we must avoid being too introspective by focusing exclusively on one organization or function as if it were independent of its context.

At its simplest, productivity can be conceived of as the relationship between outputs and inputs. Thus, marketing productivity can be expressed as:

$$\frac{\text{marketing outputs}}{\text{marketing inputs}}$$

Sevin (1965, p. 9) has defined marketing productivity in more specific terms as:

" . . . the ratio of sales or net profits (effect produced) to marketing costs (energy expended) for a specific segment of the business.**"**

This equates productivity and profitability, which seems acceptable to some writers (e.g. Thomas, 1984, 1986), but not to others (e.g. Bucklin, 1978). The major objection to Sevin's definition is due to the effects of inflation, since sales, net profit and costs are all financial flows subject to changes in relative prices. For example, any increase in the value of sales from one period to another during inflationary times will be made up of two elements:

1 An increase due to a higher physical volume of sales

2 An increase due to higher prices.

If the value of the pound sterling were constant this would remove the problem, but since this is not the case it means that any financial data is necessarily suspect. The answer is to make some adjustments to ensure that measurement is made in *real* terms rather than simply in *monetary* terms – and to make these adjustments to both numerator and denominator in a way that allows for differential rates of inflation. Once measurement is made in real terms, it is possible to use the ratio that emerges as an index of efficiency. This can be used in relation to two types of question:

1 How much output was achieved for a given input?
2 How much input was required to achieve a given output?

These questions can be asked retrospectively (as above) or prospectively (for example, how much output should be achieved from a given mix and quantity of inputs?). The first relates to the notion of *technical efficiency*, whereby one seeks to maximize the output from a given input, whereas the second relates to the notion of *economic efficiency*, whereby one seeks to minimize the input costs for a given output.

Having specified in operational terms the numerator (output) and the denominator (input), and having eliminated the impacts of inflation, the result represents a measure of resource allocation (i.e. the pattern of inputs) and resource utilization (i.e. the generation of outputs), and these can be depicted via *ratio pyramids*, which we will look at later in this chapter. What we need to recognize at this point is that the array of ratios within a ratio pyramid can give us a vivid picture of the manner in which the organization has allocated its resources, and the efficiency with which those resources have been utilized. The next step, of course, is to consider how the allocation and its efficiency might be improved, which will mean changes in inputs and outputs. In turn, this requires an understanding of the causal relationships between inputs and outputs.

Let us be a little more specific and consider a particular productivity index from the distribution domain. The relevant output may be expressed in terms of the number of orders shipped during a given period, and the associated input may be the number of labour hours worked in the period. Thus:

$$\text{Productivity index} = \frac{\text{number of orders shipped}}{\text{number of labour hours worked}}$$

It will be apparent that this index relates one physical measure to another, hence there is no need to worry about inflationary distortions. However, had the numerator been expressed in terms of the *sales value* of orders shipped, and/or the denominator in terms of the *cost* of labour hours worked, it would have been necessary to adjust the figures to eliminate the effects of inflation – even though the index that results is a true ratio (i.e. it is not stated in terms of specific units).

It should also be apparent that any productivity index that is calculated is meaningless in isolation from some comparative figure. With what should an index be

compared? There are a number of alternatives that will be examined later in more detail, but for the present we should be aware of the following:

➡ *Internal comparisons* can be made with figures from previous periods (which give a basis for trend analysis) or figures representing efficient or desired performance (which give a basis for budgetary control)
➡ *External comparisons* can be made with other organizations operating within the same markets.

The importance of external reference points cannot be overemphasized. As Christopher (1977) has stated:

"Business success is achieved where the client is, more than in our plants. External returns from the market are more appropriate measures than internal returns on investment. Success is more in manufacturing satisfied, repeat customers than in manufacturing products."

3.10 The use of ratios

Whether one's primary interest is in the productivity of an organization as a whole, or in the productivity of a highly specific activity within an organization, ratios can be computed at a suitable level of aggregation. Their value lies in the relative measures (as opposed to absolute measures) on which they are based.

It is possible to calculate a great range of ratios, but a word of warning is needed to ensure that only useful ratios are calculated. Thus, for example, the ratio of

$$\frac{\text{advertising expenditure}}{\text{miles travelled by salesmen}}$$

within a given period is not likely to be very useful for at least two reasons:

1 It seeks to relate two input factors (rather than one input and one output)
2 The resulting ratio (of advertising expenditure per mile travelled by sales representatives) is not meaningful.

On the other hand, the ratio of

$$\frac{\text{incremental sales}}{\text{incremental promotion expenditure}}$$

relates one input to a relevant output and is potentially useful as a measure of promotional effectiveness. Discretion, therefore, is most important in choosing which ratios to calculate as a means towards assessing productivity within marketing.

