

CHAPTER 3

VERTICAL AND VIRTUAL BOUNDARIES

Introduction

We have seen, following Ronald Coase, that it is profitable to establish a firm when the **transaction costs** of using the market outweigh the benefits of market exchange. Viewed from a Coasian perspective, the firm consists of a supply chain where a product is exchanged between a number of discrete, sequential activities. It is these activities that create or add the value inherent in the good or service being produced and it is for this reason that supply chains are now frequently known as **value chains**. This approach to the firm immediately raises a key strategic question; namely, how many separable production activities should a firm undertake? A firm's **vertical boundary** is determined by the number of technologically separable intermediate production stages that are controlled by one hierarchical governance structure. This chapter implicitly focuses on the value chain for a single product; in the next chapter we will focus on multi-product firms and thereby a firm's **horizontal boundary**. This chapter builds on the concepts introduced in Chapter 2 to provide understanding of the factors that determine how many separable production stages it is productively and allocatively efficient for an individual firm to undertake. The decisions a firm takes as to what it produces or 'makes' for itself and what it chooses to purchase or 'buy' from the market are fundamental to its strategy at both the corporate and business unit level. Put succinctly, at the heart of all business strategy is the 'make-or-buy' decision.

If a firm's vertical boundary encompasses two or more separable, sequential production stages, the firm is described as being vertically integrated. The term **vertical integration** describes a situation where a governing hierarchy has replaced the market as the means of exchange between successive stages of production. We observed above that all firms are value chains, but most firms are embedded within a longer industry value chain incorporating the firm's suppliers and customers. Focusing on a firm in the middle of an industry's value chain, if it acts to produce some or all of the intermediate goods or services that it would otherwise purchase from suppliers it is described as having vertically integrated *upstream*. If the firm acts to utilize its output as an input to another value-adding activity,

it is described as having vertically integrated *downstream*. Thus, a vertically integrated firm not only has **property rights** over the means of producing one or more separable stages of the production of an output, but also it has complete discretion as to how the intermediate product will be exchanged between the successive stages. Put another way, a vertically integrated firm controls by management authority the flow of production between two or more stages of the industry value chain.

Vertical integration may occur when a firm is set up – this is known as vertical formation. Alternatively, vertical integration that occurs as a result of organic growth is known as vertical expansion and vertical merger describes vertical integration that occurs through a merger or acquisition. Since the 1980s, two new words have entered the business language – ‘downsizing’ and ‘**outsourcing**’ – reflecting a move away from vertical integration: their use is perhaps understandable given the alternative of ‘disintegration’. In many cases, the internal governance of value exchange has been replaced with procurement via spot market transactions, but equally likely is outsourcing that takes the form of a vertical relationship lying somewhere between the polar extremes of a spot market transaction and vertical integration. One consequence of these vertical relationships is that firms build inter-organizational structures with suppliers and/or customers, the effect of which is to blur the boundaries of the firms involved. As governance in such arrangements is shared between two or more separate entities, there are no clearly defined boundaries and it is more realistic to think of the firms involved in such relationships as having virtual boundaries.

The theme underlying this chapter’s focus on vertical and virtual boundaries is how the issue of vertical co-operation is influenced by the existence of **incomplete** knowledge, **imperfect** and **asymmetric information**. In later chapters, we will return to vertical integration and vertical relationships as a means of engaging in or resolving strategic conflict. Here our focus is within the firm and, in particular, how the presence of uncertainty can determine whether a firm chooses to produce its inputs in-house, or buy them from the market, or produce them jointly in partnership with other entities. These issues are key strategic elements and address the fundamental difference between a subsidiary and a supplier, an employee and a sub-contractor, an acquaintance and a partner. By reading this chapter you will:

- Appreciate how a firm’s vertical boundaries determine its influence within its value chain.
- Understand how the efficiency criterion can explain the number of separable production stages within a firm’s boundaries.
- Know why outsourcing frequently involves the creation of a new type of vertical relationship rather than spot market procurement.

This chapter is divided into six sections. In the first, we will start by defining and measuring vertical integration. We will then go on in the second section to explore how imperfect and asymmetric information can encourage vertical integration, and in the third section we will examine the role of transaction costs in the ‘make-or-buy’ decision. In the fourth section we will analyse the **governance approach** to vertical integration, and in particular how Oliver Williamson’s development of Ronald Coase’s perceptive insight into the nature of the firm has yielded a theory of vertical boundaries that explains why they are not fixed and are likely to wax and wane over time. As discussed in the previous chapter, despite the many valuable insights of the governance approach to the firm it is not a complete theory and needs to be complemented with the **competence approach**, which provides further insights as to why some firms grow by expanding their vertical boundaries. In the fifth section

we will briefly outline the competences approach to vertical boundaries, before turning in the last section to investigate vertical relationships, and in particular joint ventures and partnership alliances, as alternatives to vertical integration.

Vertical Integration

We noted above that a firm can be described as vertically integrated if it encompasses two, or more, technologically separable, sequential production processes whereby the output from the upstream process is an intermediate product that becomes an input to the downstream process. Inherent in this definition is the substitution of market exchange, either a planned or spot transaction, with internal governance to procure the intermediate product. This definition implies ownership of the property rights in the resources utilized in the separable, but neighbouring, production stages and complete control over the production and exchange decisions at each stage.

In the rather special case of a new, functionally unique, product, e.g. the light bulb at the end of the nineteenth century, there may be no suppliers of key inputs. This may reflect a lack of technological knowledge or it may reflect incomplete knowledge as to the likely volume of sales. In such circumstances, the innovating firm may have no alternative but to produce these inputs itself as a vertically integrated business. To quote Adam Smith, (1776), the division of labour is 'limited by the extent of the market'. If the new product is successful, demand will grow and as it does so, this will create opportunities for the development of specialist producers of key inputs and, hence, procurement via market exchange. All other factors remaining equal, the outcome of a number of specialist producers competing to supply an intermediate input should result in the lowest possible unit price. But for the firm producing a highly specialized product it may never be economic to source key intermediate inputs from the market. It is not the price, but the total cost of the exchange that is critical to the decision. Before exploring the costs of exchange and their influence on a firm's vertical boundaries, we need to be clear as to how a firm's internal value chain relates to an industry or sector value chain. A highly simplified representation of a firm's internal value chain involving only one production stage before assembly of the product is shown in Figure 3.1

Say, for example, that Figure 3.1 represented a food processor who makes cheese flans. The processor purchases key inputs from the market, e.g. butter, cheese and flour, and then at the production stage prepares the flan base and fillings before baking the flan (assembly) to produce the finished product. Before packaging and despatching (sales) the product to customers, samples are likely to be tested. Figure 3.2 shows how our highly simplified, internal value chain (i.e. our food processor) sits within a greatly simplified value chain. All value chains start with raw materials, i.e. primary inputs or raw materials, which are then processed at successive stages in the chain into a finished product. In the

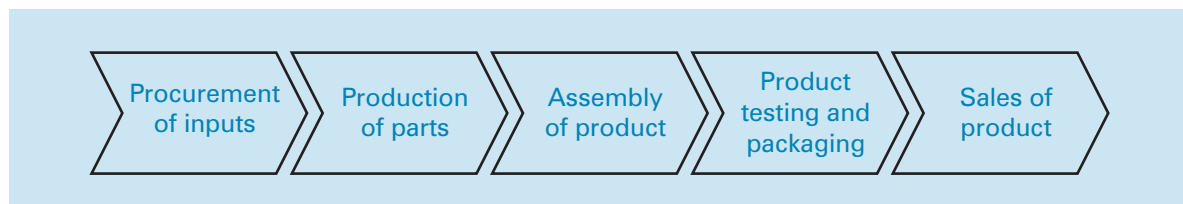


Figure 3.1: An internal value chain

example shown, inorganic fertilizers made from nitrogen become inputs into agricultural production. Note that some of the cereal output from arable farms is the raw material for animal feed processors (a separate value chain). Continuing down the chain, these agricultural commodities are then processed into flour, butter and cheese before being utilized by the food processor in the manufacture of its food products. These products are then packaged and distributed to the point where they are sold to consumers for consumption.

In Figure 3.2, starting with our representative firm – the food processor – moving back through its suppliers and its suppliers' suppliers is described as moving upstream. Alternatively, starting with the fertilizer manufacturer, the food processor is located downstream in the food value chain; that is, the flow of material inputs is described as moving down the chain. If we go downstream from our representative food processor, then we move to retailers and other outlets. It is the physical movement of resources down the chain that gives rise to the idea of vertical movement. Figure 3.2 is highly simplified; not shown are the merchants, wholesalers and distributors who move the intermediate products between each stage in the supply chain. Each stage in the value chain also purchases goods and services from other value chains, e.g. the purchase of machines. In practice, value chains are a highly complex web or network of exchange transactions. Figure 3.2 implies that each stage in the value chain deals only with firms that are immediately up- or down stream. Increasingly, this may not be the case; for example, in order to ensure safety and traceability, supermarkets and other final food sellers now routinely build links with farm businesses. Figure 3.2 also implies that our food processor only buys from one milk processor, one ingredient manufacturer and so on. In practice, unless the supplier has a monopoly, firms will usually trade with more than one supplier, though for reasons that will be discussed below, the trend is for firms to reduce the number of suppliers. By sourcing inputs from more than one supplier, the firm reduces the risk of a breakdown in supply and also partly ensures the prices charged are competitive.

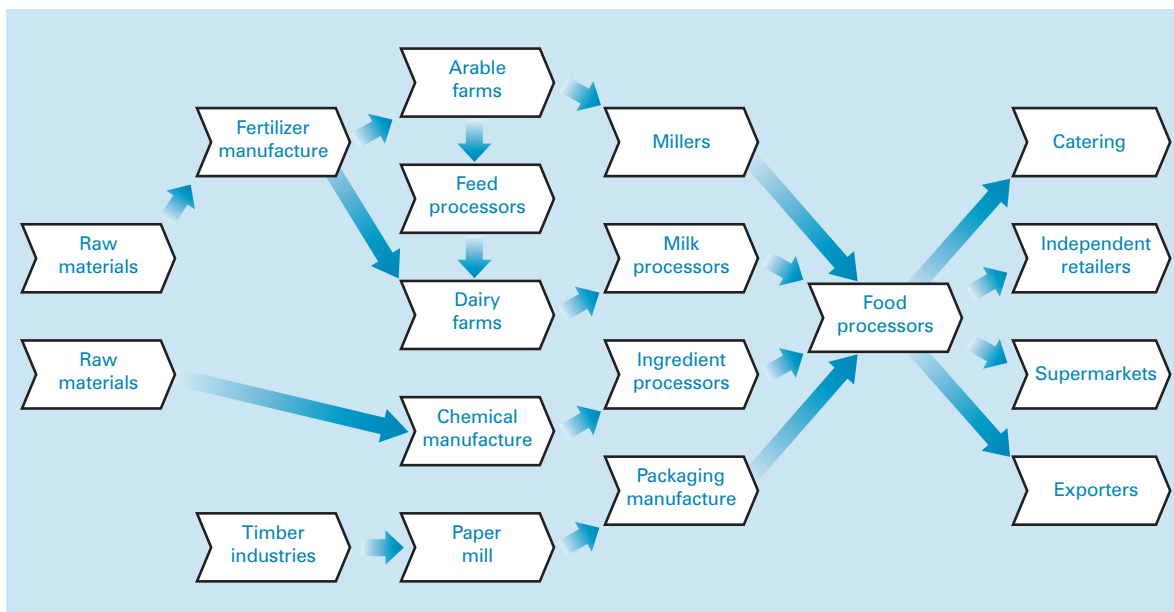


Figure 3.2: A schematic value chain

As illustrated, the food processor's vertical boundaries are clearly shown. If, however, the food processor decided to develop the in-house ability to undertake an upstream or downstream function, this would represent vertical expansion. To vertically expand the food processor could merge with, or acquire, a firm at the appropriate stage in the value chain or it could decide to develop the expertise itself. For example, if our food processor purchased a milk processor, or acquired the assets and the necessary skills to turn milk into butter and cheese, it would have added a separable production stage to its existing activities and in so doing the firm would have vertically expanded upstream. The effect of the processor's action would be not only to increase its vertical boundaries, but also to alter the structure of the food chain, as shown in Figure 3.3. Now the milk processor is missing from the value chain and dairy farms supply the food processor directly with milk. In the value chain shown, the range of activities that are co-ordinated within a governing hierarchy has increased and the number of transactions determining market exchanges has declined.

