A Post-Structural Analysis of Perceptions and Experiences of Continuity and Change within the UK Automotive Supplier Base

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Summary of Thesis

Firms acting as suppliers to the British automotive industry have a long history of so doing, with some evidencing histories that predate even the invention of the motor car. In exploring the challenges faced by the descendants of these firms in the 1990s, a review is undertaken of the bodies of literature surrounding the changes wrought through the increased globalisation of the industry; the impact of new manufacturing technologies and techniques; the rising levels of co-operation between firms; and the growing impact of the automotive 'service sector'. Moreover, an exploration is undertaken of the perceived 'realities' of the automotive industry as constructed through discourse, including the ways in which discourse effects a continual reinterpretation and re-evaluation of the historical evolution of the industry. Attention is focused on the implications of the above for the automotive supply chain, and the means for its rationalisation proposed by the major car manufacturers and their partner-suppliers.

Post-structuralist approaches are introduced as part of an attempt to establish an appropriate research methodology that can explore and deconstruct the discourses surrounding 'modernity', 'supply chain rationalisation', 'flexible specialisation', and 'globalisation' within the automotive industry. Analytical research is conducted into the small- to medium-sized businesses that constitute the majority of the supplier base in the United Kingdom, and the findings of this research are compared with those of a similar study conducted a quarter-century ago. In this way, the relationships of these firms with their customers, suppliers, and peers are investigated, as are their perceptions of a changing marketplace and their reactions to the impact of policies such as the 'supply chain rationalisation' pursued by the major automotive manufacturers. Authoritative discourses of industry form, function, and structure are challenged, with voice being granted to the marginalised: small suppliers, 'service sector' firms, or those only partly involved in the automotive industry.

Keywords

SME; automotive industry; modernity; supply chain; discourse theory.

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Chapter 1: The British Automotive Industry

Introduction

The automotive industry can be seen to differ from other heavy engineering industries in that the end product – the motor car – has come to symbolise the technological achievements of the modern era as a whole. For more than a century, the manufacturing process itself has, in the words of Turnbull *et al.* (1992:159), "traditionally led the way in establishing patterns of work in other sectors". Thus in the 1910s and 1920s, the Detroit manufacturing plant of Henry Ford was credited with the term "Fordism" – particularly to mean the use of the moving assembly line – and in the 1980s and 1990s, the paradigm – this time of the "Toyota" or "Japanese production system" to promote another 'definitive' manufacturing system.

The aim of this work is not, however, to focus on the large, automotive assemblers and their major suppliers, but on the large base of small suppliers on which the industry ultimately rests. Within the UK, a number of the firms which constitute this base have histories dating back to the earliest days of the car industry and, in some cases, predating it – indicating a rich tapestry of experiences with differing manufacturing paradigms, technologies, and products. It is proposed to explore how these firms have experienced continuity and change throughout the last quarter century and the new challenges of the 1990s in particular. These may be said to involve:

- The increased globalisation of the industry and its implications for both the car assemblers and their suppliers.

- The impact of new manufacturing technologies and techniques, and the rising levels of co-operation between firms; an age, it is said, of 'alliance capitalism'.
- The specific contribution made to the industry by the vast number of lower-tier small firm suppliers.

In looking at the implications of the above, it is proposed to consider the increasingly common model of the supply chain, in particular with reference to the means for its rationalisation proposed by the major car manufacturers and their partner-suppliers.

The research conducted into the small- to medium-sized firms that constitute the majority of the supplier base in the United Kingdom is exploratory: the relationships of these firms with their customers, suppliers, and peers are investigated, as are the competitive advantages available to them through their roles as entrepreneurs and specialists. Given that a similar study (Redden, 1975) was carried out a quarter-century ago, a comparison will be drawn to explore how such firms have changed in this period. It is questioned whether the economies of scale once sought by the industry may have been replaced by economies of scope offered by the myriad networks of small, flexible firms. Furthermore, the discourses surrounding 'globalisation' and 'modernity' within the automotive industry are analysed in terms of a post-structuralist approach, in an attempt to establish a more appropriate research methodology for this new survey. Consequently, the degree of continuity and change experienced by the small business suppliers is examined and evaluated.

Plan of work

In order to provide an appropriate background for exploring continuity and change within the automotive industry, this chapter will feature a discussion of the origins of the car industry in the UK and the challenges that have faced it during the 20th Century. These will then be related to the situation in the late 1990s through an exploration of the issues involved. Given that the major corporations involved in the industry may be considered to be multinational enterprises, *Chapter 2: Multinationals and the Global Marketplace* will then discuss the natures of these firms and how their

operations – and the existence of a global market for automotive components – impacts firms within the UK automotive industry. In *Chapter 3: An Age of Alliance Capitalism*, such links are explored further, in which the relationships between firms in the supply chain are important to the car assemblers and (their) Tier-1 suppliers. This theme is taken up further in *Chapter 4: The Distinctiveness of Small Firms*, but with regard to the point of view of the smaller firm. The entrepreneurial advantages of smaller, lower-tier suppliers are discussed here, as are the variety of relationships that such firms may form.

In *Chapter 5: Researching a Modern Motor Industry*, certain of the discourses surrounding the above (e.g. 'globalisation') are deconstructed as part of a critique of research methodologies employed in studying the automotive industry. Within this discussion, a post-structuralist approach to the research conduct and analysis is proposed and its mechanics explained. The findings of the research undertaken into the changing role of SME suppliers are analysed and explored in terms of this post-structuralist approach in *Chapter 6: Deconstructing the Questionnaire Survey*, *Chapter 7: Textual Analysis of the Follow-Up Interviews*, thereby seeking to demonstrate the value of such an approach within the field. Finally, a discussion of the issues raised by this work may be found in *Chapter 8: Conclusions*.

The 'supply chain' terminology in usage

As the aim of this work is to investigate the challenges and opportunities facing small businesses within the British automotive industry, it is necessary to investigate also the relationships between such firms and the larger players, such as car assemblers (Ford, Rover) and major suppliers (LucasVerity, Bosch). The predominant structural model applied to these relationships may be said to be the 'supply chain', in which the car assembler is at the 'top' of a feudal pyramid, supported by a network of major suppliers ('Tier-1'), their suppliers ('Tier-2'), and their suppliers' suppliers ('Tier-3').

It should be noted that a specific terminology will be employed throughout to describe these firms, which has been chosen in an attempt to minimise any implicit value

judgements and to describe most accurately the activities of these particular firms. The terms 'car assembler' and 'car manufacturer' are used synonymously, since while such firms typically subcontract a significant (and rising) proportion of the value of a vehicle to outside firms (i.e. Tier-1 suppliers), the company might still retain control over key components (e.g. as Jaguar does with its bodywork and engines) although the choice of such would vary from company to company (i.e. Jaguar subcontracts its car audio systems and 5-speed automatic transmissions to Harmon-Kardon and General Motors respectively, while Ford sources its equivalents from its own subsidiaries). A parallel line of argument may be taken with respect to the *name* applied to the industry itself, since this frequently depends on its domestic historical development: thus 'auto industry' and 'automobile industry' are used widely within North America, suggesting the domination of the car manufacturers, whereas 'motor industry' tends to be more of a British term, reminiscent of an era in which the car manufacturers manufactured their own engines (the 'motors') but subcontracted the majority of other components.

Similarly, the terms 'Tier-1' or 'Tier-2' are used in preference to the equally-common 'first-tier' or 'second-tier' nomenclatures, as the former implies a position more than the value judgement implicit in the latter. This argument will be expanded later (see *Chapter 5: Researching a Modern Motor Industry*).

The supply chain model is a useful one with which to begin, especially as the concept was originally formulated from studying the differences between the Japanese and American systems of supplier relations in the 1980s (see *Figure 1* overleaf), at a time when the car assemblers were desperate to research – and to assimilate – the competitive advantages that were enabling rivals like Honda and Toyota to make such sweeping inroads into the American home market.

Even a cursory examination of the model suggests that a tightly-integrated manufacturing network – characterised by the close proximity of member firms and a high degree of specialisation – will outperform a loosely-integrated network characterised by low levels of specialisation (Dyer, 1996). It is these advantages which can be seen to explain the success of Japanese automotive entrants into the United States and other major markets (Dyer and Ouchi, 1993).

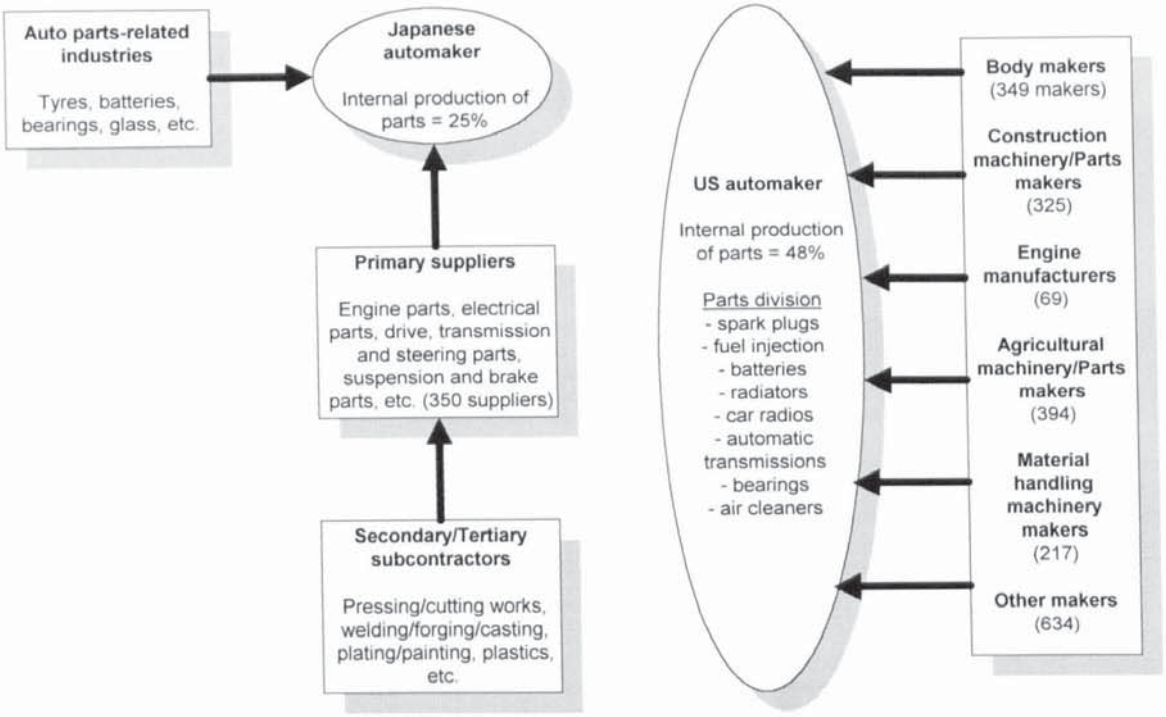

Figure 1. Differences between Japanese and US automotive industry structures in the 1980s (after Dyer and Ouchi, 1993)

Thus, the supply chain and tiering concepts provide a useful model to begin examining the pressures and advantages peculiar to the automotive industry. This will be employed to introduce first the challenges faced by the industry at the time of writing, then the attributes of the global multinationals (those that most visibly represent the industry), and lastly the intricate national and international networks of smaller firms that form the host of the supplier base.

Origins of the British automotive industry

Car manufacture in the UK can be traced back to 1896 as a low-volume, speciality industry that had considerable prestige associated with it (e.g. Edward VII granted the Royal Warrant to the Daimler Company in 1902, symbolising its status among the upper echelons of society). By the 31st March 1906, some 23,192 private cars were in

use in Great Britain (Richardson, 1977), yet the car industry still retained considerable prestige accrued through associations such as Neville Chamberlain's directorship of Daimler, which commenced in 1912, following the amalgamation with the BSA and the considerable regional influence it held.

Roots in the machine tool industry

The early manufacturers, based in the Coventry area, took advantage of the existing local expertise in precision machining, steam engine, and bicycle manufacture. The long-established coach-building industry, for example, was a logical supplier for the often-bespoke car bodies, as "coach makers took it for granted that a customer, after ordering the chassis and the engine from a motor manufacturer, would order a car body to his own specification and from whom he pleased" (Richardson, 1977:43). Jaguar Cars, a generation later, was to grow out of the motorcycle sidecar industry. Reminders of these early links can still be seen almost a century later, in "Van den Plas" (a prestigious coach maker) editions of luxury cars. A parallel situation, though perhaps not quite as prestigious, may also be found in the 'kit car' industry, in which assemblers meld custom chassis and fibreglass bodies with common OEM components.

Comparisons with America

The early days of the Ford Motor Company of Detroit, in America, were very similar to those of British manufacturer. Just as British manufacturers outsourced heavily from local manufacturers of related components, so did Henry Ford: in sharp contrast to the later embodiment of total supply chain integration, only the wheels and the bodywork of the first Model Ts were made in-house.

It has been argued that the moving assembly line (MAL) that is popularly associated with Ford, a production innovation through which the company supposedly achieved

its price cuts and efficiency gains, is a myth (Williams *et al.*, 1993). This myth, rooted partly in popular culture (e.g. on the silver screen in Charlie Chaplin's *Modern Times*), can be traced also to the use by researchers in the field of the Ford archive as a primary source, and the authoritative dissemination of their work. Furthermore, Williams *et al.* (1993) hold that the MAL was not as widely implemented as popularly described during this period, and nor did it noticeably reduce labour costs. For example, as the list price of a touring Model T fell from $850 in 1909 to $360 in 1919, the payroll cost remained steady at $64-$70 per car. Rather, the economies may be found in the bill of materials, as these fell from $590 to $262 per model during the same period: economies arising out of the shift from purchasing major components from parts suppliers to in-house production.

Similarly, Raff (1991) suggests that General Motors' success in the 1920s was attributable more to economies of scale than to the marketing innovation which is normally thought to be the case. Unlike Ford's single-model approach, GM offered a variety of models ("a car for every purse") – but for that used common parts, multi-purpose rather than dedicated machine tools (to minimise the costs of variety), and thus made model changes and a multi-product line an important force within the evolving industry. Henry Ford's methods, rather than setting the standard for the industry, were uniquely applied by his company.

However, while Ford and General Motors pursued a policy of ever greater integration – Henry Ford had a sheep farm that grew wool for car seat covers and the old General Motors-DuPont combination made car paint (Gupta and Zhender, 1994) – as a result of seeing the virtue of increased economies of production, Morris, the "Ford of Britain", considered its specialist supplier base to be a key strength. The Morris Oxford of 1913, a medium-sized family car, could be broken down by supplier as follows:

- Its engine unit, clutch, gearbox, and carburettor from White and Puppe.
- The rear axle and remaining transmission from E. G. Wrigley and Co. of Birmingham.
- Pressed steel wheels from Sankey.

- Bodyshell from Raworth, the Oxford coachbuilders.
- Tyres from Dunlop.
- Lamps from Powell and Hanmer.

Morris claimed that this constituted "the only Light Car which embodies the joint productions of the greatest British experts" (Richardson, 1977:73). The outbreak of the First World War, through its effects both on demand and supply – as the luxury market dwindled and suppliers turned to the War effort – prompted Morris to source from the US. This secured not only an unaffected supply, but also took advantage of the greater economies of scale, and thus cheaper costs, of this larger market. For the 1915 Cowley, the Continental Motor Manufacturing Co. of Detroit was contracted to supply its "Red Seal" engines. With the advent of international sourcing, the post-First World War government enacted a 33½% tariff to protect the domestic automotive market.

Wartime industries, such as aerospace manufacture, brought new expertise to the manufacture of domestic components:

> The specialist component manufacturers have been a particular feature of the British motor industry, and for good reasons. They enabled the manufacturer to buy... equipment and many [components]... without having to borrow the money to install his own plant and machining.
>
> Far more important were the myriad contacts with the skills and traditions of British industry which the existence of specialist component firms gave the car manufacturers. In the great revolution of production technique which took place within the British motor industry between the wars, this skill and technique became subtly interwoven with plans of the car manufacturers, so that the creation of the car began far outside the plant where it was actually to be assembled. Movements of components from all parts of the country had to be co-ordinated so that they arrived at the car factory on time for final assembly. It involved a vast effort of organisation, and harmonisation... on a scale which was beyond the dreams of the early manufacturers.
>
> (Richardson, 1977:93,94)

The post-war depression, and growing sum of capital investment in the industry, prompted greater cost-cutting to be implemented. Morris, for example, bought out Hotchkiss, their engine manufacturer, when the latter proved unwilling to step up volume production.

Mass production, synonymous with monotonous assembly line work, would also offset its manufacturing economies by requiring greater incentives for its labour force. This was recognised by Morris, a strong advocate of the need for higher wage rates at a meeting of the Institution of Automotive Engineers in February 1924 (Richardson, 1977).

With the market for motor cars growing steadily again in the period of 1924-39, Morris and Austin were no closer to realising a universal model built on an assembly-line system, in the style of Ford. Despite the economic pressures of the War and of post-war austerity, with greater emphasis placed on mass-production, volume sourcing, and the odd piece of vertical integration, the British domestic market for motor cars was still characterised by variety (and the high level of customisation this entailed). In their 1934 catalogue, Hillman offered 34 different models, and Austin a yet greater choice of 52 (Richardson, 1977:104).

Integration of the industry in the 1950s and 1960s

The export markets in the immediate aftermath of the Second World War were "seller's markets" (Dunnett, 1980). Continental European production was in disarray, and with the US firms unable to meet demand (e.g. Ford had an annual production capacity of 1,000,000 units but faced orders for 1,700,000 in 1948), there existed a captive market for British manufacturers. In 1948, the UK was the world's leading exporter of motor cars, in sharp contrast to its traditionally national market. The main factors limiting production were the government-controlled supplies of coal and steel, both of which resources were scarce. Clearly, this was a temporary position at best, as the US producers enjoyed substantial economies of scale and larger capacity, meaning that in a more competitive market, they would hold the advantage.

With the advent of the Korean War in 1950, the British government undertook a re-armament policy that had a profound effect on the motor industry: for one thing, it benefited from a standing government order for military vehicles (such as the 'Fox' armoured personnel carrier and 'Scorpion' light attack vehicles, whose engines were

supplied, and still supported, by Jaguar); and for another, it was encouraged to export heavily to aid the balance of payments in the short term.

In the longer term, the effects of these policies were not as beneficial, for they:

- Continued to discourage the much-needed rationalisation of the industry.
- R&D was directed towards military rather than domestic vehicles.
- Steel quotas and military orders further held up the growth of the industry.
- Long-run export efforts were discouraged, as home waiting lists (and therefore apparent domestic demand) became artificially inflated by government policy.

However, it should be noted that as the automotive industry was regarded as a means of meeting other government objectives, so other policies should be taken into consideration here: income distribution, taxation, roads and transport, labour relations, and competitions policy.

Morris and Austin merged in 1952 in an effort to find the same economies of scale in production as those enjoyed by their American counterparts. However, such a move would have required considerable reorganisation of both companies – a reorganisation that never took place (Dunnett, 1980). The merger resulted in the British Motor Corporation (BMC) which proceeded to acquire the body suppliers Fisher & Ludlow, while in a parallel move, the British Ford Company acquired Briggs. The government supported both acquisitions, as greater vertical integration was seen to be in the public interest.

Thus by the end of the 1950s, the British automotive industry was as concentrated as that of other major vehicle-producing countries, with five large-scale manufacturers producing over 90% of the total output of cars. These five manufacturers differed considerably in terms of their level of vertical integration (which on the whole was low, due to the large and diverse nature of the components sector, where firms such as Lucas rivalled the automotive manufacturers in size) and in product and manufacturing techniques. Furthermore, a significant part of the industry was under the ownership and control of American interests: Vauxhall being a wholly-owned

subsidiary of General Motors, and Ford of Detroit holding a controlling interest in the British Ford Company.

The American industry, meanwhile, was even more concentrated, as three companies dominated a market many times the size of the British one. This situation was the consequence of specific historical circumstances, such as the insistence of the first Henry Ford that his company should produce every automotive component, and the merger policy of General Motors in its early years. Such an explanation should ignore neither the huge volumes produced by these firms, nor the considerable economies of scale that a high level of vertical integration would provide (Maxcy and Silberston, 1959).

The case for rationalisation in the 1970s

In 1975, a report considering the future of the British motor industry concluded, "there are too many manufacturers with too many models, too many plants, and too much capacity" (CPRS, 1975). These "serious competitive weaknesses", in addition to those posed by low productivity, investment, and labour relations, suggested a "need to rationalize plants and reduce assembly capacity and to ensure that this reduction takes place with the least possible adverse effects on the general level of employment". Despite such a combination of agglomeration, standardisation, and low levels of productivity (in order to maintain employment levels), the idea of a "volume producer car industry" continued.

The case for greater rationalisation can be seen in the economies promised by mass production, and in the belief that standardisation and integration would allow the British car industry to reach the ever-rising 'minimum efficient scale of production' (MES) for the various components. Such theoretical economies have been summarised in *Table 1* (overleaf).

Table 1: Production economies of scale in the motor industry between 1939 and 1975 (after Dunnett, 1980:22)

MES	*Year*	*Country*	*Stage determining MES*
100,000	1939	USA	Pressings
100,000	1939	UK	Pressings
250,000	1950	UK	Pressings
150,000	1954	UK	Pressings
1,000,000	1954	UK	Pressings
1,200,000	1955	UK	Pressings
600,000	1956	USA	Pressings & machining
1,500,000	1962	UK	Pressings
400,000	1965	USA	Pressings
800,000	1969	USA	Pressings
1,000,000	1969	UK	Pressings
2,000,000	1971	UK	Pressings
4,000,000	1972	USA	Pressings
1,750,000	1975	UK	Pressings
250,000	1976	USA	Assembly
2,000,000	1975	UK	Foundry

The case for economies of scale has always been a tempting one:

> [A]ll these estimates were no more than informed guesses, possibly even optimistic wishful thinking: it must have been very tempting for all of them to genuinely believe that if only they could increase their production a little their competitive position would improve greatly.
>
> (Dunnett, 1980:21)

This ideal may be compared to the realities of British manufacturing as indicated in *Table 2* (below).

Table 2: Relationship between MES and the size of the largest British car manufacturer (after Dunnett, 1980:23)

Year	*Largest firm's production share*	*Total production*	*Estimate of largest firm's production*	*MES*
1947	21%	287,000	60,000	150,000
1954	38%	769,000	292,000	600,000
1960	36%	1,352,000	486,000	750,000
1967	45%	1,552,000	700,000	1,000,000
1974	48%	1,543,000	740,000	1,250,000
1977	49%	1,315,000	651,000	2,000,000

Dunnett's argument is very much that the British motor industry in this period faced significant intervention by a government in pursuit of policies that ultimately brought

about the much-spoken-of demise. At this time, companies accounted for 99% of car production and employed some 300,000 people in this area. However, the same survey did not consider the components industry, which employed 1,000,000 people, accounted for 60% of the value of car production, and also had a much lower concentration ratio, with ten firms supplying 50% of this value (CPRS, 1975). Commercial vehicle production was not studied either, as it was considered "entirely different" from the car industry. It was referred to only briefly in terms of having higher production volumes than that in Italy or West Germany, with the dominant firms being profitable, and the future of the industry consequently looking far less bleak.

In the components industry, however, it is arguable as to whether significant economies of scale could be realised. As Maxcy and Silberston (1959) have argued, the British components industry should be considered as a well-developed, mature industry in a highly industrialised country. The economies of scale therefore open to such an industry should be considerably lower than those for the still-maturing car manufacturing sector. In certain industries, such as steel and chemicals (i.e. suppliers of many industries aside from the motor industry), a doubling in car production might involve only a 10-20% increase in volume for suppliers of this type. The vertical disintegration and standardisation had, then, by the 1950s already secured most of the economies of scale available to them, and the resulting cost savings were already incorporated into the cost structures of the industry. Furthermore, the same authors argue that if the economies of scale available to large manufacturers are seen to stem from research, design, and development, then they should be considered the "economies of technological progress", economies that in themselves do not arise from scale, but from the investment of sizeable resources.

From another point of view entirely, while the possible economies arising through very large scales of production might be desirable from a technical standpoint, they would be undesirable from a managerial one, since such structures lead to inefficiency.

A distinctively British motor industry

Due to its historical evolution, the British motor industry has a different structure to its counterparts in the US and Japan. Its roots in the already-established machine tool industry of the 19th Century may be seen in its characteristic diversity of suppliers: large engineering firms that do not necessarily specialise in supplying a particular automotive sector, nor even the automotive industry itself. Furthermore, the growth of industrial regions (such as the West Midlands) specialising in heavy engineering – and by extension, automotive industry manufacturing – have long given rise to a wide variety of smaller, sometimes more specialist suppliers. Clearly, in the case of such low-volume car assemblers, parallels may be drawn to the early low-volume luxury car assemblers and their suppliers. Indeed, Beecham and Cordey-Hayes (1998) describe the British automotive industry as being divided into two main sub-sectors:

1) Motor vehicle manufacture and assembly.
2) Motor vehicle parts and components, a more complex sub-sector including large engineering companies (which operate mainly in other sectors), more specialised manufacturers, and a large number of small companies.

Therefore, in any consideration of the automotive supply chain in Britain, the distinctive nature of the supplier firms must be remembered, and care should be taken to maintain this (historical) distinction between this and other manufacturing traditions, in particular those of the US and Japan.

The 'Japanisation' of the 1980s

With the growing inroads made by Japanese car assemblers in the 1970s and 1980s, the Western car manufacturers sought to reverse the decline in their home markets by firstly assessing the causes of the competitive advantage of these firms, and then assimilating this into their own methods (Oliver *et al.*, 1996a). As Lamming (1986:20) has described them, the events of the 1970s "were nearly fatal for the industry", and change was necessary. The methods adopted have been – and still are –

a major source of research and debate since the beginning of the 1980s, and are described here only briefly, in order to outline the origins of the now-standard manufacturing techniques.

Such techniques – including 'Total Quality Management' (TQM), 'just-in-time' (JIT) or 'lean manufacturing' – have, as adopted by the major car manufacturers (Lamming, 1993; Womack *et al.*, 1990) and companies like Xerox (Hewitt, 1995) in the 1980s, resulted in greater significance being attributed by the car assemblers to their Tier-1 suppliers. Bosch and Lucas, for example, have since found themselves sharing ever more of the burden of car production (i.e. through design and quality responsibility, and the manufacture of assemblies, sub-assemblies, and systems in place of components), as well as needing to manage their 'position' within the 'supply chain', i.e. ensuring JIT delivery to their car assembler customers and requiring the same of their own Tier-2 suppliers.

Lamming and Cousins (1999:27) warn that, in order to gain the greatest possible benefits out of such a 'lean production' buyer-supplier relationship, both parties need to take equal risks: "The theoretical argument of lean supply is that to reduce costs in supply relationships, each side must respect the other's risk management. This does not happen in traditional supplier assessment". Indeed, it is precisely this issue – of short-term, competitive, and adversarial buyer-supplier relationships – that has proved "detrimental" to the performance of the UK automotive industry, and which the 'Japanese' methods and supplier partnerships seek to avoid (Turnbull *et al.*, 1992). Yet even if, as Delbridge and Oliver (1991) hold, "much" of the UK manufacturing industry has adopted such systems, empirical evidence suggests that as far as the retail side of the automotive industry is concerned, there is little progress towards "true" JIT (i.e. as practised by Toyota in Japan).

The expectation that the use of 'Japanese' lean production practices alone could lead to high manufacturing performance has been questioned by Lowe *et al.* (1997), whose research into 71 Tier-1 automotive suppliers found that tight process control and closely integrated performance were more productive. Indeed, Delbridge (1995:805) holds that the "JIT/TQM manufacturing system has definite requirements of a whole

supply chain", envisaging the need for supply chain management as "a natural development of internal total quality programs" (Levy *et al.*, 1995).

The supply chain in the late 1990s

The endless drive towards exacting further economies of production is well known within the automotive industry, particularly through the example of the ever-increasing reliance placed by the car assemblers (once 'car manufacturers') on their Tier-1 suppliers. What may, however, distinguish the focus of the supply chain during the late 1990s from that of the 1980s is that it has shifted/is shifting beyond the Tier-1 and Tier-2 suppliers and towards the lower tiers (Larson, 1998). The global supply chain, according to the University of Michigan's Office for the Study of Automotive Transportation, is "overweight to the tune of $100 billion" (Piszczalski, 1998a) – and it is from the 'rationalising' of the lower tiers that the next generation of efficiency savings may be made (Murphy, 1998d). Everything preceding the assemblers, i.e. Tier-1 and earlier, is estimated to contain approximately £40 billion in excess inventory, capacity and costs. The retail industry following the assemblers fares no better, with excess vehicles draining the industry of a further £25 billion of working capital.

Instability and oscillation

One of the main causes of this "bloat" is seen to be the operation of the supply chain itself: under modern just-in-time (JIT) production systems, components required for production are theoretically 'pulled' as demand dictates. In practice, information flows are confused – and thus a momentary demand or slack at the far end of the supply chain may ricochet into far larger demands as still-present forecasting and supposedly obsolete 'buffer inventories' further muddy the waters. The supply chain has in recent years been described as "painfully similar to that of the 1950s"

(Piszczalski, 1998b), in spite of the considerable changes wrought among the car assemblers and the higher tiers.

For example, a minor Tier-3 supplier may be slow in production and add another week of lead-time. This can ripple up the supply chain, so that dealers further along fear potential shortages and thus place excess orders to cushion themselves. To take a 'real world' example, the America-wide strike at General Motors in the summer of 1998 resulted in 300,000 unfinished 1998 models still being in production in August, a time when the 1999 models should already have been in the showrooms (Piszczalski, 1998a). Clearly, this would leave them at a competitive disadvantage with regard to their competitors. Supply chain "oscillation" and "extreme sluggishness" have also been blamed on an extreme reliance on forecasting and planning (Piszczalski, 1997b).

Such a problem has also been termed "schedule instability" (Inman and Gonsalez, 1997). Since automotive suppliers face changing demands (meaning that fixed schedules are unfeasible) and suppliers typically require a significant lead-time to produce and supply material, it is necessary for them to employ forecasts when making current production decisions. For example, even a Tier-1 supplier may find that, under JIT, the forecasts for the coming month's production may change with only a few days of lead-time available to it.

Over-capacity, alliances, and mergers

Within Europe itself, there is considerable over-capacity on the one hand, and escalating development costs for new models on the other. Manufacturers have already begun to rationalise their own structure through alliances (e.g. Ford and Volkswagen), globalisation initiatives (e.g. Ford's *Global 2000*, or the decision by the major manufacturers to enter the Chinese market), and mergers (e.g. Rover and BMW). This has enabled further platform reduction to take place, with Rover reducing its 5 basic platforms to 2 (based on BMW designs) and Ford reducing its global platforms from 24 to 16. In the case of Ford, these platforms may also be

shared with other companies, with, for instance, the Fiesta and Galaxy being shared with Volkswagen through joint manufacturing facilities. However, in addition to the investment requirements for such moves, there are also the *internal* costs of re-organisation: for example, the massive *Global 2000* project embarked on by Ford in order to integrate its design and manufacturing divisions world-wide raised the cost of developing its standard model – the Mondeo – to £4 billion in 1995.