Another warning needs to be given over the way in which ratios tend to average out any patterns in the underlying data. Consider the case of a seasonal business

making 90 per cent of its sales in the first six months of every year and the remaining 10 per cent during the other six months. Average monthly sales over the whole year will differ significantly from the average monthly sales in each half year, so one must choose carefully the period over which one gathers data and the frequency with which one calculates ratios.

At an organizational level, the ultimate financial measure of short-term efficiency is the relationship between net profit and capital employed, typically expressed in percentage terms as the rate of return on capital employed or the rate of return on investment (ROI):

$$\text{ROI} = \frac{\text{net profit}}{\text{capital employed}} \times 100$$

This ratio shows the return (i.e. net output) that has been generated by the capital employed (i.e. input) during a given period of time. Problems exist in connection with the definitions, hence measurement, of both numerator and denominator, which highlights another note of caution in using ratios: always be sure to establish the definition of numerators and denominators. For example, is the net profit pre-tax or post-tax? Is the capital employed based on historic cost or replacement cost figures?

Given that profit is the residual once costs have been deducted from sales revenues, it is clear that ROI can be improved by either increasing sales revenues, decreasing costs or reducing capital employed – or by any combination of these. This gives us the basic idea underlying the ratio pyramid. At the apex is ROI, but this can be decomposed into two secondary ratios:

$$\text{Primary ratio:} \frac{\text{net profit}}{\text{capital employed}}$$

$$\text{Secondary ratios:} \frac{\text{net profit}}{\text{sales revenue}} \times \frac{\text{sales revenue}}{\text{capital employed}}$$

Each of the secondary ratios can help explain the ROI. The first is the profit rate on sales and the second is the capital turnover. Their interrelationship is such that:

$$\text{profit rate} \times \text{capital turnover} = \text{ROI}$$

Even the secondary ratios are highly aggregated, so it is necessary to proceed to measure tertiary ratios as one moves down the ratio pyramid using its structure as a diagnostic guide.

The general cause of any deviation in ROI from a target rate may be found by computing the profit ratio and the capital turnover ratio, but this is only a starting point. Before corrective action can be taken, a study of specific causes must be made, hence *tertiary ratios* need to be worked out.

Tertiary ratios are those that constitute the secondary ratios. The profit ratio reflects the relationship between the gross profit rate, the level of sales revenue, and operating costs (i.e. net profit + operating costs = gross profit), while the rate of capital turnover is affected by the level of sales revenue and the capital structure mix (of fixed and working capital, etc.). From these details it is a simple step to compute four tertiary ratios as follows (as shown in Figure 3.19):

1 $\dfrac{\text{Gross profit}}{\text{Sales revenue}}$

2 $\dfrac{\text{Sales revenue}}{\text{Operating costs}}$

3 $\dfrac{\text{Sales revenue}}{\text{Fixed assets}}$

4 $\dfrac{\text{Sales revenue}}{\text{Working capital}}$

Figure 3.19 also shows many other levels of the ratio pyramid that can be identified, and the process of decomposing broad ratios into their component parts can be continued further and further until the reasons for overall outcomes are known.