Vertical expansion will alter a firm's cost structure, as shown in Table 3.1, which continues the example of the food processor absorbing milk processing activities. The food processor sells products valued at €1,600m and to keep matters simple let us assume that before vertically expanding it purchased all €200m of the milk processor's output. These dairy products are then combined with €700m of other purchased inputs to total €900m of purchased inputs, generating a gross margin of €700m for the food processor. The annual cost of the food processor's labour and capital depreciation amounts to €300m, delivering a net margin – or profit before interest and tax – of €400m. Similarly, the milk processor, in producing milk products to the value of €200m, purchased intermediate inputs – mainly raw milk – to the value of €100m. After allowing for labour and capital costs of €90m, the milk processing company achieved a net margin of €10m. If now the milk processor is absorbed within the food processor, the situation is shown in the right-hand column of the table. In our simple example, the value of the food processor's output remains unchanged but the value of its purchased

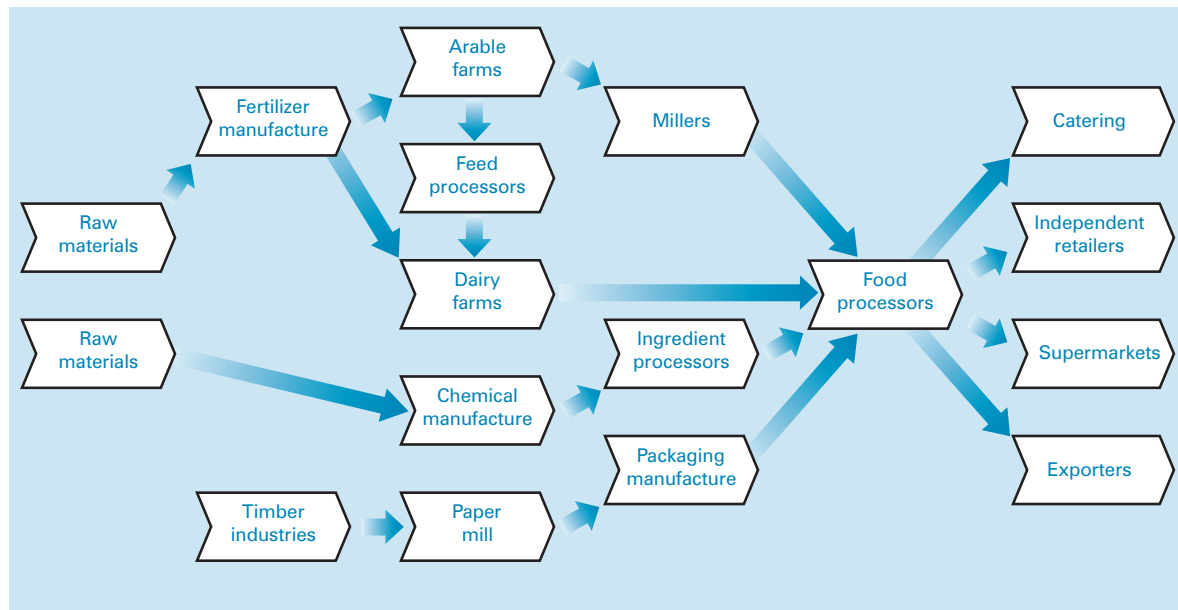


Figure 3.3: Increasing vertical boundaries

inputs falls. This follows because the food processor is now purchasing €100m of raw milk instead of milk products to the value of €200m. However, the vertically expanded food processor now incurs the cost of turning the milk into milk products. To do this, it must increase its labour force and add the necessary fixed assets to its stock of capital; hence, the increased costs of its labour and capital.

Table 3.1 Vertical integration and costs

All figures in €m	Milk processor	Food processor	Integrated food processor
Revenue	200	1,600	1,600
Less:			
Purchased inputs	100	900	800
Gross margin	100	700	800
Less:			
Wages and salaries	40	100	140
Capital costs	50	200	250
Net margin	10	400	410
Ratio: (<i>Inputs/gross margin</i>)	2.0	1.28	1.0

The foregoing is a very simple example, but it shows how moving from reliance on market exchange for inputs to making them in-house reduces the ratio of the firm's purchased inputs to its gross margin, and increases its labour and capital costs. As shown, the vertically integrated business makes no saving on the labour and capital costs of processing milk and hence the vertically integrated net margin is equivalent to the combined net margin prior to integration. The example has been prepared for heuristic reasons but if, in vertically expanding, our firm cannot generate a net margin that is greater than the combined net margin of the buyer and seller prior to vertical integration, then a rational justification for integrating the separate production stages must rest on less tangible cost savings, e.g. reducing uncertainty. Our food processor might believe that by vertically integrating it

Vertically Expanding Farmers

The 1990s were tough times for Britain's dairy farmers. As producers of a commodity product in over-supply, they were classic price takers and when the pound appreciated markedly against other European currencies they found their returns pushed to historically low levels. Even worse, in 1999 the Competition Commission (CC) determined that Milk Marque, the farmer-owned milk buying company, was a scale monopoly owing to its control of almost half of the country's sales of milk. The CC recommended, and the government implemented, the division of Milk Marque into three independent companies. One of these farmer-owned businesses is called Milk Link.

Milk Link realized that if it was to increase the returns to its 3,400 farmer members it had to capture more of the value that was added downstream to the 1.4 billion litres of milk that Milk Link's farmers produced each year. In order to achieve this objective Milk Link took the strategic decision to move into the processing of milk and set about raising sufficient funds to purchase processing capacity. In essence, the farmer members of Milk Link agreed to provide security for institutional financial support. Within a year Milk Link had sufficient funds to embark on a strategy to buy, merge or jointly produce with creameries, cheese and yoghurt businesses.

secures supplies of a key resource and thereby reduces the risk of a breakdown in supply or perhaps a reduction in quality. In fact, as we shall see, the desire to reduce uncertainty is a major determinant of vertical integration.

Before turning our attention to the main determinants of vertical integration, it is worth pointing out that merely measuring the ratio of the value of a firm's purchased inputs to its gross margin is not always an accurate measure of the degree of vertical integration. If we are comparing two firms at the same stage in the supply chain, then it may be a reasonable indicator, but not if we compare firms at different stages in the supply chain. Consider a coal mine and a retailer. The coal mine spends a relatively small proportion of its revenue purchasing inputs from other industries, but it incurs high labour and capital costs in bringing the primary input, coal, to the surface for sale. Typically, therefore, a coal mine – like other primary producers – will have a relatively low ratio of purchased inputs to gross margin. In contrast, a retailer who sells the products it purchases in a competitive market will have a purchased input–gross margin ratio that is relatively high – for UK supermarkets, it is typically around 1.8.

Private Information and Uncertainty

Vertical integration may arise from technological economies. For example, in the production of steel the blast furnace and the basic oxygen furnace are co-located within one firm on one site. In practice, the energy savings from not having to reheat the pig iron from cold are so large that only by co-locating the two stages can unit costs be minimized. The energy economies arising from the co-location of the two steel-making stages are not *per se* the subject of this chapter. What is the focus of this chapter is why the co-location of the two furnaces under separate management might result in a less efficient outcome than would be the case if the two production stages were under the control of the same governance hierarchy. As separate entities, the two firms would be highly dependent on each other, but on the basis of private information may make decisions that are adverse to the relationship. The downstream steel producer in attempting to profitably meet the demand for steel, seeks the certainty that the supply and price of pig iron will enable it to meet all variations in demand. For its part, the iron producer also seeks certainty in demand from the steel producer. The separate managements may, on the basis of private information, form different views as to the demand for steel in the next production period. As a result, the supply and demand for pig iron will be misaligned, causing either a fall or rise in its price. Let us examine the situation from the perspective of the buyer, i.e. the steel producer.

Being able to obtain the key input of iron in sufficient quantity and of the right quality, as and when needed, at a known cost, helps the steel firm in its planning and co-ordination. In principle, if the steel producer could source its iron from a competitive market this would provide greater certainty in respect of quantity and quality, but it would involve the additional cost of reheating the iron. The issue here is the extent to which the supplier of iron will exploit its quasi-**monopoly** position. If the upstream supplier behaves like a monopolist, this implies the downstream purchaser will have to pay a price in excess of **marginal cost** (*MC*). This might seem to suggest sufficient justification for vertical integration; namely, for the buyer to reduce and control the price of a key input and thereby to increase the purchasing firm's profit. But again, this is not a sufficient justification for vertical integration. To see this, consider the following, simplified example. Say firm (S) is our steel firm purchasing pig iron as an intermediate product from the upstream monopolist, firm (I) for which there is no scope for substitution. The annual profits for the upstream monopolist (I) can be represented thus:

$$\pi_I = P_I Q_I - c(Q_I) - \delta K_I \quad (3.1)$$

where $c(Q_I)$ represents annual variable costs, K_I capital costs and δ the depreciation rate. To keep matters simple, we will assume that firm S's only variable cost is the intermediate input – pig iron – purchased from firm I, and hence annual profits for firm S are:

$$\pi_S = P_S Q_S - P_I Q_I - \delta K_S \quad (3.2)$$

where K_S represents capital costs and δ the depreciation rate. The profit-maximizing condition for firm S is to set **marginal revenue** equal to marginal cost, i.e. $MR = MC$, and hence the profit-maximizing condition under the situation described can be written as:

$$P_S \left[1 + \frac{s_s}{\epsilon_S} \right] = P_I \quad (3.3)$$

where s_s is firm S's market share and ϵ_S is the price elasticity of demand for its output. Appendix 3A explains the derivation of the left-hand side of Equation (3.3). In this example, P_I is the supply price for the pig iron, which is fixed for the production period and hence P_I is firm S's marginal cost. If S is a monopolist, then $s_s = 1$. If S operates under perfect competition, then $s_s \rightarrow 0$ and $s_s/\epsilon_S \rightarrow 0$.

Given that $P_I > MC_I$, by vertically integrating, firm S could, in principle, source its pig iron (the key intermediate input) at marginal cost (MC_I) and from Equation (3.3) this would allow firm S to lower its price, thereby selling a greater volume of output and increasing its economic rent. In the process there would be the welfare gain for consumers of a lower price and increased supply. But, in fact, in this situation the two firms could come to a mutually beneficial arrangement involving a **two-part tariff** without resort to vertical integration. In essence, the upstream supplier, firm I, would provide pig iron at MC in return for a payment from the steel firm (the buyer) sufficient to restore I's economic rent. We will return to this issue in Chapter 12 when considering **vertical restraints**. Vertical integration could, however, be a rational response to uncertainty in the quantity or quality of a key input supplied by an imperfectly competitive market.

There are several important respects in which intermediate products, or rather their exchange, differs from final products. Unlike consumer products, a purchaser of an intermediate good will generally purchase a high volume, increasing the severity of the problem of **adverse selection**. In many instances intermediate products will possess complex bundles of attributes, increasing the risk of **moral hazard**. The downstream buyer's competitive advantage is likely to be heavily dependent on the private information and **hidden actions** of its suppliers. Kenneth Arrow (1975) pointed out that in a world of imperfect and asymmetric information, a justification for vertical integration could be the acquisition of valuable private information regarding effort and performance. We can demonstrate this observation with the extensive form game set out in Figure 3.4. The game represents a situation of asymmetric information involving a contract between an upstream supplier, firm A, who might be a **monopolist** or an **oligopolist**, and a downstream purchaser, firm B. The contract specifies the price and quality of the intermediate product, but only the upstream supplier knows at the time of supply whether the quality criteria have been met, and if the quality is represented by durability it may be some years before the buyer becomes aware of any problem.

At node α , buyer and seller agree a contract. If the seller, firm A, fulfils the contract the quality is high, generating total profits of π_A and π_B for firms A and B, respectively, over the lifetime of firm B's

product. The probability of fulfilling the contract is ρ , where $0 < \rho < 1$ and the probability of failing to fulfil the contract is $(1 - \rho)$. In the situation of not fulfilling the contract, firm A's profit increases to $\mu\pi_A$, where $\mu > 1$ owing to reduced effort by firm A. In contrast, as the durability of firm B's products falls below expectations it suffers a loss of profits, i.e. $-\pi_B$, and must now decide whether to accept the situation or sues for compensation. There is a probability, λ , where $0 < \lambda < 1$ that firm B will sue, but if firm B resorts to litigation there is no guarantee of success and this is represented by ϕZ , where Z is the award of compensation and ϕ the probability of an award where $0 < \phi < 1$. As set out and assuming no other influence on firm A, e.g. reputation, whether or not it puts effort into supplying firm B will depend on whether $[\lambda(\pi_A - \phi Z) + (1 - \lambda)\mu\pi_A] < \pi_A$. Faced with this situation of asymmetric information, firm B may have a strong incentive to vertically integrate, either by acquiring firm A or setting up its own facilities.