Furthermore, the numerous mergers and acquisitions taking place in the late 1990s (i.e. BMW acquiring Rover; Ford acquiring Jaguar, Aston Martin, and Volvo; or Chrysler merging with Daimler-Benz) would add another rationalisation requirement: the merging of two previously distinct supply chains (Murphy, 1998a). In the case of Daimler-Benz and Chrysler, this was particularly significant as Chrysler was noted as a heavy outsourcer of parts and components, whereas Daimler-Benz had a tradition of working closely with its suppliers on a technical level. While some, like Smith (1998), have described this as part of a movement towards global mergers, others, like Sharf (1998), have seen it as "the ultimate outsource".

With the high growth rates promised by the developing markets (whose exact definition varies: sometimes Korea, then China, now perhaps India), various automotive OEMs (original equipment manufacturers) had initiated overseas expansion in order to secure a place in the markets of the next century. Bringing suppliers with them was a necessary step (Owen, 1997). Thus with the existing possibilities for cost savings exhausted, further funding for such high levels of investment will need to come from the reduction of supply chain costs (Tulip, 1997).

The need to further rationalise the supply chain

As can be seen, the car assemblers and their Tier-1 suppliers face a number of different imperatives calling for greater rationalisation of the various supply chains:

- Joint ventures, thereby creating new supply chains from the different partners' supplier bases.

- Globalisation initiatives, where supply chains would need to be extended into new markets.
- Mergers, where two previously distinct car assemblers merge into new, multinational players.
- Reduction of supply chain instability and oscillation, and the costs arising from this.
- A continued winnowing of existing suppliers – progressing further down the tiers – to source ever more parts from an ever more dedicated and smaller supplier base.

A variety of different initiatives aim at resolving these imperatives, ranging from the introduction of new technologies to the creation of new markets for new products and services. Rationalisation, then, may be achieved through (a) information technology, (b) logistics, (c) inter-organisational relations, or (d) closer integration of the supplier base.

Information technology

One proposal from North America to control such supply chain instability is to implement new electronic data systems, creating closer supply chain integration and reducing waste through the use of information technology, since, according to the Automotive Industry Action Group (AIAG), supply chain activities account for more than 60% of a new vehicle's costs (Gourley, 1998). Teresko (1998) speaks of the automotive industry as "undergoing a wave of fundamental transformation" wherein major information technology initiatives are "reinventing all the processes involved with satisfying the global demand for vehicles". These involve not only Western car manufacturers like VW, but Eastern European ones like Škoda and their local supplier bases as well (Mainwaring, 1998). Rather than being departmental initiatives, these IT investments are intended to go further: to serve not only as an integrating force for large global enterprises (such as the IT association with the Ford *Global 2000* programme), but to extend beyond the enterprise and create a supply chain that is closely linked and cost-optimised.

For example, the growing use of EDI (electronic data interchange) systems has enabled aluminium suppliers to shorten the cycle time in the supply chain, and has also transformed their business practices (Nolan, 1997). SCM (supply chain management), another new abbreviation, is increasingly applied to mean an information technology solution to the supply chain problem (Gould, 1998), ranked alongside MRP (material requirements planning), MRPII (manufacturing resource planning), CIM (computer-integrated manufacturing), and ERP (enterprise resource planning).

But are there alternatives to yet further investment and ever greater computerisation? JIT, after all, was intended to be an organisationally driven, rather than computer-controlled, system. Critics such as Winter (1998b) point towards similar intentions in 1985, 1988, and 1990 which were by and large unsuccessful. Suggested reasons for this include the wide variety of incompatible computer systems and software being employed, the preference by designers for hardcopy, and the difficulty for suppliers to gain access to digital prototypes. A similar situation exists with barcodes and EDI: subscribing to proprietary networks proved expensive, and barcodes ended up as little more than 'decoration'.

One of the means proposed for overcoming software incompatibility and the need to subscribe to proprietary networks is to utilise the existing Internet, specifically the WWW and widely supported languages such as Java. The Automotive Network Exchange (ANX) is one such project, aiming to link North American and European automotive manufacturers and suppliers; Skyva is another (Wilder *et al.*, 1998). There have also been calls for a product-centric approach, so that the information on any given product is no longer strewn across multiple, unconnected systems (Piszczalski, 1997b).

Within the UK, the European Automotive Initiative Group (EAIG) started a series of initiatives aimed at introducing firms within the automotive heartlands of the West Midlands to the possibilities offered by information technology: the Internet, electronic commerce, information services, distance learning, and EDI. This particular project, AutoLean, involved 20 SMEs in 1998 and aimed at increasing participation to 100 SMEs in 1999/2000.

However, such technologies need not concern only communications and planning between firms. For example, CAD (computer aided design), although potentially a labour-saving device in the fields of design and prototyping of automotive components, sub-assemblies, and even entire cars, had long been outside the reach of Tier-2 and Tier-3 suppliers: computer systems able to run such high-powered software solutions were expensive, as were the networks that would link them with their customers. Recent years have witnessed not only the increasing power of PCs, but also the increasing use of the Internet. The extent of these advances has resulted in the use of CAD systems becoming commonplace, as these are now within range of a standard desktop computer and thus within the range of Tier-3 use (Gould, 1997). Similar CAD/CAM applications have even found their way to scale model manufacturers, such as Testor Corp. (Schmitz, 1998). Similarly, while 'proper' EDI services are complex, expensive, and require specialised equipment, the Internet offers a relatively low-cost medium for conducting business electronically (McGloin and Grant, 1998). In addition, even much simpler systems such as barcoding (when properly used) may make a significant difference, as Delphi Automotive Systems found when it undertook a programme to eliminate problems with mixed and improperly-labelled shipments (Jesitus, 1998).

Logistics

An alternative approach is to extend JIT throughout the supply chain, as did the NUMMI joint venture (Minahan, 1998). GM and Toyota had established this particular joint venture, and when it faced the same supply-side problems they had once experienced themselves with the Tier-1s, so the parents began encouraging NUMMI's 220 suppliers to adopt JIT techniques (Toyota had, after all, begun a similar crusade in the 1980s, meaning that this was familiar territory). In recent years, Tier-1 suppliers have realised ever fewer benefits from such techniques and are in turn working their way back through their own supply chains. In short, the new efficiencies and economies are being sought at Tier-2 and Tier-3. For example, the Tier-2 supplier Techno Trim, a supplier of seat covers to JCI (a key Tier-1 supplier of the assembler NUMMI), had improved inventory returns by 24% p.a. and increased

labour productivity by 7% merely by working with its Tier-3 suppliers to utilise the same techniques that NUMMI had with JCI, and that JCI had with Techno Trim.

The same standard techniques still need, therefore, to be applied further down the supply chain. However, it has been pointed out that the needs of lower-tier suppliers may be very different to those of the automotive assemblers, and that applying identical systems may prove detrimental (Fitzgerald, 1996).

Similarly, assemblers are relying ever more on third-party logistics providers to handle the increasingly fragile supply chain (Andel, 1998), such as Ryder Integrated Logistics (Richardson, 1996). For example, Emery Worldwide provides global multi-mode supply chain management solutions to GM dealers, with eight logistics centres in Latin America, Europe and Asia. Furthermore, Ford set up an experiment with four third-party logistics providers in North America, with these firms responsible for optimising the routing and service schedules of the carriers in their regions. In 1996, GM put Leaseway Logistics in charge of feeding its 31 North American assembly plants with parts from 390 suppliers across 14 states, reducing transit times by 18% (Minahan, 1996).

"Strategic sourcing" is another buzzword, employed by Honda in its drive to maximise the value added through its external suppliers by working closely with them (Harrington, 1997). After all, Honda expects its supplier relationships to last for 25 to 50 years rather than from project to project; and with 80% of the value of its products in the hands of these suppliers, the purchasing choice is critical. Yet despite all the talk of partnering and the virtues of supply chain management, significant tension still appears to exist in the relationships due to the buyers' focusing on the cost-reduction aspects of SCM, or reduced lead-time (i.e. economic benefits at the expense of their partners). This argument is echoed by Vasilash (1997c), who quotes Brian Chambers of the Automotive Consultancy Group: "The long-term cost reduction agreements that the domestic auto makers have with their suppliers are currently inadequate to allow the OEMs to remain competitive internationally".

Partnering, according to Greek (1998), is a concept that has grown out of the need to improve industry supply chains and which now encompasses all of their links. It is recognised that the most important links for any end-product manufacturers are those at the beginning of the chain: the suppliers of raw materials and components. A weakness here is detrimental to the entire chain. Thus, essential suppliers should ideally build relationships not just with their customers, but with their customers' customers – an approach which might involve technical support from the raw materials supplier (e.g. DuPont) at the design stage – one or more stages down the supply chain from them – and not only in logistics, JIT, and electronic data interchange. Increasingly, these large raw materials suppliers, whose numbers might include British Steel or Bayer, are setting up customer-specific liaison groups for key client groups such as the automotive or construction industries.

As one commentator has put it, "Today, suppliers are more critical to the success of automotive manufacturers than ever before" ("Auto Suppliers", 1998). Assemblers such as GM, Chrysler and Toyota have taken pains to alter their organisational structure to take full advantage of the global supply chain: procurement, engineering, manufacturing, and design. The key to this is seen as the "extensive and early" involvement of suppliers. Although companies like Chrysler may have put forward programmes like SCORE (focusing on supplier cost reduction), Ford has been the first to turn over programme management of a complete vehicle (the 1998 Lincoln Navigator) to a supplier (Magna), a move showing ever more clearly the increasing burden placed upon Tier-1 suppliers by the assembler ("Managing the Supply Chain", 1997).

Projects aimed at reducing information bottlenecks, such as MAP (Manufacturing Assembly Pilot) in America, have found that although EDI solutions were useful, some 70% of their gains in lead-time reduction came through the re-engineering of business practices (Cottrill, 1996a, 1996b). Smaller suppliers have therefore been urged (Bergstrom, 1996) to become more aggressive in their dealings with their

customers, and to expand overseas or diversify in order to remain competitive in the ever-decreasing supply chain.

Supplier-base integration

In the fasteners industry, by way of an example, rationalisation through vertical integration, mergers, alliances and acquisition is expected to rise in coming years (Quinn, 1997). Such a move would result in a single distributor dealing with a single alliance (or alternatively, in the distributor having merged with its suppliers in some way) to supply a range of different products. Value-added services (such as design work) are also expected to increase, as customers will have both greater needs and more requests.

Similarly, the mounting pressure on Tier-1 suppliers in the US (Wallace, 1996), brought about by the car assemblers' demands for them to supply complete assemblies and systems on a global basis, has resulted in companies such as Johnson Controls, Lear Corp., and Dana Corp. acquiring other suppliers on a world-wide scale. This led to concern among the car assemblers as to whether these mergers would create suppliers "with too much power" ("Quality Revolution", 1997). These "supplier-system integrators" may account for as much as 36% of the total supplier group by 2005 (Owen, 1997). Even so, the increasing diversity of technological skills will require yet further alliances from the Tier-2, 3, and 4s. Within the European market, Lucas recently merged with Varity and Bosch's alliances with the US companies AlliedSignal and Bendix (Tulip, 1997).

The implications of such a move for the automotive supply industry would be considerable. Donna Parolini, a consultant with International Business Development, commented that while there had been some 30,000 car parts suppliers in the world in 1988, these numbers had narrowed to only 4,060 a decade later. This is due in part to the automotive assemblers' reduction of their supplier base in compliance with both TQM techniques and a drive to reduce supplier prices. The number of major suppliers within Europe is expected to decrease from 1,500 to under 1,000 (Lamming, 1990).

Assuming current trends would continue, it was predicted that there would be only 26 truly global parts suppliers by 2003 ("Business: Too Many Pieces", 1998).

Rationalisation: The British experience

The pressures and trends detailed above have been presented in a global context. On a more localised level, the West Midlands Automotive Supply Chain Development study conducted by KPMG found similar pressures, and forecast that unless Tier-3 and lower suppliers in the West Midlands implemented the same improvements as their customers, one third of local suppliers could find themselves 'dropped' by the year 2000 (Nolan, 1998a). There are concerns that the pressures exerted on lower-tier suppliers by the Tier-1 suppliers constitute more of a cost-cutting drive than the partnership between the assemblers and the first tier. Indications that Tier-2 and Tier-3 suppliers are becoming part of the consolidation – as shown in the first survey – may be seen in increasing numbers of joint-ventures and vertical integration mergers between Tier-1 suppliers and their own Tier-2 suppliers to develop markets abroad and diversify into other industries as an "opt-out clause".

In view of the problems that the high value of Sterling in 1998 placed upon the cost competitiveness of UK-based suppliers, the drive for cost reduction had already caused a loss of business towards Continental competitors (Nolan, 1998b). Thus with the existing reduction in the supplier base with the automotive assemblers, the UK's 2,000-odd strong component firms may be expected to come under pressure, as Ford, for example, implements its plans to narrow its global supplier base of 1,600 firms to 200 (Tulip, 1997).

Questioning the supply chain model

Despite its popularity and usefulness, the supply chain model has attracted a growing body of criticism. Rejecting the concept of a linear, logical series of relationships

between firms, critics have likened the automotive supply base instead to "a twisting, swirling web of sorts" (Bergstrom, 1996). After all, "a [member] company could easily identify another company that is simultaneously a supplier, customer, competitor, and possibly joint-venture collaborator" (Laseter, 1998d). Similarly, Harland (1996:S63) has questioned the very meaning of the phrase, in that "it appears to be a term used in several emerging bodies of knowledge which, to date, have remained largely unconnected", finding instead structures more akin to networks than chains within an empirical comparison of 'supply chains' in Britain and Spain.

Hewitt (1999a, 1999b) has argued that, with the advent of new technologies, particularly in the fields of communications and distribution, it should be possible to replace the "supply chain" concept with that of a more efficient "demand pipeline". After all, surely such a "demand pipeline" would be more consistent with the functioning of a JIT sourcing strategy. Similarly, Laseter (1997a) argues that longer-term supply relationships provide new opportunities for value creation, such as the integration of the supplier's processes with those of its customer and the increasing manufacturing of sub-assemblies and modules (Laseter, 1998e). Thus, it is "scope boundaries", according to Laseter, that are the key issue, and trust – rather than potential efficiency savings (Laseter, 1997b, 1998a, 1998b, 1998c) – that should form the basis of these relationships, especially as tiering and specialisation make supply webs ever more complex and therefore ever more vulnerable to instability (Laseter, 1999).

Thus, as argued previously in Sadd and Bennett (1999), the supply chain concept is both enduring and endearing – an "idealised vision of the industry" – that has gained currency through popular discourses surrounding the supply base, in spite of inconsistencies with empirical reality.

Summary

As has been suggested here, there are a variety of strategies open to the car assemblers and their Tier-1 partners to gain efficiency savings from further down the supply

chain. However, there is no single solution, as may be seen from the cases of Parker Hannifin Corp. and Dana Corp. (Madden, 1997). Both these industrial manufacturers had international distribution challenges to meet, but Parker pursued a technological solution (linking each of its 20 world-wide subsidiaries with an integrated computer system), and Dana a logistics one (C. H. Robinson Co. has had the "headaches" outsourced to it).

Drawing on the work of Prida and Gutierrez (1996), it would indeed appear that the relationship of the automotive industry with its supply chain is continuously evolving. Their 3-stage evolutionary model sees an industry supply chain progressing through:

1) Traditional purchasing, where the goods are undifferentiated and there is an adversarial relationship between supplier and customer, with competition aiming at driving down the price.
2) Supply management through subcontracting, aimed at establishing a co-operative network of suppliers.
3) Supply management through innovation, involving collaborative agreements and strategic partnerships.

It is the third stage that is of concern here, as not only are the lower-tier suppliers being targeted for the next generation of efficiency savings, but they are expected also to become partners to the higher tiers – as the higher tiers have to the car assemblers – who can be relied on for innovation, supply chain management, JIT logistics, and to shoulder part of the burden of new product development.

Chapter 2: Multinationals and the Global Marketplace

Given that the major players in the automotive industry (such as Ford, General Motors, BMW, LucasVerity, or Delphi) are multinational enterprises (MNEs) and operate strategically on a world-wide scale, it is necessary to explore the implications of this: the 'global economy' and the nature of the MNE.

The new economic order

Before the Second World War, global production and trade were still dominated by the old, well-established core economies of Europe and the USA. Yet while manufacturing for the most part remained located within this core, international investment on a global scale, particularly from the United Kingdom and the United States, was concentrated towards developing countries, who were host to some two-thirds of direct investment

However, the period of the war shattered this long-established structure, devastating the global economy and radically altering it. On the one hand it resulted in the sharp political division of East and West, of capitalism and communism (the OECD countries and the US, versus the Soviet-dominated nations of Eastern Europe) – and outside these two power blocs, the highly heterogeneous and generally impoverished 'Third World'. On the other hand, it resulted in the formation of GATT, the IMF, and the World Bank, institutions aimed at building a new, freer, economic order.

Returning from political considerations to the multinational firm, it can be seen that as the industrialised nations grew in strength after the Second World War:

> *[T]rade increased more rapidly than production*, a clear indicator of the *increased internationalization* of economic activities and of the greater *interconnectedness* which have come to characterize the world economy.
>
> (Dicken 1992:16, italics in original)

Livingstone (1989) concurs, in that the change in volume coincided with a change in the nature of international activity. The established patterns of exporting unfinished raw materials to the industrial core for further processing gave way to local processing, then to local manufacture. Thus the interest of firms shifted from extraction and transport possibilities in overseas locations to processing, and later production value.

These changes may be attributed to "a profound transition in the nature of the global production system and in the determinants of international competitiveness [which] is underway" (UNCTC, 1990). These, according to the UNCTC, are driven by technological advances and organisational innovation:

(a) *Technological advances* that stem from the microelectronics based data-technology revolution (and its implications for both manufacturing and service industries), biotechnology (pertaining to agriculture, energy, health and chemicals), and new materials (such as superconductors, ceramics and composite alloys).
(b) *Organisational advances* that are characterised by entirely new approaches to the organisation and management of production at both the inter-firm and the intra-firm levels which are diffusing outwards from the Core. The emphasis here is on flexibility, quality and co-operation.

Technological development

The early post-War period can perhaps be characterised by the surge in technological development, as the new wartime technologies found their way into everyday life.

These were accompanied by the products of the US multinationals that emerged in strength at this point to bring their brand names into European households, creating something of an American hegemony. Stable exchange rates dominated this 'Golden Era', and as US MNEs invested heavily in Europe, a technology flow took place, narrowing the technological lead they enjoyed. The MNE, as Cantwell (1993) says, came of age.

Organisational development

The most prominent aspect of this has been the growth and diversification of existing US and European firms, associated with the rise of intra-industry trade and production in Europe and North America. Japan and the NICs (newly industrialising countries) emerged as powerful new centres for source countries for a range of new MNEs. The rise of global capitalism (absorption into the world-economy) brought with it a tendency for MNEs to integrate their international networks, with 'rationalised' investments. The rise of globally integrated MNEs has also been associated with a decline in the vertical integration of the firm at national levels. This rationalised investment, following the slowdown in growth in the 1970s (the previous high growth rates had led to increasingly dispersed activities), expanded from the OECD nations to include Southeast Asia, and beyond.

Put briefly, the growth of the modern MNE is attributed to the opportunities arising from the application of the advanced technologies of the Second World War to producing consumer goods for world markets (Casson, 1979).

Cultural distinctions between multinational enterprises

The pioneering multinationals had faced difficulties in the European market, yet still had a strong international presence. And, indeed, newcomers had a preference for what had become the Commonwealth. However, this preference was neither so

pervasive nor so long-lived as before. Engineering firms tended to favour the Commonwealth, guided by their past history. Firms with no existing Commonwealth manufacturing, such as recent entrants in the food and construction industry, made major investments in Europe towards the late 1960s and early 1970s. With the steady amalgamation of Europe into the European Union bloc, the domestic market boundaries blur, as do the logistical and other barriers blocking expansion.

According to Ohmae (1985), the different cultural heritages underlying European and American MNEs may explain the predominant modes of international activities employed by such firms. European multinationals (such as the British-Dutch Unilever), stemmed from the colonisation period of European dominance, and therefore tended to be multi-domestic in their operations. American multinationals, on the other hand, were shaped in the relatively stable era between the two World Wars, and thus were more international, with overseas divisions being "clones" of the domestic parent.

Japanese international enterprises, for example, can be seen as the result of long-term planning under national objectives, and short-term expediencies (as in FDI to overcome trade barriers erected in nations to which their exports were too successful). Japanese multinationals have operated internationally in a relatively limited range of industries: mostly electronics, motor vehicles and construction, with the apparent national strategy guided by the Ministry of Trade and Industry, MITI. Industrial groupings often consist of a bank, an industrial group and a trading company. Exporting, argues Livingstone, is still the prime intention of these groupings; multinationality has been thrust upon them rather than it being in their nature. Japan is now the world's largest outward investor.

Japanese investment in Europe might best be explained by means of the Product Life Cycle Hypothesis (Dunning, 1993a): goods which required resources and capabilities in which Japan had a comparative advantage (such as miniaturisation) were first exported to countries with similar consumer income levels and tastes, e.g. much of Western Europe. When it became more profitable to produce locally than to export (as in the case of cars), Japanese firms established production in Europe.

Multinational enterprises

Multinational enterprises (MNEs) have existed for hundreds of years, although it is perhaps debatable whether the plantations owned by the Dutch chartered trading companies of the early 17th Century would be multinationals by the modern consensus, namely that the MNE is an enterprise which owns and controls assets in more than one country (Casson, 1979). An alternative definition (Dunning, 1981), considering solely the phenomena of the latter half of the 20th Century, would be to identify by effect, rather than cause: thus the multinational enterprise is any firm which engages in foreign direct investment (FDI).

Indeed, MNEs play a vital part in the world economy: in 1978 they accounted for one fifth of the world's output, and were growing in those terms by some 10-12% per annum, roughly double that of world output. "In every respect," wrote Dunning (1981), "MNEs are among the most powerful economic institutions yet produced by the capitalist system". However, there are also enterprises that – if not technically MNEs – may still be classed as 'near relations', namely:

(a) The national enterprise which has production units in different parts of the nation-state, i.e. a multi-location domestic enterprise. It could be argued that enterprises operating within a greater trading bloc (such as the European Union) number among these.
(b) The national enterprise which exports some of its output, i.e. the international trading firm.
(c) The national enterprise that exports part of its factor inputs, such as material or human capital; enterprises may trade personnel for a variety of reasons, not least in the setting up of new foreign joint ventures.

Economic models of the MNE

As has already been suggested, the great trading companies of the 1780s might technically be counted as MNEs, yet there is a surprising paucity of research into such

corporations, with studies being concerned more with economics than FDI until about 1960 (Lévy-Leboyer, 1989). Adam Smith in the *Wealth of Nations*, to cite the classic work (Smith, 1850), cites the example of an early kind of international production which was associated with a wave of migration. This had the potential to raise growth in both the developed source country (Britain) and the developing host country (the American colonies). The colonists took with them skills and equipment, and helped to establish a local infrastructure, enabling agriculture and resource-based production to grow at a faster rate. Trade with Europe furnished a market for the expansion of tobacco and other primary commodity exports, while the more sophisticated manufactured goods were imported. In Britain, growth was increased not only due to the more rapid rise in export markets, but also because the redeployment of surplus capital in the colonies (and in the foreign trade link with them) increased the domestic rate of profit.

Comparisons may be drawn to Ozawa (1982) and Kojimi (1990), who consider the activities of such transnational corporations (TNCs) from more advanced countries, as they switch production from a locally declining sector to a country in an earlier stage of development, where the new sector has strong growth prospects. This contributes to industrial restructuring and higher growth in the developed country, and provides technological capability in an appropriate sector in the less developed country. As with Smith's colonial settlers, TNCs have a 'tutorial' function in facilitating learning in the host country. As a particular case, resource-related production might thereby be enabled to expand more rapidly in a developing country, providing the raw material inputs required by the more industrialised country to sustain higher growth.

The Product Life Cycle

Related to this is the concept of the product life cycle, a model proposed by Vernon (1966), wherein consumption is dependent on the stage in its life cycle. The home market is significant in that it serves as both the source of stimulus for the innovating firm as well as the preferred location for the actual development of that innovation. Historically, therefore, US firms have developed and produced products that were

labour-saving or responded to high-income wants; continental European firms, products and processes that were material-saving and capital-saving; and Japanese firms, products that conserved not only material and capital but also space (Davidson, 1976). As in many cases, the transitions from development work to pilot plant operation to first commercial production take place in imperceptible steps, and the first production facilities tend to be located in the home market. Demand for the product arising from foreign markets would initially be served by the existing production unit. Eventually, however, international operations or licensing become viable options, and production may begin abroad. Vernon (1979) later reconsidered this hypothesis, as firstly an increase in the geographical reach of companies took place, and secondly, the differences between the markets of the industrialised countries were reduced. This has resulted in the introduction times for products between the home and international markets declining, and a rise in the number of nations into which these products are introduced:

> One typical pattern... consists of firms that develop and produce a line of standardized products which they think responds to a homogeneous world demand rather than to the distinctive needs of individual markets.
>
> (Vernon 1979: no pag.)

By standardising their product on a world basis, firms can hope for two kinds of benefit: reducing the costs of processing information on the distinctive needs of individual markets; and economies of scale on a global level.

The Heckscher-Ohlin model

Differing models, based on comparative advantage, have also been proposed. Until around 1950 the general view of international involvement comprised a formal theory of international trade and a complimentary theory of capital movements. This, the Heckscher-Ohlin model, was a theoretical rather than a descriptive approach, and considered two factors. It employed a development of early work by Ricardo to arrive at a two-nation, two-input model, an example of which might be the case of Britain and America.

If one supposes that the cost of capital were higher in Britain than in America, and that labour was therefore cheaper, then so labour-intensive production would favour Britain, and capital-intensive, America. This model has been heavily criticised in the literature, not least on grounds of its unreality (as Leontiev's paradox demonstrates) and its inapplicability. Theories emerging from this in the 1950s tended to fall into either the neofactor category (which extended the Heckscher-Ohlin model to include other location-specific endowments, and differences in the qualities of inputs), and neotechnology and market imperfection ones (which included scale economy models).

Internalisation theory

The 1970s saw the rise of internalisation theory, a more sophisticated tool for conceptualising the multinational. To the internalisation economist, the existence of firms' cross-border value-added activities stems from the failure of the intermediate product markets to operate efficiently. FDI seeks to improve upon the market as a transactional mechanism. The replacement or internalisation of such markets by hierarchies leads to an extension of the boundaries of the firm (Hymer, 1968). As Rugman (1981) writes, "the MNE uses its internal market to service foreign markets with its firm specific advantage in knowledge or other proprietary information".

The essence of internalisation theory is the recognition of market imperfections that prevent the efficient operation of international trade and investment. It shows that the MNE has developed in response to exogenous government induced regulations and controls which negated the theoretical rationale for free trade and private foreign investment as explanations for free trade and investment. The process of internalisation allows the MNE to overcome the externalities resulting from such regulations. The MNE can also use its firm specific advantage in knowledge and technology to service foreign markets by internal production and marketing rather than exporting and licensing.

Competitive advantage

Competitive advantage, as described by Porter (1990), refers to the ability of a nation – or more specifically, those enterprises indigenous to it – to use its location-bound resources in a way that will enable them to be competitive in international markets. Kogut (1985) holds that the design of international strategies is based upon the interplay between the comparative advantages of nations, and the competitive advantages of firms. This determines the answer to the two principle questions of strategy:

1) Where should the value-added chain be broken across borders?
2) In what functional activities should a firm concentrate its resources?

Competitive and comparative advantages are not independent of one another. Firms differ in location of sourcing of production and therefore can acquire a competitive edge with superior exploitation of comparative advantages among countries.

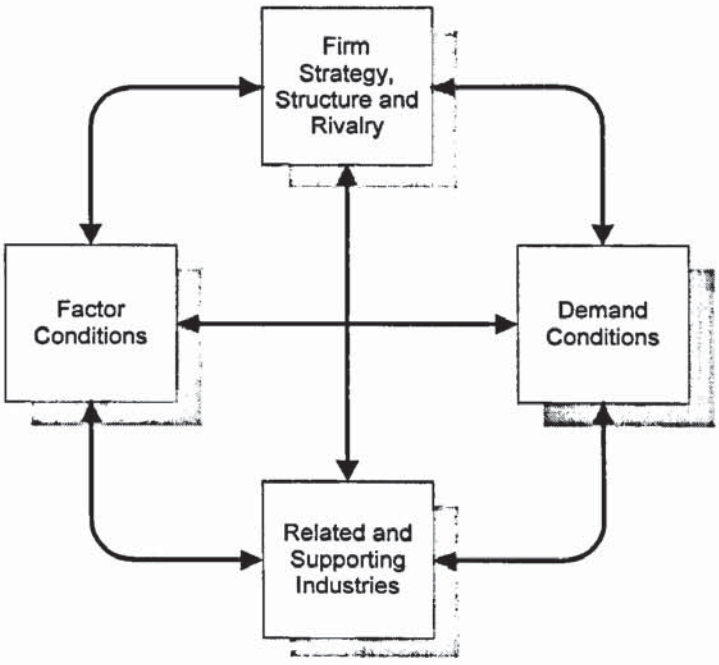

Figure 2. The "diamond" of competitive advantage (after Porter, 1990)

The determinants of this ability may be drawn as a diamond, which comprises a set of attributes which "shape the environment in which local firms compete, and which promote or impede the creation of competitive market" (Porter, 1990). Further, the diamond is self-reinforcing and each attribute contingent on the other (see *Figure 2*).

Strength and sustainability of the nation's competitive advantage will be demonstrated by the value of its national product, and/or the rate of growth of that product, relative to that of its leading competitors. The degree of success of this is contingent on both the types of goods and services provided by the enterprises, and the efficiency with which they are supplied. This in turn rests on the extent and quality of, and the interaction between, four sets of attributes:

1) The quality and quantity of demand for goods and services by its domestic consumers
2) The level and composition of its natural resources and created factor capabilities
3) The nature and extent of inter-firm competition
4) The extent to which its firms are able to benefit from agglomerative or external economies by being spatially grouped in clusters of related activities

Surrounding and influencing these variables are two others: the role of government; and chance. However, there are some criticisms that need be made of the diamond. Dunning (1993) suggests the inclusion of a third exogenous variable into the Porter Diamond, namely that of multinational business activity (MBA). In other words, this comprises the effects on the diamond of competitive advantage of the foreign business activities of MNEs and the domestic output of foreign-owned companies.