A variation on Figure 3.19, relating specifically to marketing, is provided by Figure 3.20.
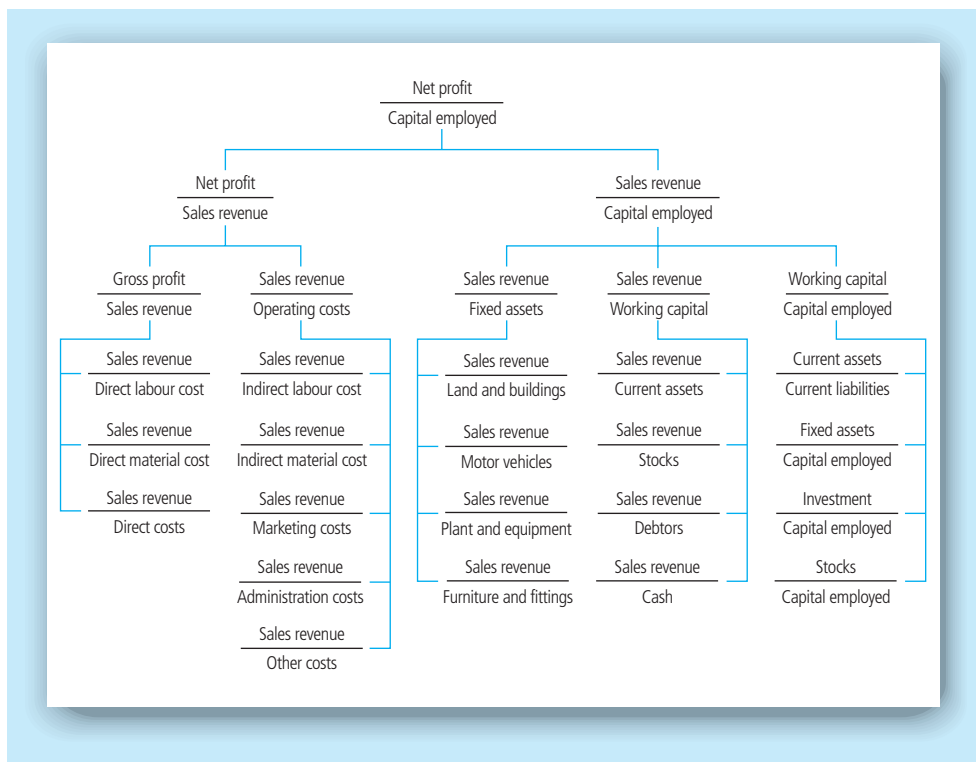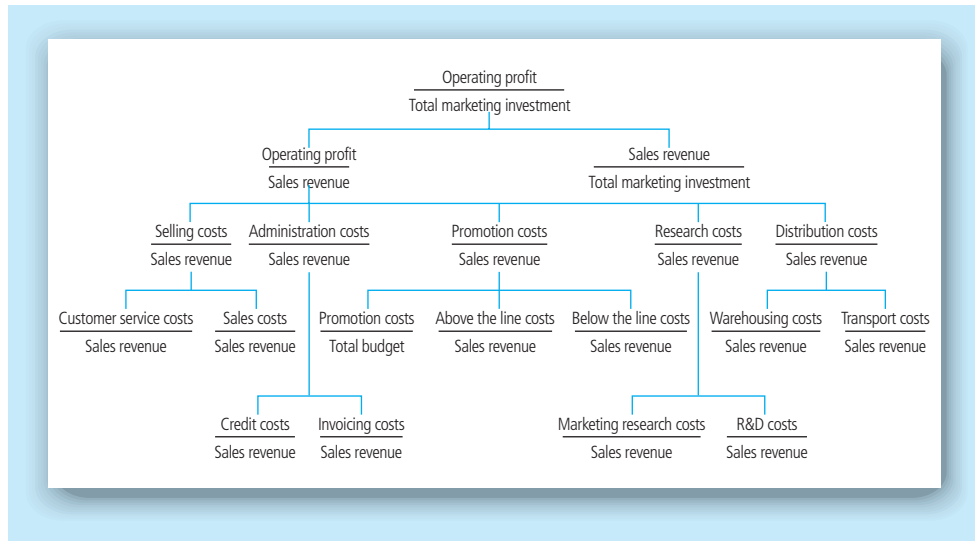

Figure 3.19   Ratio pyramid

Figure 3.20 Marketing ratio pyramid

3.11 Analysing ratios and trends

It is possible to indicate trends in a company's performance over time by plotting successive ratios on a graph and thereby showing trends. Some important trends may only become apparent over a number of months (or even years), and ratio analysis can ensure that such trends do not develop unnoticed. Figure 3.21, for example, shows a continuing decline in a company's profitability. The causes for this trend may be found by breaking it down into its secondary components and so on through the ratio pyramid. These secondary trends – profit rate and capital turnover – are shown in Figure 3.22 and can be seen to be falling and rising respectively. Figure 3.23 then takes the former of these trends (falling profit rate) and decomposes it into a falling gross profit trend and a rising operating cost to sales revenue trend.
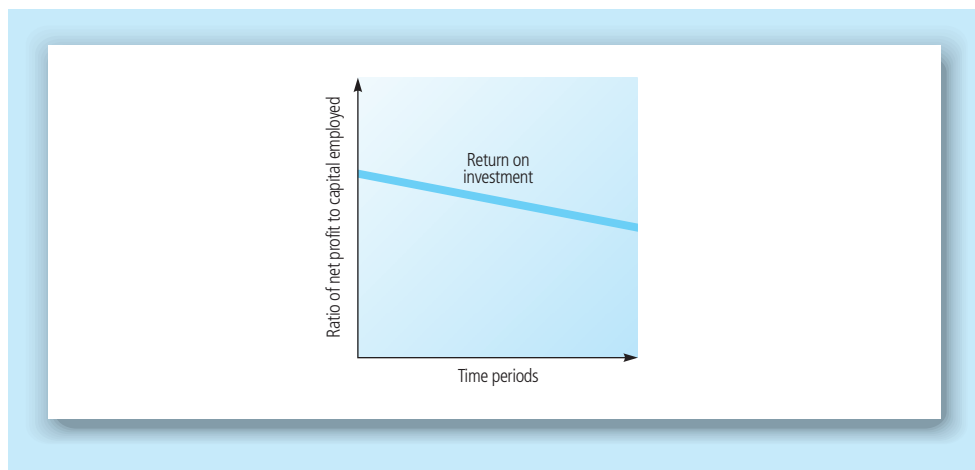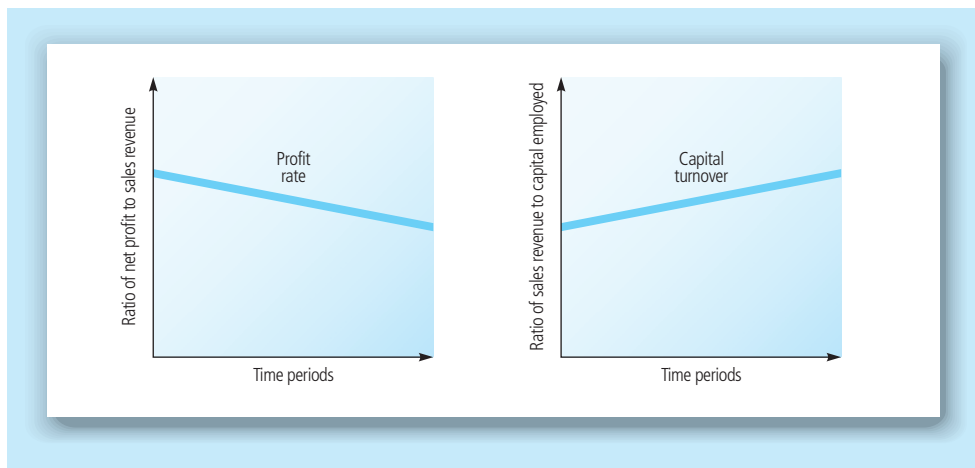