The inability to monitor the behaviour of a supplier, and in particular behaviour relating to undertaking the necessary performance-enhancing investment, has given rise to a complementary theory of vertical integration. Grossman and Hart (1986) put forward the theory that vertical integration, by granting the vertically merged firm control of productive assets, allows it to exploit its property rights unencumbered by contract stipulations. Most importantly, ownership of assets allows the firm to capture the value created by performance-enhancing investment and hence increases the incentive to make the necessary investment. As demonstrated in Figure 3.4, without vertical control property rights are shared between buyer and seller, raising the possibility that joint profits are not maximized and consequently there is under-investment by both firms. Grossman and Hart point out that with vertical control the production decisions are vested in a single governing hierarchy which does not have to consider the probability, given *incomplete contracts*, of recontracting for the sale or purchase of the intermediate product.

Imperfect and asymmetric information can also justify downstream vertical integration. For example, consider a brewer who puts great effort and care into producing a quality beer. Whether or not the beer reaches consumers in perfect condition depends on the efforts of the owners of bars and restaurants who have a vested interest in attempting to negotiate a lower price with the brewer in order to offset the extra costs of serving 'perfect pints'. If the downstream buyers are imperfectly competitive, e.g. oligopolists, the brewer cannot rely on competition to drive out inferior performance. The extra effort is private information, which may only be revealed by the brewer vertically integrating downstream. If the brewer owns a number of retail outlets it will obtain private information that will help it to write a more *complete contract* with other publicans in order to minimize the probability of beer being sold in less than perfect condition. The gathering of private information at the retail level may also have the beneficial effect of helping the brewer remain competitive. The difficulty in evaluating performance is a significant factor in accounting for the fact that some manufacturers employ a direct sales force.

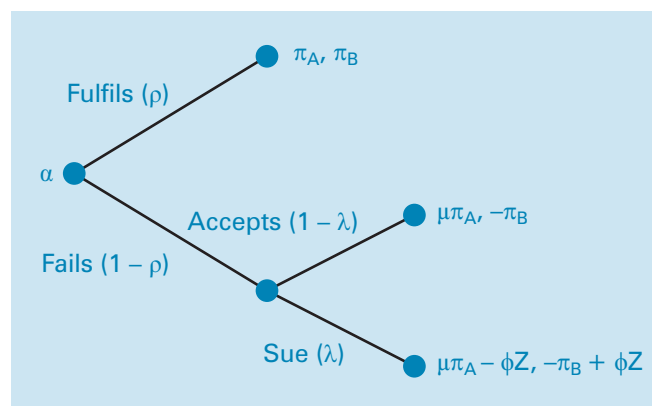


Figure 3.4: A contract to supply game

Fashion to Go

When Spain's Crown Prince Felipe and Letizia Ortiz Rocasolano announced their engagement in 2003, the bride-to-be wore a stylish white trouser suit. Within a matter of weeks, women across the European Union were wearing what, to the untutored eye, looked like the same white trouser suit. The firm with the vision and capability to seize this opportunity was Inditex, a holding company of eight retail brands and one of Spain's biggest business success stories.

One of its brands, Zara, has built a global reputation for timely and relevant fashion designs. Not for Zara the catwalks of fashion houses or large advertising budgets. Zara's business success is built on its ability to reduce the informational uncertainties of the fashion world by monitoring the demands of its customers and fashion statements of public icons. Once it identifies a demand, the appropriate fashion design is sent to its outlets within a matter of weeks. While most Spaniards were rejoicing at the sight of the royal couple, Zara saw a very different picture, a fashion statement and an opportunity to be exploited.

Its ability to respond rapidly to such opportunities has raised Inditex from its humble beginnings in the 1960s to one of the world's fastest expanding makers of affordable fashion clothing. By 2004, it had more than 2,250 outlets and annual sales of more than €5 billion. Just as the European Union's textile industry was coming under pressure from cheap imports, Inditex was demonstrating how a modern European clothing company could counter the threat of cheap imports. Inditex, or

rather Zara's, strategic response is based on the value of being fleet of foot. In contrast to many of its rivals, Zara is vertically integrated from design through just-in-time production to retail and this allows the company to respond very rapidly to market opportunities.

The production process starts with the 3,000 designers who work at the firm's head office in La Coruna in Galicia. Fabric is cut in-house and then sent to a cluster of local co-operatives for sewing. When the finished product returns it is ironed, wrapped and distributed to the firm's retail outlets in Europe and other parts of the world. In order to retain some exclusivity, production is deliberately carried out in small batches. Anyone buying a Zara design knows that only a limited number of people around the world will be wearing the same item. They also know that new designs arrive frequently and that they will reflect the latest in fashion thinking.

As a result of its vertically integrated organization, Zara's production cycles are much shorter than those of old rivals such as Sweden's Hennes and Mauritz or the US giant, GAP. In a typical year Zara launches more than 10,000 new designs. All Zara's shops use point-of-sale terminals to report directly to La Coruna and each evening store managers can check what designs are available and place their orders accordingly. In the case of Zara, vertical integration speeds the flow of information from the customer up to the organization for rapid decision making and it also speeds the product response, ensuring a close match between Zara's products and the demands of fashion-conscious customers.

So far we have focused on imperfectly competitive markets, but information can be lacking in competitive markets. Think of a milk processor whose need for a daily throughput of milk is supplied by a competitive dairy farm sector. The processor is dependent not only on a secure supply of milk, but also the assurance that the milk is safe to drink. However, because the dairy sector is an **atomistic industry**, the processor will be unable to monitor safety effort on the part of its farmer suppliers if it engages in spot market transactions. In this situation the need for assurance will encourage, at the very least, contractual arrangements between buyer and seller and in many cases these develop into longer-term relationships and even vertical integration in order to secure the desired degree of transparency and safety effort. It should be noted that the milk processor also faces uncertainty in the volume of milk supplied. Given the nature of an agricultural product, its quantity and quality are likely to vary according to the season. However, the uncertainty that arises from this potential source of instability cannot be avoided by vertical integration.

It might seem tempting to argue that, regardless of the extent of imperfect information a modern industrial organization will always gain from vertical integration because it avoids duplication of specialist support services such as human resource (HR) management, accounting and marketing. However, even if it is true that bringing successive production stages within a firm's boundaries economizes on specialist support activities, it does not follow that vertical integration results in an overall reduction in production costs. Indeed, if this were the case, we would need to explain why all firms are not vertically integrated. Any specialist support economies, e.g. HR management, arising from vertical integration must be set against the capital costs of acquiring the necessary assets, the costs of a lack of the specialization and the less tangible organizational costs associated with ensuring the activity is performed efficiently and in accordance with the goals of the vertically integrated organization. The organizational costs are known as **agency costs** and arise out of the need to co-ordinate, monitor and motivate a particular activity.

Transaction Costs

Information, or rather the lack of it, is central to the transaction cost approach to vertical integration, where the emphasis is to view value chain relationships from the perspective of exchange rather than production. All market transactions necessitate a human facilitator, but for the transaction cost school, the replacement of the neo-classical assumption of hyper-rationality with **bounded rationality** creates scope for **opportunistic behaviour**. Viewed from this perspective, the foregoing focus on market imperfections is incomplete because it ignores the transaction costs of exchange. If there is only one or a few suppliers of a particular input, uncertainty is created by the scope for opportunistic behaviour. Given the impossibility of writing a complete contract at some point in the future, an oligopolistic supplier might take advantage of an unforeseen contingency to charge an excessive price for a key intermediate product thereby capturing some or all of the buyer's economic rent and possibly making the final product more expensive and less competitive. Thus, a focus on imperfect competition is not sufficient because it does not explicitly take into account the implications of imperfect information and incomplete contracts. The attractiveness of the transaction cost approach is that it deals with these issues and in so doing it can explain a much wider range of motives for vertical integration.

The transaction costs approach is based on a straightforward proposition: if the transaction costs of market exchange outweigh the internal organizational costs of exchange, then vertical integration is to be preferred to market exchange. We can approach the transaction costs of exchange with a simple

example. Think of the transaction involving the purchase of paperclips. For a firm this is a transaction that is probably undertaken frequently, the product is unlikely to be critical to the purchasing firm's achievement of its goals, and there is little doubt or uncertainty as to what will be received in return for the price paid. The paperclips' quality and performance will be very familiar and if paperclips are produced by a competitive industry, i.e. there are many suppliers, the price charged is likely to be competitive, i.e. close to *MC*. In this situation the problems of adverse selection and moral hazard are minimized. In short, the existence of competitors and knowledge based on experience of the product means that the transaction costs to the purchaser are minimal. In these circumstances paperclips will be sourced from the market.

But now consider the position of a firm contemplating the purchase of a highly specialized input that is critical to a new strategy, e.g. the launch of a new product. The existence of bounded rationality will ensure that uncertainty and risk are attached to the new strategy and both are greatly enhanced if the input is very complex and a potential supplier will only enter into a long-term contract. In this situation, the transaction costs of purchasing the input in the market are likely to be very high. For example, when developing a new model, the period from concept to mass-production is likely to be a complex three-to-four-year undertaking for a vehicle manufacturer. In such an environment key components are unlikely to be procured by simply announcing performance and design requirements and awaiting offers to supply. The risks of adverse selection and moral hazard are high as the buyer will have to trust the assurances of a potential supplier regarding price and performance. There is great uncertainty in such a transaction: is the price being charged too high? Will the part perform as required? Will it be produced in sufficient numbers? What happens if the supplier runs into financial difficulties? The more dependent a purchaser is on a particular supplier, the greater the purchaser's

Cosworth

In 1958, two young, very enthusiastic engineers, Keith Duckworth and Mike Costin, who worked for Lotus Cars, founded Cosworth Engineering, where they worked at night. At first, they worked in a small garage in Shaftesbury Mews, West London, but by 1964 Cosworth Engineering had established itself as a producer of high-performance engines and the company moved to Northampton. Both men were now working full time for the company and in 1966 they signed a contract with Ford to put their DFV engines in Ford's high performance cars. The deal turned Cosworth into a world leader and in the following years the DFV engine piled up Grand Prix victories.

Critical to the success of a high performance engine is the quality of the engine block casting. Only the highest-quality castings will allow the engine block to be machined to a width that will withstand the pressures of high performance whilst weighing less than a conventional engine. Grand Prix racing not only involves frequent changes in engine design, but also race track success demands that each new engine block casting be as near perfection as possible. In 1979, Cosworth Engineering decided that only by vertically integrating to produce their own castings could they achieve both the flexibility and the care and attention they demanded to remain amongst the leaders in engine design and Grand Prix racing.

vulnerability to opportunistic behaviour following an unexpected contingency. The situation is equally uncertain from the perspective of potential suppliers. The more specialized the intermediate input, the more likely that the supplier would need to invest in one or more specific assets in order to supply the product. In order to cover the risk, the supplier may want to charge a higher price for the intermediate product. In this situation, the transaction costs of market exchange might be so high that it would be more efficient for the buyer to produce its own intermediate component.

For the purchasing firm, the transaction costs associated with exchange are positively related to the importance of the intermediate product to the firm's final product and inversely proportional to the number of sellers of the intermediate product in the market and the frequency of transactions between buyers and sellers. If the intermediate input is not particularly specialized and the number of alternative suppliers is large, then it is likely that the market price is a 'sufficient statistic', i.e. decisions can be made on the basis of price information alone. However, in the case of a new technology, a highly specialized input or the likelihood of the exercise of upstream market power, the quoted market price is unlikely to be a 'sufficient statistic' and the alternative of making rather than buying the intermediate product might be the optimal solution.

We noted above, the technological economies of an integrated steel mill and the difficulties, even if the two furnaces are co-located, in aligning supply and demand for the intermediate pig iron. But transaction costs are also likely to rule out the separate ownership of a blast furnace and a basic oxygen furnace. If the blast furnace and basic oxygen furnace are separately owned, the scope exists for either the supplier or purchaser of pig iron to engage in opportunistic behaviour depending on whether demand for steel is high or low. Iron- and steel-making are linked via technology, but from a transaction cost perspective it is the scope for opportunistic behaviour that militates against market exchange and dictates the vertical integration of iron and steel production. We can represent this situation with the extensive form game set out in Figure 3.5.

Both the managers of the blast furnace and the managers of the steel furnace will have the incentive to draw up a contract that minimizes the scope for opportunistic behaviour. But both sets of managers will be boundedly rational and hence will not be able to contract for all possible contingencies.