The Eclectic Paradigm

Dunning (1981, 1988, 1993) states this is a generalised framework for exploring the level and pattern of the cross-border value-added activities of firms. It postulates that at any given point in time, the stock of foreign assets, owned and controlled by multinational firms, is determined by:

- The extent and nature of the ownership-specific or competitive advantages of those *firms*, *vis-à-vis* those of uninational firms
- The extent and nature of the location-bound endowments and markets offered by *countries* to firms to create or add further value to these competitive advantages
- The extent to which the market for these advantages, including those which arise from multinationality *per se*, are best internalised by the firm itself, rather than marketed directly to foreign firms

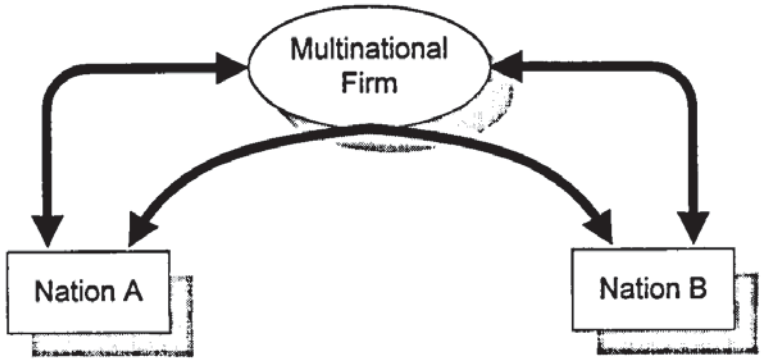

Figure 3. The Eclectic Paradigm (after Dunning, 1981)

The paradigm avers that, given the distribution of location-specific advantages, enterprises which have the greatest opportunities for, and derive the most from, internalising activities will be the most competitive in foreign markets (see *Figure 3* above). Enterprises will engage in the type of internalisation most suited to the factor combinations, market situations and government intervention with which they are faced. As Dunning (1988) summarises, "this theory is less an alternative theory of international production than one which synthesizes the essential and common characteristics of the mainline explanations".

Product policy for the MNE

Livingstone points out that the MNE cannot expect to replicate the same production methods in all its production plants. Rather, the production methods are determined by three elements:

1) *The size of the market.* This is important when the techniques (and gains from) mass production are considered, whereby the greater the market, the greater the ability to break down and specialise in stages of production, and thus the higher the level of technology. However, if an export market is to be served, then it is possible to utilise more advanced technology.
2) *The level of local technology.* This influences the level of technology that can be mastered when introduced from abroad (i.e. the efficiency at which a plant can be run), and also the "take-off" point at which improvements and innovations may be introduced.
3) *The local distribution of the factors of production.* With nations where labour is cheaper than capital, it makes sense to take advantage of this by introducing more labour intensive methods.

The product itself may take one of three forms:

i. The 'universal' product, designed for the world market (as discussed in this chapter).
ii. The exported product, introduced into a secondary market for which it was not originally designed, an approach that may be the preamble internationalisation.
iii. The transferred product, where the obsolete product from one market is manufactured in the less important market where it is still new.

Locational strategy

It has been recognised by Vernon (1974) that the choice of site by foreign-based enterprises is dominated by locational considerations different to those affecting

national enterprises. Dunning (1981) has suggested that MNEs are influenced by regional policy incentives, quoting data from the period to 1971 showing a shift of foreign-based firms' investments moving strongly towards assisted areas. A report of the US Tariff Commission (1973) considered incentives to exert an important influence on an MNE's choice of location within a foreign nation. The Commission estimated that approximately 50% of all investments by American MNEs in Europe during the post-war period were located in assisted areas. Dunning (1981) suggests a combination of three factors that impact the locational strategy of the MNE:

- The extent to which the locational characteristics of the depressed regions match the locational requirements of the planned new development of MNEs
- The extent to which MNEs respond more than multi-locational domestic enterprises (MLDEs) to regional incentives
- The extent to which MNEs are more amenable than MLDEs to pressure or persuasion by national government

Estall and Buchanan (1970) hold that the choice of location, like any other business decision, is usually a rational one. Factors influencing this decision include:

1. *Transport costs*

   The relative proximity and availability of acquiring input commodities, servicing the market, and the cost of transferring freight between sites are important. Raw materials may be relatively available, or in a unique location. Furthermore, the produce of another industry may be required, so that locating a plant close to that industry saves costs. The costs of transporting the material itself depend on:

   - Whether it loses greatly in weight or bulk in manufacture (meaning that the industry is again prudent to locate near to its source).
   - The degree of perishability of the material.
   - The value of the raw material per tonne (higher value bears the transport costs better).
   - Whether the possibility exists of employing substitute materials (whether or not to locate near the source of the given material).

- The number of raw materials involved and their relative importance (the degree of attraction in one direction may be opposed by another).
- The structure of freight weights.

2. *Market influences* are also important, as the cost of moving the material to the market may bear a high part of the costs of production. This is especially clear if there is:

    - An increase in weight or bulk or fragility of the product.
    - A high degree of perishability.
    - A need for personal contact between producer and consumer.
    - Greater value commodity (the cheaper it is, the higher the relative transfer costs).
    - A geographically large market area.
    - A high market capacity (in order to achieve economies of scale, the local market may be too small for modern industry and so a larger market need be sought).

    Transfer costs can also be used to explain clustering, such as the British motor industry in the Midlands.

3. *Historical influences of transfer costs*

    Functional and area specialisation requires an efficient transport system in order to be feasible on a commercial scale. Thus, during the agrarian and industrial revolutions new methods of transport were needed. The early costs of inland transport influenced the location of industry: coastal, estuarine and river towns were favoured (such as London and Bristol, or Antwerp and Bruges) for commercial activities.

    In the early part of the industrial age, canals were built and riverways improved, and industry nestled on their banks. Later, with the development of railways in the United Kingdom, they fell into disuse as their relative limitations became obvious. The development of industry in the German Ruhrgebiet has been attributed to the intensive use of waterways.

Railways permitted far greater flexibility in the movement of goods and raw materials, were far speedier and easier to construct and maintain. This aided industrial growth away from the coalfields. With the dawn of the twentieth century, motor vehicles are superseding even the railways.

4. *Other influences*

The location of energy sources is likewise important. The high demand for electricity in the extraction of aluminium locates such facilities near to cheap hydroelectric power sources. For a review of the influence of factors of production, see above.

5. *Clustering and Geographical Location*

Estall and Buchanan (1970) point out that by far the greatest proportion of total world output of manufactured goods occurs in a few highly concentrated regions of industrial production. This clustering, including that of related and supporting industry, may be due to initial requirements, e.g. availability of energy supplies and transport routes. As the nucleus grows, however, it becomes a concentration of earning power and thus other supporting industries grow up around it. SMEs can gain advantages by locating in such an area, as economies arising from low transport costs, learning, and so forth.

The Growth of industrial clusters

It has been suggested that the "most technologically promising companies in Asia tend to be the networks of small specialist exporters that spread in places such as Hsinchu and Bangalore" (Micklethwait 1996), with the former a Taiwanese business park aimed at the microchip industry, containing world-class manufacturers and developers, although still lacking in qualified researchers (some 85% of Taiwanese postgraduates remain at university rather than working in industry). This model has also been adopted as a basis for industrial policy in Finland, e.g. the 1993 proposal for the "National Industrial Strategy for Finland" by the Ministry of Trade and Industry,

which is based both on this and Porter's competitiveness model. The aim is to identify existing – as well as potential – national clusters of internationally competitive industries (Yla-Anttila, 1994).

Globalisation

The concept of a single, global marketplace has been notably promoted by writers (Levitt, 1983): "gone are accustomed differences in national or regional preference". In this vision, the MNE is superfluous, as "the global corporation operates with resolute constancy – at low relative cost – as if the entire world were a single entity". Dicken (1992) attributed this phenomenon to the possibilities arising from modern communications and transportation technology, arguing that globalisation is very much a late 20th Century phenomenon, being "a more complex form of internationalization which implies a degree of functional integration between internationally dispersed economic activities".

This vision, of a world being rendered increasingly global by the changing pace of modern technology, has been written about in many different ways. Some authors argue that globalisation and the spread of multinational firms are not merely resulting in an international diffusion of technology, best practices, or production, but possibly instigating a convergence of national business cultures (Mueller, 1994). "Increasingly", as was argued by Dunning (1981), "the world is becoming a large marketplace with the interpenetration of national markets by international production, supplementing, and in some cases replacing, that of trade".

Thus globalisation is also seen to allow a firm to transcend its domestic limitations: "globalization of industry decouples the firm from the factor endowment of a single nation" (Porter, 1990). In a global market, industry competitive advantage derives from the integration and co-ordination on an international scale of the various activities of the value chain, while in multi-domestic markets the competitive advantages are specific to each country and different local strategies are adopted (De Toni *et al.*, 1992). Interest in this began to pick up in the early 1980s, and this may be

attributable to the decline of US manufacturing dominance compared to Japan. Another reason is market size theory. As the case of the airline industry illustrates, it is necessary to operate on a global scale as even the global market itself is too small to support more than a handful of manufacturers. Some of the theoretical advantages of manufacturing on a global scale are:

- The effective utilisation of scale economies.
- The concentration of learning in one plant or a number of plants.
- The integration of operations.
- The co-ordination or the concentration of activities to support production and product development.
- The use in general of world-class manufacturing policies.

As Porter (1990) has remarked, the increased "globalization of industry decouples the firm from the factor endowment of a single nation".

Implications of globalisation

Compared to traditional internalisation or domestic strategies, three paradigms in global strategies appear to emerge as far as company performance and behaviour are concerned:

(a) *Cost and time compression.* Reduction in costs in the operation chain and compression of time garner competitive advantages in price, product innovation and service. These arise from economies of scale, the integration of comparative advantages gained through multi-national location and the use of management systems and information technologies to make the operation flow "lean".

(b) *Agreements and coalitions.* These are vital in order to reduce innovation and research, design and development (RD&D) times, to reduce risk, and to create better economies of scale.

(c) *Transference.* The transfer of know-how, experience/learning, managerial skills and invisible assets are more easily obtainable by firms with a global strategy.

Handfield (1994) argues that – while global sourcing is not a requirement in all situations – in the case of firms facing significant forces of competitive performance improvement, globalisation can affect all firms regardless of size. Despite this, some of the underlying assumptions of the globalisation paradigm need to be questioned:

- Sourcing globally should not be framed purely in terms of cost savings, since quality, product, or process technology may constitute more important factors.
- Domestic sources have an advantage in terms of delivery performance and communications, which is of particular importance to a customer employing JIT techniques.

Trust is also an important factor, and even if a firm has built long-term relationships with overseas suppliers and has developed trust through communication and experience, many firms will still trust domestic suppliers to a greater extent.

Globalisation and the automotive industry

It can be argued that companies such as the Ford Motor Co. have been "the impetus behind a disproportionate share of today's globalization activity" (Fitzgerald, 1996), with initiatives of the form of *Ford 2000*. By deliberately co-ordinating not only its own activities on a global level (e.g. assigning design, manufacturing, parts, and service operations for different models to different regions), such a company will have a similar effect on its supplier base. In this particular instance, to qualify as a 'full service supplier' to Ford, a tiered supplier would need to possess a global manufacturing presence.

Thus it is the globalisation of the car assembler/manufacturer that serves to bring about a greater internationalisation of the automotive supply base (Cusumano and Takeishi, 1991). One such example would be that of GKN Hardy Spicer, which followed Ford to the USA in order to supply constant velocity joints. "To provide multinational car customers with local support in terms of security of supply and

logistical benefits such as just-in-time, many component companies have thus also had to become multinational" (Carr, 1993:556).

Alternative approaches to globalisation

The argument has been put forward by Morrison *et al.* (1991) that, "The move toward the globalization of competition was paralleled in the latter half of the 1980s by a dramatic upsurge in regional competitive pressures". Furthermore,

- Industry standards remain diverse.
- Customers continue to demand locally differentiated products.
- Being an insider remains critically important – e.g. the case of Inmos, where a UK chip manufacturer noted that Silicon Valley manufacturers were preferred.
- Global organisations are difficult to manage.
- Globalisation often circumvents subsidiary competencies.

The question of regionalisation

One of the most important developments underlying this was the formalisation of trading blocs. By 1991, 21 of the 22 richest industrialised nations in the world – Japan being the exception – belonged to regional trading groups. However, Japanese investment in the Pacific Rim increased dramatically, reaching some 14 times more than the United States that year. Trade within Pacific-Asia is growing at an annual rate of 30%, and regional trading agreements are underway.

It has been suggested that regionalisation is a stepping-stone to more effective global competition, as researchers have found that:

> Although the majority of the organizations we visited had developed a strategic global supply chain vision, not all had the necessary management structures and systems in place to fulfil that vision. Furthermore, many companies had not really

> thought about how to configure their supply base to take advantage of local supplier capabilities, while leveraging the knowledge and capabilities of global suppliers.
> (Handfield and Krause, 1999:146)

In the work reviewed, the findings were that regional strategies were increasingly providing the primary determinant of competitive advantage. According to the majority of companies surveyed, managers were finding that regional competitive pressures were superseding those towards globalisation (Morrison *et al.*, 1991).

The same research found that home-oriented parents and subsidiaries – whether in Europe, North America or Japan – were pressured to become more regionally focused or face a competitive disadvantage, even in so-called global industries. To the majority of companies studied, regionalisation represented a compromise between the traditional strategies adopted by miniature replica subsidiaries and the global strategies currently being advocated. Furthermore:

- Regional production facilities have proved to be as scale-efficient as global ones (whilst allowing easier tailoring product features to local demand).
- The company is thus better able to maintain an insider advantage (one of the reasons for FDI cited by the Japanese).

However, as Julien *et al.* (1994) have commented, little research has been undertaken into the globalisation of the economy with regard to its effects on small businesses, with the exception of those situated in the border regions.

A decentralised global corporation is also best placed, as some might argue, to take advantage of the differing circumstances of operations within its host nations. Ogbuehi and Bellas (1991), considering the implications of such a strategy for R&D and product development, concluded that not only would dispersion of development facilities allow the targeting and tailoring of products for specific markets, but that this would provide an important source of technological innovations and new product development for global operations. These potential benefits were seen to outweigh the possible costs, such as the duplication of functions and activities through a lack of integration.

Scully and Fawcett (1993) found in their survey of 103 American firms that global manufacturing strategies were adopted by firms of all sizes, and that it was the level and structure of industry competition – rather than firm size – which drove firms towards a global outlook. Firms that manufactured abroad also tended to operate in three main regions: Europe was the most popular, due to a large consumer market and low-cost labour in regions such as Greece and Portugal; followed by Pacific-Asia (an area of traditionally low labour costs); and finally Mexico and Canada (geographically proximitous and also a source of low-cost labour). However, such strategies were not pursued simply to obtain lower labour costs, as logistics considerations and the 'rationalisation' of manufacturing were also important.

While there exists a sizeable body of research concerning the differences in national culture and the implications of this, e.g. for new product development (Nakata and Sivakumar, 1996), there is a contrasting school of thought in which the three large trading blocs of Europe, North America, and Pacific-Asia are treated as a single entity: the 'Triad'. Ohmae (1985, 1989) is perhaps the most vocal exponent of this phenomenon, arguing that, moreover:

> Whatever their nationality, consumers in the Triad increasingly receive the same information, seek the same kinds of life-styles, and desire the same kinds of products. They all want the best products available, at the lowest prices possible. Everyone, in a sense, wants to live – and shop – in California.
>
> (Ohmae, 1989:144)

Thus Ohmae sees the Triad nations as becoming increasingly similar from a cultural viewpoint, in addition to the high levels of trade and foreign direct investment conducted between them. Indeed, the significance of the Triad nations should not be understated, according to Rugman and Verbecke (1990), as the largest 500 MNEs all stem from Triad nations. In terms of foreign direct investment, the Triad nations accounted for 81% of the total world outward stock of FDI in 1989, compared to their corresponding 47% share of world exports ("Foreign Investment and the Triad", 1991). Furthermore, Rugman (1981) argued the case for the future economic prosperity of the North American nations being dependent on the formation of a formalised trading bloc similar to that developing within Europe (as has since

happened with the United States, Canada, and Mexico joining together under NAFTA).

The 'world-economy'

An alternative commentary on the rise of 'hubs' of industrial manufacturing has been proposed in the form of a narrative of historical development. Notable exponents of this alternative paradigm, of a 'world-economy', have included Wallerstein (1979) and Braudel (1984) in their historical analyses of the emergence of the capitalist mode of production:

> The modern world-system is a capitalist world-economy, whose origins reach back to the sixteenth century in Europe. Its emergence is the result of a singular historic transformation, that from feudalism to capitalism. This capitalist world-economy continues in existence today and now includes geographically the entire world, including those states ideologically committed to socialism.
>
> (Wallerstein, 1979: no pag.)

As may be seen from Wallerstein's description, the discourses surrounding this model of the world-economy are couched in terms of political and economic power. The implications of this will be explored further in *Chapter 5: Researching a Modern Motor Industry*. However, this model is used to explain the formation of "core economies", surrounded by their geographically proximitous and dependent "semi-periphery" which is itself surrounded by "periphery" nations, comprising those which appear "backward" and "archaic" to the others.

Implications for trade and investment

The previous two models would suggest, that for the investment interests pursued by MNEs, 'core' nations would be most concerned with firstly *other* 'core' nations, then those falling within their 'semi-periphery' (Livingstone, 1989; Ohmae, 1985). Papanastassious and Pearce (1991) concur in this view, having noted increasing FDI into the European mainland from the UK.

Table 3. Registered or operational foreign direct investment in Eastern European nations in terms of the percentage of foreign projects by source as of the period given (after Dunning, 1993b)

	Czechoslovakia (March, 1991)	*Hungary (January, 1990)*	*Poland (January, 1990)*	*Russia (October, 1990)*
Western Europe	88.6%	77.8%	81.2%	60.8%
North America	1.8%	7.0%	8.4%	13.4%
Japan	0.0%	0.3%	0.1%	1.8%
CMEA economies	5.2%	N/A	1.5%	7.7%
Developing nations	1.3%	1.5%	2.0%	9.9%
Unclassified	3.1%	13.4%	6.8%	6.4%
Total projects	*228*	*582*	*911*	*1884*

In the case of Western European FDI in general, Dunning (1993b) has suggested that Eastern Europe and Russia would be potentially vital markets and manufacturing locations for Western European firms. As may be seen from *Table 3* (above), this theory appears to be supported by the strong bias towards Western European nations as sources of foreign direct investment.

Similar arguments may be made for the influence of Japanese FDI in Pacific-Asia (Dunning and Narula, 1996; UNCTC, 1991) and for North American FDI in South America (Dunning, 1993a).

Chapter 3: An Age of Alliance Capitalism

Introduction

As has been explored in the earlier chapters, the combination of global supply and demand pressures on competitiveness has caused firms, particularly large multinational firms, to reconsider both the scale and scope of their in-house value-adding activities. Indeed, as Turnbull *et al.* (1993) have put it, the automotive industry has experienced several "phases" of development throughout the 20th Century. These have encompassed a change from custom-building to mass production around 1910, the combination of mass production and product differentiation in the 1950s, and a period of "unprecedented change" in the 1980s and 1990s. It is this latter period that is to be investigated here, in particular in terms of the following developments:

1) A fairly general movement by firms towards the shedding or disinternalisation of activities both along and between the value chains.
2) A specialisation in those activities that require resources and capabilities in which firms already have (or can acquire) a perceived competitive advantage (Jaguar, for example, identifies its advantages as being in design and engine manufacture, and therefore chooses to outsource parts other than the body and engine).
3) In order to retain some measure of control over and access to these relinquished products or services, firms frequently replace disinternalisation with controlled inter-firm co-operative arrangements (in the automotive industry, the relationship between the automotive assembler and supplier subcontractor frequently relies on the subcontractor for design. Some 85% of BMW's components are both sourced and designed out of house).

The use of these particular strategies is considered in greater depth in this chapter, as well as the technological and organisational developments associated with them.

Outsourcing core competencies

One popular description of these pressures and processes can be found in the core competency model proposed by Prahalad and Hamel (1990), who cited the case of NEC during the 1980s. NEC had emerged as the world leader in semiconductors, and was among the first rank in telecommunications products and computers, through the development of its core products and core technologies. These necessitated the use of myriad strategic alliances (over 100 by 1987) aimed at building competencies rapidly and at low cost. As NEC's director of research summarised: "From an investment standpoint, it was much quicker and cheaper to use foreign technology. There wasn't a need for us to develop new ideas."

Reference can be made here to Freeman and Hagedoorn (1992), who traced 4,192 similar alliances between 1980 and 1989, and found that:

- 42% were organised through R&D pacts
- 90% were between companies from the Triad
- 63% were formed during the second half of the 1980s
- The majority of the alliances involved large firms competing as oligopolies in global markets

Clearly, the advantages of such a shift from a centralised, vertically integrated form of mass production to decentralised outsourcing can be beneficial to a firm. Gupta and Zhender (1994) couched the argument in terms of a shift from high volume to high value, suggesting a typology of different forms of outsourcing that included:

- *Secondary services and contingent workers*, where a firm manufactures its products from start to finish, but contracts out non-essential services (e.g. cafeteria) and hires temporary staff to meet peak demand.

- *Subsidiary networks*, in which a large firm disintegrates its hierarchical structure into separate business units to become more flexible, efficient, and innovative, as IBM famously did in 1980 in order to compete better with its more entrepreneurial rival, Apple.
- *Collaborative relationships with competitors*, where two organisations pool their resources for a specific task.
- *Outsourcing all but the "core" advantage*, in which outsourcing is taken to an extreme and the organisation involved focuses on a specific advantage while relying heavily on a variety of other firms for product innovation (e.g. MCI focusing on delivering telecommunications packages, with outside firms providing practically all the services).

As can be seen, outsourcing may be taken to a variety of degrees, and by extension, involves a variety of different levels of collaboration and mutual dependency between firms. Within the British automotive industry, car assemblers range from companies like Ford, which still manufactures key components in-house, to specialists like Morgan, which buys in the greater part of its components, systems, assemblies, and sub-assemblies from other firms.

Strategic alliances

Ohmae (1989) suggested that the very act of globalisation mandated the formation of alliances between firms. Nohria and Garcia-Pont (1991) agreed, connecting the rise of strategic linkages (mergers, joint-ventures, alliances) within the world automotive industry with the increased globalisation of the industry throughout the 1980s, a process begun by the global oil crises of the 1970s and the Japanese 'threat' of the 1980s. This is in part due to the wish to maintain a competitive edge, such as NEC's use of alliances to build on its core technologies during the 1980s, but also in part in order to defray the fixed costs of production: the growing use of automation has caused the capital investment required (despite lowering the cost of the labour element), and research, design and development costs to 'skyrocket'.

Serving a global market, even if it is 'merely' the Triad, is therefore expensive, as even the building and maintaining of a brand name is in itself a large fixed cost. As technology in the automotive industry becomes increasingly complex, such R&D alliances are increasing in number. For example, Ford, General Motors and Chrysler had formed 12 different consortia by 1994 to avoid duplication of work by performing basic "precompetitive R&D" jointly (Bonk, 1996).

Alliances, however, differ from joint ventures (which result in new identities and shared ownership) in that alliance partners retain their identities while working towards common goals. Motives for forming such an alliance (Varadarajan, 1994) between firms that have complementary skills and resources include:

(a) Gaining access to new markets.
(b) Broadening their product line, or filling product-line gaps.
(c) Gaining a foothold in emerging industries.
(d) Joining entrepreneurial smaller firms with the reputations and resources of established organisations.
(e) Accelerating market entry by using the host partner's sales force, distribution infrastructure, and knowledge of local markets.
(f) Lowering manufacturing costs by sharing production facilities and manufacturing process experience, and exchanging technology.
(g) Enabling resource extension for smaller firms that lack the means for investment in research and product development.
(h) Enhancing skills through learning from alliance partners.
(i) Responding to shifts in customer buying patterns from the purchase of individual products to integrated systems.

The ABS & Brakes division of the automotive systems supplier Bosch alone, for example, employs 16,500 in 44 manufacturing locations around the globe, providing ABS systems for 220 different vehicles built by 56 manufacturers (Vasilash, 1998c). The two companies forming the LucasVarity partnership, a competitor to Bosch, saw their alliances and technology agreements with their Japanese customers and suppliers as a key means in building a stronger competitive position ("A Merger Strengthened", 1998).

In a reappraisal of the Eclectic Paradigm taking the above forms of alliance capitalism into account, Dunning (1995) reasoned that in hierarchical capitalism, market failure is ameliorated by the internalisation of various nations into the hierarchy of the firm. Thus collaborative arrangements are less fixated on reducing transaction costs than protecting – or gaining new – proprietary advantages. However, these alliances are also aimed at lowering transaction costs, developing new skills and overcoming or creating barriers to entry in national or international markets.

The pressures of globalisation, according to Dunning (1995), have therefore resulted in firms striving to raise efficiency, to innovate new products successfully, and to upgrade skills and assets throughout the value chain. These responses may be grouped as:

- *"Concentrate on critical competency response"* – the shedding or disinternalisation of activities along and between value chains, and moving towards specialisation of activities in which the firm has (or may acquire) a competitive advantage.
- *"Asset-seeking alliance response"* – the operational participation, complementarity, shared learning and an encapsulation of the innovation time span by firms through, for example, RD&D pacts.
- *"Market-positioning alliance response"* – widening up the markets for core products, gaining entry to new markets, improving access to existing markets. Particularly popular among firms with Japanese partners.

The above trends and driving-forces may be integrated into the Eclectic Paradigm in a similar way to the earlier, hierarchical view of the firm.

I. *Vertical alliances.* These involve backward access to R&D, the design engineering, and training facilities of the suppliers. They furthermore require regular input from suppliers on problem solving, product innovation, and the consequences of projected new production processes for component design

and manufacturing. Thus the parent company gains new insights into (and the monitoring of) materials development and how this might impact on existing products and production processes.

II. *Forward access* to industrial customers, new markets, marketing techniques and distribution channels, particularly in unfamiliar locations or where products need to be adapted to meet local supply capabilities and markets. Such closer proximity gains a company customer advice on product design and performance, and help in strategic market positioning.

III. *Horizontal alliances.* These give a company access to complementary technologies and additional innovatory capacity. These additional capabilities allow the company to benefit from a fusion of different technologies and to identify new uses for related technologies through the encapsulation of learning and development times. Such inter-firm interaction often generates its own knowledge feedback mechanisms and path dependencies.

IV. *Networks of similar firms.* These reduce transaction and co-ordination costs and offer a greater capacity to disseminate of knowledge and information through the mutual support and co-operation between members of the network. This additionally grants improved knowledge about product development and markets, multiple complementary inputs into innovatory developments and exploitation of new markets, and access to embedded knowledge of members of the network. This gives a firm the opportunity to develop "niche" R&D strategies, and share learning and training experiences (e.g. as in the case of co-operative research associations). Networks may also help to promote uniform product standards and other collective advantages.

V. *Business Districts.* These grant the same advantages as vertical alliances (see I. Above) as well as spatial agglomerative economies (e.g. labour market pooling), i.e. access to clusters of specialised intermediate inputs, and linkages with knowledge-based institutions (e.g. universities, technological spill-overs).

While, in some cases, time-limited inter-firm co-operative relationships may be a substitute for FDI, in others, they may add to the internalisation-incentive advantages of the participating network hierarchies, R&D alliances and networking which may help to strengthen the overall competitiveness of the participating firms. Moreover, the growing structural integration of the world economy requires firms to go outside

their immediate boundaries to capture the complex realities of know-how trading and knowledge exchange in innovation, particularly where intangible assets are tacit and need to adapt competitive enhancing strategies to structural change speedily.

Alliances or network related advantages are those that prompt a "voice" rather than an "exit" response to market failure; they also allow many of the advantages of internalisation without the inflexibility, bureaucratic or risk-related costs associated with it. Such quasi-internalisation is likely to be most successful in cultures in which trust, forbearances, reciprocity and consensus politics are at a premium. It suggests that firms can be likened more appropriately to archipelagos linked by causeways rather than self-contained "islands" of conscious power. At the same time, flagship or lead MNEs, by orchestrating the use of mobile firm-specific advantages and immobile advantages, enhance their role as arbitrageurs or complementary cross-border value-added activities. However, there are some concerns that these necessary changes, giving what Helper refers to as greater "voice" to suppliers, were exaggerated, with the automotive assemblers dominating the relationships (Helper, 1994).

The location-specific advantages of alliances arise essentially from the presence of a portfolio of immobile local complementary assets, which, when organised within a framework of alliances and networks, produce a stimulating and productive industrial atmosphere. The extent and type of business districts, industrial or science parks and the external economies they offer participating firms are examples of these advantages which, over time, may allow foreign affiliates and cross-border alliances and network relationships to better tap into, and exploit, the comparative technological and organisational advantages of host-countries. Networks may also help to reduce the information asymmetries and likelihood of opportunism in imperfect markets. They may also create local institutional thickness, intelligent regions and social embeddedness (Armin and Thrift, 1994).

The importance of this is observed by Swamidass and Kotabe (1993), who note that inter- and intra-company trade by multinational firms represents a sizeable part of international trade. In 1988, intra-firm trade accounted for 30% of US exports and 40% of US imports. Similarly for Japan and Western European nations, intra-firm transactions accounted for approximately 30% of their trade flows.

In considering the problems faced by international sourcing and corresponding supply chain stability, Levy (1994) argues that to focus purely on cost savings is myopic, citing the example of a Californian computer systems manufacturer's estimate of the extra costs involved in sourcing computer systems for the US market from the company's assembly plant in Singapore (see *Table 4* below).

Table 4. Incremental cost of sourcing from Singapore compared to California, as percentage of cost of goods sold (after Levy, 1994)

Activity	*% of value*
Transportation (by sea)	0.8%
Inbound Freight and Duty	-2.5%
Inventory Carrying Cost	1.4%
Duty on Finished Goods	4.0%
Total	*3.7%*

Although the additional 3.7% cost of sourcing from Singapore was very low compared to the savings available from Singapore's lower wages and overhead (estimated at 15% of the cost of goods sold), the company experienced much higher costs than these due to fluctuations in the supply chain. Sharp and unpredictable fluctuations in demand, for example, forced the company to use air freight frequently to expedite deliveries, a recourse that itself caused further oscillations in the 30-day lead time required for conventional shipping by sea.

Component sourcing strategies

In the case of firms within the automotive industry, alliances and partnerships have had a large impact on the way in which suppliers operate. Lean manufacturing systems, such as JIT – rather than the use of any advanced technologies such as CNC machine tools – have, for instance, allowed Delphi Automotive Systems' brake components manufacturing facilities in France to achieve noticeably higher efficiency levels than the company's North American plants (Winter, 1998). Although this is a

single recent example, productivity gains throughout the 1980s and 1990s have been notable.

As suggested earlier, a variety of different forms of alliance strategies are employed by automotive firms. Two of the most common in this industry are 'network' (in particular among Tier-2 and Tier-3 firms in Europe) and 'partnership' (more common among car assemblers and Tier-1 suppliers).

Network-based strategies

In the supply chain systems within the glass and clothing sectors in Italy, De Toni and Nassimbini (1995) identified two distinct forms of product structure: an 'articulated pipeline' as used in the production of glass, and a 'linear pipeline' as used in the production of clothing (see *Figure 4* below). In these systems, the 'core-firm' is defined as one within a supply chain that contracts external units to product parts of the finished product and manages the outward flow of goods. In the automotive industry, such a 'core-firm' could be either a car assembler or a Tier-1 supplier.