Figure 3.21 Primary trend

Figure 3.22 Secondary trends

It could prove necessary in a specific instance to work right through the ratio pyramid in plotting trends in order to isolate the causes of variations from the desired trend line in higher levels of the ratio hierarchy, and it may also be necessary to apply some imagination and common sense. This last-mentioned requirement can be illustrated in two ways. First, the declining ROI noted in Figure 3.21 may be thought, prima facie, to be due to the falling net profit to sales revenue trend shown in Figure 3.22, and so the rising capital turnover trend as in Figure 3.22 may be ignored. But ROI is clearly the combined outcome of a particular level of profit and a particular quantity of capital investment, so any variation in either will inevitably affect the ROI. Furthermore, a rising aggregate trend of capital turnover will almost certainly conceal many more compensating highs and lows in tertiary and subsequent levels of the ratio hierarchy. It follows that attention in the light of a falling ROI should not necessarily be focused
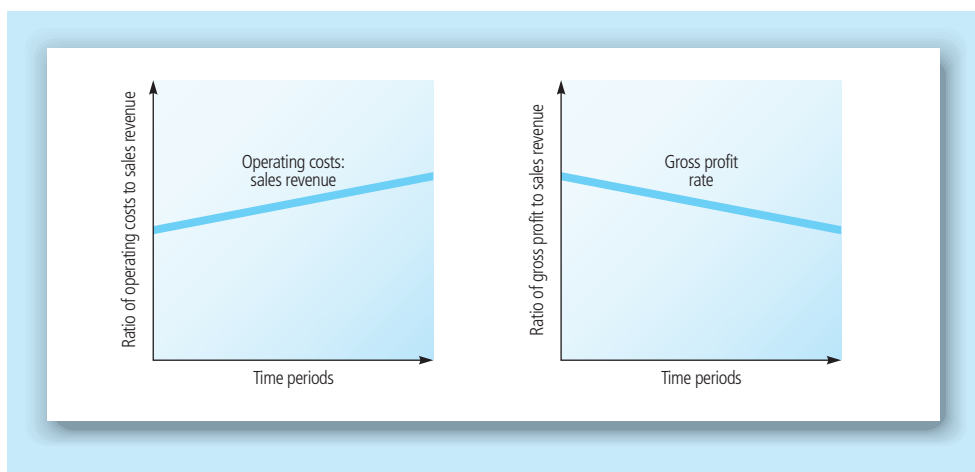

Figure 3.23 Tertiary trends

exclusively on the net profit trend, but some consideration should be given to the rate and trend of capital turnover.

The second common-sense point to note is that a rising operating cost to sales revenue trend, as in Figure 3.23, cannot be controlled until the specific items that cause the trend have been identified and appropriate steps taken to bring them under control. Of course, the extent to which the decline of the profit rate (a secondary trend) is caused by either of its constituent tertiary trends should be carefully established.