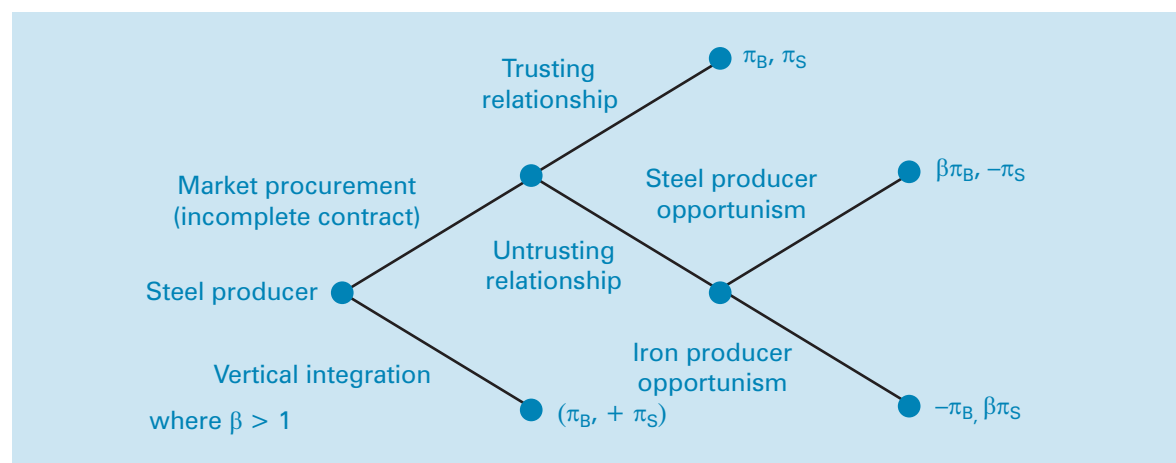


Figure 3.5: A relationship game

An unexpected change in demand for steel may provide the managers of the blast furnace with the opportunity to charge the highest possible price for the supply of pig iron, with the effect that the steel producer's margin or sales volume would be lower than anticipated. We can represent this situation as the steel furnace making a loss, $-\pi_s$, and the blast furnace enjoying an increased profit of $\beta\pi_B$, where $\beta > 1$ and the subscripts $_B$ and $_s$ refer to blast furnace and steel producer, respectively. But when the game is repeated in the next production period, the steel producer's management will not be prepared to trust the blast furnace managers and will be more disposed to engage in opportunistic behaviour should an unexpected contingency allow them to take advantage of their blast furnace suppliers. This is a situation of distrust and the net effect is that both supplier and purchaser run the risk that over a period of time both will make lower profits than need be. If the game is repeated, being rational, the managers of the blast furnace and the managers of the steel furnace will choose to co-operate in a trusting relationship, with the effect that average annual profits are π_B and π_s . That is, the outcome over a finite period will in fact be:

$$PV_B = \sum_{i=1}^n \pi_B / (1+r)^i \text{ and } PV_S = \sum_{i=1}^n \pi_S / (1+r)^i \quad (3.4)$$

where r is the cost of capital and $0 < r < 1$. Being rational, both players will realize that the outcome of distrusting each other and seeking 'advantage with guile' will be reduced profitability over n time periods. If, however, one of the parties cheats on the agreement to co-operate or if either for some reason feel unable to enter into a longer-term trusting relationship, vertical integration may offer a better outcome.

The foregoing highlights the importance of trust. As explained in the previous chapter, in practice contracts cannot adequately deal with situations where agents are boundedly rational and prone to opportunistic behaviour. The more infrequent the transaction and/or the more complex and specialized the product being exchanged, the greater the difficulty of writing, executing and policing a complete contract, i.e. a contract that covers all contingencies. The existence of incomplete contracts creates scope for opportunistic behaviour, particularly if potential suppliers are few in number. Once the contract comes into effect, *ex post* the contractual relationship between buyer and seller is transformed.

Any unexpected contingency gives one party the opportunity to exploit the situation. It is therefore the scope for opportunistic behaviour – as opposed to the lack of information – that from the perspective of transaction costs creates the conditions where it can be beneficial for

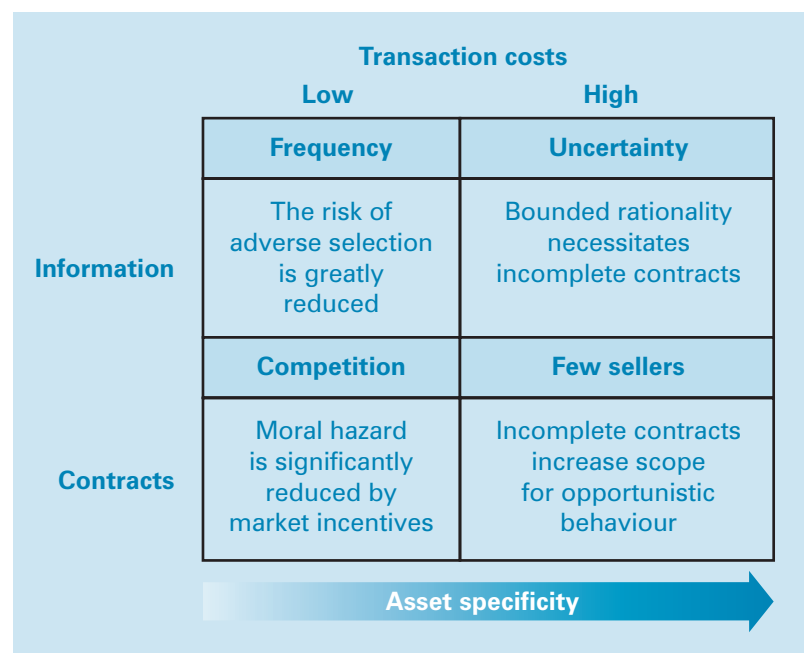


Figure 3.6: Make or buy?

a firm to consider vertical integration rather than market procurement for a key input. In the presence of uncertainty and boundedly rational decision makers, the transaction costs associated with co-ordinating the flow of material inputs down the value chain may render market transactions inefficient. These points are summarized in Figure 3.6. The first column represents the situation when an intermediate input is purchased frequently in a competitive market. The second column represents the situation when the intermediate product is highly specialized. *Ex ante* there may be a number of potential suppliers, but once a contract is signed *ex post* there will be only one supplier of the specialized input.

The more specialized a particular intermediate input, the more likely that its production involves the employment of a highly specialized asset, i.e. an asset that either cannot be redeployed to alternative productive uses or can be redeployed only by incurring considerable additional expenditure or loss of productive value. In its intended use, a highly specialized asset is likely to yield economic gains in terms of productive efficiency, but being highly specialized has little or no value in any other uses. Williamson (1971) describes the extent of asset specialization as **asset specificity**. The greater asset specificity, the greater the scope, *ex post*, for opportunistic behaviour and the higher will be the transaction costs of products necessitating the use of a highly specialised asset. There has been a considerable amount of empirical work in this area and, as Shelanski and Klein (1995) report, it has tended to support this prediction. Put succinctly, there is a positive relationship between asset specificity and transaction costs, as indicated in Figure 3.6. Williamson defines five types of asset specificity:

- *Site specificity* – arises when there are cost advantages to locating the assets for successive production stages in close proximity, e.g. an iron foundry and steel mill.
- *Physical asset specificity* – arises when there are cost advantages associated with a customized asset, e.g. specialized dies.
- *Human asset specificity* – arises where cost advantages are gained from learning and tacit knowledge.
- *Dedicated asset specificity* – arises when a discrete investment in general purpose plant is made at the behest of a particular customer.
- *Brand asset specificity* – arises when a brand's reputation depends on its specific use.

The common characteristic of these five types of asset specificity is that in principle rents can be earned as a result of the deployment of the specific asset – e.g. a specialized machine reduces production costs – but, in a world of bounded rationality, it is not possible to specify the sharing of these rents between buyer and seller under all possible contingencies. The purchase of such an asset is a **sunk cost** and gives rise to what Klein *et al.* (1978) call appropriable **quasi-rents**. Once a supplying firm has deployed a specific asset, its *ex post* quasi-rent earning capacity becomes vulnerable to the opportunistic behaviour of the firm's customers. For example, a supplier that has invested in plant dedicated to supplying a unique input to an individual buyer is locked into the supply relationship and is vulnerable if an unexpected contingency arises. Alternatively, if individuals in the supplying firm accumulate a deep understanding of the buyer's routines and systems, the buyer's future profits may be at risk if the supplying team is broken up. In the extreme, the quasi-rent associated with specific assets may be reduced to zero (see below). The likelihood of either the buyer or seller engaging in opportunistic behaviour has been described by Goldberg (1976) as a problem of **hold-up**.

Hold-Up

Say a distributor has been offered a contract to supply a major multiple. This requires the distributor to invest in some highly specialised computer software. Not only would the software have to be specially developed and therefore very expensive, it would not be capable of being used for any other purpose. The multiple has offered a contract to pay the distributor a fixed price (p_0) for a minimum number of deliveries, Q per year, which, after allowing for the variable costs and a return on the cost of investing in the specialist software generates an acceptable economic rent (π) for the distributor, as shown:

$$\pi_t = p_0 Q_t - c(Q_t) - (r + \delta)K \quad (1)$$

Where $p_0 Q_t$ is the expected revenue per year, $c(Q_t)$ is the variable costs and ignoring the distributor's other capital costs, K is the investment cost of the software and r and δ are the costs of capital and the depreciation rate, respectively, where $0 < r, \delta < 1$. Now consider the risk the distributor is taking. As the software is highly specialized, the capital costs are sunk. A contract has been entered into with the multiple regarding P_0 and Q , but the contract is necessarily incomplete and once the software has been purchased the distributor will be in a weak position if the multiple

demands, owing to *force majeure*, a reduction in the price charged for each delivery. In considering the contract, *ex ante* the distributor faces uncertainty regarding future deliveries and would therefore need to charge a sufficiently high price to cover the risk associated with the purchase of a dedicated software program. Once the specialized software is installed, under *force majeure* or blatant opportunistic behaviour, the multiple could drive the price down, at the extreme to p_1 such that quasi-rent is reduced to zero:

$$p_1 Q_t = c(Q_t) \quad (2)$$

That is, the price has been reduced to a level that allows the distributor to cover variable costs, but makes no contribution towards the investment cost of purchasing the specialized software. The actual outturn in the extreme is the failure to recoup $(r + \delta)K$ per period as opposed to the expected outturn of an economic rent of π . In this example, the difference between the expected rent and the quasi-rent measures the magnitude – the risk – of the hold-up problem. The (transaction) costs of market procurement are very high and the multiple may be forced to share the cost of the software or undertake its own distribution rather than using the market.

Governance Approach

We noted above, that if a firm is contemplating sourcing an intermediate input from the market it faces two costs: the price paid plus the transaction costs associated with the contract. However, if it is contemplating vertical integration it also faces two costs: the cost of physically making the good; and the internal organizational cost of ensuring production is carried out efficiently and in congruence with the firm's goals. We introduced the phrase agency costs above to represent the organizational costs that arise out of establishing appropriate incentives and monitoring performance within the vertically integrated firm. Depending on the degree of asset specificity associated with the

production of an intermediate product, the transaction costs of using the market may or may not exceed the agency costs of organizing production in-house. Hence, highly relevant to a decision to vertically integrate will be a calculation of the agency costs of in-house production relative to the transaction costs of market procurement. We can demonstrate the relevance of asset specificity, agency costs and transaction costs using a heuristic model developed by Williamson (1998). If we define the agency costs of producing a fixed quantity of an intermediate product as $A(\bar{Q})$, where \bar{Q} is the fixed quantity and the transaction costs (not the price paid) of obtaining the same quantity from the market as $T(\bar{Q})$, then we can define the net governance cost (NGC) as:

$$NGC = A(k, \bar{Q}) - T(k, \bar{Q}) \quad (3.5)$$

where k is a measure of the degree of asset specificity. For an asset that can be used generally $k = 0$ and as the specialization of an asset becomes greater (i.e. its alternative uses become fewer), so $k > 0$. If $k = 0$ transaction costs are minimal and the agency costs of intermediate production outweigh the transaction costs of using the market, hence:

$$A(0, \bar{Q}) > T(0, \bar{Q}) \quad (3.6)$$

but as the index of asset specificity increases above zero, so the change in the transaction costs, $T(\Delta k)$, is greater than the change in agency costs, $A(\Delta k)$, where Δ represents change. Hence the change in net governance costs, ΔNGC

$$\Delta NGC = A(\Delta k, \bar{Q}) - T(\Delta k, \bar{Q}) \quad (3.7)$$

is an inverse function of Δk . Where asset specificity is slight $A(\Delta k) > T(\Delta k)$, but as the value of k increases so, at some point, $T(\Delta k) > A(\Delta k)$ and ΔNGC becomes negative, i.e. $\Delta NGC < 0$ and from this point on internal organization is progressively cheaper than the transaction costs of market exchange. This function is shown as curve AB in Figure 3.7 and the switchover point is shown as k_1 .