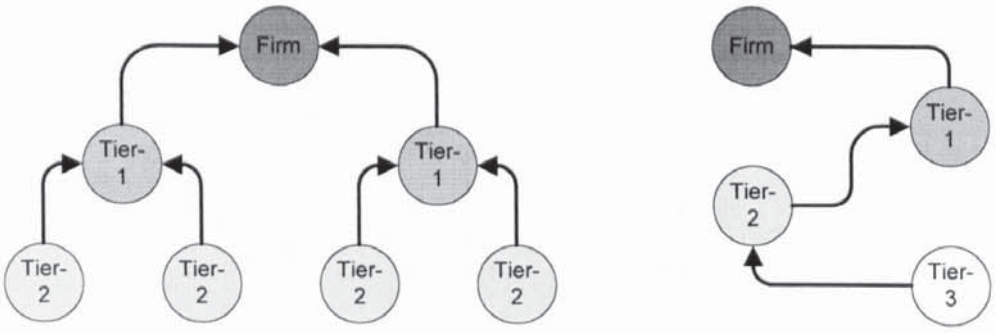

Figure 4. An 'articulated pipeline' (left) compared to a 'linear pipeline' (right), after De Toni and Nassimbini (1995)

The end product in the glass industry is the result of the assembly of separately manufactured components (i.e. an articulated product), whereas the end product in the clothing industry is the result of a series of phase transformations. With increased co-operation (i.e. networking) between the various firms, the supply chains in both instances could be re-drawn as in *Figure 5* (below).

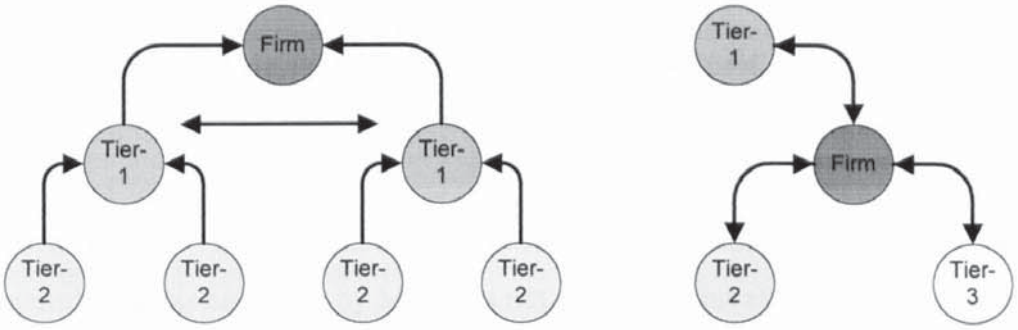

Figure 5. Changes brought about by networking in an 'articulated pipeline' (left) compared to a 'linear pipeline' (right), after De Toni and Nassimbini (1995)

A parallel may be drawn with the automotive industry, as while a traditional situation (as logically follows from the disintegration of a highly vertically-integrated industry once epitomised by Ford and General Motors in America) envisages the transformational, linear chain, the articulated model is perhaps more applicable now.

In considering how such a network-based approach might be compared with a more 'traditional' centralised/decentralised manufacturing network (e.g. the operations of Ford UK, Ford Europe, and Ford America with the proposed global structure), Malnight (1995) has taken an evolutionary perspective in order to investigate *how* established MNEs undertake this shift. Malnight concludes that such changes are gradual, arising out of a reaction to external events as opposed to being part of a rationalised programme of change. These distinctions can be seen in *Table 5* (overleaf).

Table 5. A comparison of decentralised and network based models of the MNE (after Malnight, 1995)

	Decentralised models	*Network-based models*
Market orientation *(Strategy)*	Overseas operations as portfolio of independent businesses	Integrated world-wide strategy, with differentiated contributions by dispersed operations
Resource configuration *(Where resources are located)*	Decentralised and nationally self-sufficient	Distributed, specialised, and interdependent resources and capabilities
Organisation *(How activities are linked)*	Informal headquarters-subsidiary relationships overlaid with simple financial controls	Complex process of co-ordination and co-operation in an environment of shared decision making

Thus in the view of Malnight (1995), the formation of strategically-dispersed manufacturing networks by MNEs is not so much a break with previous models, as an ongoing evolution as the firms involved seek to derive greater efficiency savings out of their multinational structures.

Extreme forms of network alliances

As noted above, firms within the automotive industry employ a wide variety of alliances. Millington *et al.* (1998), for example, suggest that motor component manufacturers may choose to service car assembly plants through decentralised production in local assembly units (LAUs) located close to the assembly plant. Such facilities were found to offer significant reductions in transport costs and improved delivery reliability, as well as being able to take on some assembly tasks devolved to them by the original OEM plant.

Indeed, such a form might be seen as part of a spectrum of 'post-JIT' supply relationships: Collins *et al.* (1997) describe an alternative approach to outsourcing, namely that of "modular consortia". In such a situation, as typified by Škoda and Volkswagen, Tier-1 suppliers assemble modules on the automotive assembler's production line – activities that go beyond both JIT and LAU operations (see *Table 6* overleaf).

Table 6. Basic features of each approach (after Collins et al., *1997)*

	Just-in-time	*Integrated supply*	*Modular consortia*
Suppliers	Several	Tier-1	Co-investors
Location	Proximate, with geographic separation	On-site with no geographic constraint	On-line, with no geographic constraint
Relationship	Independent	Independent	Dependent
Logistics	Effect co-ordination	Increasing efficiency	Increasing efficiency
Flexibility	Possible to reconfigure	Limited ability to reconfigure	Limited ability to modify partnership

Network-style supply relationships, as has been argued here, appear to be in transition: JIT might have constituted the great revolution of the 1980s, but towards the end of the 1990s even closer forms appear to be evolving.

Networking in the Russian aerospace industry

An example showing the changing nature of a manufacturing network might be found in the Russian aerospace industry. Shaw (1996), researching this in the post-Perestroika era, noted that, prior to August 1991, this industry had been characterised by a centrally administered innovation system and had benefited through the dominance of the military in resource allocation in an otherwise 'shortage' economy. This network, focusing on the aircraft design bureaux, had also included the ministry of defence, manufacturing plants, research institutes, specialist universities and testing centres, and the Aircraft Certification Authority. Following Perestroika, this network faced considerable change (due to the need for new customers, international certification, and western collaboration, as well as encountering supply chain disruption and a funding crisis) and also included new actors (such as new customers, financiers, the Department of Aviation Industry, the International Certification Authority, the ICAO, and 'nearest and furthest abroad' subcontractors).

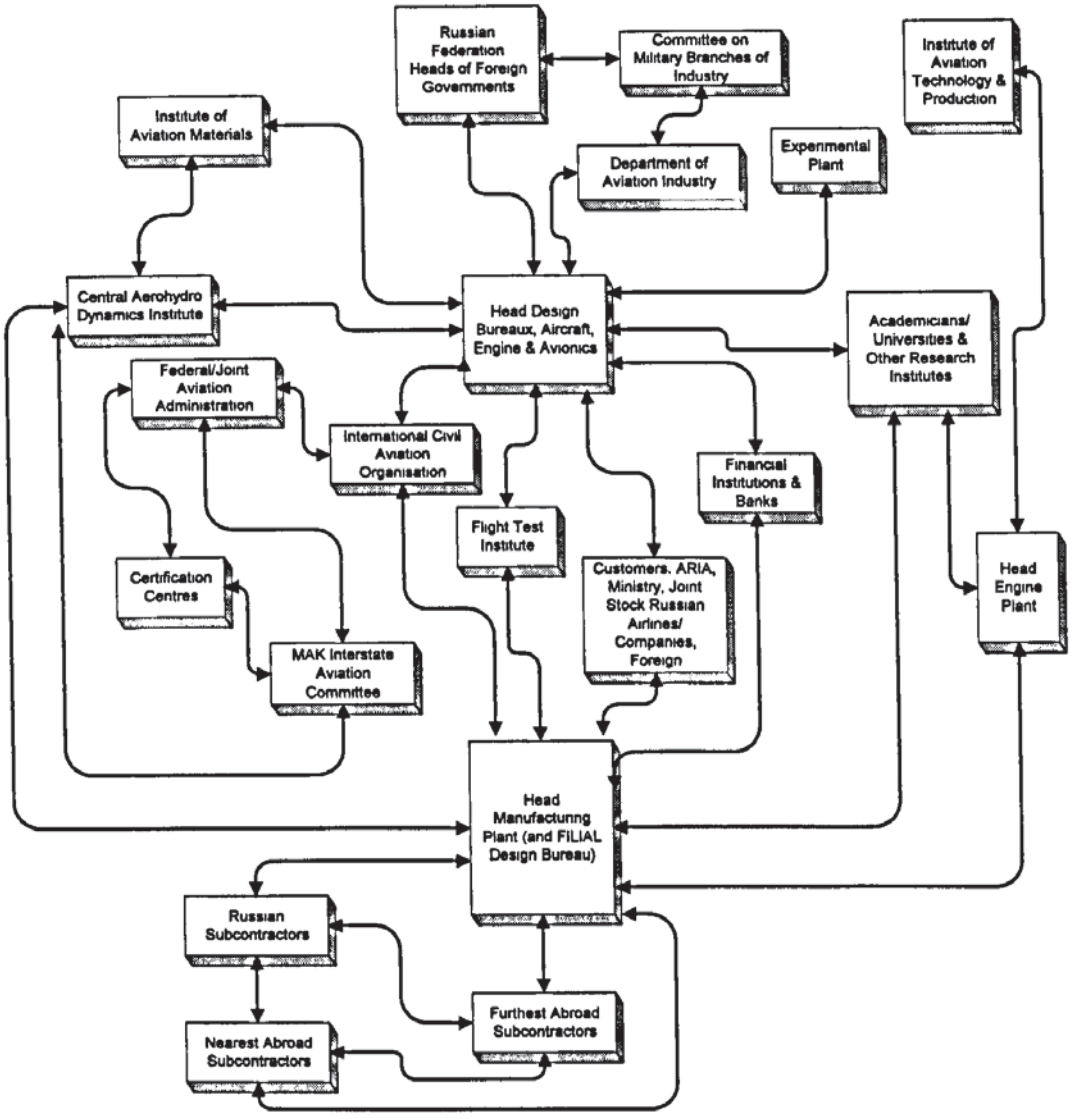

Figure 6: The network of actors involved in the design, development, and manufacturer of aircraft in the Russian aerospace industry (after Shaw, 1996)

Such a complex web of operational involvement between a great variety of different firms (see *Figure 6* above) forms what Shaw describes as "stable innovation... [An] 'enclave of competence in a congealed system' in terms of aircraft design, development and manufacture" (Shaw 1996:264). The addition of the new elements is seen as bringing new skills, finance, and customers to an already successful industry, and therefore the management of this network is mostly to ensure continuity and protection of the existing store of knowledge through the retaining of key actors within this.

Benefits of the new alliances

An alternative view of these new manufacturing alliances focuses more on the relationship aspect, and thus suppliers are seen more as partners in the manufacturing process. Cusumano and Takeishi (1991), in exploring product development by this type of supplier, categorise the role of such firms into three modes:

1) Suppliers that develop parts on their own as standard products (supplier-proprietory parts).
2) Suppliers that do the detailed engineering for parts based on functional specifications provided by their customers (black-box parts).
3) Suppliers that produce parts developed by their customers (detail-controlled parts).

To this might be added a fourth classification – that of parts co-developed between two or more firms (partnership-developed parts) – as such forms appear to be increasingly common among the Tier-1 and 2 suppliers and their car assembler customers. The development of parts in such a fashion might occur through the sharing of personnel (e.g. Siemens maintains daily contact with its major customers through assigning resident engineers to them, according to Trunick, 1997), and the term 'part' appears to be becoming outdated as the major suppliers develop 'systems', 'sub-assemblies', or 'modules'. Indeed, a "Global Development Benchmarking Study" (conducted by KPMG Consulting together with ACG during 1997-8, and involving 150 automotive suppliers in North America and Europe) found that OEM suppliers to the automotive manufacturers were themselves requiring their own suppliers to manufacture more fully-assembled or modular systems, in addition to taking on a greater responsibility for their supply chains ("Auto Suppliers Handle More Design Tasks", 1998).

For example, a supplier might supply a 'corner module' that integrated suspension and braking components, thereby cutting costs by up to 20%. One such supplier, TRW, supplied its first modular suspension to the Rover Group in 1989, an innovation that at the time helped Rover to nearly double its labour productivity and

to cut floor space by 60%. From model year 2001, TRW is expected to supply similar corner systems modules to an upcoming Chrysler Jeep platform, with an option for Chrysler to choose a brakes supplier for TRW to additionally source and integrate the braking system into the modules (Murphy, 1998b). Similarly, Visteon, a manufacturer of automotive instrument panels, interiors, and vehicle systems, operates four manufacturing plants within the UK and serves a mainly European customer base dominated by Ford, having moved from supplying components to supplying systems (Whitworth, 1998).

An even more extreme case might be that of Dana Industria Ltda., a Brazilian operation of the American Dana Corp., which went from supplying only components and sub-systems to supplying an entire rolling chassis for the local Chrysler Dodge Dakota pickup truck production line, i.e. 30% of the cost of the vehicle (Teresko, 1998). Within the same region, other car assemblers (i.e. Ford, Volkswagen, and General Motors) are pursuing similar strategies, featuring not only extensive use of supplier-built modules but even parallel manufacture of components by suppliers within the same factory as the car assembler ("Ford's New Brazil Plant", 1998).

As automotive technologies change, it may be argued that an increasing number of systems and modules may need to be outsourced by both the car assemblers and their Tier-1 partners. Already, companies are having to co-operate with non-mechanical engineering partners in order to develop catalytic converter systems (chemical engineering), fuel injection systems (industrial control), and engine management systems (electronic engineering) – all of which are high-value systems that the car manufacturer/assembler is unable to manufacture in-house. The automotive semiconductor content alone is expected to reach £8 billion by the year 2000, with the automotive electronics themselves expected to pass £33 billion. 'Electronification' – the replacement of traditional mechanical components with electronics – is gaining momentum, with such innovations as 'mechatronics', in which a previously separated electronic control is consolidated with a mechanical item such as a motor or ignition coil (Tam, 1998). Indeed, the demand for automotive electronics is expected to rise faster than that for most other light-vehicle components ("Automakers", 1998).

A related problem is that, as car manufacturers/assemblers expand existing manufacturing operations into new countries and markets, the need to bring their existing major suppliers along with them is rising. For example, key suppliers being drafted into production in China include Ford's Visteon and General Motor's Delphi Automotive Systems, as the rising numbers of private cars on the roads necessitate the introduction of catalytic converter technology through yet another series of supplier joint-ventures (McClellan, 1998). Not only is the manufacture of such devices beyond the in-house capability of the car assembler, but the very knowledge base is from a completely different industry.

Jaguar and its role within the Ford conglomerate

One example of a fairly independent conglomerate of automotive end-assemblers is the Ford group of companies. Although the Jaguar and Aston Martin divisions are nominally run by Ford, they in fact enjoy considerable autonomy. After all, a large part of the identity – and therefore competitive edge – of these two firms lies in their marque, a fact that Ford has recognised, pursuing a policy aimed at preservation. "Jaguar must stay green", as one manager explained, alluding to the general policy by associating it with the brand image (just as Ford uses a specific shade of blue for its branded products, so Jaguar employs a specific shade of green). To have relocated Jaguar production to Detroit would have negated this, meaning that Jaguar's existing West Bromwich, Browns Lane, and Whitely facilities were retained, expanded, and made available to the group (e.g. the testing facility at the Whitely design plant being used by Ford).

In practice, Jaguar and Aston Martin have benefited from considerable capital investment (such as help in developing and expanding the new model ranges, and the new production lines at the Browns Lane plant in Coventry), while being able to draw on the parent group when needed (e.g. reducing production costs by sharing parts across companies, and using Ford's considerable purchasing power as a lever when dealing with much larger suppliers). This did not necessarily involve the parent

company directly, as the Aston Martin DB7 model was based on a Jaguar XJS chassis and even manufactured on the (superseded older) line.

New manufacturing technologies

In addition to the new manufacturing alliances and partnerships, so there are a number of new manufacturing techniques and technologies. Rather than forming a separate phenomenon, these appear to be interlinked with the relationships: networking in particular (see *Chapter 4: The Distinctiveness of Small Firms*) is frequently linked with flexible manufacturing and advanced manufacturing technologies. Indeed, to quote an UNCTC report,

> There is substantial evidence regarding the superiority, rapid diffusion and mutual reinforcement of the new flexible manufacturing technologies and the new mode of production organization. The two combine in unpredictable ways in different firms and economies. As the broad outlines and principle features of the new system now are becoming clear, it is likely that they will fundamentally influence international competition and economic development in the coming decades.
>
> (UNCTC, 1990:2)

The diffusion of these new manufacturing technologies has had a noticeable effect:

- Sales of computer-assisted design (CAD) systems grew at an annual rate of 85% between 1978 and 1982, and by 1989 an estimated 27,000 systems were in use around the world.
- The total OECD stock of industrial robots grew from a few hundred in 1974 to over 100,000 in 1986.
- MNEs accounted for the bulk of the use of both commodities, in 1982 in the US alone accounting for over 70% of CAD and numerically-controlled machine tools.

Others concur, such as those employing the argument that:

> Progress in human society has been accomplished by the creation of new technologies. The last few years have witnessed unparalleled changes throughout the world... Customers now prefer a large variety of products. This phenomenon has inspired manufacturing firms to look for progressive computerized automation in various processes. Thus mass production is being replaced by low-volume, high-variety production.
>
> (Sambasiva Rao and Deshmukh, 1995:43)

Beatty (1992), however, warns that only half of companies implementing advanced manufacturing technology, such as CAD/CAM and flexible manufacturing systems, succeed in reaching their goals, as the technology in itself is insufficient: it needs to be embraced throughout the company culture.

Defining the 'new manufacturing technologies'

Sánchez (1991) suggests grouping the various forms of advanced manufacturing technologies (AMTs) in an evolutionary, historical context. Numerically-controlled machine tools (NCMTs), he argues, are undoubtedly the most mature. Although these were developed at MIT in the 1950s, they did not come into common use until the 1970s. Flexible manufacturing systems (FMS) – which essentially consist of a set of NCMTs together with automatic tool changers, an automatic materials handling system, and a central computer – are considered to be a more recent technology, in that they did not become widely used until the 1980s. Together with computer-assisted design (CAD), computer-assisted manufacture (CAM), and computer-controlled machine tools (CCMTs), all of these technologies are nominally referred to as advanced (i.e. AMT). In the early 1990s, much was written on the benefits of integrating all of these into a single system, i.e. computer integrated manufacturing (CIM). Kaighobadi and Venkatesh (1994) expand on this typology, arguing that the definition of FMS further varies from source to source, alternatively referred to as computerised manufacturing system (CMS) and variable mission manufacturing (VMS).

The issue of flexibility

It has been argued – for example, by Mechlin *et al.* (1995) – that the exploitation of AMT can give firms a competitive edge in manufacturing in ways other than the economies of scale ascribed to mass manufacturing by large firms. Indeed, advantages arising from firm size have been queried by Jaikumar and Upton (1993), who argue

that since machines for many processes are now very flexible (in that they may be programmed to perform a wide variety of manufacturing tasks), it is now possible for a smaller firm to accommodate diverse product characteristics and provide both high quality and low cost at the same time. Furthermore, the authors maintain that broad diffusion and standardisation of this technology has made production capacity commonplace. Thus, the sourcing of the product becomes less relevant since, even for highly differentiated products (such as metal-machined parts or socks), quality – as well as cost performance – is consistent. The conventional wisdom that cellular/flexible manufacturing can only be applied to low-volume manufacture rather than to large production runs, has also been questioned (Vasilash, 1998a), as two Indiana supplier plants owned by Freudenberg-NOK demonstrate.

Indeed, it has been suggested that:

> Economic issues alone are inadequate to justify new manufacturing systems because traditional evaluation mechanisms are inadequate for that purpose. Non-economic benefits could not be included in the justification procedure, while the direct cost factors are insufficient to justify the AMT because AMT offers a large number of intangible benefits. The problem lies not in the level of technology, but rather in its implementation.
>
> (Sambasiva Rao and Deshmukh, 1995:58)

The example of Visteon Automotive Systems can be cited here. Visteon, an American systems manufacturer that is part of the Ford Motor Co. group, aimed to eliminate the disruptions caused by expediting orders (a common occurrence, when a customer requires an order prior to the arranged delivery date, and the manufacture schedule is thus disrupted) through lean manufacturing (Vasilash, 1998b). The company effectively moves away from mass production and automated production lines, towards a one-piece flow (i.e. a batch that is fully processed within a specific cell or system – it is not moved between operations). Aside from the internal benefits of such a change (including increased cash flow, short lead times, short changeover times, low inventory costs, low floor space requirements, and the assignment of personnel to where they can add the most value), Visteon enumerated three drivers that hold true for any supplier:

1) Technology advances require responsive production systems.
2) An expanding customer base requires flexibility.

3) Customer demand has shifted to low-volume niche products.

Thus, in the view of Visteon, the use of such systems is becoming inevitable as the nature of the industry and its dominant technology changes over time.

Flexibility as a manufacturing objective

Suarez *et al.* (1995) would alternatively argue that there have been three main "strategic imperatives" emerging throughout the 20th Century: strategic management in the early part of the century, followed by quality (as expounded by W. Edwards Deming in Japan), and finally flexibility in the 1970s and 1980s, as a reaction to increasing market instabilities and global pressures. Flexibility differs from previous modes, according to Slack (1983), in that the cost element of a system's flexibility is seen as the cost of making the change itself rather than the cost of providing the capability to change. It is therefore argued that:

1) There are several types of flexibility – the ability to change product specification, volume of output, delivery performance and quality level.
2) Flexibility has three dimensions – the range of states a system can adopt, the cost of moving from one state to another, and the time taken to do so.

However, despite the fact that much has been written on flexible manufacturing systems in recent years (Suarez *et al.*, 1995), it has been argued that much of the literature remains theoretical, and managers attempting to implement such systems have little empirical research on which to base their decisions. Indeed, while Link and Quick (1994) acknowledge the existence of great interest in the 1990s towards new manufacturing technologies and techniques (FMS in particular), they have commented on a distinct lack of in-depth industry studies in the literature, despite an abundance of anecdotal evidence. The authors' own research, carried out within the US tooling and machining industry, however, had found that:

(a) Potential adopters should not restrict themselves to a single source of information concerning FMS.
(b) Overcoming the cost of FMS implementation presents a significant barrier to adoption, as well as to more extensive use of the technology.
(c) The benefits of FMS are myriad, and adopters should not expect primarily cost benefits in terms of saving labour.
(d) If the technology is well understood before it is adopted, then fewer organisation changes will be needed.

Indeed, one of the many variants of FMS, cellular manufacturing, appears to be gaining popularity among Tier-1 automotive manufacturers. One of the VarityKelsey-Hayes manufacturing plants in Fowlerville, Michigan, for example, employs 60 machining centres arranged in cells to manufacture ABS components (Vasilash, 1997a). Aside from its efficiency advantages over conventional transfer lines (i.e. 85% machine utilisation as opposed to 70%), the system would be able to run at 90% capacity if 10% of the cells were taken off-line due to maintenance, breakdown, or product change-over, whereas if a stage of a line went down, the entire production run would need to stop. A similar system of 9 cells was used in an Ontario plant for brake disc machining ("Vertically Integrated for Turning, That is", 1998). In addition, PK USA, a Tier-1 supplier of body parts, used a pair of multi-purpose robots to solve a production problem: a moulded polypropylene interior panel for an Isuzu sports model had been redesigned after PK USA had already produced the moulds for the part. Rather than go to the expense (£125,000) of redesigning the moulds, the company transferred a pair of robots from another application to the production line to make the necessary changes ("Robots Prove Time & Cost Efficient", 1998).

Mass customisation

Another way to consider the argument in favour of the new manufacturing technologies is as a paradigm shift, away from *mass production* and towards *mass customisation*. Pine (1993) defined the differences between the two as:

> In Mass Production, low costs are achieved primarily through economies of *scale* - lower unit costs of a single product or service through greater output and faster throughput of production process. In Mass Customization, low costs are achieved primarily through economies of *scope* - the application of a single process to produce a greater variety of products or services more cheaply and quickly.
>
> (Pine, 1993:43, italics in original)

The argument here is that advances in manufacturing and information technology (such as CAD/CAM, FMS) as well as new management practices (such as JIT and TQM) allow firms to pursue a policy of mass customisation in industries that would hitherto have incurred deterring costs in attempting to do so. Whether or not such a move represents a subsequent 'evolutionary stage' of the process of industrialisation, or is a move-specific occurrence (i.e. valid only for certain industries, or as one of many competitive strategies adopted by individual firms), is open to debate. Spina *et al.* (1996) similarly attempted to synthesise what they describe as the "post-Fordist experience". They suggest the creation of a multi-focused paradigm, based on the simultaneous implementation of strategic multi-focusedness, integration of business processes, and process ownership.

Others, such as Kotha (1995), disagree with the implicit assumption within these arguments that mass customisation and mass production are incompatible, citing the example of a Japanese firm, the National Bicycle Industry Company (NBIC), that decided to pursue both strategies simultaneously. NBIC, Japan's second largest manufacturer of bicycles, decided to run a second manufacturing plant, originally intended as a pilot plant, alongside its original manufacturing facilities. This second plant focused on mass customisation, directly contrasting with the mass production focus of the original facilities. This additional, smaller plant might at first seem superfluous – especially as a large part of its work lay in producing similar-model bicycles to those mass-produced next door – but NBIC found that this arrangement contributed in unexpected ways to the mass production heart of the business: the pilot plant served not only as a training ground for the main facility's assembly and engineering workforce, but also, on account of its closer links to the end customers and the high skill level of its engineers, contributed substantially to the accumulated knowledge of the wider firm. This accumulation of knowledge included production improvements, new product designs, and experience in using machinery a step ahead of that in current use in the main plant.

The "flexifactory" form of production used by Honda is a good example of a system of manufacture intermediate between mass production and mass customisation. The assembly lines, such as those for the Accord and Civic models in North America in 1991, permit a number of different models and variations on those models to be assembled consecutively (Mair, 1994). This is achieved through various different types of flexibility: flexible machines, flexible personnel, and flexible organisation; with the various national plans operating as part of a network.

A similar example may be drawn from the West Midlands, as Jaguar's Browns Lane plant manufactures the basic X300 model on a single assembly line. Each motor car in the line, however, is unique: the customer has already chosen and purchased the car, and thus not just its colour, trim and accessories, but its engine, gearbox, and associated sub-assemblies add another level of complexity. A black 'Daimler' saloon, with its characteristic wavy grille masking a V12 engine, might precede a racing green turbo-charged 'XJ Sport' model, and in turn a pearl grey 'XJ6' saloon, a basic model lacking an automatic gearbox as well as most of the standard fittings of the earlier two models.

The reduction of manufacturing costs

Given that over the last two decades production processes have become increasingly mechanised – through automation, robotics, computers, etc. – the labour content of traditional assembly has dropped from some 25% of the total product to between 5-10% (Ohmae, 1985). Thus the gains arising from using cheaper labour from newly-industrialising nations are minimal, and are easily offset from the costs of shipping components for assembly to and from these nations. Furthermore, cheap labour often means inexperienced labour, and once trained, does not remain cheap much longer. Thus cheap labour alone is no explanation for drift. Mechanisation can also be recession-proof, e.g. the highly automated Yamazaki plant (machine tools) can break even at 10% capacity, and Toyota claimed to at 70%. An example of this is in the production costs of integrated circuits (see *Table 7* overleaf).

Table 7. Integrated circuit production cost estimates in US cents per unit: The US versus Hong Kong (after Ohmae, 1985)

Assembly Method	*Hong Kong*	*United States*
Manual	2.48	7.53
Semi-Automatic	1.83	2.93
Automatic	1.63	1.78

As can be seen from these figures, robotic production methods soon reduce the labour cost advantage enjoyed by newly industrialising nations, and flexible manufacturing techniques may reduce this further through economies of scope. It should also be noted that the cost of capital would be more advantageous in 'core' nations for this mode of production. IBM, for example, spent some £10 billion between 1986 and 1989 in making its factories showcases of flexible automation. Previously, it sourced a large share of its components from developing Asia. Now, the £130 million automated plant in Charlotte, North Carolina, is the world's lowest cost producer of printers, which used to be purchased in Asia. Similarly, the £220 million highly-flexible typewriter factory in Lexington, Kentucky, from which keyboards are sourced, reduced its labour force from 6,000 to 2,000, and increased its annual production from 700,000 units to 1.4 million at a saving of £650 per unit. Automated flexibility at the plant is such that 100 different product lines can be assembled there, other than keyboards.

Acquisition of new knowledge

Bohn (1994:61) would argue that "as we move from the industrial age into the information age, knowledge is becoming an ever more central force behind the competitive success of firms and even nations". In increasing the knowledge available to a firm, there are a variety of means, not least of which is the formation of a strategic alliance with another firm. In this instance, two or more firms co-operate (horizontally or vertically) to develop new products, giving rise to greater feats of

innovation than those of which a single firm would be capable. Similarly, it is arguable that a smaller firm – by virtue of its size – is more able to innovate than a larger firm (Kotabe and Swan, 1995). These different types of alliances may be summarised as:

- Vertical, such as that between a Tier-1 supplier and an automotive assembler, where customer and supplier collaborate on new product development.
- Horizontal, such as that between two firms of the same 'tier', where both firms contribute expertise in a specific area (e.g. between a braking systems supplier and an engine management system supplier). In the UK, the definitive example might be of the Rover-Honda collaboration, in which both companies designed the next generation of cars jointly, and drew on each other's knowledge and abilities, i.e. Honda's implementation of TQM and Rover's logistics network (Schill *et al.*, 1994).
- Scions, where a firm – typically small – is depended on as a specialist technology supplier by a larger firm, such as the relationship between Ford (an automotive assembler) and Ghia (a vehicle design firm). While this could involve two independent firms, the scion could be owned by its larger parent, or have been deliberately 'cladded off' at some time in the past.

Indeed, Amey (1995) has proposed that the automotive engine management systems (EMS) are the result of the merger of a number of different supplier technologies: electronic fuel injection, ignition, and electronics, arising out of early collaborations between car manufacturers (e.g. Mercedes-Benz, Jaguar) and electronic systems suppliers (e.g. Lucas, Bosch) in the 1950s-70s, a subject that has been commented on previously.

In the global marketplace, Japanese multinationals have become known for their increasing number of overseas R&D facilities, a phenomenon ascribed to the need to develop specific local variants of new products and to utilise the high-quality science base of certain countries (Papanastassiou and Pearce, 1994) – although others, such as James *et al.* (1998), might argue that merger and acquisition decisions tend to be

dominated by financial and business managers, and that technology is rarely the main motive for acquisition.

The existing literature on technology transfer might best be divided into the following areas:

- *East-West technology transfer*, in which the purchase of Western technology by the former Soviet Union (Wiener and Slater, 1986) was once studied, but which has more recently addressed the transitional economies of Eastern Europe (Bertsch, Vogel, and Zielonka, 1991). It has been argued that this had done little to enhance the export competitiveness of the former Soviet Union (Wiener and Slater, 1986), but that despite this, many firms in the transitional economies of Central and Eastern Europe have been actively searching for Western partners to assist them in their economic recovery – although some would argue that the economies in question lacked both the perception of the large technology gap and the means to assess the technology of internal and external processes (Tesar, 1994).
- *Collaborative arrangements between MNEs*, such as interfirm strategic alliances for technology development (Hagedoorn, 1993), specifically high-technology collaborations between Triad multinationals (Chandler, Kelly, and Berstein, 1994), and those between firms from newly-industrialising nations and foreign multinationals to acquire key technologies (Micklethwait, 1996). It has been suggested by some that such a structural "spillover" of technological or managerial resources can occur after a certain threshold, giving rise to a number of small, highly-specialised "minors" (Usui, 1977), a phenomenon that on the macro level might be termed "intra-country technology permeability" (Kogut, 1991).
- *Government policies promoting technology transfer*, such as the expectation by the government of the People's Republic of China that foreign investors would transfer new technologies to domestic firms (Micklethwait, 1996). A similar example might be the establishment of a technology transfer infrastructure by the government of Taiwan (Tan, 1995) as a strategy to promote industrial automation in its manufacturing sector. Typical host government policies include infant industry protection (by tariffs and market reservation), export incentives and the

promotion of indigenous RD&D (Meyer-Stamer 1990). Conversely, bodies such as the National Technology Transfer Center in the US aim to aid domestic firms with the commercialisation of technologies for entry into "Big Emerging Markets" like China (Rivers, 1994).