3.12 Ratios and interfirm comparison

In many industries – and especially in those in which operating methods, technology, product characteristics and general operating conditions are very similar – it is helpful to have comparative figures for one's own company and for other companies within the industry. From published accounts it is possible to see the primary, secondary and tertiary ratios (hence trends) of competing companies, but no reasons for divergences between one's own company's results and other companies' results can be discerned from such accounts due to a lack of detail relating to the lower part of the ratio pyramid (i.e. below the tertiary level) and so there is no guidance for future actions.

One major cause of divergence between the results of any two companies can be found in their use of differing accounting techniques and definitions. This will be seen, for example, if two companies purchase a similar asset each at the same point and one company chooses to depreciate the asset over four years while the other company chooses to take a 100 per cent depreciation allowance in the first year. It follows, therefore, that a meaningful comparison must be based on common definitions and usage. This can best be achieved (for comparative purposes) by a central organization and for this reason the Centre for Interfirm Comparison was set up.

While interfirm comparison figures are expressed in relation to quartiles and the median (i.e. if all results are ranked in descending order of size, the median is represented by the figure that comes halfway down, and the third quartile is three-quarters of the way down), the following example (OPQ Ltd) simplifies this by just giving the general approach to interfirm comparisons. The necessary steps in such an exercise are:

1 Ensure that the reports, etc., that are to be compared incorporate figures that have been prepared on a comparable basis
2 Compute the required ratios, percentages and key totals from submitted reports
3 Compare the results of each company with the aggregate results
4 Introduce intangible or qualitative factors that may aid in interpreting the results of each individual company in the light of the whole picture
5 Examine the numerator, denominator and lower ratios in instances where a ratio differs significantly from the external standard (or average, median or whatever)
6 Determine the adjustment (if any) that is required to bring a given company's divergent ratio into line with the aggregate norm.

OPQ Ltd: ratio analysis

The following is a simple example of interfirm comparison. Figure 3.24 shows the ratios of OPQ Ltd, a firm in a light engineering industry, for the two years 2002 and 2003.

	Ratio	Unit	2002	2003
1	$\dfrac{\text{Operating profit}}{\text{Assets employed}}$	%	8.25	10.0
2	$\dfrac{\text{Operating profit}}{\text{Sales revenue}}$	%	5.5	6.1
3	$\dfrac{\text{Sales revenue}}{\text{Assets employed}}$	times	1.5	1.65
3a	$\dfrac{\text{Assets employed}}{\text{Average daily sales revenue}}$	days*	249	222
4	$\dfrac{\text{Production cost of sales}}{\text{Sales revenue}}$	%	71.0	70.4
5	$\dfrac{\text{Distribution and marketing costs}}{\text{Sales revenue}}$	%	17.7	17.7
6	$\dfrac{\text{General and administrative costs}}{\text{Sales revenue}}$	%	5.8	5.8
7	$\dfrac{\text{Current assets}}{\text{Average daily sales revenue}}$	days*	215	188
8	$\dfrac{\text{Fixed assets}}{\text{Average daily sales revenue}}$	days*	34	34
9	$\dfrac{\text{Material stocks}}{\text{Average daily sales revenue}}$	days*	49	45
10	$\dfrac{\text{Work-in-progress}}{\text{Average daily sales revenue}}$	days*	53	46
11	$\dfrac{\text{Finished stocks}}{\text{Average daily sales revenue}}$	days*	52	39
12	$\dfrac{\text{Debtors}}{\text{Average daily sales revenue}}$	days*	61	54

* Days required to turn the asset item over once.

Figure 3.24 OPQ's own figures

This looks like a success story. Profit on assets employed has gone up from 8.25 to 10 per cent due to an increase in the firm's profit on sales (Ratio 2) and the better use it seems to have made of its assets (Ratios 3 and 3a). The higher profit on sales seems to have been achieved through operational improvements, which results in a lower ratio

	Ratio		Firm				
			A	B	C	D	E
1	$\dfrac{\text{Operating profit}}{\text{Assets employed}}$	%	18.0	14.3	10.0	7.9	4.0
2	$\dfrac{\text{Operating profit}}{\text{Sales revenue}}$	%	15.0	13.1	6.1	8.1	2.0
3	$\dfrac{\text{Sales revenue}}{\text{Assets employed}}$	times	1.20	1.09	1.65	0.98	2.0
3a	$\dfrac{\text{Assets employed}}{\text{Average daily sales revenue}}$	days*	304	335	222	372	182
4	$\dfrac{\text{Production cost of sales}}{\text{Sales revenue}}$	%	73.0	69.4	70.4	72.5	79.0
5	$\dfrac{\text{Distribution and marketing costs}}{\text{Sales revenue}}$	%	8.0	13.1	17.7	13.7	15.0
6	$\dfrac{\text{General and administrative costs}}{\text{Sales revenue}}$	%	4.0	4.4	5.8	5.7	4.0
7	$\dfrac{\text{Current assets}}{\text{Average daily sales revenue}}$	days*	213	219	188	288	129
8	$\dfrac{\text{Fixed assets}}{\text{Average daily sales revenue}}$	days*	91	116	34	84	53
9	$\dfrac{\text{Material stocks}}{\text{Average daily sales revenue}}$	days*	45	43	45	47	29
10	$\dfrac{\text{Work-in-progress}}{\text{Average daily sales revenue}}$	days*	51	47	46	60	52
11	$\dfrac{\text{Finished stocks}}{\text{Average daily sales revenue}}$	days*	71	63	39	94	22
12	$\dfrac{\text{Debtors}}{\text{Average daily sales revenue}}$	days*	36	84	54	18	26