Consider now how the relative physical costs of producing and procuring an intermediate product alter as the production process is increasingly subject to asset specificity. One of the benefits accruing to a firm that supplies a product to the market is the unit cost reductions arising from cumulative production, i.e. learning and more than likely **economies of scale**. It is reasonable, therefore, to expect that a firm specializing in the production of a standardized intermediate product is more likely than a vertically integrated firm to benefit from **productive** and **allocative efficiency**. Its learning enables it to enjoy relatively higher productivity and by supplying many customers it achieves economies of scale. Providing outside suppliers can find customers for the intermediate product, the ability to aggregate demands will impart cost benefits, e.g. fixed costs can be spread over a larger volume of output, and hence the cost of supplying the buying firm with any given volume, \bar{Q} , will benefit from learning and scale economies. We will represent the market price of market procurement as $P(\bar{Q})$. To simplify matters, we will continue with the assumption that the buying firm's demand for the intermediate product is fixed at \bar{Q} and we will further assume its production does not yield **economies of scope**. If we now represent the physical costs – materials, labour and capital – of producing the intermediate product in-house, i.e. within a vertically integrated firm as $I(\bar{Q})$, we obtain the following expression for the relative advantage of market exchange over internal production:

$$NPC = I(k, \bar{Q}) - P(k, \bar{Q}) \quad (3.8)$$

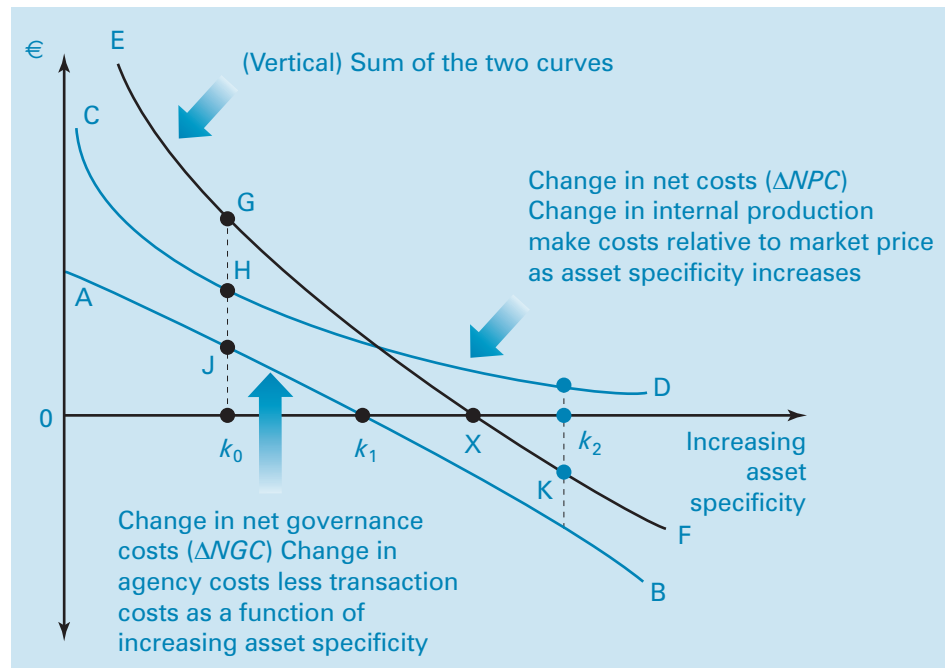


Figure 3.7: Asset specificity and vertical integration

where NPC is the net production cost of internally sourcing the intermediate input. Equation (3.8) expresses NPC as a function of the degree of asset specificity that influences relative 'make' costs in the following manner. A firm that decides to vertically integrate to produce a standardized product that utilizes assets that can be redeployed cheaply to other uses will incur relatively high production costs because, as explained above, an external supplier will enjoy the cost advantage of supplying other customers, i.e. economies of scale and cumulative learning. However, the NPC disadvantage of bringing production within the boundaries of the firm decreases as asset specificity increases. The more specialist the asset needed to produce the intermediate product – i.e. the greater the value of k – the less likely that it can be used by external suppliers to service other customers; by definition, the scope for economies of scale and specific cumulative learning will be diminishing. Put simply, as asset specificity increases, so the external advantages of economies of scale and learning diminish, i.e. as Δk increases in value, so ΔNPC declines towards zero:

$$\Delta NPC = f(\Delta k, \bar{Q}) \quad (3.9)$$

The function ΔNPC is an inverse function of asset specificity and is shown as the curve CD in Figure 3.7. As illustrated, although CD declines as k increases, it remains positive. This reflects the fact that despite the external supplier charging a higher price to compensate for the risk of hold-up, the specialist supplier's unit costs still benefit from experience. In an extreme case when the specific asset is unique and the specialist supplier has no experience to impart, the curve CD may touch or even fall below the horizontal axis. The strategic object for a cost-minimizing firm is not to minimize ΔNPC or ΔNGC separately, but given the optimal level of asset specificity to minimize the sum of net production and governance costs. In Figure 3.7, the vertical sum of $\Delta NPC + \Delta NGC$ is shown as curve EF and its crossover value – the point at which the sum of $\Delta NPC + \Delta NGC$ is equal to zero – given by point X .

Beyond this point, movements to the right along the horizontal axis reflect higher levels of asset specificity and result in $\Delta NPC + \Delta NGC$ becoming increasingly negative.

Figure 3.7 is interpreted in the following manner. Given a fixed demand, \bar{Q} , by the firm for the intermediate product, if its production involves only a limited degree of asset specificity the appropriate place on the horizontal axis might be k_0 . At k_0 , the sum of $\Delta NGC + \Delta NPC$ is represented by point G. That is, at k_0 the net physical cost is represented by point H and the net governance cost by point J. In contrast, at point k_2 production of the intermediate product involves a high degree of asset specificity and consequently the sum of ΔNGC and ΔNPC is negative, represented by point K. Thus at k_2 , which is to the right of X, it would be more efficient for the firm to incur the physical and agency costs of producing the intermediate product rather than sourcing it from the market.

Figure 3.7 makes clear the importance of agency costs to a successful vertical integration. Whether or not a merger or acquisition between a buyer and a seller enhances efficiency depends critically on the buyer's **organizational architecture**. The success of a vertical integration depends not only on the ownership of the property rights associated with a specialized asset, but also on the synergies that can be achieved by co-ordinating the use of the specialized asset within the firm to better achieve its goals. This is particularly the case when the asset specificity that merits vertical integration is human. For example, if a firm purchases one of its suppliers to benefit from the supplier's employees' specialist knowledge, the vertically integrated firm will require careful and sensitive management if it is to continue to benefit from such knowledge – particularly if knowledge is tacit.

The foregoing has focused on backward integration, but forward or downstream integration can also be analysed using the forces summarized in Figure 3.7. Transaction costs increase when the actions of downstream firms directly affect the success of upstream suppliers, e.g. brand reputation. For example, a brand's reputation may be highly dependent on the quality of service at the point of sale. In these circumstances, the transaction costs of monitoring and motivating retailers may be so high that it is cheaper to exercise hierarchical control over the quality of service to consumers. This can be demonstrated by returning to the earlier example of draft beer. Draft beer has a relatively short shelf life; it also requires careful storage and tends to sell better in premises that provide comfortable, hospitable surroundings. The higher the reputation of a particular beer – a specific asset – the greater the transaction costs for the brewer of ensuring that independent publicans devote sufficient resources and care to the storage and serving of its beer. Traditionally, these transaction costs have encouraged brewers to vertically integrate downstream. However, we should add that when UK brewers were investigated by the competition authorities, vertical integration by breweries was viewed as a threat to the selling of beer at competitive prices.

There are market alternatives to downstream integration, e.g. **franchising** and **vertical restraints**, which we shall return to in Chapter 12. As the above reference to the competition authorities serves to indicate, there is another motive for vertical integration – to gain and exploit monopoly power. As the sole supplier of a key input, an aggressive motive would be the opportunity – subject to the competition authorities – to exploit the monopoly power by charging rivals using the same input a higher price than justified by production costs.

Power in More Than One Sense

Lignite is a low-quality, brownish-black coal. It is highly volatile and is used primarily to generate electricity. Its use does, however, attract criticism from environmentalists, who argue that its open mining techniques and the production of sulphur dioxide when it is burnt are damaging to the natural environment. In Greece, lignite accounts for more than 75 per cent of total electricity production and this is mostly supplied by two thermal power plants located at Ptolemais and Megatopolis.

In 2001, the state-controlled electricity generator Public Power Corporation (PPC) acquired the Greek lignite mines. As a consequence, PPC became responsible for 95 per cent of all lignite mined in Greece. The vertical integration was justified by the Greek government as a response to the EU's intention to create a single market in energy. In principle, the opening up of the Greek energy market to outside competition made it imperative that the Greek lignite mines improve efficiency. This involved large capital investment, which the Greek government was persuaded would only be forthcoming from PPC. One consequence

of PPC's exclusive rights is that despite the signing by Greece of the Kyoto Protocol – which identifies lignite as one of the main sources of greenhouse gas emissions – under PPC's control, the extraction of lignite has increased over recent years.

The claims that PPC's vertical integration was a response to potential competitors did not impress the European Commission. In April 2004, it warned the Greek government that the exclusive rights granted to PPC to mine lignite may be in breach of European competition rules and in particular Article 86 of the EU Treaty in conjunction with Article 82. This, the Commission argued, follows because PPC is able to protect its dominance of the Greek electricity market due to its exclusive rights in the lignite sector. Put simply, the vertical power of PPC gives it an unfair competitive advantage and the Commission issued a Letter of Formal Notice, giving Greece two months to either provide a satisfactory explanation for the exclusive rights or to abolish them. PPC is still the country's only supplier of electricity.

A Competency Approach

The foregoing makes it clear that the decision to vertically integrate will always be a matter of judgement for senior managers who must weigh up the benefits of market exchange and the benefits of controlling exchange in-house. As we have seen, for the governance approach to the determination of a firm's vertical boundaries, the decision is based on the efficiency criterion of minimizing transaction costs. An alternative approach to determining a firm's vertical boundaries is provided by the competency school. From this perspective, it is not the exchange of products between stages in the value chain, but the exchange of knowledge between separate stages. The idea is that it is efficient to vertically integrate activities that benefit from a firm's **core competency**, i.e. activities that would benefit from a common repertoire of knowledge.

A firm, as we have previously noted, is a collection of resources – some of which, e.g. materials and physical assets are purchased from the market – that are controlled by a single strategic decision-making hierarchy. But other resources, in particular organizational and product knowledge, are internally generated and by definition are a potential source of heterogeneity for individual firms. Internally accumulated knowledge-based resources are rooted in the skills, experiences and co-operative routines that individuals and teams have developed within the firm. In this context, the knowledge may be largely tacit; that is, it cannot be codified and if so is not capable of market exchange. If a firm has developed a specific knowledge resource that can contribute to the generation of economic rents, this is equivalent to the firm acquiring a unique stock of a specific asset: in the language of strategic management, the firm has acquired a core competence. If this particular resource, e.g. a design skill, can be transferred across a firm's vertical boundaries to be used productively upstream or downstream, this may provide an alternative explanation of vertical integration.

This competency approach to vertical integration has a great many similarities with the governance approach. Indeed, the two approaches are complementary in explaining how a firm's vertical boundaries are determined. Both approaches recognize the existence of asymmetric information between stages in the value chain and the constraints imposed by bounded rationality. Both approaches view the heterogeneity of some assets as limiting or preventing market exchange. The divergence between the two schools arises from the way resources are acquired. For the competency approach, the boundaries of the firm are determined by the accumulation of internal resources, which in turn puts the focus on knowledge and learning. As such, resources have the potential to be firm specific and this limits the scope of beneficial vertical integration to those areas where the firm has a resource competency. That is, the competency approach suggests that the vertical expansion is limited to those areas where the firm can transfer its competencies along the value chain, i.e. the vertical growth of the firm is path dependent.

A firm's heterogeneity, i.e. tacit knowledge, can be confined to its procurement, production or marketing techniques and/or it can be embodied in the firm's organizational architecture. In both cases, a firm's accumulation of repertoires of such knowledge resources is equivalent to an investment, and efficiency demands that the firm strives to achieve the maximum return on its investments. In the previous chapter, we quoted Penrose (1959, p. 76): 'a firm's opportunities are necessarily widened when it develops a specialised knowledge'. If this knowledge offers economies of scope, these may be efficiently realized by expanding the firm's vertical boundaries. Economies of scope may arise from competencies in product design, production techniques, marketing campaigns or specific elements within the organizational architecture, e.g. strategy formulation. Alternatively, economies of scope may arise from the merging under a single governance hierarchy, complementary skills and knowledge. A buyer and a seller may be strong in complementary fields of, say, IT (e.g. software and databases) and a vertical merger could be justified in order to leverage rent from co-ordinating these two strengths.