- *Technology transfer in the developing world*, in which it has been suggested that the technology that is transferred by MNEs between nations does not necessarily correspond to the needs of the developing country (Germidis, 1977b), and that in considering adaptation, a distinction must be made between the technology of production *processes* (which are independent of the technology level of the host nation) and that of the *products* (which may need to be adapted to match indigenous demand characteristics and production techniques). In this way, the technology transferred is linked to the industrial development of the host nation (Germidis, 1977a) or the host supplier (Nueono, 1977).
- *Growth of regional manufacturing 'clusters'*, such as the argument that the "most technologically promising companies in Asia tend to be the networks of small specialist exporters that spread in places such as Hsinchu and Bangalore" (Micklethwait, 1996).
- *Forms of technology upgrading*, such as the 'six dimensions' envisaged by Kaplinsky (1990) of technology selection, technology transfer, utilising technology to its designed performance, adapting technology to specific conditions, improving technology beyond its designed performance, and generating new technologies. While conventional means of such technology transfer include the acquisition of a share in the equity of a firm, licence agreements, the outright purchase of equipment or know-how, the purchase of know-how in the form of detailed specifications or blueprints, and the acquisition of know-how through the flow of human resources (Kotabe, Sahay, and Aulakh, 1996), others have suggested that less conventional forms, such as reverse engineering, reverse brain-draining, and FDI into industrialised countries have been used to circumvent the MNE-dependent assembly operations (Meyer-Stammer, 1990).
- *Modelling technology transfer*, as Roessner and Porter (1990) and Roessner, Porter and Xu (1992) have suggested, is a conceptual model based on four key factors which influence a nation's ability to develop an indigenous capacity to

produce internationally-competitive technology-based products: national orientation, socio-economic infrastructure, technological infrastructure, and productive capacity. By comparing these factors derived from the literature with statistical data, three composite indicators of a nation's success in international markets were developed: high-tech standing (HTS), high-tech emphasis (HTE), and high-tech momentum (HTM).

Conclusions

It would appear that despite a number of different pressures facing MNEs – not least, the problems arising from the possession of a global manufacturing presence – there have been developments in both organisation relationships (i.e. alliances, partnerships, and networks formed between firms) and in production techniques and technology (i.e. AMT, flexibility) that provide new competitive advantages to such firms.

Lamming (1986) has argued that to fully exploit AMT within the UK automotive industry, strong long-term links must exist between car manufacturers and their suppliers. Mills *et al.* (1995) see the application of the new manufacturing technologies and techniques as being contingent on the manufacturing process, competence, capabilities, and culture of the firm that seeks to utilise them.

As the automotive industry has a number of large players who are active globally, various examples may be drawn to illustrate these changes. However, the vast majority of suppliers (particularly in the British automotive industry) are small- to medium-sized enterprises (SMEs), and therefore the next chapter explores how these issues can affect them.

Chapter 4: The Distinctiveness of Small Firms

Introduction

The contribution made to the economy by small firms is sizeable. Indeed, as Michelin *et al.* (1995) argue, small firms are particularly significant in that they far outnumber large firms and employ a substantial majority of the manufacturing workforce. Yet equally, the same authors have lamented the relative paucity of literature on the subject, compared to the vast body of knowledge concerning the dealings of much larger firms.

Given that the SME sector in Europe alone employs the majority of the labour force (68 million employees), commands two thirds of sales volume, and has been the source of greatest expansion in employment over the last decade, it is considered important to European competitive development. SMEs dominate in construction, distribution and most service sectors, and are powerful even in some manufacturing sectors. Giaoutzi, Nijkamp and Storey (1988) argue that SMEs may be regarded as generators of new growth, as primary sources of technological change and, via job creation, as one of the major factors in maintaining socio-economic stability – hence the formation of a long-term European SME policy. Similarly, others such as Okada (1991) have argued strongly in favour of the co-operative interface between MNEs and their suppliers, the Japanese *keiretsu* system promoting not only gains in production, but in the innovation of new products. Equally, it has been suggested (Suarez-Villa, 1988) that the SME is a major vehicle both for employment creation and the diffusion of innovation at local and regional levels, and as "complementary" to the large- to medium-sized firm.

Definitions

Defining a firm on size alone is difficult: definitions range from workforce to assets to turnover. In terms of workforce alone, European SMEs tend to be larger than average in the wealthier nations, though on the whole EU SMEs tend to be smaller than those of the USA. The nations around the Mediterranean have a greater number of smaller firms compared to the generally wealthier northern European nations. In fact, the further north the nation, the larger the average size of the firm. For example, Germany, France and Britain have an average enterprise size double that of Spain or Italy, and the soon-to-join Scandinavian countries have the largest sizes of all. However, Italy still accounts for 22% of European small firms, most of these being small and micro-sized firms, while the UK, with greater numbers of larger firms, achieves second place with 18%. It has been suggested that:

> The concept of an SME appears to be more an economic rather than a legal one and tends to vary according to the industrial structure of the country... However, these variations in definition in no way diminish the significant role attributed to this sector and revitalising the economy in the case of both developed and developing countries.
> (Basu, 1993:3)

Within the UK, a number of definitions have been proposed in previous years, such as the 1981 Companies Act which defined a firm as medium-sized if its turnover did not exceed £5.75 million, its balance sheet total did not exceed £2.8 million, and its average weekly number of employees did not exceed 250. Similarly, a firm was defined as small-sized if its turnover did not exceed £1.4 million, its balance sheet total did not exceed £0.7 million, and its average weekly number of employees did not exceed 50.

Indeed, definitions vary from country to country, and from academic to government, making them hard to pin down. For the purposes of this research, however, it is proposed to use a simpler definition (in common use within EU member states), in terms of the number of employees in a firm, as per *Table 8* (overleaf):

Table 8. Classification of company size by number of employees

Size of company	*No. of employees*
Micro	1-9
Small	10-99
Medium	100-499
Large	500 or more

Financing and promotion of SMEs

Support for SMEs through explicit and comprehensive policies appears to be a post-Second World War phenomenon in most countries. In all countries, and at EU level, efforts to promote SMEs were given a new impetus and urgency by rising unemployment in the early 1980s. Policies in Britain only became important after 1979, although a Small Firms department was established in the Department of Trade and Industry following the Bolton Report of 1971. The policy approach taken by the UK has been that intervention to promote small firms can only be justified if it is aimed directly at the removal of, or compensation for, market imperfections (Bannoch and Albach, 1991).

The British government devotes about £500 million pounds of dedicated resources to the promotion of SMEs, financed through central government taxation, European development funds, and local government taxation. In revenue terms, this is approximately equal to basic income tax at 1/3 of 1 penny in the pound. This figure comprises some £321.4 million in general sources, in addition to £3 million financed by local authorities. According to the Anglo-German Foundation, however, these sums underestimate the total. For example, tax concessions also exist (the 'small firms' band, contributing 25% instead of 35%), but are not counted in these figures. Furthermore, the British Overseas Trade Board supports SMEs (such as support for stands at overseas trade fairs) as well as through wider resources.

Small businesses, however, do have different needs to their larger brethren. One example might be the need for non-traditional banking services (insurance, personal asset management), something that – if provided by banks – may be "the most important area in banking for the next five years" (Britt, 1997).

In South Korea, organisations like the IBK (Industrial Bank of Korea) pursue a long-term growth strategy with a strong commitment to small and medium enterprises. With the aid of a specially developed 'SME Credit Appraisal Model', a total of 4,216 small firms were awarded a total of 193 billion won in special support loans in 1995, a 31.2% increase from 1994. Additionally, an extra 17 "seed companies" were selected amongst the SMEs to qualify for managerial and technological guidance. By 1995, a total of 77 companies had received such aid, of which 22 had graduated from the support scheme ("Helping Small Companies at Home and Abroad", 1996). In America, institutions such as the American Institute of Certified Public Accountants have placed new emphasis on their small firm members by means of advocacy committees ("Small Firms Discuss Big Issues", 1996).

A report published by the Bank of England on October 28, 1996, focused on the financing of small technology-based firms in the UK (Piper and Lund, 1997a, 1997b). One of the findings was that perceived high risks, understanding the technology, and relatively low annual rates of return have increased institutional reluctance to invest in early-stage technology firms. Four recommendations were suggested:

1) Raising the profile of such firms,
2) Improving understanding of the technologies involved,
3) Increasing the supply of finance,
4) Improving financial management and awareness of such firms.

However, there are already various EU policies in existence that are aimed at promoting small firms. Government industrial policy in OECD nations (Vickery, 1994) includes aid to SMEs in adjusting their activities in a changing domestic and international environment. The most recent focus, for example, has been on their contribution to employment, through programmes aimed at fostering entrepreneurship and stimulating the growth of existing small firms. One primary objective of government support has been to improve the financial situation of SMEs and accelerate tax and regulatory reform, in order to help in offsetting the impediments faced by SMEs due to lack of resources and their small size. This is especially true with regard to international activities, and measures have been introduced to reduce risks and improve support for small firms to expand overseas.

Pierre Defraigne of the European Commission (1995) has mentioned the notion of partnership in encouraging FDI flows to developing countries and the scope for official policies to foster and support such partnerships. Networks, whether private or public, formal or informal, are an essential factor in this. SME partnerships are targeted as they face several constraints when they attempt to engage in FDI:

(a) The long gestation period of the project.
(b) The limited resources of the SME in terms of managerial skills and personnel.
(c) The early reliance upon local staff.
(d) The ability of the host country counterpart to establish sound business relationships.
(e) The problems and costs of distance.

These constraints, among others, can be grouped into three main categories:

i. The need for information and advice.
ii. Specialised technical capacity.
iii. The need for financial support.

It is these constraints that the EU, the Commission, and Member States seek to rectify in order to foster and support FDI flows. Regional development programmes also play a part in this (especially in the EU). Persistently high unemployment in many peripheral areas has encouraged governments to develop infrastructure, reduce inter-regional trade barriers, and attempt to expand economic benefits arising from regional clusters of inter-related firms.

In a 1995 speech, the former US Secretary of Commerce, Ronald H. Brown, stressed the importance of providing government aid for the smaller firm when he said that "the cumulative health and actions of 21 million partnerships, small corporations and sole proprietorships are an almost unsurpassed influence on our economy and our society" (Brown, 1995).

Although the largest 600 enterprises in the world (the "billion dollar club") still create a fifth of the world's total value-added in manufacturing and agriculture, fully one half of all the world's enterprises that have international operations are small or medium-sized ("Come Back Multinationals", 1988). Japan and Britain during the first half of the 1980s were two of the largest exporters of capital: 23% of Japanese multinationals employed fewer than 300 people in 1984; and in 1981, 78% of the British firms with direct investments overseas employed fewer than 500. Furthermore, as Gunasekaran *et al.* (1996) have argued, "Most SMEs produce a product or a service that could be competitive in international markets, but are unsure of the appropriate strategy for entry."

However, the effects of economic adjustment (Basu, 1993) give SMES greater problems than large enterprises due to their smaller economic base. Circumstances necessitating economic adjustment include:

- Changes in political institutions and government policies.
- International trade fluctuations.
- Market conditions.
- Consumer preferences stemming from economic and demographic changes.
- Technological developments.
- Economic changes on macro and meso levels.

Small firms as technological innovators

However, size can also be advantageous, in that SMEs have greater flexibility in adjusting to changes than larger firms. Indeed, Hoffmann *et al.* (1998), in considering SME innovation, note the existence of an extensive innovation support structure across the European Union targeted at SMEs, as well as country-specific policies like the UK Business Links programme. The authors also comment on a pre-existing bias

in the relevant literature towards high-technology sectors (predominantly biotechnology and IT).

Entrepreneurship and innovation

Some, like Caird (1994), have considered the role of key innovators within SMEs, and commented on a lack of research into both, concluding that although "innovators" and "innovations" are hard to define, those responsible for key innovations tended to be "project champions", promoting and pushing a project through the idea stage to commercialisation. As SMEs tend to be small companies - with a great number of them too small to utilise multi-tiered management structures and job descriptions, "project champions" are likely to have more freedom than in larger companies. This has led some, like Woolgar *et al.* (1998), to argue that SMEs prefer to rely on their "networking" for innovations, rather than take the risk of developing new technologies themselves.

Table 9. Entrepreneurship, product innovation and development: The role of small firms as sources of innovation (after Suarez-Villa, 1988)

Phases	*I*	*II*	*III*	*IV*
R&D	Invention (individual, corporate)			
Finance	Investment			
Marketing		Strategic planning		(Strategic planning)
Production			Co-ordination	Co-ordination
Enterprise size	Small	Medium	Medium-Large	Large-Medium*

*Small complementary firms (subcontractors) likely

However, Suarez-Villa (1988) holds that SMEs have been major vehicles for both employment creation and the diffusion of innovations at local and regional levels, especially in less developed economies. In conceptualising product innovation and design in the life cycle model with four distinct phases of invention, growth, maturity and decline, Suarez-Villa (1988) sees SMEs as playing key parts as both the seed-corns of larger firms and sources of innovation as subcontractors to larger firms (see *Table 9*).

In a fragmented industry, with cutting edge technologies, AMT and FMS implementation, the SME takes a growing role throughout the product life cycle. The SME is regarded not only as the innovative progenitor of the later large corporation (as the giant software company Microsoft grew from a garage operation in the 1980s), but as the innovative specialist sub-contractor required for the larger corporation to survive. In addition, Okada (1991) holds that the co-operative interface between Japanese MNEs and their suppliers, not just in the production of car components but in the innovation of new products, production processes and organisational structures stands in marked contrast to the often adversarial relationships that are frequently found between US firms and their suppliers. Since the time of Okada's writing, Japanese methods have been taken on board ever more by companies of varying nationality, and in particular, those from the newly-industrialised economies of Pacific-Asia following the Japanese model. Innovation and co-operation of this kind, which Porter (1990) refers to as clusters, can be found wherever successful industries exist.

Such specialist suppliers, to cite an example from the automotive industry, might include the Extrude Hone Corp., a Philadelphia-based engineering firm that uses abrasive putty to achieve ultra-smooth surfaces inside racing car engines. Among its diverse customer base, the firm was hired by Ford to work on its SVT 2.5L engine, allowing the automotive assembler to supply 5,000 Contour SVTs per annum (Murphy, 1998c). Indeed, Harold R. Kutner, General Motor's head of purchasing, stated that, "Where we measured suppliers relative to their quality and service, we think it's time to measure them by the kinds of technology they bring forward" (Gardner and Murphy, 1998).

Staying ahead of the technology curve, as Fraza (1998) argues, is a daunting task for any firm, particularly the smaller ones. With fewer resources on which to draw, smaller firms often lack the technological capabilities employed by their larger counterparts to compete against them. However, in *Industrial Distribution*'s 1998 survey of "50 Outstanding Small Distributors", not only did 67% of the nominees use EDI, but 22% used barcoding, 28% had Web sites, and several of the firms surveyed had a level of technological know-how comparable to that of larger firms. A further study showed that 83% of small distributors provided JIT delivery, 72% offered a 24-hour emergency service, and more than 40% managed inventory for their customers (Fraza, 1998).

It is often possible to ease the adoption of new technologies by smaller firms. In the case of computer telephony integration (CTI), the installation is simplified to the extent of only an additional board being required for the firm's PC server. The software here is likewise simplified to a flowchart GUI, meaning that a small firm needs only limited DIY knowledge to install a CTI solution (Emmerson, 1996). The IT industry has been criticised for failing to address the IT needs of SMEs by offering them applications and services focused on the needs of large companies rather than the different, often niche, requirements of small firms. Conversely, SMEs tend to use IT predominantly to automate repetitive or routine administrative tasks, without realising alternative potentials for improving relationships between (potential) customers and suppliers (Wirszcyz, 1998).

Lefebvre *et al.* (1995), writing on the adoption of computer-based administrative and production applications within manufacturing SMEs, hold that the benefits derived from these measures are contingent on the level of technological penetration attained by a particular firm. Their research suggests not only that the benefits increase (in both scope and intensity) with the level of technological penetration, but also that this build-up of benefits is intrinsically linked with the organisational learning that takes place as a result of the firm's experience with the technology. Such measures are

particularly important in the success of small firms working towards flexible manufacturing and/or globalisation.

Furthermore, the transfer of technology between two firms is not necessarily linked to size, as Venanzi (1996) argues, with smaller firms entering into a variety of contractual relationships to secure a strategic advantage, whether from overseas or domestic partners. This point should be borne in mind when considering technology transfer (as discussed in the previous chapter), as the firm or firms in question could just as well be SMEs, rather than large, multinational conglomerates.

New forms of manufacturing

It has been argued (Brown and Inman, 1993) that the use of JIT by small firms is not only of benefit to their larger customers. Rather, such a firm is able to enjoy the same efficiency savings as well as a 'partnership' relationship with its immediate customers and suppliers. It has furthermore been suggested that SME automotive suppliers are now following the larger OEMs in adopting TQM techniques, but that their circumstances differ in a number of key ways: smaller size means that human resource management and thus the necessary cultural change becomes easier, but that management of the financial and technical resources to carry this through are harder. Thus the formation of shared facilities to offer advice and long-term support to firms (such as in automotive manufacturing centres such as the Birmingham area) has been advocated (Lee and Oakes, 1995).

One such example might be the enhanced performance enjoyed by the Valeo Wiper System company, a British automotive supplier SME, when it adopted JIT production and cellular manufacture (Gunasekaran and Cecille, 1998). Similarly, Vornotas and Xue (1997), in their empirical study of six small US metalworking firms, found that none of the firms was hindered in its adoption and implementation of CNC technologies by any lack of technological or organisational sophistication, nor by financial constraints. Rather, five of the firms were able to use internal financing to

acquire the specific CNC machine tool required, and all reported sufficient in-house technical expertise to adapt standardised CNC equipment to their own needs:

> We were thus left with a puzzle. On the one hand, the literature overflows with calls for helping out small firms that supposedly form the soft underbelly of American manufacturing. On the other hand, we easily came across a group of small metalworking firms which disagree with such ideas and have ways to prove it.
> (Vornotas and Xue, 1997:436)

As has been argued, smaller firms are not necessarily unable to adopt similar technologies and techniques to those utilised by their larger brethren. Rather, due to the unique nature of the small firm – as entrepreneur or specialist – more unusual forms of production may be adopted more quickly and easily, and earlier than by larger firms.

Flexible manufacturing by SMEs

The above argument can be extended in that with the steadily dropping costs of new technology, and with the global competitive pressures to adopt highly-integrated computer systems, manufacturing SMEs should not consider CIM implementation as either unnecessary or too expensive (Arcelus and Wright, 1994). Such systems, argue the authors, will enable the smaller firm to optimise its existing competitive advantage: a management with a greater in-depth knowledge of their firms, and with the ability to easily champion the adoption and implementation of new technology.

Additionally other proponents of flexible manufacturing technologies, such as Gupta and Cawthon (1996), hold that in order to derive the most utilisation of these as a competitive asset in operations strategy, an SME must develop its organisational structure, culture, and external alliances to take full advantage of the benefits. The authors see FM as being supported by both 'hard' (e.g. CNC, CIM, CAD/CAM) and 'soft' (e.g. SPC, JIT, MRP) technologies. However, as higher-skilled workers are needed to operate in the FM environment (unlike the semi-skilled workforce required for mass production), the organisational environment must account for this:

decentralisation of decision-making to product teams, fewer levels of management hierarchy, fewer rules, and a shortening of the lines of communication.

However, given that the firms in question are SMEs, their size may have already precluded the development of a bureaucratic organisational structure: the firm may be too small to have a significant distinction between management and the workforce, let alone to develop rigid job descriptions. Mechlin *et al.* (1995) express similar sentiments, but have a more optimistic view of the relationship between SMEs and AMT. Manufacturing SMEs play a critical role in the global economy, they argue, for with their customer orientation and flexible nature, small firms are the "logical innovators" (Mechlin *et al,* 1995:72) to adopt these new technologies necessary to enter such markets. Their research found evidence to suggest that among exporting SMEs, global competitive pressures made the use of AMT a necessity for competing globally, and that the size of the firm in question did not appear to moderate the relationship between exporting and AMT adoption. From a different perspective, Sambasiva Rao and Deshmukh (1994) advocate the need for the Indian machine tool industry to embrace FMS technology more heavily, if it is to compete effectively with that of rival nations, such as Brazil.

Forms of co-operative relationships open to SMEs

As with larger firms, there are a variety of different forms of networking and strategic co-operation available to SMEs. Gunasekaran *et al.* (1996) have identified three distinct patterns:

1) *Horizontal*, where SMEs work together and share facilities and information for their mutual benefit.
2) *Vertical*, where SMEs establish linkages with large organisations, such as through subcontracting or franchises.
3) *International*, where SMEs benefit from linkages with international-based organisations for information and technology exchange, as well as access to international-based resources and markets.

One example of a vertical SME alliance in the service sector exists between small, specialist financial analyst firms and large, global risk management firms (Webb, 1998). Alliances could, however, be as straightforward as joint marketing (Clift, 1996), in which two or more firms could pool their advertising budgets, swap mailing lists, share display space, insert promotional items, co-sponsor booths and events, share advertisement specialities, bundle products and services, and trade public exposure.

It has, on the other hand, been suggested that the co-operative strategies so popularly advocated among high-tech companies may not fully apply to non-high-tech companies (Brush and Chaganti, 1996). Expressed in terms of value chains, co-operative strategies enable new ventures to link their value chains to those of stronger partners, and thereby to provide superior value to their customers. However, the research conducted by Brush and Chaganti (1996) among 97 small businesses found that although a small but significant proportion of non-high-tech new ventures employed co-operative activities, none of these activities occurred in core aspects of their operations.

Japanese models of networking among SMEs

If the norm within Europe is for small businesses to be independent, it is interesting to note that small firms in Japan seldom stand alone (Dana, 1988). Rather, it is more common for Japanese small businesses to participate in a variety of different alliances. The Japanese *chusho kigyo* (small- and medium-sized enterprises) can be found co-operating in:

1. The *keiretsu*, a diversified enterprise group in which each firm voluntarily co-operates with the others for mutual gain. The best-known examples may be found within the automotive industry, where the vertical *keiretsu* dominates, despite the horizontal *keiretsu* being more common.

2. The *sanchi*, a grouping of small businesses operating in a similar line of business. This usually involves a physical cluster of a number of firms, co-operating in similar work or dividing labour into different processes.
3. The *kyodokumiai*, a co-operative of small businesses. This is an informal network of independent firms that strengthens its members through legal and financial assistance, and has been described as similar to a political federation.
4. The *shita-uke gyosha*, a sub-contract system in which numerous small-scale businesses are dependent on one large company. This parent firm provides assistance to the subcontractors, as well as a variety of benefits (e.g. raw materials, financial assistance, technical guidance, and an assured client).

Banerji and Sambharya (1996) found that as the major Japanese automotive assemblers entered the US market, so did their ancillary suppliers. Due to the mutual dependencies between the assemblers and their suppliers (i.e. the *keiretsu* relationships), the core firm relied heavily on its existing distributors for quality components, expertise, and logistics (JIT), and it was important to the firms involved to transfer this specific competitive advantage. Martin *et al.* (1995) noted that in the period 1989-90, eight Japanese assemblers and more than 170 Japanese component manufacturers had established North American manufacturing facilities, thereby recreating about a quarter of their assembler-supplier links. The suppliers were found to have additionally recreated almost 60% of links with their traditional buyers and more than 16% of the possible extension links with new assembler partners.

Hundley and Jacobsen (1998) have argued, conversely, that rather than enhancing the performance of Japanese companies, membership in a financial *keiretsu* may actually reduce competitiveness, thereby dampening export performance, as the 'safety net' and assurance of support given to member firms engineer complacency. This may be compared to the point made by Richardson (1993), who considered that the advocacy of sole sourcing within the US (e.g. by W. Edwards Demming in his 14 Points) might lead to problems with supplier performance, rather than the Japanese-style productivity enhancements envisaged. In adopting such a vision of the Japanese *keiretsu* relationships, industry pundits in America, argued Richardson, were failing to realise that Japanese auto makers in fact use a hybrid form of organisation: parallel sourcing – the use of multiple sole sources for each type of component.

The various forms of networking so common in Japan may also be found in Western nations. In a 1995 survey, the UK firm PSL undertook a questionnaire survey to investigate the spread of partnership sourcing within the UK. According to the company's findings ("Can David and Goliath Patch Things Up?", 1996), 60% of the respondents were SMEs, 74% used partnership sourcing, 83% believed it would have a significant impact on competitiveness, 74.5% had reduced total costs in this way, and 70.3% reported increased quality of products and services. Langfield-Smith and Greenwood (1998) have argued in favour of adopting Japanese-style supplier partnerships, pointing out that, over the last three decades, Western automotive manufacturers have recognised the benefits and rejected 'traditional' adversarial buyer-supplier relationships.

Strategic links between two firms in the same industry also exist ("Close Encounters of the Third Kind", 1997), such as in the "competitor-networked" scenario. One example of such a network would be the Galileo Corp., an American group of fibre-optics companies, or the smaller Plexus Group, formed from two small Kentucky plastics moulding specialists, H&W Plastic and Summit Moulding and Engineering. Despite the teething difficulties of bringing firms in the same industry sector together, this form of group – rather than compete for the same work – enables its member firms to specialise without the risk. Member firms can target smaller market niches, such as legal placements as opposed to conferences and conventions, passing customers on to the requisite specialist within the group. Service sector firms appear to benefit from similar alliances, such as those seen in small-business purchasing groups in the US ("Will the Alliances Survive?", 1996).

Another example of co-operation within the previously competitive automotive industry might be the case of ABB (a European specialist in the construction of such turnkey operations) and Ford during the design and construction of a £200 million facility (Frey and Schlosser, 1993). This facility, built in Oakland, Canada, was intended to be one of the largest automotive paint-finishing plants in the world. However, it was the execution of the business relationships that was of interest, as Ford, ABB, and their subcontractors worked hard at building trust, sharing their technical knowledge and expertise, and sharing the benefits accruing from this.

Partnering

Partnerships can aid small firms in achieving goals that would be too costly, time-consuming, or difficult to accomplish on their own. Alliances can also encourage product innovation, bring stability to cyclical business, expand product portfolios, and forge new kinds of supplier relationships (Maynard, 1996). As Maynard (1996) has argued, "For years, partnering was a survival strategy adopted mainly by small, high-tech firms in need of a giant marketing partner or by companies entering international markets. Now, alliances are quickly becoming a necessity for firms across the spectrum of industries and for a wide variety of purposes". Others have advocated that SMEs "need to progress towards partnership sourcing as a means of sustaining competitive advantage in an increasingly global marketplace" (McGloin and Grant, 1998:98).

Research conducted into alliances among small firms in the Netherlands retail sector suggests that membership in voluntary alliances and co-operatives helped a firm to outperform its non-allied peers, attributable to a higher level of "professionalism", greater aggressiveness in the marketplace, and a greater willingness to outsource entrepreneurial tasks to the strategic alliance (Reijnders *et al.*, 1996). However, Mudambi and Helper (1998) hold that non-co-operative behaviour still persists among firms professing to co-operative buyer-supplier relationships. Indeed, "close, but adversarial" may be a better description for these in the case of all but a small minority of American automotive suppliers.

Networks

The co-operative networks of small firms found within Northern Italy in particular, are often commented on (Bianchi, 1996). Termed a 'small enterprise spatial system' (a SESS), such a loose local agglomeration of small firms operates as an informal manufacturing network, contrasting with the hierarchical subcontracting relationships with a 'large enterprise spatial system' (a LESS). Such a distinction, it should be noted, assumes that the set of SESS firms does not overlap that of the LESS suppliers.

Within the UK automotive industry, however, it may be argued that a whole spectrum of possibilities exists – not a rigid polarisation – and that there may be other forms of categorisation as well. Donckels and Lambrecht (1997:13), for example, define a 'network' as "the relationship of entrepreneurs and their small businesses with the outside world", finding that entrepreneur- and enterprise-related factors influenced the network structure of small businesses.

Others have advocated an internal competition approach, in which a large corporation is divided up into a number of separate business units. The corporation, in effect, becomes a loosely joined conglomerate in which the member firms enjoy considerable autonomy but also the benefits of a larger firm, e.g. brand name marketing, cheaper finance, expertise and innovation from related industries. Related examples include the "front-back" approach, in which organisations are divided in terms of different roles with regard to products and customers.

Conversely, the advantages of networks of smaller firms have been advocated. Such networks include networks of firms that form an entire industry (such as Prato, discussed below) and subcontractor relationships (ranging from supplier partnerships to JIT relationships to the *keiretsu* system). An example of a dynamic industry driven by SMEs can be found in the UK textile and clothing sector. Hardill and Wynarczyk (1996) studied the associated *filière* (described as a series of economically and technically inter-related operations placed between the availability of the raw material and that of the finished product), noting that although textiles and clothing have dominated previous studies, this has been in neglect of other major segments and processes: fibres (natural and man-made), fabrics, end-uses of fabric (clothing, home furnishings, industrial), and the related designing, printing, dyeing, and finishing processes. This *filière* was fragmented, characterised by a large number of SMEs, almost half of whom were employing 'basic' electronic systems such as EDI, CAD, and CAM.

Flexible specialisation

The Piore and Sabel thesis contains both a critique of Fordist mass production and proposes a diametrically opposed model, of 'flexible specialisation'. This is characterised chiefly by diversification of the product, economies of scope, vertical disintegration, and co-operation between relatively small firms. These features, argue Piore and Sabel (1984), will be the predominant form of production in the future, owing to the ability of such firms to adapt swiftly to fluctuating demand. Starkey and Barnatt (1997), however, hold that 'flexible specialisation' is under-used within the management fields, citing the example of industrial transformation within the American film and British television industries.

Sefertzi (1996), searching for signs of a move towards FM in large firms, utilises two basic parameters: the degree to which production is externalised, and the advantages of scope or scale over the internal organisation and utilisation of capital. These two parameters give rise to at least three types of strategy:

1) *Vertical disintegration*, concerning external economies of scope, e.g. Bosch and Olivetti in Germany. This strategy shares features with the Porterian model of geographical clusters.
2) *Flexible mass production*, which combines external production and internal economies of scale, examples of which are found with automotive assemblers. Jaguar, for example, produces standardised components like body shells and engines in house, but outsources parts that require frequent changes, e.g. trim, automotive electronics and electrics.
3) *Technical flexibility*, which concerns internal economies of scale and/or scope. In this scenario, a firm combines both economies of scale and scope through "flexible automation" – a strategy sometimes termed "neofordist".