* Days required to turn the asset item over once.

Figure 3.25   The interfirm comparison

of cost of production (Ratio 4). The firm's faster turnover of assets (Ratio 3) is due mainly to a faster turnover of current assets (Ratio 7), and this in turn is due to accelerated turnovers of material stocks (Ratio 9), work in progress (Ratio 10), finished stock (Ratio 11) and debtors (Ratio 12).

The firm's illusion of success was shattered when it compared its ratios with those of other light engineering firms of its type. Figure 3.25 is an extract from the results – it gives the figures of only five of the twenty-two participating firms. OPQ Ltd's figures are shown under letter C.

In this year, the firm's operating profit on assets employed is well below that of two other firms, and this appears to be due to its profit on sales (Ratio 2) being relatively low. This in turn is mainly due to the firm's high distribution and marketing expenses (Ratio 5). In the actual comparison further ratios were given, helping Firm C to establish to what extent its higher Ratio 5 was due to higher costs of distribution and warehousing, higher costs of advertising and sales promotion, or higher costs of other selling activities (e.g. cost of sales personnel).

3.13 A strategic approach

A strategic-oriented approach to answering the question 'Where are we now?' can be provided from the PIMS database. PIMS stands for Profit Impact of Market Strategy and refers to an objective approach to analysing corporate performance using a unique database. Some 3000 strategic business units (SBUs) have contributed over 20 000 years' experience to this database.

PIMS research on what drives business profits has become more widely known over the last 25 years as more evidence has become available. We know that there is, in general, a range of factors which we can quantify and relate to margins or to return on capital employed (ROCE). But does the evidence show that these factors work in specific industries – do they actually explain the spread which dwarfs differences between industries?

PIMS results from examining real profits of real businesses suggest that the determinants of business performance can be grouped into four categories (see Figure 3.26):

1 Market attractiveness
2 Competitive strength
3 Value-added structure
4 People and organization.

The first category contains factors in the business situation which affect its performance. Customer bargaining power, market complexity, market growth and innovation are obvious examples.
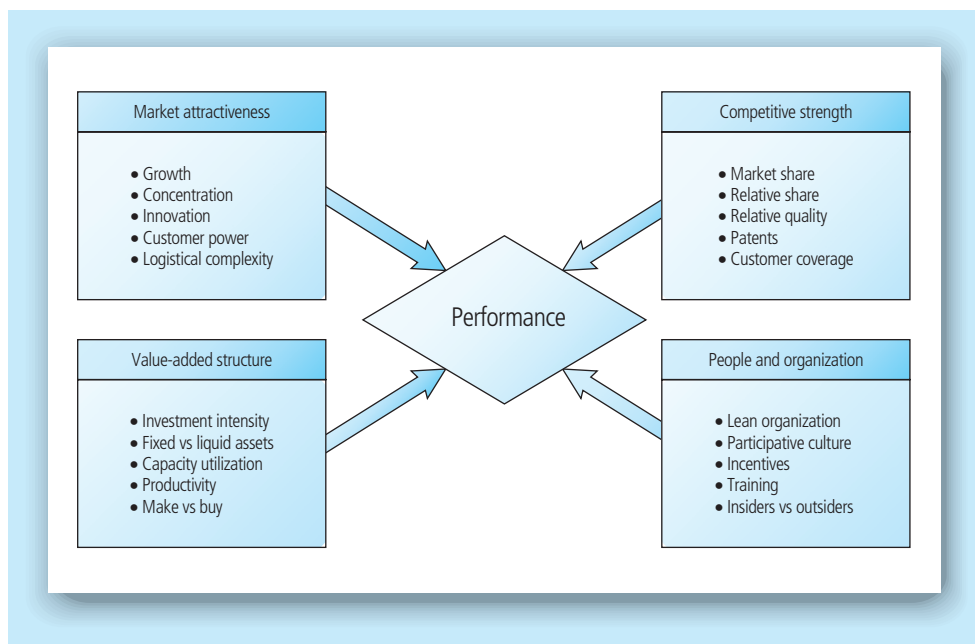
Figure 3.26 PIMS can quantify how strategic factors drive performance

The second group describes how a business differs from its competitors in its market. Share position, customer preference relative to competitors' offerings, market coverage and product range all have an effect.