It is the generation of specialized knowledge and the opportunities for economies of scope that such knowledge offers that provides a clear contrast to the asset specificity of the governance approach. If a specialized knowledge offers economies of scope, the knowledge cannot be specific to a particular product or firm. The logic of the competency approach to vertical integration is that the distribution of tasks along the value chain is not pre-ordained, but derives from knowledge accumulated by firms within the supply chain. Based on the extent to which a firm's knowledge can be applied to other stages in the supply chain, this would determine which inputs it will purchase from a specialist supplier and which are to be produced internally. In turn, the specialist supplier will, according to their competencies, decide what elements to purchase from upstream suppliers and which to produce themselves.

Vertical integration involves the ownership of productive assets and hence control. It also includes the right to exert control over the co-ordination of sequential activities in the value chain. And, significantly, it also confers the power to share tacit knowledge between sequential stages. A vertically integrated firm might better control the sharing of tacit knowledge and thereby realize the efficiency gains. That is, vertical integration is efficient if it minimizes the costs of transferring beneficial knowledge between the separate stages of the value chain. If vertically broadening the strategic use of heterogeneous knowledge under the control of a single hierarchy enables the firm to better capture the value inherent in the knowledge, then the firm has an incentive to vertically expand its boundaries.

So far in this section we have viewed the incentive for a firm to vertically integrate as arising from the desire to utilize and control specific knowledge. But an alternative incentive could be the desire to develop new knowledge, i.e. capabilities. Studies suggest (Conner and Prahalad, 1996) that a governance hierarchy has distinct advantages when it comes to developing new knowledge, particularly if the knowledge is tacit. Thus, if the capabilities a firm wants to develop are tacit, it may be necessary for the firm to use vertical integration in order to gain access to the opportunities and information deemed necessary to develop a specific capability. This competency approach to vertical integration elevates the importance of learning. Learning, innovation and knowledge are among the key issues for contemporary strategic decision makers. Rapid organizational learning and continuous innovation are perceived as important sources of competitive advantage and knowledge is the critical factor that underpins these capabilities. Rival firms are involved in a learning race and if vertical integration offers a rapid learning opportunity, then the need to enhance learning may dominate.

It would, however, be fair to observe that vertical integration poses difficulties for the competence perspective. Consider the vertically integrated oil companies. The capabilities to find and drill for oil are very different to those required to run a refinery and different again to those required to run a chain of retail service stations. Whereas the governance approach can explain why vertical integration may be pursued regardless of any similarity in capabilities at the separate stages in the supply chain, the competence approach is left to search for knowledge-sharing across vertical boundaries. Arguably, management is such a resource, but the competence school still needs to explain why a firm with such a skill would seek a vertical strategic direction rather than the opportunities afforded by a horizontal strategic direction.

Vivendi

By April 2002, Jean-Marie Messier, the chief executive of Vivendi, could feel rather pleased with himself. The French-based conglomerate had successfully completed a vertical integration with Seagram's Universal music and filmed entertainment businesses and Europe's largest pay-TV operator, Canal Plus. The French are extremely proud of

Canal Plus, the channel is seen as epitomizing French culture and it spends vast sums investing in home-grown movies. After the merger, Vivendi, a company that started out as the water utility, Compagnie Générale des Eaux in 1853, became the world's second largest media company, after AOL Time Warner.

continued

The logic of the vertical merger was very straightforward. Seagram's Universal owned the world's second largest library of films and TV programmes, as well as the world's largest music library. The vertically merged conglomerate would therefore be in a very powerful position in the pay-TV market and also in a strong position to develop new services and markets for consumers. After an investigation by the European Commission, the vertical merger was cleared, in part because Vivendi gave an undertaking to grant open access to Universal's library and in part because the European Commission took into account the potential the merger offered for the development of new capabilities, ultimately benefiting consumers.

In the event, the market was less convinced as to the opportunities the merger would provide for creating value. By July 2002, Vivendi's share price had fallen 60 per cent over the year and the company posted the largest single loss in French corporate history – €12 billion. Messier's audacious move had landed the company with a €19 billion debt and under pressure from the board, he resigned. He successfully negotiated an €18 million severance package, which was ultimately rescinded due to his illegal activities. As a young man, the Total Oil Company had turned down his application for sponsorship through Harvard Business School. Mr Messier's handwriting, Total said, showed he lacked ambition.

Alternatives to Vertical Integration

The essence of a successful vertical integration is that the benefits of hierarchical co-ordination outweigh the benefits of market transactions when exchanging an intermediate product between successive, technologically separable stages in the value chain. If an integrated firm is to deliver better levels of efficiency than market exchange, it will incur the agency costs of monitoring performance and providing appropriate incentives. One way of reducing agency costs is to benchmark internal performance and this can be achieved by combining the internal production of an intermediate good with purchases of the same good from the market. This combination of market purchase and vertical integration is known as **tapered integration**, where some proportion of the total quantity of an intermediate product is purchased from an independent supplier(s) to augment the quantity produced within the vertically integrated firm. For example, Coca-Cola has its own bottling subsidiaries, but also relies on independent firms to bottle (and distribute) their drinks. Tapered integration has a number of advantages. Firstly, it serves as a check against **X-inefficiencies** in vertically integrated firms. Using independent suppliers (outlets) provides a check on costs and a source of motivation for its internal suppliers (outlets). Secondly, the firm can use information and knowledge gained from its own operations to negotiate contracts with independent suppliers (outlets). Thirdly, the use of independent suppliers (outlets) reduces the vertically integrated firm's capital outlays and it provides additional security in the supply of the particular input or outlets for the firm's products.

One of the main advantages accruing to the governance approach to vertical integration is that it offers an explanation for the trend towards 'downsizing' and 'outsourcing'. Since the 1980s, there has been a distinct shift away from vertical integration, in many cases replacing internal production with spot market procurement, but in many instances firms have turned to alternative forms of **vertical relationships** – that is, vertical inter-organizational structures that lie between the extremes of market procurement and vertical integration. Before considering the potential advantages of vertical

relationships, it is instructive to consider how the governance approach helps explain the trend toward outsourcing. On the basis of the governance approach, the trend towards vertical relationships must reflect a change in the balance of costs between market exchange and the internal exchange of intermediate inputs. Over the past 15 or so years, two trends have come to dominate much of business life; namely, information and communication technology (ICT) and **globalization**. The use of computer-based systems to store, process and transmit data and information is now all-pervasive. Investment in ICT has grown rapidly since the 1980s, giving rise to new business models and facilitating global business relationships. Globalization is more difficult to define precisely, but broadly it sums up the growing openness of national markets to trade and investment and the increasing integration of global economic activities.

One of the consequences of the ICT revolution has been an exponential increase in information and its sources and it will be recalled that information, or rather its lack, plays a key role in the governance approach to vertical integration. The influence of imperfect and asymmetric information on transaction costs was captured in Figure 3.7 and this is now repeated in Figure 3.8. On the not unreasonable assumption that the increased flow of information has had a greater impact on reducing transaction costs than reducing agency costs, the effect of ICT would be to rotate curve AB – the net changes in agency and transaction costs – around point A to give a new curve, such as AB'. The competitive impact of globalization is likely to influence the position of curve CD – the net production cost of internal sourcing. The reduction in trade barriers, increased foreign direct investment by multinationals and the growth of export-orientated industries in low cost areas of the world have all combined to increase the scope for firms to source intermediate products from competitive overseas markets. The effect of this, *ceteris paribus*, is not only to lower the market price of competing intermediate inputs, but also to further reduce transaction costs associated with adverse selection and moral hazard. The price effect of heightened competition is reflected as an upward movement in curve CD to C'D' in Figure 3.8, as the physical costs of production within the firm rise relative to the cost of market procurement. The overall effect of these changes is captured in curve E'F', which has shifted to the right of EF. Consequently, the original point at which vertical integration made economic sense has shifted from X_1 to X_2 . Put another way, a vertically-integrated firm operating at X_1 would – following the changes outlined above – find it beneficial to return to the

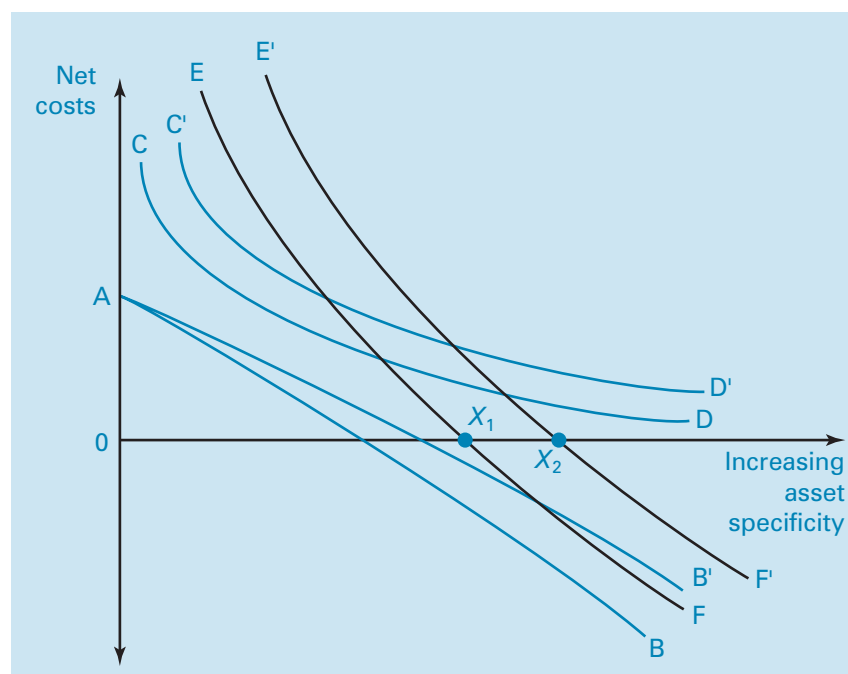


Figure 3.8: Outsourcing

market to source the intermediate input, involving a high degree of asset specificity, i.e. it would out-source its need.

Outsourcing does not, however, always involve a switch to pure market exchange. Many firms have chosen the intermediate solution of a vertical relationship, lying somewhere between vertical integration and a spot market transaction. A major influence on the attractiveness of a vertical relationship is the growing power of technology to improve communications and information. We noted above that ICT has reduced information asymmetries and therefore in principle reduced transaction costs, but at the same time these new technologies have made it easier for firms to co-operate in innovative, inter-organizational arrangements that offer the prospect of combining the co-ordination benefits of vertical integration without sacrificing the cost advantages of specialist suppliers. Inter-organizational innovations that have been established or emerged over recent years all have one or more of the following purposes: to facilitate close planning between the co-operating firms; to protect specific investments from hold-ups; to develop and/or fully exploit heterogeneous knowledge; and to establish a better understanding of final consumers. Most importantly, these inter-organizational structures seek to achieve these aims without lessening the profit incentive for suppliers inherent in delivering a superior competitive performance when supplying a key intermediate input. The main inter-organizational innovations that have developed as alternatives to vertical integration are:

- A **partnership alliance** – where two or more firms formally agree to collaborate and share resources be they information, knowledge, human or physical assets. When first privatized, the Rover Car Company entered a strategic alliance with Honda to develop an engine for a new range of cars.
- A **joint venture** – where two or more firms create a new, jointly owned, independent organization. A prominent example is Coca-Cola's and Cadbury Schweppes' agreement to jointly set up a plant to bottle their products in the UK.
- **Franchising** – more common as a downstream alternative to vertical integration. Generally, the *franchisee* owns and runs a business using the *franchisor's* brand name and buying inputs from the franchisor, e.g. a McDonald's restaurant. This organizational arrangement takes advantage of the owner-operator's incentive to attract customers and care for the premises. At the same time, the control exerted by the franchisor adds value by providing the benefits of economies of scale and overcoming the hold-up problem of specific assets.
- **Co-operatives** – business organizations that are owned by their members. They take a number of forms, but of interest here are producer–processor co-operatives, which are particularly prevalent in the food industry. Of the world's largest 25 dairy companies, ten are producer–processors, where the farmers own and control the business. This organizational structure allows the benefits of economies of scale and value added to be shared amongst its members, who would otherwise have little alternative but to take a market-clearing commodity price.
- **Long-term contracts** – by definition involve a longer-term relationship and therefore the opportunity to gain information and develop knowledge that will benefit the relationship.