In a multi-unit firm, such as a manufacturing conglomerate, it is therefore possible for all three strategies to coexist. Such strategies, however, provide an opening for the smaller firm: fragmented production, small batch manufacture of specialised products, swift response to fluctuating demand, and a craft-based structure of operations – i.e.

innate features of small industry. Sefertzi (1996) distinguishes three types of small firms connected with various forms of flexibility:

(a) *Small firms in niche markets*, where the firm in question is relatively small and produces small batches of diversified products of both high quality and design directed at specific market segments. These firms might be suppliers to larger core firms and/or serve their own markets. The competitive advantages of these firms lie in their flexibility to meet diversified, individualised demand, and this is achieved through craft production, the use of flexible technology and labour, cellular arrangement of work stations, and a distributed (both internally and externally) labour process among interconnected and specialised production stages. Examples of such firms include networks of automotive component manufacturers in Germany.

(b) *Small high technology firms*, oriented strongly towards R&D. These firms may be spin-offs from larger firms or self-made, but exhibit numerous alliances, joint-ventures, and other links with other firms (both small and large) aimed at developing the innovations that characterise their products. Examples include small high technology firms in Silicon Valley in the United States.

(c) *Small subcontracting firms*, promoted by the decentralisation of production of larger, core firms, which are strongly dependent on other firms. These are characterised by relatively traditional technology and a low level of innovation and skilled labour, but are flexible in terms of the organisation and regulation of labour. This makes the flexible production of individualised, unlabelled products easier (and comparatively low-cost), something used heavily in both the clothing and the automotive industries. These firms might be scattered around, and dependent on, a single large firm (such as in Toyota City) or operate in low-wage areas with diverse customers.

Duguay *et al.* (1997), in considering the evolution of manufacturing after the Industrial Revolution of 1770-1800, describe the basic characteristics as being the division of labour, the interchangeability of parts, and mechanisation. However, while in America both mechanisation and interchangeability became the dominant mode of manufacturing (i.e. the 'American system of manufacturing', or 'ASM'), the European model relied more heavily on human skills. Thus the basis of American

mass production – i.e. Taylorism and Fordism – can be seen to have a different basis to the skill-dominated 'mechanised craft production' developing in Europe.

Economies of scope versus economies of scale

The driving force behind corporate growth has been attributed to numerous factors, including the ever-increasing economies arising from an ever-increasing scale of operations. The size of a large organisation can indeed create a number of advantages – as many, such as Lawler (1997), have argued – particularly in areas such as marketing, finance, product development, purchasing, global reach, and technology. However, running alongside these advantages, are possible disadvantages of organisational size: bureaucracy, expensive infrastructures, visibility to government attention, and even difficulties in doing business with firms that view another arm of the corporate giant as a competitor. Suggestions on how to obtain the advantages of organisational size without incurring the related disadvantages vary in their approaches.

Small firms, on account of their size, are incapable of achieving the gains arising from economies of scale under the traditional system of factory production: the alternatives to this are explored below. Consideration is given to economies arising from scope (through use of AMT, FMS, and networking/clustering), as well as the role that SMEs play in supporting/becoming larger firms.

Production capacity as a commodity

Additionally, production capacity is now (at least in some industries) flexible enough to be viewed as a commodity. Technological change has raised the prospects of global markets for a variety of types of flexible manufacturing capacity. The necessity for large factories thus comes under consideration: companies traditionally gathered the means of production into large factories in order to reap the benefits arising from

economies of scale, and to share overhead costs. But in industries producing highly-differentiated products, economies of scale have never been strong. And with the new technologies, even the pressure to share overhead costs has diminished (due to new means of information and material flow):

> Minimum efficient scale for a modern manufacturing operation in many industries is a manufacturing cell of about six machines and fewer than a dozen people. Such a cell functions as a factory within a factory, effecting an entire production process under computer control, often including materials handling and inspection.
>
> (Jaikumar and Upton, 1993: no pag.)

The model has thus shifted from one of various factories serving different markets to that of the 'electronic marketplace' in which various units of capacity serve the various markets via a communications system. Transaction costs are thereby minimised by effectively automating transaction. The existence of standard flexible technologies has also decreased the need for firm-specific training:

> Scale is no longer the central concern. Size no longer provides barriers to entry. The minimum efficient scale for [flexible manufacturing system] operations is a cell of roughly six machines and fewer than half a dozen people. That's the new reality... No shared base of infrastructure mandates large-scale production integration. The days of Taylor's immense, linear production systems are largely gone.
>
> (Jaikumar, 1986:76)

However, the same factors that make for a competitive advantage for the smaller firm may not hold true for larger ones. Pine, Victor and Boynton (1993) reviewed Toyota's attempt to use its highly skilled, flexible workforce to make varied and often individually customised products at the low cost of standardised, mass-produced goods, seeing this as a more advanced stage of continuous improvement. By 1992, before the company retreated due to rising costs, Toyota was offering its customers a wide range of options for each model, manufacturing and delivering a made-to-order car within three days. The reasons for this retrenchment can be seen to stem from Japan's economic troubles at the time, and from the fact that mass-customisation was rather more than 'continuous improvement plus':

> Mass customization... requires a *dynamic network* of relatively autonomous operating units. Each *module* is typically given a specific process or task... The modules, which may include suppliers and vendors, typically do not interact or come together in the same sequence every time. Rather, the combination of how and when they interact to make a product or provide a service is constantly changing in response to what each customer wants or needs.
>
> (Pine *et al.*, 1993:109, italics in original).

Mass customisation, in other words, is arguably incompatible with continuous improvement in that it is a customer-driven process, rather than mere variety. As Nilsson and Nordahl (1995:5) have written, "The issue of flexibility is complex, relating closely to the overall strategic plan of the enterprise and, at the same time, to single production factors at the operational level". The concept here of a dynamic network is similar to the Prato example. Thus, small businesses may be the constituent elements since, after all, autonomy and specialised variety would be greatest there. The reliance on economies of scope, rather than scale must be noted, as well as the part played by the brokerage network.

Automotive SMEs

Fitzgerald (1996) notes a trend towards an increasing number of SME automotive supplier companies undertaking global operations, and considers it a direct response to the OEMs' "aggressive expansion" into emerging markets and simultaneous reduction in their world-wide suppliers. Initiatives aimed at fostering greater co-operation between SME automotive suppliers also include the 1996 European Auto Supplier Mission, sponsored by the European Commission and Michigan Jobs Commission to 'match' pairs of companies from different nations (Fitzgerald, 1996).

Others, such as Friedman (1998), have furthermore argued that the global, vertically-integrated corporate behemoth is outdated, and that co-operating SMEs are better equipped to survive in a constantly-changing market. In some areas, such as investment services, alliances between large corporations and small, local third-party brokers are required in order for the larger firm to access the lucrative small business sector (Richardson, 1996). Indeed, when Holmlund and Kock (1996) analysed the relationships between a dominating buyer and four small-sized suppliers in a supply chain, in which the suppliers manufactured metal components for use in the buyer's diesel engines, it was found that on the part of the buyer, the need for quality and reliable deliveries (i.e. the ability to take part in a JIT schedule) ranked higher than the relative price of the components when choosing a supplier.

Small Firms and their relationship with larger firms

Small firms are not only spearheading the economic transformation in the core nations from 'traditional' industries (those which emphasise mechanical technology and utilise unskilled labour) to 'sunrise' industries (high technology, communications, computers and information technology), but are also vital allies to larger firms for those self-same reasons (Morgan, 1994). In such strategic alliances, the small firm may be regarded as a 'captive ally' that can be relied on as an extension of the corporation. Small firms can be used by larger firms as a low-risk, low-cost and fast way to move into certain markets or commercialise spin-offs, or more generally, as subcontractors to allow the larger firm to focus on its core business. Numerous small firms sprang up in the late 1980s and early 1990s to fill the vacuum left by downsizing and subcontracting on the part of larger firms. The Big Three car manufacturers are a case in point. These alliances may be formed by either the creation of a new small firm, or by co-operation with an existing small firm.

Rothwell (1981) argued that the role of post-war SMEs in an industry varies as that industry develops from newness to maturity. Three major stages of industrial evolution can be distinguished here:

I. *Dynamic growth stage* (1945 to about 1964): emergence of new industries – such as electronics, synthetic materials, pharmaceuticals, petro-chemicals, and agro-chemicals – based on new technological capabilities that emerged during the pre-Second World War period; production initially in small units; introduction of many new products; rapidly growing new markets; new employment generation.

II. *Consolidation stage* (mid- to late 1960s): increasing industrial concentration; growing static scale economies; increasing emphasis on process and organisational innovations; rapid productivity and growth; markets still growing rapidly; output growth and productivity growth in rough balance (manufacturing employment).

III. *Maturity and market saturation stage* (early 1970s to date): highly concentrated industry; very large production units; increasing production

process and organisation rationalisation; growing automation; stagnating and replacement markets; productivity growth higher than output growth; rapidly growing manufacturing unemployment.

In the early stage of this typology, SMEs can be seen as the seed-corn of the new industry. Their role over time as a major force of industrial development diminishes. In the later stages, SMEs can play an important part as subcontractors to large firms and as suppliers of specialist services to market niches. In the West Midlands, for example, the growth of SMEs may be attributed to the decline and rationalisation of large firms in the area. The addition of a fourth stage – namely, the post-industrial one – is proposed, as with the use of AMT and new manufacturing techniques, the large-sized firm may no longer be necessary:

IV. *Flexible manufacturing stage* (late 1980s+). AMT; FMS; cellular manufacturing; fragmentation of industry (see Prato case); wide variety of production; globalise sourcing; proliferation of small, innovative, specialist firms; change in manufacturing employment and greater service employment.

The supply chain and supplier partnerships

Kalwani and Narayandas (1995) have suggested that research concerning long-term manufacturer-supplier relationships has tended to concentrate on the benefits accruing to the manufacturer, often overlooking the impact on the smaller partner. The goal, from the point of view of the larger firm, is often to secure valued resources and technologies from selected suppliers – "to harness the strengths and skills of suppliers to their advantage" (Kalwani and Naryandas, 1995:1) – without incurring the associated managerial and resource costs involved with vertical integration, for example, in addition to benefiting from improved quality and process performance and continuous cost reductions. From the point of view of smaller suppliers, the authors suggest that there are potential costs involved here: being forced into a niche through overspecialisation, having to invest in excess of any long-term gains, or suffering greatly reduced profit margins to secure cost savings for the manufacturer.

This might be compared to the Japanese model in which a parent company might give rise to a 'spinoff' subsidiary, a firm partly owned by the parent company, yet independently managed and listed on the stock market (Ito and Rose, 1994). Whereas such a divestment in the US might more typically happen in the case of a poorly-performing section of the parent firm's business, the Japanese spinoff was more often highly-specialised, encapsulating specialised technological and organisational learning. While there are parallels with the concept of outsourcing in order to focus on core competencies, it is the relationship between the parent and semi-subsidiary that differs: the Japanese parent is keen to maintain the genealogical relationship by being on hand to aid its spinoff in adverse business conditions.

SME networking: The disintegration of the Prato textile industry

Since the fourteenth century, the textile industry in Prato, Italy has constituted the economic backbone of the Florence and Pistoia regions. Consisting originally of armies of artisans, the industry changed with the Industrial Revolution: firms grew in size and became vertically integrated in order to achieve greater and greater economies of scale. By the early 1970s, most Prato mills were highly integrated vertically, with fibre production, dyeing, spinning and weaving performed in-house. But with new technologies, global competition and rising costs, this structure proved uncompetitive.

Since capacity had become economic in smaller and smaller units, and the vertical structures proved too inflexible for market conditions, many manufacturers disintegrated their firms into separate units. So successful was this implementation that by 1980 all but one of the Prato mills had disintegrated to form a thriving community of innovative, flexible companies. The process continued throughout the value chain. The keys to this success have been the large brokerage system, the use of computer-aided manufacturing and the permeation of information technology throughout the system. Effectively, manufacturing capacity has become a commodity like any other on the market (Jaikumar and Upton, 1993).

Large firms and SMEs: The case of Baden-Wuerttemberg

Considering the interdepencies of large, small and medium-sized firms operating in Baden-Wuerttemberg, Herrigel (1993) argues that the success of these firms rests in a decentralised system of risk spreading, with the SMEs utilising a system of contract, authority, trust and networks to create a dynamically innovative and prosperous industrial system.

In this region, firms employing between 50 and 1,000 employees account for some 99.4% of manufacturing enterprises and 57.9% of manufacturing employment. Two characteristics stand out among these firms: they are highly flexible and highly specialised. They have been, to quote Herrigel, "extraordinarily successful" at applying and utilising new technologies in traditional areas of manufacture. This success has been characterised by the ability to produce high quality, specialised products with very short product cycles while reducing the cost gap between a standard product and a specialised custom one.

The costs of specialisation have been socialised, that is, they have been shared or embedded within a deep network of organisations and practices in the political economy. Factors here are:

- Educational institutions and their links to industry.
- Trade associations and chambers of commerce.
- Banks, especially finance from local banks.
- The regional government which focuses on promoting industry.
- Openness and collaborative subcontracting among local firms.

Large firms also benefit from this system, as they face increasing competitive pressures caused by new developments in technology, increased international competition, shrinking product cycles and rising development costs. This compels them to look to outside specialists in order to maintain their competitive edge. BMW, for example, now purchases between 50% and 75% of its production costs, and some 80% of its parts involve collaboration with its supplier. This process of mutual

convergence is duplicated in other areas of industry, with large firms interacting with SMEs through the establishment of collaborative and subcontracting relationships (Herrigel, 1993). Reference may be made to Porter (1990), who considers the cluster situation vital to both national and industry competitiveness.

Conclusions

It has been argued here that SMEs – and specifically, automotive SMEs – are vital, for a variety of different reasons, to the competitive success of larger firms. Not only may entrepreneurial SMEs be the "seed-corns" of future multinational giants, but as 'spin-offs', specialist suppliers, or *keiretsu* affiliates, they may be key partners in a supply chain.

Thus in researching automotive SMEs, the relationships (with other SMEs and larger customers), technologies, and manufacturing techniques need to be explored, and care should be taken to avoid the assumption (which has been argued against already) that smaller firms would be mere suppliers of standardised parts. Rather, it is suggested, SMEs might demonstrate traits either unknown to or unfeasible for larger firms.

Chapter 5: Researching a Modern Motor Industry

Introduction

It has been suggested above that research into the British automotive industry should make reference to its particular heritage, which is distinct from that of American and Japanese car manufacturers and assemblers. Similarly, as network relationships are to be considered, a research methodology needs to be chosen that is appropriate to exploring the *life-world* of the people who incorporate the SME, as well as some of the symbolism and mythologies surrounding the automotive industry. This latter factor is important, for as Bardou *et al.* (1982) have suggested, the car in the 20th Century has become a "symbol of technology", or in the words of Lamming (1993:1), "the most fundamental single influence of modern life".

Therefore, in order to arrive at a suitable methodology for undertaking an exploratory study into the automotive industry, the essentially hermeneutic approach adopted so far will be expanded to embed this within methodological *praxis*. Thus this chapter also explores literature concerning modernity as well as methodological critiques presented in the social sciences within the 'post-modern turn', before applying these to deconstruct the symbolism and mythologies related to the automotive industry.

Modernism, modernity, and the post-modern turn

It is useful to draw a distinction between the study of *modernity* and the *modernism/post-modernism* debate within the social sciences. For the aim here, rather than looking at the modernist movement within the arts, is to look at the effect of 'modern culture' on the automotive industry. Berman (1982) is careful to make the distinction here between 'modernity', i.e. *modern* culture; 'modernism', which he defines as a movement consciously responding to the changes being wrought by modernity; and 'modernisation', which is simply the ongoing process of change in the modern world.

Modernity: paradox and uncertainty

"To be modern", Berman (1982) writes, "is to live a life of paradox and contradiction". On the one hand is the drive – the will – to change: to be modern is to want to transform both yourself and the world. On the other, there is the terror of disintegration and disorientation, as, in the words of Marx, "All that is solid melts into air". The experience of modernity is therefore a paradox consisting in a simultaneous desire for both revolution and continuity.

In constructing a world which strives to be endlessly new, the past is frequently represented as a more stable era in order to emphasise that change. Indeed, according to Best, such modern uncertainty:

> is linked to: the new world disorder; universal deregulation which allows the market mechanism to work freely in all areas of life and at all times, without any restraint; the dismantling of the safety nets once provided by the welfare state and uncertainty about the nature of the political action we can take to prevent or promote change within the world.
>
> (Best, 1998:317)

The same assertion has been made by Taket and White in considering the changing terrain within the social sciences:

> It has been noted by several authors that we have moved in to the 'New Times'. The 'New Times' represent a shift, not just in culture, but in all manner of social and economic life. It might be hard to convince the reader that there has been a shift and even harder to demonstrate the shifts within our own discipline. The 'New Times' has accelerated upon us. The terrain which we traverse has taken on new contours. The scene has changed and what has been associated with the modernist era would appear strange to us today.
>
> (Taket and White, 1993:868)

Meanwhile, socio-economic historians such as Wallerstein have expounded the concept of a *world-economy* that evolved over historical time, in order to account for the origins of the peculiarly occidental experience of 'modern global capitalism':

> After all, the modern world did not come out of nowhere. It involved the *transformation* of a particular variant of the redistributive mode of production, that found in feudal Europe, into a European world-economy based on the capitalist mode of world production.
>
> (Wallerstein, 1979:134, italics in original)

There are certain parallels between the world-economy of Wallerstein – one that emerged from feudal Europe in the 16th Century to spread gradually outwards, integrating other world-economies within it – and Berman's concept of modernisation. Indeed, Berman (1982:16) sees the 'modern world' as having evolved over three phases of modernity:

1. The first phase, encompassing the early 16th Century until the end of the 18th Century, in which "people are just beginning to experience modern life".
2. A second phase, beginning with the great periods of political revolution around the 1790s and early 19th Century, in which those in the West were living between two worlds: the emerging modern world, and that of the pre-modern past. It is during this period that the ideas of modernisation and modernism emerge.
3. The third phase, taking place from around the beginning of the 20th Century, when "the process of modernisation expands to take in virtually the whole world".

Here, one can reasonably substitute "capitalism" for "modernity", and "modern world" for "capitalist world-economy" to arrive at a similar interpretation to the central thesis of Wallerstein's work in a parallel field. Dicken (1992), writing after Wallerstein, takes care in his work on the formation of a global, world-economy to create a boundary between his analysis and that of Wallerstein: Dicken maintains that

the post-1945 period is discontinuous with previous economic, social, and technological changes, although others, such as Kern, would ascribe similar changes to be taking place somewhat earlier:

> From around 1880 to the outbreak of World War I a series of sweeping changes in technology and culture created distinctive new modes of thinking about and experiencing time and space... The result was a transformation of the dimensions of life and thought.
>
> (Kern, 1983:1)

Such a view may be taken as hauntingly familiar to our own *fin-de-millennium* time, with commentators drawing attention to the dramatic changes caused by the pace of social and technological change: where Kern might discuss spatial and temporal compression via the telephone, telegraph, steam ship and aeroplane, so these commentators discuss the import of the Internet and jet engine. Kern argues further that:

> Every age also has a distinctive sense of the past. This [the 1880-1918] generation looked to it for stability in the face of rapid technological, cultural, and social change.
>
> (Kern, 1983:36)

Thus the discontinuity with a stable past (pre-1945) as perceived by Dicken (1992) may, ironically, be a parallel to this, in that the post-Second World War generation – in the face of rapid technological, cultural, and social change – looked towards the Victorian and Edwardian ages as an earlier time of stability. To extend the argument further, 'Generation X' (defined as those born between 1965 and 1975) may well look to the 1940s and 1950s as a 'Golden Age' of socio-economic stability. It is this cultural attitude that characterises Western modernity, for as Bauman puts it:

> Indeed, we can define modernity as the time, or the way of life, in which order-making consists of the dismantling of the 'traditional', inherited and received, order; in which 'being' means a perpetual new beginning.
>
> (Bauman, 1997:10)

Change and instability, after all, lie at the heart of the capitalist system: to reiterate Marx's observation – "all that is solid melts into air". Bauman summarises:

> In the modern world, notoriously unstable and constant solely in its hostility to everything constant, the temptation to arrest the movement, to bring the perpetual

> change to a halt, to instil an order secure against all further challenges, becomes overwhelming and very difficult to resist.
>
> (Bauman, 1997:10)

It is therefore interesting to note the motivations ascribed by Alex Trottman (former chairman of the Ford Motor Co.) to the "Global 2000" programme he initiated in the 1990s. His fear was that, although Ford had once more edged ahead of its great rival, General Motors, the age-old temptation towards complacency could again undo this. His solution was to deliberately precipitate a system of challenges that "would force us to keep running".

The post-modern turn in the social sciences

As suggested already, the so-called 'post-modernism' and 'post-modern turn' within the social sciences may be read as reactions to the perceived shortcomings of the positivist (referred to alternatively as the 'modernist') project. Writers such as Schultz (1992) describe this 'challenge to modernism' as a "kaleidoscope in which conceptual fragments interrelate in different ways", implying that the post-modern school itself is an eclectic accumulation of different criticisms of the positivist tradition in the social sciences, an argument which may explain the difficulties faced by writers in defining the post-modern movement.

It is the intention of this work in the post-modern tradition to borrow ideas and analytical frameworks from related fields: the study of modernity and the social and cultural perceptions of technology and change may be applied to the case of the motor industry, a potent symbol and signifier of both; the post-modern critiques suggest strong additional tools for the investigation at hand. The need to take these critiques on board has been made by Kreiner in that:

> We all seem to subscribe to the notion that the organizations of modern society are changing radically. Few believe, however, that the development within organization theory is a simple reflection of such changing empirical realities... It is hardly controversial to assert that new theoretical schools are new ways of viewing and representing the object, as much as they reflect actual changes in the object.
>
> (Kreiner, 1992:37-38)

Indeed, in exploring the available literature (see above), the question may be asked as to whether the advanced theories and models are created from empirical research, or whether they themselves shape and contribute to the ongoing changes to a greater or lesser extent.

In considering the implications of the post-modern turn, it is proposed here to discuss separately some of the major schools of thought that have contributed to this view: the hermeneutic tradition and the literary turn it entails; the post-structuralist critique in the vein of Foucault and Derrida; and the post-modern rejection of modernism in the style of Lyotard.

The literary turn of hermeneutics

This school of thought has its origins in the study of religious – i.e. hermeneutic – texts, but has been drawn on over the centuries by other disciplines: philosophy, linguistics, and more recently, the social sciences. The definition given by Lavoie is that:

> Hermeutics, or interpretive philosophy, is essentially a philosophy of understanding, which elucidates how it is that one person comes to understand the actions or words, or any other meaningful product, of another. It takes the case of reading a text as paradigmatic of all forms of interpretation, throughout the arts and the sciences, and in everyday life. It would treat a painting, for example, as a "text" which needs to be read.
>
> (Lavoie, 1990:1)

The terminology of hermeneutics will form the basis for much of the discussion that follows, and should be understood accordingly: the text refers to both the interplay of discourses and the stage upon which the process of deconstruction is enacted (Hassard, 1994). Associated with this literary turn is the concept that as history is in a constant state of revision and reinterpretation, the ongoing changes within the present can be compared only to an interpretation of the past.

The post-structuralist critique

Drawing on the hermeneutic approach, post-structuralists such as Foucault and Derrida would argue that as institutions (e.g. an industry) are social constructions, their very existence is bound up in ongoing discourses. Although at the first instance this seems similar to the hermeneutic school, the structuralist approach of hermeneutics makes for a significant distinction:

> The structuralist method, then, assumes that meaning is made possible by the existence of underlying systems of conventions which enable elements to function individually as signs. Structuralist analysis addresses itself to the system of rules and regulations underlying each signifying practice: its activity more often than not consists in producing a model of this system.
>
> (Young, 1981:3)

The problems posed by the structuralist method may be said to lie in its assumptions: (1) that it results in an autonomous model, (2) that meaning and signification are both transparent and already in place, and (3) that these findings may be objectively, scientifically verified. The essence of the post-structuralist critique may, in turn, be summarised as:

> [Post-structuralism] involves a critique of metaphysics (of the concepts of causality, of identity, of the subject, and of truth), of the theory of the sign, and the acknowledgement and incorporation of psychoanalytic modes of thought. In brief, it may be said that post-structuralism fractures the serene unity of the stable sign and the unified subject.
>
> (Young, 1981:8)

Thus the post-structuralist would reject the 'commonsense' understanding of a world of objects or notions existing independently of the linguistic symbols ('signifiers') through which they are addressed: knowledge is bound up in texts and discourses which represent it through such signifiers; (subjective) reality is in perpetual flux and meaning is created only through an interplay of texts. Consequently, all perceived meanings, objects, and realities can be analysed only through a deconstruction of these constitutive properties (Reed, 1996). It may be summarised that:

> Poststructural analyses demonstrate how signification occurs through a *constant deferral of meaning* from one linguistic symbol to another. At its most basic, poststructuralist approaches suggest that there is no stable or original core of signification and, thus, no *stable structure on which meaning can rest.*
>
> (Calás and Smircich, 1999:653, italics in original)

It should be noted, however, that there is no single, over-riding school of post-structuralist thought. The contributions made by Foucault and Derrida were significant in laying the foundations for the methodological critiques drawn on in this work. Derrida was a strong proponent of the use of deconstruction to 'peel away' the layers of 'meaning' in any given text, with his work targeting Western philosophy's central assumption of reason as the totalitarian arrogance of logocentrism. To Derrida, the structuration of meaning includes and implicates observers – and if to observe is to interact, then the detachment of the scientist is untenable. Hence the Derridan terminology of *différance* to signify the duality of a given meaning: its identity (what it is) and difference (what it isn't). Similarly, Foucault extended the concept of *discourse theory* in the 1960s and 1970s, writing in particular about the interdependency between power and knowledge in key works such as "The Archeology of Knowledge" (1969) and "The Order of Discourse" (1970). Deconstruction, according to Foucault, is inherently subversive, demonstrating how totalising discourses create the 'other' in order to exclude it (a concept comparable to *différance*). In the words of Foucault:

> Discourses are not once and for all subservient to power or raised up against it, any more than silences are. We must make allowances for the complex and unstable process whereby discourse can be both an instrument and an effect of power, but also a hindrance, a stumbling-block, a point of resistance and a starting point for an opposing strategy. Discourse transmits and produces power; it reinforces it, but also undermines and exposes it, renders it fragile and makes it possible to thwart it.
>
> (Foucault, 1979:100,101)

To generalise, the post-structuralist aims to explore a text using such 'deconstructions': "philosophical meditations delineated in very close readings of particular texts... [that] attend to the language in text and to those areas where language betrays itself" (Calás and Smircich, 1999:656). In so doing, the deconstructive approach "which, on inverting the notion of construction, illustrates how superficial are the normative structures of the social world" (Hassard, 1994:311). Giving the example of such textual analysis in *praxis*, Kilduff and Mehra argue that:

> The danger is that a concern for method can overwhelm a concern for relevance, surprise, challenge, and discovery. The appearance in scientific texts is then misleading, because science does not hold a mirror up to nature... Rather, scientific work takes place in contexts of interpretation involving rhetorical conventions and taken-for-granted assumptions.
>
> (Kilduff and Mehra, 1997:464)

One of the strong assertions, then, of the 'post-modern turn' is the rejection of such 'ocular metaphors', i.e. that it is possible to 'mirror' reality since 'seeing' equals 'knowing'. Thus the goal of methodological purity is replaced with the demystification of the technology of mediation (through the explicit detailing of the researcher's involvement) (Kilduff, 1993). As such, a paper may be referred to as a 'narrative' – it is, after all, being portrayed from a specific viewpoint regardless of the form – with (if the author is inclined to detail his or her involvement in a self-reflexive way) the replacement of the formal third-person style common to scientific narratives with the informal first-person, the aim being to involve the reader in a 'conversation'.

The post-modern synthesis

As has already been argued, the post-modern critique may be described as a general reaction towards positivism, rather than a unified school of thought. As such, post-modernists might tend towards hermeneutic or post-structuralist positions: if there exists a post-modern approach *per se*, it consists of the "incredulity towards metanarratives" expressed by Lyotard (1984). Indeed, as Hoksbergen (1994:679) has commented, "It is now widely accepted that there exists no grand or meta-narrative that explains the world from some objective, disinterested standpoint. There are only narratives based on particular perspectives and viewpoints". Furthermore, Thompson (1993:325) reminds us that "metanarratives unify by privileging one socio-cultural and/or theoretical vernacular while marginalizing, regimenting, or overtly oppressing the voices of divergence": hence the intention in deconstruction to 'privilege de-privileged voices'. Indeed, the implicit criticism of the positivist approach through such a position is expressed by Brannigan (1997:606): "One of the major narratives concerns our ability to achieve knowledge of social life through adherence to scientific principles in order, thereby, to achieve both social and scientific progress".

Such *relativism*, however, has been fiercely debated in the social sciences, with critics, such as Parker (1995:553), arguing that it establishes post-modernism as "a dangerous, and potentially disabling set of ideas". In the view of Parker, only the

positivist project avoids this "subjectivist and relativist quagmire". It is noteworthy that Parker in this instance is careful to distinguish between "self-avowed" post-modernists while accepting the post-structuralist critique. Furthermore, criticism has been made of the post-modernist stance in that while its adherents claim to reject grand narratives, it is ironic to note that, as Alvesson (1995:1065) phrased it, "The only narratives to be trusted are those marketed under the brand of [post-modernism]".

In reconciling the different, often polarised views held by writers under the general banner of 'post-theorists', it might be useful to make a distinction between 'hard' and 'soft' post-modernism. The implications of a strong relativist stance – namely that all interpretations are inherently local – can be avoided by the assertion that "our beliefs and practices affect each other and the world(s) we inhabit – we are not islands, but participants in the construction of social organizational patterns" (Parker, 1995:no pag.). Using the example of conducting research into the motor industry, the 'hard' post-modernist might assert that this would be a futile task, since each observer would have his or her own disparate conceptualisation. The 'soft' post-modernist, on the other hand, would argue that the research *could* be conducted, as a certain social construction is commonly (and readily) perceived to exist. Furthermore, Knights (1997:6, italics original) would argue that, "It may well be impossible to reconcile conflicting interpretations that localized situations throw up by methods entirely internal to those narratives, but this should not entail *imposing* an external discourse on those narratives": while it might be necessary to reason in terms of a social construction brought about by an interplay of texts, this should not take the form of a grand narrative.

Deconstruction in practice

Although the methods of textual *deconstruction* might initially seem somewhat mysterious and, perhaps, tangential to this research project, they offer a set of rational analytic techniques which may be applied in a variety of situations. To give a brief

overview of what these techniques entail, Stern (1996a, 1996b) has suggested the following systematic approach to understanding the meaning in a given text:

1. *Identification of attributes*, i.e. (a) language, (b) character, (c) plot. To begin with, it is useful to look at the elements used in the text. If, in a literal sense, we were analysing an interview, we might look to the choice of words used to describe something, such as breaking down the idea of 'quality control' into 'quality' and 'control'. Similarly, we might look to the 'voice' being used, whether it is directed at an 'insider' or an 'outsider', and what connections are being made.
2. *Construction of meaning*, i.e. (a) genre categorisation, (b) rhetorical tactic. Meaning, as will be continuously asserted here, is constructed – it is not an inherent property of a given text and needs to be 'read'. The analyst would need to ask what, in the context of the text being studied, the meaning it is intended to convey represents.
3. *Deconstruction of meanings*, i.e. (a) oppositional binaries, (b) revelation of gaps, (c) de-privileging privileged voices. By breaking apart – deconstructing – the construction of meaning within a text and looking at its attributes, we can explore the text on a higher level (what Foucault would term "reification"). In this exploration, the post-structuralist tradition suggests running it against an oppositional meaning and looking to the conflicts (in the style of Derrida), or looking to what is marginalised within it if not missing altogether (in the style of Foucault).