The third category quantifies the way a business converts inputs into outputs; it includes investment intensity, fixed/working capital split, employee productivity, capacity use and vertical integration.

People and organization, an area in which PIMS has only recently built up comparable data, includes managers' attitudes, skill and training mix, personnel policies and incentives.

Figure 3.27 shows the impact of these factors on business profits tracked across PIMS' 3000 businesses. Some factors are more important than others, but each has an influence that is both measurable and explainable. The positioning of a business on the chart can be described as its 'profile'.

To test whether the profile of a business can explain its profits, irrespective of the industry in which it operates, PIMS looked at the performance of businesses with 'weak' and 'strong' profiles in each of five sectors. Weak and strong profiles were picked in terms of position on each of the fifteen variables in Figure 3.28. Factors related to people and organization were omitted from the exercise because the available sample at the time was not large enough to examine them by sector.

The results are startling! In every industry sector where there were enough observations to test, a business with a weak profit makes a 6 per cent return on sales (ROS) or 10 per cent return on capital employed (ROCE) over a four-year period. In contrast,

Factor	− Effect on ROCE +

Factor	−	+
Market attractiveness		
Market growth	Low	High
Innovation	Zero, very high	Moderate
R&D spend	Zero, very high	Moderate
Marketing spend	High	Low
Contract size	Large	Small
Customer complexity	Complex	Simple
Competitive strength		
Relative share	Low	High
Relative quality	Worse	Better
Differentiation	Commodity	Differentiated
Customer spread	Narrow	Broader
Product range	Narrow	Broader
Value-added structure		
Investment/sales	High	Low
Capacity use	Low	High
Vertical integration	Low	High
Employee productivity	Low	High
People and organization		
Attitudes	Restrictive	Open
Training	Little	Substantial
Incentives	Weak	Strong

Figure 3.27 Impact of strategic factors on performance (source: PIMS database)

a strong-profile business makes 11 per cent ROS or 30 per cent ROCE. The gap in profit performance between strong and weak businesses in each sector is bigger than the standard deviation in each group. So the profile does a better job of explaining differences in performance than the industry each business is in. The profile represents the strategic logic that shapes the real competitive choices facing managers in each business (see Figure 3.29).

These new results are critically important. Earlier studies have shown how margins are related to business characteristics, but this is the first time that businesses in different industries with similar profiles have been shown to have more in common when it comes to performance than businesses in the same industry with different profiles.