These alternatives to vertical integration lie within a spectrum between a spot market transaction and a vertically integrated firm. Figure 3.9 attempts, following Bart Nooteboom (1999), a schematic positioning of the more common vertical relationships within a spectrum bounded by organizational co-ordination and financial integration.

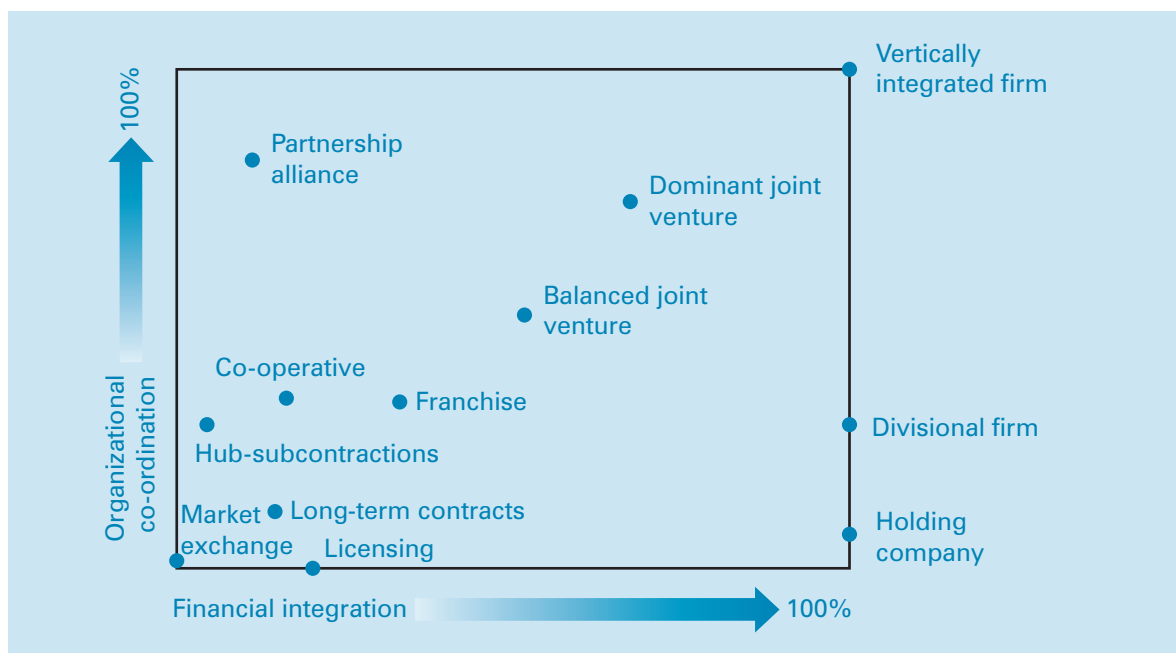


Figure 3.9: Degrees of vertical relationships

Our focus here is primarily on **strategic alliances** as alternatives to the polar extremes of vertical integration and spot market transactions. A joint venture is a particular type of strategic alliance involving the setting up of a firm under the shared ownership of two or more existing firms. Ownership may be shared equally or one firm may have a dominant stake, implying a distribution of decision rights and profits in favour of the dominant firm. A joint venture will normally result in the creation of a limited liability company, with its own legal identity and a clear strategic objective of creating value for the joint owners. The joint venture may serve as an outlet for products or knowledge produced by the owners or it may serve to provide the owners with intermediate products or knowledge, e.g. R&D. By definition, the relationship involved is expected to last over a number of time periods.

A superficial justification for a joint venture would be the sharing of capital costs, though with the existence of an **efficient capital market** this is a weak justification. More credible, in a world of imperfect and asymmetric information, is a joint venture which can facilitate the bringing together of private information and capabilities within a formal and controlled environment to the mutual benefit of the joint owners. A very common reason for a joint venture is as a vehicle for entering a national market. One partner has the product knowledge and the other knowledge of the particular market. We know from game theory that the prospect of a longer-term relationship – an infinitely repeated game – encourages a co-operative attitude on the part of rational players.

Another form of strategic alliance is a partnership alliance, which is defined as consisting of two or more firms who agree to co-operate closely, but the relationship does not involve the sharing of taking of equity and, most importantly, lacking a legal basis *it is based on a high level of trust and a high intensity of co-operation*. Thus, as defined here, a partnership alliance differs from a network of

suppliers, hub sub-contractors and long-term contractual relationships, in that the level of trust is much higher than the contractual trust involved in these relationships. A partnership alliance involves 'goodwill trust' (Sako, 2003), which consists of actions by partners designed to deliver more than would be formally expected for the success of the relationship. Goodwill trust implies the absence of opportunistic behaviour and can only be fully developed within a longer-term relationship involving a small number of participants. A partnership relationship between buyer and seller therefore avoids, or greatly reduces, transaction costs and is thus an efficiency improvement on market exchange.

A partnership relationship between buyer and seller replaces market exchange by a governance structure founded on mutual trust and as such can be described as a quasi-vertically integrated organizational structure. A vertical partnership achieves the benefits of co-ordination by means of close collaboration between the buyer and seller based on a willingness by both participants to work for the benefit of the relationship. Such a relationship is a powerful means of economizing on bounded rationality. Partnership relationships are common within Japanese industry, where typically buyers and sellers are prepared to share confidential information and work together to resolve problems. In Japan, large companies refer to their SME suppliers as *kyoroku gaisha* (co-operating company) in order to highlight the mutually co-operative atmosphere of firms working towards a common goal. In a partnership alliance, the traditional arm's-length relationship with suppliers is replaced by an **implicit contract** between buyer and seller – that is, a contract that is not codified and there is no legal remedy if one party defaults or behaves opportunistically. The mechanism for making such contracts viable is loss of reputation and the prospect for the party that breaks the implicit contract of losing future business. This threat is more powerful than it at first appears. If two firms within a value chain have established a longstanding relationship that has enabled them through joint planning and monitoring to co-ordinate their activities, breaking the implicit contract means greater uncertainty and new contracts.

A partnership alliance can be explained and understood by either the more contractually focused governance approach to the firm, or the capabilities-orientated competency approach to the firm. A vertical relationship founded on trust reduces the potential for opportunistic behaviour and it also facilitates the combining of knowledge and capabilities in ways that will generate economic rents. Although the governance and competency approaches were originally developed to address different issues – exchange issues and competitive advantage, respectively – there is, as previously noted, a large element of overlap between the two. Both approaches are central to a strategy that seeks economic rents. This can be seen with the aid of the normal form game, set out in Figure 3.10.

The game is a 'simultaneous move' game in which both the buyer and seller have imperfect information, i.e. they do not observe some of the buyer's or seller's actions before engaging in exchange. In the absence of a trusting relationship, the buyer and seller enter into pre-play discussion before separately deciding their exchange strategies. If neither player trusts the other, they will withhold information and expect the other to engage in opportunistic behaviour if the scope

		Seller	
		Trust	Opportunistic
Buyer	Trust	π_B / π_S $\lambda\pi_{B-C}$ / $\lambda\pi_{S-C}$	0 / $\lambda\pi_{S-C}$
	Opportunistic	0 / π_B	π_{S-C} / π_{B-C}

Figure 3.10: The benefits of trust

arises. In terms of pay-offs, both the buyer's and seller's potential rents, π_B and π_S respectively, are reduced by the transaction costs of minimizing the scope for opportunistic behaviour and/or the opportunity costs of not sharing information that could add value to the exchange; both costs are represented by c . If a player is trusting enough not to limit the scope for opportunistic behaviour or willing to share valuable information, but the other then takes advantage of this trust, the outcome is a much reduced rent for the trusting player – represented by 0 in Figure 3.10 – and an increased rent for the opportunistic player, where $\lambda > 1$. If the game is played once, the game has a unique Nash equilibrium: the dominant strategy for each player is to distrust the other and engage in opportunistic behaviour. If, however, the game is to be repeated over an unknowable number of time periods, the best strategy is for the players to trust each other and achieve a co-operative equilibrium.

Partnership alliances have the effect of extending the boundaries of the firm, but in a virtual manner. Under a vertical partnership, the vertical boundaries of the firm are based on:

- *Trust* – a highly efficient governance mechanism for minimizing transaction costs.
- *Shared knowledge and information* – in order to co-ordinate and increase the value of interdependent tasks.
- *Self-enforcement* – both partners have a vested interest in prolonging the relationship.

A successful application of this type of relationship is employed by Toyota. Over many years, the company has steadily developed long-term partnerships with first-tier suppliers who enter into implicit contracts regarding future business. In return, the suppliers are prepared to make asset-specific investments, which enhance the productivity and efficiency of the Toyota partnership. This virtual vertical integration has gained considerable support in the US and Europe over recent years. Firms are coming to see strategic advantages in such relationships and the process has been given an enormous boost with the development of the internet. This allows firms in a partnership relationship to share information in real time. In establishing partnership relationships, western firms have overcome the idea, long peddled in organizational theory, that a firm loses power when it increases its dependency on outside suppliers. They also have to overcome the western legal philosophy, which focuses on contractual, rather than trusting, relationships.

By their very nature, such partnership relationships will vary according to the culture of the firms involved and the strategic importance of the intermediate product being supplied. The closer the relationship, the greater the interaction between employees of both firms. Design engineers must co-ordinate with buying engineers, the buyer's marketing team must share information with the supplier's planners and so on. As these functional interrelationships multiply, so the boundaries between buyer and seller blur. The partners' destinies become ever more tightly intertwined and consequently both partners have a strong incentive to help the other. But partnerships may not last forever. Marks and Spencer had an enviable record as the best brand on the high street, a record that was in part built around partnership relationships with suppliers. However, in the 1990s, under pressure from shareholders, it started to exploit these supplier partnerships to improve short-term profits. Instead of improving matters, profits deteriorated. In eroding the very relationships that had made Marks and Spencer different, it appears the company also eroded the source of its higher profits.

The success of a partnership alliance depends not only on what resources are subject to joint decision making, but how this is accomplished. This starts with the partner selection process involving a search for partner compatibility in terms of vision, competencies and attitudes. The management of

the alliance will involve an inter-firm organization architecture, involving a decision hierarchy, measurement systems and incentives. It must also be able to adapt to changing circumstances. The strength of a partnership alliance depends in part on the complementary knowledge that the partners bring to the alliance, but fundamentally the capture of value requires that the parties proactively and entrepreneurially engage in the relationship and make investments in relational specific assets. The important point is that the management of a partnership alliance requires a mindset that involves treating the relationship itself as a renewable asset (or resource) whose value-generating potential is enhanced by its management.

Dell computers

Michael Dell launched his computer company in 1984. It was not, however, just another computer company. By 2000, Dell had grown to a \$20 billion company – a remarkable success story based on Michael's vision and confidence to develop a new business model. In contrast to the polar models of vertical integration and a value chain comprising arm's-length market transactions, he developed a compromise model which he described as *virtual integration*. The computer industry is about 50 years old and the founding companies had to build large vertically integrated firms to manufacture memory chips, disk drives, application software and so on. In short, they produced themselves everything a computer needed. As the industry grew, specialized companies developed to supply specific components, and it was Michael Dell's great achievement to realize that the computer industry did not have to develop into the traditional value chain.

As a small start-up, Dell was not going to survive if it merely attempted to replicate the 'engineering-centric' structure of IBM, HP and Compaq. Instead, it used ICT to integrate the value chain and make it very responsive to demand. Michael Dell's virtually integrated value chain involves the innovative use of technology to co-ordinate across company

boundaries in order to achieve levels of productivity and efficiency that lead the industry. The Dell model of virtual integration harnesses the economic benefits of two separate business models. It offers the advantages of a tightly co-ordinated value chain that previously had only been achieved through vertical integration. And it also harnesses the benefits of focus and self-interest that traditionally had only been achieved by independent firms.

The virtual value chain pioneered by Dell has significant cost advantages. Firstly, Dell does not have to invest in the assets to manufacture components, hence its accounts boast a very high sales to assets ratio. Secondly, it has fewer operations to manage, including a smaller workforce. Thirdly, in the fast-moving computer industry Dell can rapidly respond to change. For example, it holds only a few days of inventory compared to three months of inventory for its rivals. In achieving these cost advantages Dell also incurs risk – for example, an interruption to supply as a result of a delivery failure by one of its first-tier suppliers. But in minimizing this risk, Dell has created another strength.