Although Stern's systematic approach is useful in providing an overview of what *textual* deconstruction might involve, it should be understood that in practice, the choice of particular tools depends strongly on the aims of the user: a deconstruction in the style of Derrida would draw more on philosophy and look to oppositional binaries, whereas a deconstruction in the style of Foucault aims to subvert authoritative voices, frequently drawing on psychoanalysis. As deconstruction is more an aim and an attitude than a methodology – one that intends to tear down the boundaries between academic disciplines – it is perhaps easiest to explain deconstruction through practical application.

The use of deconstruction has so far been restricted to the realms of theory. But as has already been stated, it is widely applicable elsewhere. In this example, it is proposed to demonstrate how deconstruction can be used to reify (i.e. raise to another level) the literature reviewed to a literature analysis. Deconstruction, after all, is simply the *exploration of social constructions*, and therefore suitable tools may be borrowed from other disciplines (such as linguistics or psychoanalysis) to investigate the *how* and the *why* behind the apparent reality. Thus 'deconstruction' is not a method in its own right, but simply the term for a form of analysis that questions and challenges authoritative discourses.

Deconstructing the positivist/post-modernist debate

The analytical tools presented here may, by way of a first example, be used to deconstruct – to take apart and analyse – the assertions made in the name of the 'post-modernist' school. To begin with, we might look to how the opposing 'positivism' is represented ('constructed') by its critics. Barnes (1996), for example, sets out the position taken by the positivist school (which he terms "the Enlightenment") as the following ideology:

- The assertion of progress, which is to be both gauged and achieved through the application of reason.
- A belief in the inviolability of the human subject, i.e. anthropocentric, individualistic, and rational.
- A belief that the world has order and that humans can find it.
- A belief in a 'universal truth', one that holds for all places and all times.

The identification of this set of beliefs would jar strongly with the stance taken by a self-avowed 'modern positivist' such as Habermas, however. Indeed, in the words of Turner (1992:160), "much of the criticism of positivism and the possibilities for a science of society is based upon a highly caricatured version of the 'hard' sciences". By portraying positivism as an essentially pre-modern *Enlightenment* (an 18th Century movement) philosophy, the post-modernists have constructed a 'positivism' which is

easy to critique in these 'more modern' times. Post-theorists, it should be remembered, are actually drawing on modern, scientific thought for their critiques: psychoanalysis, linguistics, and analytical logic.

Perhaps, then, this conflict should be reiterated with regard to which school – positivism or post-modernism – should be labelled 'pre-modern' or 'pre-scientific'. This debate, it would seem, is not new, as Kaufmann (1978) – writing in the 1940s – had described this philosophical divide in the social sciences as existing between "scientific" and "pre-scientific" thought. Positivism, held Kaufmann, is a pre-scientific, or pre-modern, project. The rationale behind this argument is that positivist social science asserts its scientific credentials through 'quantitative' analysis, as opposed to 'qualitative pre-scientific' thought. The implication of this argument is that science is perceived *by the positivist* to yield absolutely certain knowledge by establishing mathematical laws, while common sense – as used by pre-modern thinkers – can lead only to more or less probable beliefs.

From this deconstruction, we have observed briefly how positivists and their opponents might construct such concepts as 'scientific thought' and 'pre-scientific thought'. The positivist/post-modernist debate in the social sciences might appear, at first glance, to be one between the 'hard science' of the positivist school and the 'nihilism' of the post-modernists, yet by asking – as Derrida might within such an analysis – what happens with this 'text' when it is run against its opposite (i.e. by portraying the positivists as 'nihilists' and the post-modernists as the adherents of 'hard science'), we can question the labels ('signifiers') of these positions ('signifieds'). The post-modernists can be seen to subject the essentially pre-modern, pre-scientific approach of positivism to a barrage of *modern*, scientific critique, drawing on a variety of scientific disciplines (e.g. psychoanalysis, linguistics) in so doing.

Drawing on the conceptualisation of modernity, we might extend this exploration by arguing that, just as the positivist school takes pains to distinguish itself from pre-modern times (by adopting a caricature of science), so too does the *post-modernist* school through its very name: if positivism equals modern science, then *post-modernism* must occur 'after the modern' (despite, in fact, being inherently 'modern'

in its construction). Here we have explored another Foucauldian tool – deconstruction through psychoanalysis – to see where the "language betrays itself". This situation, however, is not limited to social science debates, as Barnes (1996:4) has remarked on a similar situation in spatial science, in that "much of the post-spatial-science debates of the 1980s... were an attempt to create something different from the past – to establish new times". Furthermore, Runciman (1995:712), in the field of sociology, also critiques similar reactions: "to talk of the 'collapse' of corporatism in the 1970s and 1980s is to imply that it had previously succeeded. But it never had... I have a similar difficulty with the notion that British capitalism ceased to be 'managed' and became 'disorganized' after 1979".

A good example of such a situation may also be found by looking to some of the 'classic' literature defining the field of economics. For instance, Adam Smith's *Wealth of Nations* differs very strongly in its mid-19th (Smith, 1850) and late 20th Century (Smith, 1986) editions. The earlier texts, for example, were published in unabridged form with lengthy annotations by the author (and with additional commentaries by contemporary economists), whereas the more recent texts are considerably smaller – only an excerpt of the earlier editions is presented, with much of this slim volume taken up by an editorial commentary explaining these 'basics' of economics. This disparity may be considered to originate in those divergent discourses surrounding the text at the different times of its publication. The earlier publications were embedded within discourses avowing Smith's *Wealth of Nations* as a seminal and defining new work, whereas the later publications are embedded within discourses informed by modernity, which presume it – as an artefact of the supposedly 'less developed' past – to be of an introductory character that will long since have been surpassed. It is ironic to note that part of the analysis in a now unpublished part of the text – dealing with what would now be termed 'foreign direct investment'– bears remarkable similarities to the works of certain *avant-garde* Japanese economists writing more than two centuries later.

Re-evaluating business literature using deconstruction

In the above chapters, the literature (we might now prefer to qualify this term as 'industry and academic discourses') suggested that in the British automotive industry, the 20th Century had seen the evolution from an early craft/workshop production system to a modern system of integrated mass production. This process had also, since the beginning of the 1980s, seen the 'Japanisation' of the principal firms involved (such as the adoption of JIT and TQM by car assemblers and their immediate suppliers) and the adoption of new manufacturing technologies (such as CAD/CAM, AMT, and flexible manufacturing) which by the end of the 1990s, had fundamentally changed the nature of the industry. Contemporary issues in the industry were found to include the rationalisation of the supply chain, greater alliances and subcontracting arrangements between firms of all sizes, and the implications of the increasingly global nature of operations.

Yet if we bear in mind that the above trends are embedded in *discourse*, we need to ask ourselves what their relationship to *experiential reality* might be. In other words, to what extent is *what we believe to be true* representative of *what is actually taking place*? Thus it is proposed to deconstruct the above discourses (at the same time exploring how they are constructed) in order to understand better how our concepts of the automotive industry are framed within discourse.

Re-telling the past: Modernism, modernity, and mass production

To begin our analysis of the key constructs associated with the automotive industry, we should reiterate the *talismanic power* with which they have become laden. Such perceptions of the industry are shared not only by its researchers, but also by the media and those operating within the industry. It becomes necessary, then, to consider the culture of modern society. After all, what other industry or product is so quintessentially *modern* as the motor car? As Allen writes:

> If the emergence of a modern industrial economy can be epitomized by the rise of factory production and a factory workforce, its characteristic image must surely be that of the giant industrial workplace in which car after car, or other consumer durable, is turned out on a seemingly endless assembly production line.
>
> (Allen, 1992:232)

Furthermore, according to Tolliday and Zeitlin:

> The automobile industry has long occupied a central place in debates about management, technology and work in advanced industrial societies. Since the days of Henry Ford the industry has served as a model of economic expansion and technological progress based on mass production.
>
> (Tolliday and Zeitlin, 1986:1)

Indeed, we can say that the automotive industry is bound up in discourses of modernity, since the motor car is perceived as a symbol of modern times, and therefore as something that must be eternally new. A symbolic industry, then, dominated by large, powerful firms and distinctive production processes, it is a "modernising influence" (Bloomfeld, 1978): "The automobile industry stands for modern industry all over the globe. It is to the twentieth century what the Lancashire cotton mills were to the early nineteenth century: the industry of industries" (Drucker, 1972:172).

The first construct we might begin discussing is that of the synonymity of mass production and the automotive industry. After all, the early assembly lines producing the heavily-standardised Model T ('available in any colour so long as it is black') have established the *Fordist* production system at the forefront of popular thought. It is this strong identity connecting the automotive industry, mass production, and Fordism which helps to construct its particular character. To America, this system might be said to be laden with particular representative significance:

> The history of U.S. business during the past 100 years has been a story of mass production and mass distribution of standardized goods. Scholars and practitioners who examined the economic landscape have generally been drawn to large corporations that built their fortunes by transforming fragmented and heterogeneous markets into unified industries. At the heart of this transformation were strategies based on standardization: standardization of taste that allowed for standardized design, standardization of design that allowed for mechanized mass production, and a resulting standardization of products that allowed for mass distribution.
>
> (Lampel and Mintzberg, 1996: no pag.)

The authors furthermore demonstrate the vigour of the US standardisation movement in the earlier half of the 20th Century by citing a 1929 survey of 84 product classes, in which a noticeable reduction in variety was evident, in some cases showing a reduction of 98% compared to levels in 1921.

As might already be suspected, the portrayal here of mass production as being synonymous with *American* cultural perceptions of industrial modernity is deliberate. In our deconstruction, we have suggested that there is a cultural element underlying the popular perception of the dominant production paradigm. As may, however, be recalled from *Chapter 1: The British Motor Industry*, the early British motor industry arose out of very different circumstances to its American counterpart. After all, the American market was both large and fairly homogenous, whereas the European markets were much smaller and more diverse, with competition on grounds of design and body shell customisation running high – in stark contrast to the uniformity of the Model T. Equally, the low-skill, capital-intensive system of mass manufacture stood in sharp contrast to the higher-skill, labour-intensive European system sometimes described as "semi-craft" (Volpato, 1986) or 'mechanised craft production' – a fusion created through the gradual industrialisation of the existing base of craft production. The roots of the British automotive industry, may, as Lamming has argued, be found at the end of the 19th Century when:

> Craft production had grown from the rich industrial experience which existed in Europe following the industrial revolution, over a century earlier, and the history of skilled manufacture, professionalized by the 'apprentice-journeyman-master' system and the guilds.
>
> (Lamming, 1993:2)

Yet as we will also remember from the brief sketch given above of the British motor industry, mass production gradually replaced the existing production systems, with the earlier networks of components suppliers become subsumed into ever fewer, ever more vertically-integrated, car manufacturers (Allen, 1992). Why, we might ask, was this so avidly pursued? We might argue that this was because vertically-integrated mass production ('the American model') had come to represent the 'expected' character of the industry – one constructed through discursive practices and not through actual observation of the industry. This was a sufficiently potent construction to become translated into practice: in other words, because people perceived the

industry to employ mass production as the dominant form of automotive construction, so the industry in turn took to such methods in the 'real world', seeking to 'live up to' these discursive expectations. In this sense, then, the belief in mass production can be seen as a kind of tautologous 'self-fulfilling prophecy': with that which was believed to be true in the first place being made true subsequently in order to confirm that initial belief.

Thus, even despite early failures – such as the attempt in 1932 to transfer production and management practice from Ford's American plants to Dagenham in England (which would run at under-capacity until 1943) – mass production did become the dominant (because expected) form of automotive manufacture. Moreover, the associated pursuit of ever-greater 'economies of scale' predominated, leading to ever more calls for "rationalisation" of the extant diverse industries in Britain: one that eventually found its zenith in the effective triumvirate presented by Ford, Vauxhall, and British Leyland.

The hidden text: Discourses of Japanisation, rationalisation, and supply chain management

If the first deconstruction here has served to challenge the authority of mass production as a dominant paradigm in the automotive industry, then our second one will build on the first by considering the impact of the industry's 'Japanisation' in the 1980s. These changes have already been documented in a wealth of texts, and therefore our treatment of what is involved need be no more complex than a cursory review. In short, it may be said that the following changes are associated with 'Japanisation': the introduction of methods such as Total Quality Management (TQM), an appreciation of the importance of the supplier base of a firm (i.e. close relationships, such as design co-operation between the customer and supplier), and the drive for integrated logistics networks (e.g. JIT manufacturing).

Within Japan, the car manufacturers had become ever more assemblers of components and sub-assemblies designed and manufactured by close suppliers. Indeed, as Maxton

and Wormald (1995) noted of the Japanese supplier system of "delegation upon delegation", outsourcing as much as 75% of the value of a motor car had become the norm. It has also been argued from the viewpoint of the British motor industry that "[w]here once a single company could design, develop and build a vehicle alone, the numerous material technologies and related design and development costs require the involvement of a plethora of companies across the manufacturing industries" (Twigg, 1990:33).

Yet we might, through a growing appreciation of the early history of the industry, wish to challenge these assertions. After all, writing in the 1950s, Maxcy and Silberston (1959) drew attention to the high proportion of outsourcing in the motor industry as a "striking characteristic", citing one contemporary model of motor car as having a bought-out content of nearly 80% (see *Table 10* below). Owing to the nature of the components industry, three quarters of this expenditure was accounted for by only six firms – the statistics here being hauntingly reminiscent of the 'modern' Japanese system of production.

Table 10. Major bought-out components as a percentage of total expenditure in a typical small car in 1954 (after Maxcy and Silberston, 1959)

Component	*% of total expenditure*
Body	46.0
Electrical equipment	9.3
Tyres and wheels	8.2
Front suspension assembly	4.9
Castings	4.7
Brakes	3.2
Forgings	2.7
Total	*79.0*

Bannock (1972:18) noted a similar situation when he wrote that British car manufacturers in the 1970s "are, to a very great extent, assemblers and processors of components and materials purchased from other firms". The perceived drift of car manufacturers into car assemblers, casting off ever more of the supply chain onto a decreasing number of key Tier-1 suppliers, is not a new concept, nor even a departure from the recorded history of the British motor industry: "The low level of integration

in the UK industry reflects the existence, for historical reasons, of a very large and efficient component industry and there is no clear evidence for any substantial increase in integration since 1954" (Bannock, 1972:18).

We might now wish to question the authority of popular discourses surrounding the 'modernisation' of the British motor industry through 'Japanese' means. Looking at how these discourses are constructed, it can be argued that they are – by definition – portraying 'Japanisation' as superseding a flawed mass-production paradigm. To work from the converse assumption that the mass production paradigm had not been in ascension, and that a system analogous to the modern 'Japanese' one had already dominated, would lack the contrastive power that renders this 'revolution' so apparent within the first approach. Furthermore, discourses promoting the idea of considerable manufacturing disparity across the 20th Century can be identified, and can here be seen to exemplify and account for differences between *accepted* notions of the industry's development and its recorded *historical* development: we might be surprised to discover, for example, that statistical process control dates to the 1930s despite its current association with 'modern' TQM (BSI, 1942). Indeed, a similar point has been made by Graham (1988) when deconstructing JIT:

> The myth of JIT allows organisational changes to be implemented as an imperative, claiming that they must be introduced to defeat foreign competition. To argue that these techniques owe something to developments pioneered in the USSR or Scandinavia would make it difficult to argue that their introduction is imperative, so they are continually linked with being Japanese... With JIT, discourse firstly develops how the techniques observed in Japan can be adapted to become congruent with existing conditions, practices and objectives. Secondly, the discourse moulds everyone's understanding of the meaning of JIT. In the discourse, society might appear to be able to shape the technology... but under the surface the discourse is shaping society – essentially to limit any redistribution of power which might result from change.
>
> (Graham, 1988:74)

These arguments may be taken still further by looking to subtexts of *power* and *authority* (in the style of Foucault) in addition to those of modernism and modernity. Graham (1988) has not been alone, for example, in treating 'Japanisation' as a myth. De Cock (1998) and Lawrence and Philips (1998) have suggested similar deconstructions of Business Process Re-engineering (BPR) and TQM by pointing towards a disparity between the 'meaning' of these basic concepts as they are expounded in the literature and the 'means' in which they are enacted in

organisations. Although these systems are ostensibly aimed at improving the performance of a company, it can be argued that when we look at them as discursive constructions linked tightly to forms of power and knowledge, they are used to justify actions which might less kindly be described as 'strengthening top-down control'. Rather than describe TQM as a universal panacea, we might question the intent behind the words ('Total quality management') and argue that in 'quality control', the emphasis is very much on 'control' – an example of where 'language betrays itself'.

Discursive constructions: Creating visions of the future

Looking at the automotive industry and its 'romance' with mass manufacture (i.e. Fordism), we should note also that a growing number of authors have juxtaposed the fear that the current status quo may be destroyed through economic, technological, and social changes with an optimism regarding the promise of new triumphs made possible through these self-same forces. As Piore and Sabel have written:

> Our claim is that the present deterioration in economic performance results from the limits of the model of industrial development that is founded on mass production: the use of special-purpose (product-specific) machines and of semiskilled workers to produce standardized goods. We argue that the technologies and operating procedures of most modern corporations... established immediately after World War II – all must be modified, perhaps even discarded... Most dramatically, we argue that to understand the choices we face today, we must clarify the choices made in the past.
>
> (Piore and Sabel, 1984:1)

This break with the 'industrialisation' of the mass-manufacturing paradigm has been made in the terminology frequently employed: 'post-industrialisation' is a phrase used increasingly to describe a series of much-discussed changes in manufacturing and production. Or rather, we should qualify this statement by saying that the concept of post-industrialisation has entered popular discourses on industrial activity, as it represents the popular perception of one particular industry – the automotive one – with which this research is concerned. Indeed, post-industrialisation, like post-modernity, is a label applied to an increasing agglomeration of items: an emphasis on flexible manufacturing and small, specialist firms ('flexible specialisation') rather than mass-manufacturing by global behemoths; an emphasis on marketing images

tailored to individuals and sub-groups rather than the mass-marketing of products (Cova, 1996; Nooteboom, 1992); the adoption of 'world class', 'Japanese', or 'quality' techniques within a firm; an emphasis on the uses of information and communications technology; and a shift towards 'alliance capitalism' (networking and alliances between firms both horizontally and vertically in the supply chain).

Løwendhal and Øivind (1998) have argued that this "post-industrial era" is characterised by firms facing increasing complexity, as a result of knowledge and technology dissemination "fundamentally altering the competitive context of firms and managers". This change, from an industrial (or modern) society to a post-industrial (or post-modern) society is described as "a transformation which may turn out to be as fundamental as the one from agrarian to industrial (or modern) society". Petmesidou and Tsoulovis (1994) add political factors to the existing mix of turbulent changes that the post-modern world is suddenly facing, framing the Fordist/Post-Fordist and mass production/flexible specialisation debates within a national political context, i.e. into a distinction between 'American', 'Italian', 'German', and 'Japanese' forms of production.

Yet as before, we may challenge the authority of these discourses. Others, such as Kolodny *et al.* (1996:1459) have voiced concerns that the flexible specialisation school overstates its case, as "Similar and related organizational innovations have occurred without the stimulus of new technology". We might wish to go a step further here and query the means whereby these discourses are constructed. As noted previously, the mass production paradigm (that these discourses aim to overturn) has become synonymous not only with the automotive industry, but through it, modern industry in general. However, the Western European system of production – and that of automotive manufacture in Britain specifically – has different historical antecedents.

For example, we might note that discourses of post-industrialisation envisage a historical evolution of industrial production as passing through the following stages: (1) the *craft guild* as the dominant form of production after the 12th Century, (2) *mercantilism* rooted in the 16th Century when commerce with non-local markets grew, (3) *factory production* following the Industrial Revolution of the 18th Century, (4) the

modern corporation as typified by mass production, and (5) the *agile corporation* that has gone beyond and into the realms of post-industrialisation ("Full Circle", 1996).

In this model, the dominant form of production is seen to progress through five stages, in which the 5th stage is analogous to the mores and values of the 1st. Such distinctions, while possessing a pleasing symmetry of form, are facile and simplistic, painting the rich and varied tapestry of socio-economic history without regard to definition. Such a compartmentalisation requires considerable ellipsis: the distinctions between "guild" and "agile" production make no mention of the millennial gulf of technological and organisational change. The increasing pace of change from "factory" to "modern" to "agile" forms of production owes more to a *modern* (as per the arguments of industrial symbolism embedded within popular discourses surrounding modernity) world-view than to any recorded historical evolution.

It is worthwhile comparing this model to one mentioned by Braudel (1982:298) while citing the work of Hubert Bourgin, who classified the early industrial activities of the 15th to 18th Centuries as: (a) tiny family workshops, (b) dispersed manufactories, (c) concentrated manufacturing, and (d) factories. Although there existed some degree of chronological succession of one form of manufacturing to the next, Braudel (1982:302) is careful to reiterate that there was "no logical and natural succession" between these different activities. For example, the concept of 'craft manufacture' was not differentiated from 'industrial manufacture' throughout this period. We may furthermore question the discursive association of flexible specialisation and mechanised craft production with Eastern cultures (such as Japan): the implication that flexible specialisation is not endemic to Western Europe is paradoxical if flexible specialisation is similarly being linked to the concurrent development of the modern consumer era with the Industrial Revolution (Knights and Morgan, 1993).

Thus post-industrialisation need not be described as constituting a break from industrialisation: mechanised craft production enjoys the same heritage and may even have dominated in the past, but has simply not been perceived in this way. Japanese techniques, for example, share a similar heritage to European scientific management, and are thus hardly 'new'. This 'newness' needs to be reconsidered with regard to the perception that, in a modern world, all must strive to be eternally new. This is

particularly true of the car industry, functioning as a talismanic symbol of industrial modernity. Thus, its techniques are subject to these same discourses: they must be eternally new and better, and the ones of the past must be regarded as old and inferior. Therefore Morris' use of craft production is ignored, and Henry Ford's use of mass-production exaggerated. Now, as mass-production is rejected, craft production too has to be perceived as new – as a break from the past.

To conclude, we should be aware of sub-texts of modernism and modernity resonating through the above discourses. This is also highly visible in related discourses of globalisation, a phenomenon described by Kobrin (1992) as "entering a period of turbulent, systematic change in the organisation of the world economic and political order – a period comparable to the transition from the feudal to the modern era". Kobrin's description – which maintains the usefulness of the "neo-medieval" metaphor to describe the formation of the "modern digital, global world economy" – may be read as a reaction itself bound by the logic of modernism: since the 'modern world' is supposedly distinct from the 'distant past', so continuity within Western European culture and society (particularly the assumption that "turbulent, systematic change" is a *recent* phenomenon), must be rejected, or when noticed, dismissed as an anomaly.

In the automotive industry, the problem of 'ownership' may be questioned with regard to the breaking down of the monolithic structure of the nation within modernity: "With the emergence of an integrated global economy, however, it is difficult to determine what is a national product, a national technology, or even a national firm" (Kobrin, 1998). For example, while Honda might be the leading North American exporter of passenger cars, the question may be raised as to whether Honda is an American, Canadian, or Japanese manufacturer. Thus as Paterson (1999) and Woodiwiss (1996) have argued, the term 'globalisation' is – both discursively and materially – largely just an extension and reorganisation of ideas of 'development' or 'modernity', representing "myth making and ideology" rather than a new intellectual paradigm (Spich, 1995).

Summary

In the above explorations, we have seen the advantages that might be derived from taking a deconstructive approach. These examples from the initial literature reviews have been *reified* to the level of literature analyses through the application of discourse theory. We have furthermore seen that deconstruction is less a functional methodology than an attitude towards analysis, one that seeks to question, challenge, and subvert the privileged positions of authoritative discourses (such as those concerning mass production, Japanisation, or the 'new' production systems). In so doing, we have also been made aware of the existence of sub-texts (such as the enforcement of management authority through TQM) and accordingly, as Derrida might say, that there is always more than one level of interpretation available.

Thus, as has been argued here, the combination of a historiographical, post-structuralist approach with a modernist perspective, enables the researcher to deconstruct and analyse discourses of 'industry' and 'progress' in a way that questions many of the implicit – and therefore overlooked – assumptions and narratives inherent within them. Indeed, as Jackson and Carter concluded at the end of their study of the effectiveness and 'newness' of management techniques over the 20th Century:

> Clearly, any attempt to regress to the "past-perfect" is delusory. The past was not perfect, the same or kindred problems existed then, and, what is more, the techniques used to solve them did not work then and there is no reason to suppose that they will work if used again. We are now in the "imperfect future" of the 1930s, and perhaps all that we can say is that we have so far failed to cope with the problems that were faced then.
>
> (Jackson and Carter, 1992:24)

It is inherent to Western modernity that perceptions of the past be not only continuously shifting, but skewed in such a way as to emphasise, if not construct, a divide between the 'old' (i.e. inferior) and the 'modern' (i.e. superior). To discover, then, that similar assembler/supplier relationships were once in place and credited with similar benefits to the industry in the 1920s and 1930s as they are in the 1990s, should come as no surprise. Rather, the researcher should approach such narratives with a combination of scepticism and inquiry, as such attitudes towards the past tell

more of perceptions of the present state of the industry and where companies might be perceived to be going.

Proposed research methodology

So far, the use of post-theorist methods in exploring both theory and literature has been discussed. But in the above chapters, it has also been argued that there is a paucity of empirical research into the supplier-base – made up of the various 'tiers' of companies – and that an exploratory approach has been suggested (Denzin, 1978). Furthermore, authors such as Harrigan (1983) hold that multiple methods of data gathering would best serve such an exploration, facilitating a more detailed interpretation of the data. These approaches yield both qualitative and quantitative data, permitting a more comprehensive understanding of the phenomenon (Jick, 1979). However, the post-theorist critiques may also be applied to this *praxis* situation: the collection and analysis of data. Before exploring these further, it is useful to note the existing criticisms of similar data collection practices within the field.

Criticisms from related research

Borch and Arthur (1995), for example, in studying strategic networks among small firms, found that such research required a broad set of organisational and environmental variables, and that the methodological approach chosen therefore needed not only to provide such data, but also the tools with which to interpret it. The authors criticised traditional approaches to strategic management research, which they considered to be predicated on "descriptive orientation, lack of conceptual adequacy, the common sense nature of findings, reductionism at the expense of complexity, lack of scientific rigour, and over-emphasis on statistical techniques" (Borch and Arthur, 1995:419). The growing popularity of the network concept may be distinguished from the neo-classical models as per *Table 11* (overleaf).

Table 11. The difference between neo-classical management models and strategic network theory (after Borch and Arthur, 1995)

	Neo-classical principles of strategic management	*Strategic network management principle*
Flexibility	Low, limited to formal contact	High, based on openness to the consequences of trust
Conflict-reducing mechanisms	Power-oriented. Based on formal agreement and law	Norm-oriented, based on communicative action and agreement
Range of relation	Limited in time and space through formal contracts	Long-range because of transaction-specific investments
Connection to personal and social *lifeworlds*	None. Instrumental and system-oriented	Several. Co-ordination through involvement of personal affiliation and social norms

Indeed, as Sayer (1992) has argued, the usefulness of statistical methods depends crucially upon the type of objects to which they are applied and the type of research design to which they are deployed. Furthermore, the "[e]valuation of the possibilities for statistical analysis requires a non-statistical examination of the objects of interest" (Sayer, 1992:196). In the case of the UK automotive industry – and in particular, the automotive *components* industry – emphasis has been placed more strongly on "benchmarking" manufacturing performance than on exploration (Lowe *et al.*, 1997; Delbridge *et al.*, 1995; Oliver *et al.*, 1994; Neely *et al.*, 1994), the argument being that "[p]erformance measurement... is the process of quantifying action, where measurement is the process of quantification and action leads to performance" (Neely *et al.*, 1995:80).

The underlying implication here is that the industry structure, issues, relationships, and trends are 'already known'. The argument that the automotive industry and its research are subject to discourse can be applied also to this phenomenon, in that the most basic assumptions used in researching the industry need to be emphasised in precisely these terms – as assumptions that need to be validated – within any investigations: "forget what you think you know", as Vasilash, 1998a, advocated. Furthermore, the use of the tiering system to rank companies in an arbitrarily-created value judgement should be avoided as it unconsciously places certain firms ('first-tier' suppliers) in a position of greater *value* – and therefore greater *interest* – over the

greater number of suppliers, with whose particular role in the supply chain this research is concerned.

Within the literature already reviewed, the theoretical models of the SME suppliers were based strongly on network theory: indeed, such network models have commonly been regarded as the best means for accounting for the competitive advantages peculiar to such firms, and they have even been employed to study international manufacturing networks (Shi and Gregory, 1998). Thus the research here needs to investigate not only the supplier- and customer-base of the firm in question, but its *relationships* – the 'lifeworlds' – thereby created, mandating a balance between the 'depth' of the data-collection method and its 'breadth' (i.e. validity). Such a balance needs to be struck carefully, as Brush and Chaganti (1996) found out in their study of managerial practices and co-operative strategies among small firms. In this, the authors initially surveyed 97 firms by means of a questionnaire survey. However, they found that, "While this analysis revealed some broad patterns, several key questions were unanswered... To address these issues, the quantitative data was supplemented with qualitative case studies gathered through extended interviews". In particular, these interviews were formulated to explore the missing "circumstances leading to cooperation, partners' motivations, outcomes, and similarities in patterns of strategies".

Thus it may be argued that qualitative methods are required for researching causality, as:

> the nature of individuals – whether people or institutions – and their social framework are rarely simply externally related and susceptible to treatment simply as variables... The main verdict on statistical methods must therefore be that despite their logical rigour they are primitive tools as far as explanation is concerned.
>
> (Sayer, 1992:198)

Osborne (1996) also applied a similar qualitative method for conducting exploratory research (i.e. in-depth personal interviews conducted among a small sample of firms) while studying the degree and nature of channel integration in the small- to medium-sized manufacturing exporting environment in New Zealand, and a similar case-study approach was used by De Toni and Nassimbeni (1995) in their study of Italian supply networks, as well as by Lowe (1993) in researching the changing role of the

production supervisor. Furthermore, Harland (1996), in a comparative study of British and Spanish supply chains, employed an empirical approach – based around 107 semi-structured interviews conducted among 50 firms – to further explore the emerging issues, noting that even the performance measurement of these firms was not formalised (Harland *et al.*, 1993). Similar methods, such as participant observation to develop an "appreciation" of the social world under study (Delbridge, 1995) or to understand the "language" used within the company culture pertaining to the management of e.g. technology (Probert *et al.*, 1999) have also been suggested.

Furthermore, Mick and Fournier (1998) used a similar approach when investigating consumers' perspectives, meanings, and experiences in relation to a range of technological products, through a series of "lengthy and repeated" phenomenological interviews with 29 households. This was itself preceded by four in-depth interviews and a focus group of adult volunteers "to initiate us to consumers' terminology and perspectives on the meanings of 'technology' and related products" (Mick and Fournier, 1998:127).