PIMS also tested the relationships between margins and profile variables in various subsectors in the chemical industry, which is particularly well represented in the PIMS database. In each case the determinants included in the profile have a powerful and consistent influence on profits. The effect of each determinant is similar irrespective of the product category. This is true even for what is probably the most subjective of the variables that PIMS measures: relative quality.
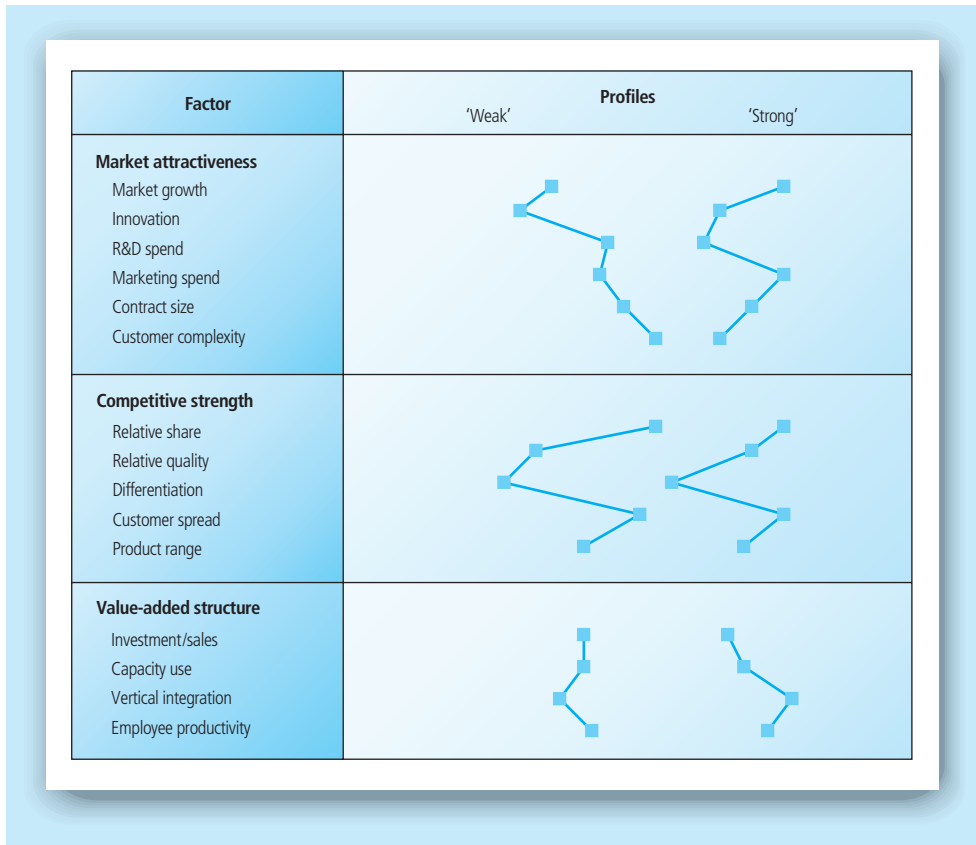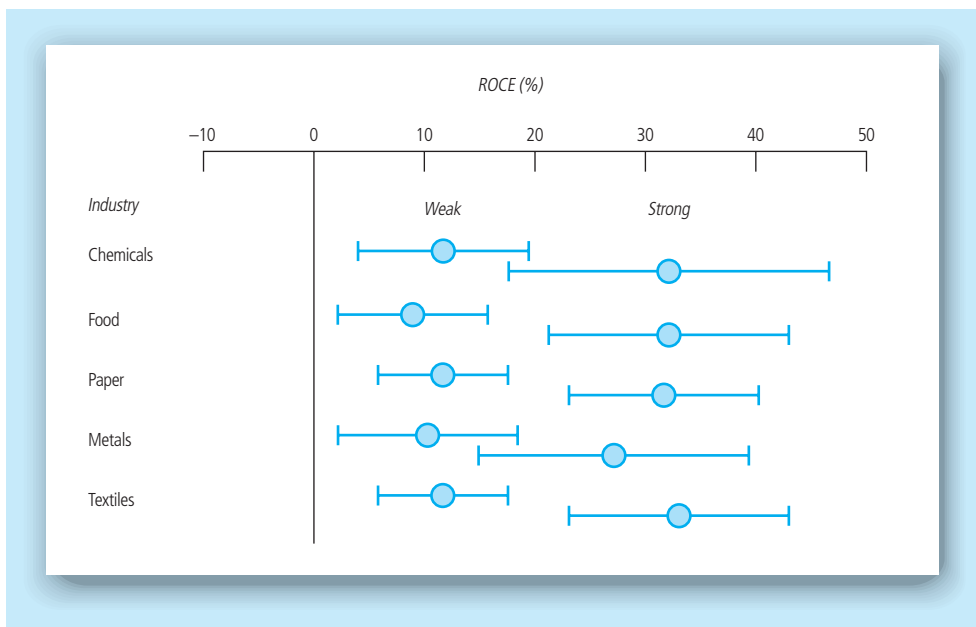
Figure 3.28 PIMS profiles 1

Figure 3.29 PIMS profiles 2 (source: PIMS database)

3.14 Summary

This chapter has been concerned primarily with the pattern of utilization of resources and its efficiency within the enterprise. Both ratio analysis and productivity analysis can help in establishing the pattern of resource utilization and its productivity by relating inputs (resources consumed or costs) to outputs (revenue). From this base, marketing managers will be able to derive greater insights into relationships between inputs and outputs to help them in planning (and controlling) future activities.

If the utilization of 'effort' (i.e. resources) across an organization's various activities can be measured and related to the revenues generated by those activities, it is possible to determine their productivity. In essence, this is the ratio of outputs/inputs. While the outputs are fairly easy to establish with precision, the same is not true of the inputs, so most of the discussion has focused on the measurement of inputs.

The starting point is the specification of the cost objects of interest, for example the productivity of operating via different channels, or serving different customer groups. Costs will be *direct* or *indirect*, depending upon the cost objects of interest. Full cost needs to be determined for each cost object (i.e. segment), and the ways in which this can be done have been discussed and demonstrated. Once this has been done, the productivity of each segment can be measured and from these measurements questions can be raised about the adequacy of each segment's productivity. For example, can effort be reallocated from Segment A to Segment B to improve these segments' productivity?

The key role of ratio analysis and productivity analysis lies in the basis they give for raising questions in the light of the existing state of play. Such techniques cannot generate answers as to what to do next.

A pyramid of marketing ratios was constructed to show the pattern of ratios (reflecting resource utilization and productivity) across relevant activities in a way that highlights interdependencies in an overall context.

Finally, the strategic approach provided by PIMS was outlined, which adds extra dimensions to the analysis of 'Where are we now?'