In order to minimize the adverse effects of a supply failure, Dell needs to understand very well the needs of its customers. Some have a

continued

priority for delivery, others are prepared to wait – in return for a lower price. To obtain this intimate knowledge of its customers – 90 per cent of Dell's sales go to organizations, not individuals – Dell has put enormous effort into looking inside its customers' businesses and understanding the growing, and separate, needs of the parts of the organization. By making it easy for individuals within large organizations to do business with them, Dell build up individual-specific information within organizations. In this way, the Dell

value chain can truly be described as a demand chain: it is fully responsive to the needs of individuals who use its products, not the average needs of the organization.

The Dell model, formally described as virtual integration, represents an improvement on vertical integration in that all elements in the supply chain are focused on understanding and meeting the current and developing needs of its customers and all elements obtain a higher reward by performing better.

Concluding Thoughts

Vertical integration is only of benefit when a single organizational governing hierarchy is superior to the market as an exchange co-ordinating mechanism. We have set out above the main economic explanations as to the circumstances in which hierarchical organizations have advantages over market exchange. But, vertical integration is not without its costs; internal sourcing of an intermediate product will incur the agency costs associated with ensuring it is produced efficiently and managers keep abreast of related technological developments. These costs must be set against the transaction costs of sourcing from the market and/or the additional value that might be generated if the firm's capabilities are enhanced. From a strategic perspective, firms rarely compete on the basis of cost alone, but rather on the basis of value delivered. Value is manifested as the rent-earning capacity of an asset or resource, whether tangible or intangible. A single governance hierarchy might capture the available rent by lowering transaction costs or alternatively by co-ordinating initiatives that generate new knowledge.

By definition, vertical integration increases the size of the firm and it needs to be emphasized that as organizations grow in size so they are vulnerable to **control loss**. Given the limited span of control for any individual manager, increasing size implies either increasing hierarchical levels within the firm or innovative ways of circumventing control loss. As the number of hierarchies grows, so there is an inevitable loss of information as it is transmitted through the organization and this is paralleled by a reduction in the firm's ability to monitor. If vertical integration is an organizational form that developed purely as a result of senior managers seeking greater efficiencies in buyer–seller relationships, then we should expect new technologies and a changing business environment to alter senior managers' perceptions of the balance of forces.

This is precisely what has been happening since the 1980s. Just as at the end of the nineteenth century we witnessed the impact of new technology on industrial organizations – the coming of the railways and the telephone permitted the establishment of vertically integrated giants who dominated large sections of industry for most of the twentieth century – the 1990s witnessed the arrival of ICT, together with a concerted global drive to reduce trade barriers and increase competition. The increasing competitive pressures emanating from global competition have encouraged firms to view closer vertical relationships as an indispensable tool of strategy formulation and conduct. Advances

in ICT are giving rise to new organizational structures and relationships. These new structures and relationships use the rapidly developing information and communications technologies to achieve the benefits of co-operation and co-ordination without sacrificing the efficiency benefits of the rent-seeking motive inherent in the independent firm.

One consequence of the focus on vertical relationships has been the outsourcing of many technologically separable activities that were formally co-ordinated by a single governance hierarchy. We now speak of the *hollowed out* firm, which relies on outside suppliers for the procurement of key inputs – in many cases, involving vertical collaboration such as joint ventures or alliances. The prevalence of vertical relationships demonstrates that the vertical co-ordination of value chain activities is no longer, if it ever was, solely about reducing the contractual costs of exchange. The opportunities such relationships offer for the pursuit of competitive advantage through the efficient and effective development of organizational capabilities is now central to strategy and the search for economic rent.

Key Learning Points

- Any good or service sold to a final consumer is the culmination of a value chain comprising a number of sequential processes and activities that convert raw materials into final goods or services.
- At one extreme, all sequential processes and activities involved in a value chain could, in principle, be carried out within one vertically integrated firm; at the other extreme, each step could be carried out by a separate, independent firm.
- As a general rule, individual firms are involved in one or a limited number of sequential stages relying on independent upstream suppliers for intermediate products and downstream independent outlets for sales.
- Once we depart from the ideal of perfectly competitive markets, the costs of using market exchange are positive. In a world of uncertainty and bounded rationality, the transaction costs of using the market are inversely related to the number of potential suppliers, the level of complexity and the degree of asset specificity.
- The governance approach to vertical integration elevates asset specificity and the scope this affords for opportunistic behaviour to a central role in explaining the incentive to organize and control production within a single governance hierarchy.
- Vertical integration avoids these transaction costs, but to be efficient the savings must outweigh the costs to the vertically integrated firm of a limited scale of production for the internally produced input, as well as the agency costs of achieving efficiency.
- Transaction costs emphasize the costs of imperfect and asymmetric information. The combination of globalization and ICT have increased competition and the flow of information, thereby reducing transaction costs and making outsourcing more attractive.
- The competency approach focuses on the importance of heterogeneous knowledge and capabilities. From this perspective, the motive for vertical integration is to develop and exploit knowledge assets so as to capture their full value.
- The competency approach to the firm can also provide an explanation for the trend toward vertical relationships over recent years. Driven by increasingly intensive competitive conditions, firms seek knowledge development opportunities inherent in joint ventures and partnership alliances.
- Alliances, joint ventures and other forms of vertical relationships extend, in a virtual manner, the vertical boundaries of the firm by reducing transaction costs, building new inter-firm organizational resources and retaining the benefits of market incentives.

Exercises

- 3.1** Can upstream vertical integration provide a solution to a stochastic pattern in the supply of a key commodity, intermediate input?
- 3.2** Why is vertical integration unlikely to be efficient if the target input is a frequent purchase and is supplied by a competitive industry?
- 3.3** The governance approach to vertical integration places emphasis on the scope for opportunistic behaviour by either the buyer or seller. How does asset specificity increase the scope for opportunistic behaviour?
- 3.4** The competency school focuses not so much on the stock of specific assets, but rather how they are acquired and employed. What are these assets and how does vertical integration help?
- 3.5** Using the governance framework, explain why globalization and ICT are encouraging many previously vertically integrated firms to outsource.
- 3.6** List the advantages of a trusting vertical relationship between buyer and seller of a key intermediate input relative to vertical integration and a spot market transaction.

Problems

- 3.1** Suppose the inverse market demand curve for Manchester United (MU) paperweights is $p = 100 - Q$. MU paperweights are exclusive to MU, who obtain them from a monopoly wholesaler (MW) at price w_0 per weight. MW in turn obtains the paperweights from a manufacturer (MM), who holds the patent for the technique and sells to MW at a price of w_M . MM incurs marginal costs of €10 per unit and MW and MU both incur marginal costs of €5 per unit in addition to the prices they have paid for the paperweights.
- Calculate the equilibrium price to consumers, the wholesaler and the manufacturer.
 - What is the profit earned at each stage in the chain?
 - Demonstrate that vertical integration by any two firms will increase profits and that integration by all three is even more beneficial.
- 3.2** An *avant garde* sculptor has been commissioned by the government to design the stage set for a one-off performance of *Waiting for Godot* to be performed for the president of the United States, who is expected to undertake a state visit within the year. The government offers the following contract: €500,000 when the stage set is erected. The sculptor, who normally uses items of organic rubbish in her work, calculates that, at most, materials will cost €20,000 and hired labour, at most, €150,000:
- Having built the set, but prior to acceptance by the government's Minister for the Arts that the stage is suitable, what is the sculptor's quasi-rent?
 - In what circumstances might the sculptor find that she is out of pocket?
 - At what point is the sculptor in a position to hold up the government?

References

- Arrow, K. (1975) 'Vertical integration and communication', *Bell Journal of Economics*, vol. 6, pp. 173–183.
- Conner, K. and Prahalad, C. (1996) 'A resource-based theory of the firm: knowledge versus opportunism', *Organizational Science*, vol. 7, pp. 477–501.
- Goldberg, V. (1976) 'Regulation and administered contracts', *Bell Journal of Economics*, vol. 7, pp. 426–448.
- Grossman, S. and Hart, O. (1986) 'The costs and benefits of ownership: a theory of vertical and lateral integration', *Journal of Political Economy*, vol. 94, pp. 691–719.
- Klein, B., Crawford, R. and Alchian, A. (1978) 'Vertical integration, appropriable rents and the competitive contracting process', *Journal of Law and Economics*, vol. 21, pp. 297–326.
- Nooteboom, B. (1999) *Inter-firm Alliances: Analysis and Design*, Routledge, London.
- Penrose, E. (1959) *The Theory of the Growth of the Firm*, Basil Blackwell, Oxford.
- Sako, M. (2003) *Prices, Quality and Trust: Inter-firm Relations in Britain and Japan*, Cambridge University Press, Cambridge.
- Shelanski, H. and Klein, P. (1995) 'Empirical research in transaction cost economics: a review and assessment', *Journal of Law, Economics and Organization*, vol. 11, pp. 335–361.
- Smith, A. (1776) *The Wealth of Nations*, Glasgow edition, R. Campbell and A. Skinner (eds), 1976 Bicentenary Edition, Clarendon Press, Oxford.
- Williamson, O. (1971) 'The vertical integration of production: market failure considerations', *American Economic Review*, vol. 61, pp. 112–123.
- Williamson, O. (1998) 'Transaction cost economics' in *Handbook of Industrial Organization*, 5th edn, pp. 135–182, R. Schmalensee and R. Willig (eds), North Holland, Netherlands.

APPENDIX 3A

Consider the diagram below showing an inverse relationship between the market demand for a product and its price, i.e. $P = f(Q)$.

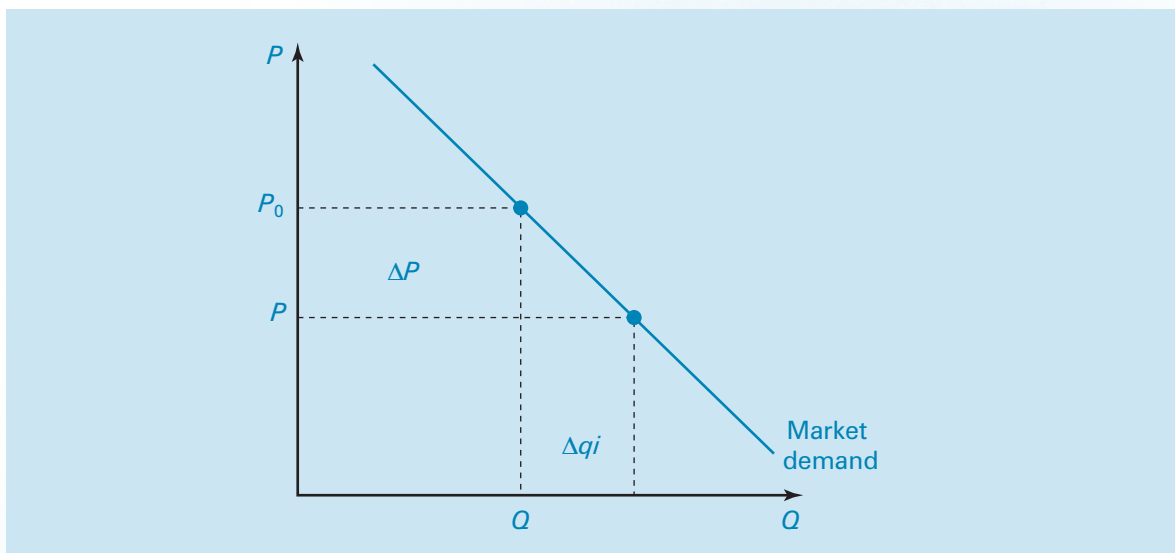


Figure 3A.1: A market demand curve

If the market is supplied by an oligopoly, we can define the output of each firm as q_i and total market supply as $Q = \sum q_i$. Assuming q_i s are homogeneous products, the total revenue (TR) for the i th firm is:

$$TR_i = P_0 q_i \quad (3A.1)$$

98 Part I: The firm and the creation of value

as shown in the figure. Following a change (Δ) in the quantity supplied by the i th firm, the market price falls to P and, as shown in the figure, we have:

$$\Delta TR_i = P\Delta q_i + \Delta P q_i \quad (3A.2)$$

Given that marginal revenue, $MR_i = TR_i/\Delta q_i$ we can divide through by Δq_i to get:

$$MR_i = P + \frac{\Delta P}{\Delta q_i} \cdot q_i \quad (3A.3)$$

and multiplying and dividing the right-hand side by Q/q_i yields

$$MR_i = P \left[1 + \frac{\Delta P}{P} \cdot \frac{Q}{q_i} \right] \frac{q_i}{Q} \quad (3A.4)$$

The second expression in parentheses is the inverse of the firm's price elasticity of demand ε_i and q_i/Q is its market share, s_i hence:

$$MR_i = P \left[1 + \frac{s_i}{\varepsilon_i} \right] \quad (3A.5)$$