Methodological implications of a post-structuralist stance

Thus, in researching certain concepts that are common among firms within the automotive industry, care must be taken to explore what exactly is meant by the terminology as employed *by those firms*: "Concepts in society must be explained at their 'own level', or as some would prefer to say, their meaning must be *understood*" (Sayer, 1992:235, italics in original). The implications of this are that "post-structural approaches can be implemented in empirical studies within organizational settings, and not only through the analyses of the written texts with which this type of work is most often associated" (Bartunek, 1998:161). Thus although the approach used by Mick and Fournier (1998) above may at first glance appear similar to the methodology being outlined here, it is in fact following a *structuralist* position that universal signifier-signified relationships may be constructed (the post-structuralist position, it will be remembered, is sceptical of such universality in that there is no universal meaning for a given term – all is local). Indeed, instead of *deconstructing*

the narratives, Mick and Fournier *constructed* a framework within which the research was embedded.

However, it may well be asked how deconstructions can be made in a situation where every such text is read solely within its own context. The structuralist method utilised by Mick and Fournier (1998), after all, lends itself more obviously to a data analysis. Yet the Lyortardian scepticism towards meta-narratives does not, in fact, present any significant boundary to overcome, as:

> By maintaining a specific logic and orientation, sociological theory should provide a set of conceptual tools that can operate as a theoretical *lingua franca*, as a flexible vocabulary with no foundationist pretensions, which can help sociologists establish bridges between their own and other disciplines as well as between competing sociological paradigms.
>
> (Mouzelis, 1996:134, italics in original)

Thus in the view of Mouzelis, and, for that matter, Foucault, this scepticism should be read merely as such – a scepticism – rather than a denial of, for example, the existence of a socially-constructed meta-narrative (e.g. automotive assembler leadership) which may well be held by firms within the industry. In a deconstruction, we would explore social constructions, such as how a text might be embedded in discourses of globalisation or the supply chain (two meta-narratives). Exploring the existence of socially constructed meta-narratives, however, does not mean these need to be taken on board by the researcher. The explanatory power of, for example, the supply chain model needs to be approached with scepticism. Moreover, the construction of such models (narratives) is antithetical to the process of deconstruction, and thus a deconstruction should not – can not – *model*.

In a similar manner, Kilduff and Mehra (1997:453) have argued in favour of constructing "an epistemology that combines a skepticism towards metanarrative with a commitment to rigorous standards of enquiry in pursuit of radical challenges to accepted knowledge". For example, a renewed scepticism and an exploration of the real and the unreal: hyper-reality (i.e. metaphor, models, and myths) replacing everyday life. Equally it focuses on the margins rather than the centre of the text, drawing attention to that which is understated and never overtly recognised. The dismissal, for example, of a single 'real world' to be investigated in favour of a

multiplicity of beliefs may be rationalised, as Derrida might argue, by the corresponding belief that such structures exist: from this perspective, contexts may be considered relatively stable – and this stability allows for coherent interpretation. Likewise, the counterintuitive experimentalism of the 'hard' sciences should not be overlooked:

> To understand the created world – that is, the world that humans have created and to which they respond – scientists may have to strive to understand the fictions that people perceive and enact. To accept that there is a world to which people respond is not the same as saying that we all agree on how this world should be represented, or that there is, in fact, any universally agreed on representation.
>
> (Kilduff and Mehra, 1997:463-464)

Rather than dismiss grand narratives (such as popular discourses concerning the automotive industry) in favour of purely local contexts, the post-structuralist researcher *opens up* the deconstruction of a text to include such discourses within which the text is embedded. In our automotive example, the use of 'supply chain management' language and models within a text would be read in both a local context (i.e. the meanings attributed by the author) but the exploration would also be extended to include these discourses – while at the same time being sceptical that such discourses in and of themselves were a sufficient explanation. In the words of Kreiner:

> To aspire to learn what organizations *really are* is a self-defeating task. Rather, we aspire to learn what organizations *are not*, thus learning not to fall victim to the seductive imagery of organizing. And we aspire to learn what organizations *might possibly* be behind their rational and institutional expressions.
>
> (Kreiner, 1993:37, italics in original)

The goal of the research methodology proposed here is therefore to avoid the conventional construction of models (and their subsequent 'testing'), and rather to deconstruct and analyse those uncovered in both the extant literature and the texts furnished by the research project. Thus in our automotive example, discourses surrounding the 'supply chain' are *explored* instead of being used to model the industry. Taking such a deconstructive approach, it should be remembered, as Samuels has argued, that:

> The ability to do deconstruction does not obviate the ubiquitous problem of interpretation. Deconstruction by itself does not generate solutions to interpretative and other problems... Deconstruction should be considered a self-referential tool of analysis.
>
> (Samuels, 1998:1127)

Thus by conceptualising the so-called 'post-modern critique' as embodying a disparate set of tools and attitudes (hermeneutics, textual analysis, discourse theory, psychoanalysis, historiography) – borrowed from elsewhere with an interdisciplinary eclecticism (philosophy, linguistics, psychology, anthropology) – the distinction made by Foucault between the methodology of *praxis* and *analysis* becomes clearer. Deconstruction is an analytical tool that is not bound or limited to a particular form of data gathering (e.g. interviews, case studies, questionnaire surveys) and may therefore be applied universally. This view differs from the example research methodologies cited above in that analysis and praxis are treated as a single entity.

Interviews, case studies, and textual analysis

Indeed, the historiographical, deconstructive stance taken requires the construction of texts before they can be deconstructed: unlike the standard literary text, these do not come 'pre-packaged'. Thus in the above chapters, then, the (academic) discourses surrounding the automotive industry, and small firm suppliers to the British motor industry, have been explored – and deconstructed – in order to gain both familiarity with and insights into the specific terminology – if not the mythology – of the industry. As Rowlinson and Procter have argued:

> The narrated history of an organization can only be referred to by way of textual artefacts. Organization members may well refer to events that are not supported by such textual traces... but this does not mean to say that [they]... refer to events which are mythical.
>
> (Rowlinson and Procter, 1999:377)

Thus in the research work outlined below, a similar combination of interdisciplinary methods is proposed for studying the automotive industry. The above explorations and deconstructions will be merged with a similar analysis of (1) a questionnaire survey and (2) a series of interviews. These may be located as *Chapter 6:*

Deconstructing the Questionnaire Survey and *Chapter 7: Textual Analysis of the Follow-Up Interviews*, respectively, with their antecedents and conduct being more fully discussed in those sections.

In the case of the former, a standard questionnaire survey (intended to yield descriptive data and to provide a statistical background to the research) was conducted and its results may be used to explore the practical implementation of a post-structuralist, hermeneutic stance. Furthermore, this stance will be contrasted and compared with a broadly similar 'traditional' (positivist) project conducted in the early 1970s at Aston University.

In the case of the latter, a series of in-depth interviews with 42 of the original sample may be used to construct texts concerning the issues both explored in the above literature-based discussions and the questionnaire study. It should be noted that although the methodological praxis in the gathering of this data (i.e. interviews, case studies) does not differ greatly from more 'traditional' research, a distinction can be made in the methodology of the analysis. Where findings from such 'rich data' might more conventionally be *correlated* or *grounded* through a statistical analysis, the post-structuralist would explore instead how meaning is constructed by the respondents (i.e. in a local context). Instead of invoking grand narratives to give context and meaning, it is proposed to 'open up' the exploration further by considering how the *respondents'* responses are embedded within discourse. Thus there is a shift from the *correlation of narratives* to the *analysis of texts*.

Chapter 6: Deconstructing the Questionnaire Survey

Introduction

The deconstructive approach outlined above can now be applied to a 'conventional' data analysis: a questionnaire-based survey of UK automotive firms derived from a randomly-chosen sample of 49 firms (using random number generation) from an alphabetical list of 2,004 given in the 1997 *SMMT Directory*, a listing of those companies perceived by the industry association to constitute the automotive industry within the UK. This includes car manufacturers, export agents, component manufacturers, and design engineers, be they subsidiaries or independent companies, with no distinction being made other than the alphabetical ordering of company names. Although the role of SMEs in the supply chain remains the main focus of this investigation, it is useful to compare this with an earlier survey from the early 1970s into exporting by automotive component manufacturers. In so doing, it is possible to (1) contrast directly the *conduct* of the current research with that of a more 'traditional' approach, and (2) explore the implications of deconstruction for both primary (i.e. the current research) and secondary (i.e. the earlier study) analyses. Thus after exploring the origins of the two studies, it is proposed to consider the findings in relation to the following variables:

1. Descriptive statistics of the sample, in which the modelling of the industry using questionnaire-derived data is explored.
2. Alternative measures of 'dependency' of respondent firms and the implications of these distinctions in the analyses of the two surveys.

3. The international operations (exporting in the case of Redden) of the surveyed firms and the implications of these for the British automotive industry.

Of course, a crucial distinction can be made between the deconstruction of the current research and that of Redden: in the current research, the deconstruction can 'open up' the analysis to include industry discourses (such as the ones reviewed in the literature) and the 'rich data' of the interviews; the Redden study requires interpretation and extrapolation. These considerations will be addressed below.

Reading the text of the Redden study

In a literal sense, we can begin by looking to the text of the Redden study and asking how meanings are constructed within it. In the foreword to this published work, for example, the contemporary scene is set: "During the period when this study was being undertaken, the energy crisis occurred which, together with rapid inflation, created considerable industrial and economic problems for the U.K. motor-vehicle industry" (Redden, 1975:1). Furthermore, Redden draws the conclusion that, "It would appear that the future for the automotive component manufacturers may well be bleak". From this summation, we may draw several conclusions: (1) that, obviously, the vehicle industry was perceived by the researchers to be in a state of crisis; (2) that the "motor-vehicle industry" is furthermore perceived as being of over-riding concern to the "motor-vehicle parts and accessories industry" under investigation; (3) that through the dry third-person voice being used, the author is presenting the work as an objective scientific analysis based on an acceptable analysis of (statistical, as we further discover) fact. Already, we have identified a number of constructions – that is to say, assumptions – implicit within the text. In addition, we have encountered an example of a *rhetorical tactic*, in which a specific meaning is constructed (scientific objectivity) through the way in which language is used (third-person). Even if the wider implications of this latter point are not immediately clear, it serves to illustrate the reasoning behind the terminology being used in this work: not only is the Redden study a *text* that has to be *read* (i.e. meaning is interpreted from it), it is a *narrative* delivered from the standpoint of the researcher who originated it.

Following this initial discussion of the stated aims and tone of the Redden study, it may now be useful to investigate the data gathering method utilised. The research cited by Redden (1975) was based largely on statistical data collected during the period 1969-1972. According to a DTI report cited in the survey, there were roughly 8,000 manufacturing companies operating within the region at this time, of which some 7,000 were designated as 'small firms' (i.e. with fewer than 250 employees). 40% of these – or some 3,000 firms – were considered to supply a significant proportion of their components to the automotive industry. Although part of this data was derived from external sources (e.g. concerning European producers), the survey included a sample of 69 automotive component parts and accessory manufacturers in the West Midlands. The data was collected by postal questionnaires returned from 41 firms and from interview visits to 28 others. These West Midlands firms were identified and selected from classified trade directories, UK trade registers, telephone directories, press references, and from personal knowledge.

Comparisons with the current research

In terms of sample derivation, then, the Redden study may be contrasted with the research presented here. We might question the construction of the sample of firms used by Redden: an initial 43 firms were selected *by the author* as representative of the industry, and a further 28, which were already *personally known to the author*, were chosen to raise the size of the sample. Within the text itself and its ostensibly objective use of statistics, this *personal, subjective* selection is marginalised: here, in the style of a Foucauldian reading, we can move this from the margins of the text to the centre of our analysis. Drawing again on Derrida's use of a binary opposite, we could argue that the use of a strong statistical analysis within the Redden study is not so much an unquestionably valid methodology but one which makes the data *unquestionable* by granting it the appearance of *statistical validity*. In this text, the statistical analysis of the data takes centre stage, yet it is interesting to note that none of the various statistical analyses are devoted to sample validity.

In the research conducted here, no claims of statistical validity will be made (hence the conscious decision to express any statistical figures to either the nearest whole number percentage or to the nearest £1,000) – despite the calculations which *could* be generated for a random sample of 49 firms from an industry sector of 2,004 members (SMMT, 1997) – since another premise of the post-theoretical turn taken here relates to the inherent *locality* of such observations. This can be demonstrated crudely through an attempt to map the firms within the sample onto the *types* of firms who consider themselves to constitute the automotive industry. The SMMT (1997) works to 133 categories, 13 of which are considered "services" (e.g. prototype building or type approval), but the firms listed as "accessories and parts suppliers" (108 categories) may further fall into one or more of six sub-categories that denote a manufacturer, an importer, a distributor or trader, an export agent, an original equipment supplier, or an aftermarket supplier.

Clearly, this industry involves a wider variety of firms than those that could be charted by either the Redden survey or the current research. Nor, for that matter, is there any single method of classification that could be used to denote a specific sub-sector – and even if a particular viewpoint were chosen (e.g. distributors), there would be considerable overlap with other categories. The choice of a random sample in the current research was therefore made less to grant statistical validity (a pursuit which would cut drastically into the depth of exploration possible) than to grant 'voice' to those firms that might be marginalised in a more conventional study of 'traditional' sectors.

If this basic problem is compared to the implicit assumption within the Redden study (and marginalised within the same) that the industry is made up primarily of basic component manufacturers, then by this definition it would appear not to be the case. On a more sophisticated level, it may be argued that there is no 'meta-truth' i.e. no position inherently more valid than all others, and therefore the Redden study and its description of an automotive industry is no more or less 'true' than the SMMT subset chosen in this research. What is important, however, is to recognise that the Redden study is a narrative text and that its meaning is read (i.e. constructed between the writer and the reader) – as is the research here. To paraphrase Kreiner (1993), the post-structuralist turn taken here is not so much to inform as to what the automotive

industry is and how it should be researched, but what it *is not* and what the *unspoken assumptions* implied by the chosen research methodology are.

Questionnaire design and conduct

In addition to exploring the intention and conduct of the Redden study and the research detailed here, mention should be made of the design of the two questionnaires from which both studies were generated. Redden (1975:33) comments that, "The layout... was designed to assist firms by providing a logical sequence for the recording of the information required rather than facilitating the subsequent analysis and interpretation of results." Thus although the questionnaire was intended to generate both quantitative and qualitative data, the resulting format may not lend itself (well) to standard structuralist analysis. Indeed, it was found that the questionnaire survey conducted as part of this research was completed in disparate, sometimes unexpected ways.

The earlier, Redden questionnaire, for example (Redden, 1975), frequently gave generous space for the answering of questions, with a corresponding vagueness as to how this should be done. Although the questionnaire used as part of this research was based loosely on the Redden format (see *Appendix I: The Questionnaire used in the 1997 Survey*), it gave greater guidance. However, it was found that in tables such as Question 13 in Section 1 ("What are your main constraints of growth?"), respondents' answers ranged from the cursory ticking of the "Labour" box by Company 15 and the comment "Quality of staff (experience)" to the detailed ranking given by Company 19. Similarly, the problem of the applicability of a general questionnaire to both 'service sector' and 'traditional' component manufacturers was noted, as Company 16 drew a line through much of the first section concerning the products of the firm, commenting "We are not a manufacturer" (Company 16 was the distribution subsidiary for the UK market of a multinational component manufacturer).

The question of the *appropriateness* of the information gathered by such means may therefore be questioned, as from the research presented here, the responses collated

from the (detailed) questionnaire study alone would require more data to place the responses within some form of context, whether through an evocation of a grand narrative of their position within a wider automotive industry, or through a series of interviews to furnish further texts. Furthermore, a certain number of firms would be needed to take part in the survey to do so. In the current research, 150 questionnaires were sent out – 100 to respondents who were approached in advance by telephone and had the aims of the research explained to them, and 50 to respondents who were sent a questionnaire with a covering letter 'cold'. Of these two groups, 48 of the 100 returned a completed questionnaire, compared to a single response from the unapproached 50. This may be compared to the 111 firms chosen by Redden as representative of the industry who were sent a questionnaire and covering letter 'cold', with a follow-up telephone call 6 weeks later. Of these, 43 questionnaires were returned. Redden (1975:33) therefore decided that, "To ensure that a sufficient sample of firms was achieved, visits were made to 28 firms and questionnaires completed by interviewing either the owner or a senior member of the company management."

A consideration not given in the Redden text (and therefore, one which may only be guessed at), is to what degree the questionnaire survey *by itself* provided additional discourses in the form of a multiplicity of answers/answering styles on which the researcher could draw, and the extraneous (to the questionnaire framework) narratives furnished by the interviews. Indeed, in the current research, the follow-up interviews overlapped the analysis of returned questionnaires (returned between 23.04.1997 and 28.07.1997) with the interviews taking place between 17.10.1997 and 09.09.1999.

Construction of a questionnaire survey and of an industry

Although it has been argued above that deconstruction is an analytical tool rather than one that informs the conduct of research, this distinction is not quite so clear-cut if we explore this further. For example, in the more 'traditional' questionnaire survey referred to here (Redden, 1975), a sample of 69 firms was chosen as representative of the automotive components industry (an industry that in a DTI report cited by Redden, numbered some 8,000 manufacturing companies in the West Midlands

alone). However, a post-structuralist might question the very premise of what can be considered *representative* of the automotive supply industry, as the *Motor Industry Directory* supplied by the Society of Motor Manufacturers and Traders (SMMT, 1997) lists a national total of 2,004 and, as will be recalled from above, does restrict this number to 'component manufacturers' alone.

Thus the researcher is left with the problem of how to *choose* a *representative* sample of firms – as the 'official' motor industry designations would consider an "accessories and parts supplier" to be anything from an importer to an OEM supplier, or even a combination of the two. A post-structuralist would therefore find that the selection of a sample would be a subjective exercise as doing so would involve *constructing* a model of 'what is representative'. However, if we were to follow Foucault and strive to give voice to the marginalised, we might, in this instance, choose to take a random sample from the SMMT lists, thus *including* the voices of firms in the survey that could otherwise be left silent.

Categorising the firms participating in the research

Indeed, the firms taking part in the current research may be described using one or more of the following business classifications: manufacturer, importer, distributor or trader, export agent, original equipment, and aftermarket. Thus we might note that the survey included component manufacturers as well as 'service sector' firms, yet there was considerable overlap between the different classifications. The SMMT classifications do not, however, consider what *proportion* of a firm's business might be termed 'automotive' – nor did, for that matter, the Redden study. Although the current research did not investigate fully the proportions of business here, one of the questions asked of respondents concerned the types of customer that their firms supplied (see *Table 12* overleaf).

Table 12. Types of customer supplied to by the firms in the 1997 survey

Type of customer	*No. of firms supplying*	*Percentage of sample*
Car assembler	24	49%
Components manufacturer	29	59%
Retailer	3	6%
Companies in the same group	3	6%
Other	19	39%

According to the respondents in the sample, their firms did not necessarily supply exclusively a single type of customer. Thus, although it would appear that roughly half the firms in the sample supplied customers who could be thought of as typically automotive (i.e. "components manufacturers" or "car assemblers"), a substantial number supplied outside of the established frameworks – a finding that necessitates further investigation, as this does not necessarily suggest that the firms in question were supplying outside of the 'automotive industry', merely outside the automotive industry as *constructed* here. According to clarifications given by the respondents, "other" customers included: investment banks, government bodies, material suppliers, the aerospace industry, gear manufacturers, and engine manufacturers.

Turning from the nominal business areas to which the firms taking part in the study might be assigned, it is useful to look at the different descriptions of the *size* of the firms taking part in the industry. These may be summarised in *Table 13* (below).

Table 13. Comparing the differing descriptions of firms according to their size in the Redden study and the current research

	Size of firm in number of employees	
Descriptor	*Redden study (1975)*	*Current research (1997)*
Micro	Not applicable	1-9
Small	1-250	10-99
Medium	250-999	100-499
Large	1,000 or more	500 or more

Although these differences might be seen to present an obstacle to any direct comparison, it should be remembered that any comparisons would be drawn on the level of *interpretation* rather than tabulated *data*. Indeed, one of the first points we

might wish to note would relate to how the very *definition* of a small firm may vary, and that if anything, the current research focuses on smaller firms than those considered SMEs by Redden (1975). To elaborate further, the conceptualisation of a distinction between "small" and "micro-sized" firms indicates a belief that highly-specialised firms are likely both to be encountered and to differ in their operations and outlook from 'typical' SMEs. Indeed, the 3 micro-sized firms participating in the survey included a provider of vehicle testing systems, an export consultancy, and a specialist repairer of vintage magnetos – firms 'invisible' to the Redden survey on grounds of their size and their 'service sector' operations.

Comparative performance of smaller firms

In the literature reviewed in previous chapters, one of the considerations was of the differing strategic options available to firms of different size. While it could be argued that smaller firms may lack the resources (managerial or material) of their larger brethren, it was also argued that smaller firms could counter *disadvantages of scale* with *advantages of scope* (e.g. networking, flexible manufacturing, AMT). Thus we could look to the relative performance firms of different sizes from the survey.

Table 14. Changes in sales figures for 1993-1997 against firm size

Size of firm	*Count*	*Sales in 1993*	*Sales in 1997*	*Percentage change*
Micro	3	£21,000	£206,000	+881%
Small	24	£2,604,000	£4,724,000	+81%
Medium	16	£14,807,000	£20,639,000	+39%
Large	6	£109,333,000	£180,500,000	+65%

From the above data (see *Table 14* above) we can note that small firms and large firms outperformed medium-sized firms over a 4-year period, and micro-sized firms showed a phenomenal increase in sales compared to any others. In striving to interpret these figures – i.e. suggesting a rationale for them – we would, however, have further questions. For example, we might wonder if sectoral differences played a significant

part. Indeed, the questionnaire survey furnishes us with the following (see *Table 15* below):

Table 15. Types of customer supplied by firms of different sizes

		Firms supply:				
Size of firm	*Count*	*Car assembler*	*Components manufacturer*	*Retailer*	*Group*	*Other*
Micro	3	1	-	-	-	2
Small	24	9	14	2	2	15
Medium	16	12	11	-	-	2
Large	6	3	4	1	1	2
Total	*49*	*24*	*29*	*3*	*3*	*21*

Small and micro-sized firms could be described, then, as atypical in that their primary business did not appear to be with the automotive industry – and therefore the figures could be discounted as irrelevant. However, as has already been stated above, we can draw on material from *outside* the survey (i.e. from the interviews and from the SMMT) to understand that these firms were accepted as belonging to the automotive sector. This may be taken as an example of why the post-structuralist would place *researcher interpretation* at centre-stage, because in order to understand and communicate this item of statistical data, it is necessary to draw on other material (such as the researcher's own knowledge or other texts).

Yet we can continue with this interpretation by asking why we might regard the medium-sized firms as more 'typical' (i.e. tending strongly to supply car assemblers or component manufacturers). Again, in so doing we are drawing on outside material – this time what we know to call 'discourses of the automotive industry', namely certain ideas of what types of firms are 'typical automotive suppliers'. This is why this work aims, following Foucault, to de-privilege privileged voices by challenging the authority of popular discourses – in other words, we would note the irony of discounting 33 out of 49 firms for being 'atypical', and seek instead to explore the paradox between the constructed reality of discourse and these empirical data. It may furthermore be argued that 'service sector' firms have become 'invisible' in so far as the current questionnaire survey is concerned, and therefore in any comparison with

the earlier Redden study, we can ask whether this appears to have any strong impact on the interpretations possible from the data.

The age of firms in the industry

The above argument can also be extended into another realm: that of the relative ages of firms taking part in the survey. To gather this data, the respondents were asked about the date, if known, when their firms were originally founded. From this (as per *Table 16* below), we can see that the ages of firms ranged from between 3 and 163 years, indicating not only that there were comparatively recent entrants into the automotive industry, but that some players had been established manufacturers since the early half of the 19th Century.

Table 16. Firm size and age within the 1997 questionnaire sample

Size of firm	*Count of firms*	*Descriptive statistics (years to one decimal place)*						
		Sum	*Mean*	*Range*	*Std. dev.*	*Median*	*Min.*	*Max.*
Micro	3	43	14.3	10	5.5	17	8	18
Small	23	597	26.0	64	17.3	26	3	67
Medium	16	895	55.9	155	47.7	42.5	8	163
Large	4	122	30.5	41	17.4	34.5	6	47
Total	*46*	*1657*	*36.0*	*160*	*33.9*	*27*	*3*	*163*

If, as above, we look to some descriptive statistics of this phenomenon and ask how firms of various ages were distributed within the sample, it becomes apparent that the greater disparity in age stems mostly from the medium-sized firms surveyed. Not only were the mean (55.9 years) and median (42.5 years) the highest here, but so were the range (155 years) and the standard deviation (47.7 years). This was due to a cluster of four particularly long-established firms (93, 122, 132, and 163 years), namely a plastics manufacturer within a conglomerate, an independent castings manufacturer, an independent lubricant manufacturer, and an independent manufacturer of precision components. Again, we have had to draw on more information to place the statistical findings in context – a context which moreover reveals that although these four firms

focused strongly on supplying the automotive industry, their products and markets may be traced back to an earlier period predating the invention of the motor car. If we were to characterise the business of these firms as 'standard' automotive suppliers, then we would do well to question the degree of overlap between suppliers to the automotive industry and other sectors with similar product requirements (e.g. aviation, heavy engineering). Indeed, we might find ourselves reminded strongly by these revelations that the automotive industry evolved as an *offshoot* of the existing machine tool industry. This latter point may be gathered from comparable statistics within the Redden study (see *Table 17* below).

Table 17. The average ages of independent and subsidiary companies in the Redden survey (after Redden, 1975)

Company size	*Independent*	*Subsidiary*	*Total*
Small	45	44	45
Medium	71	64	66
Large	-	59	59

It would appear that the above ages are not too dissimilar to those from the current research, in particular if the different classifications of the size of firms are taken into account. However, it is notable that the Redden statistics are couched in terms of company affiliation, and thus little is known about the statistical distribution of the sample in question. Thus in comparing the two approaches in this instance, the current research has served to furnish a greater range of variables than that of the earlier study. This contrast serves to highlight the inference from the current research that a particular type of firm, micro-sized firms, tended to stand out from the mass of SMEs as the newest additions to the automotive industry, either operating in market segments developed from the 1980s or tending towards short life spans, or towards growth. Small- and large-sized firms evidenced longer establishment than the micro-sized respondents, yet tended to be younger than their medium-sized counterparts. Yet we should be careful when invoking the Product Life Cycle model to explain away these findings, as to do so we would be making certain assumptions about the products and the markets of these firms (e.g. 'sunrise' or 'sunset' industries) – a point

which can not be stressed strongly enough if a large proportion of the respondents' business might be in 'services' rather than 'manufacturing'.

The exporting ability of small firms

These considerations can be expanded further through a more direct comparison between the Redden study and the current research on the grounds of exporting ability. Redden (1975) deliberately set out deliberately to compare the relative performances of small and large firms in exporting to Western European nations, and indeed this element of the Redden study was duplicated in the questionnaires sent out during 1996-1997. However, it should be noted that there were three main departures: (1) the current study redefined "Western Europe" to apply to "Continental Europe" (i.e. the European Union member nations) for simplicity, (2) extended the scope of the questionnaire to include joint-ventures or manufacturing in addition to exporting, and (3) asked the same questions but in relation to Pacific-Asia. Although the results of these comparisons will be discussed in greater depth later, it is useful for the moment to restrict the investigation to an overview.

Table 18. Exporting behaviour of firms in the 1997 study

Firm size	*No. in survey*	*No. exporting to*		
		Europe	*Pacific-Asia*	*Both*
Micro	3	2	1	1
Small	24	17	7	7
Medium	16	15	6	6
Large	6	5	5	5
Total	*49*	*36*	*19*	*19*

As can be seen from *Table 18* (above), it was found that 17 out of 24 small-sized firms (71%) and 15 out of 16 medium-sized firms (94%) exported to Continental Europe. From these figures, it would appear that the majority of respondents were Europe-oriented. It is, however, interesting to note that in comparison, far fewer firms exported to Pacific-Asia (unless the firm in question was large-sized, in which case

this was the norm) – yet without exception these firms numbered among those which already exported to Continental Europe. If we were to look to the earlier Redden study, these figures may be compared to the 1975 finding that just over half of the automotive components parts and accessories manufacturers taking part exported their products, and that the majority of these exported to other European nations.

However, Redden went a step further by drawing a distinction between *subsidiary* SMEs and *independent* SMEs, thereby noting that while exports to Europe accounted for just over 50% of the exports of participant firms, only 20% of the total was due to independent SMEs. Redden suggested that this could be due to independent SMEs experiencing difficulties in mounting and sustaining the sales effort required to export, compared to large companies or their subsidiaries. If we consider these findings in relation to the possible aims of the Redden study (one positioned as taking place during a 'crisis of exporting'), we might well wonder if Redden therefore advocated the *promotion* of independent SMEs, or whether these were discounted in favour of subsidiaries.

Indeed, it is proposed to explore further the distinction made by Redden, as drawing on discourses of supply chain management or inter-firm relationships, we could already question the idea of *dependency* as a purely ownership-specific quality. This will become a major theme in the next subsection. Furthermore, one interpretation of the above results is that they could indicate that respondents considered Continental Europe in a similar fashion to their national market (if we wished to position ourselves through discourses of globalisation in the style of Kenichi Ohmae, 1985) – yet an alternative explanation might be attributed to the presence of 'service sector' firms within the survey, such as export agents or distributors, whose business might be 'more European' than that of 'conventional manufacturers'.

Conclusions: The implications of giving voice to 'non-traditional' firms

In this initial statistical analysis, we have suggested that smaller automotive suppliers may be seen as distinct from larger suppliers, having moreover included 'service

sector' firms among their number and extended the classification of the size of a firm to that of 'micro-sized' companies. By comparing these findings with the earlier study conducted by Redden (1975), we can argue further that the capabilities of smaller firms – particularly in their ability to export – has changed greatly over the time between the two studies. However, we should remind ourselves that as one of the aims of the current research was to give voice to the excluded and marginalised (i.e. the 'service sector'), we have to be careful with any direct comparisons of data: the two samples were extremely different. On the other hand, this has very different implications for any comparison of the *interpretations* of the data, as the above explorations have served to question concepts such as *independence*, *market orientation*, and quite what *constitutes* the automotive industry. In so doing, we have wondered whether we were finding evidence of concepts such as the supply chain within the data, or whether the awareness of these ideas (discourses) was shaping our perceptions.

Relative independence

Continuing the above argument that 'independence' is a relative concept for automotive supply firms, we can explore this issue further by considering how certain variables (as investigated by the questionnaire survey) affect the performance of firms. Specifically, we can look to (1) the size of the parent company, and (2) the customer base of the firm, before asking (3) how the analysis is informed using a *qualitative* description.

The size of the parent companies of subsidiary firms

As noted above, the distinction drawn by the Redden survey was between *independent* firms and *subsidiaries*. The relative sales performance of the firms in this sample, taken over a 4-year period, may be tabulated as per *Table 19* (overleaf).

Table 19. Changes in sales figures over a 4-year period against firm size and affiliation in the Redden survey (after Redden, 1975)

Affiliation	*Size of firm*	*Count*	*Percentage growth in sales*
Independent	Small	21	+29%
	Medium	6	+12%
	Large	-	-
Subsidiary	Small	19	+10%
	Medium	12	+4%
	Large	11	-8%

From these statistics, it may be seen that as far as small firms were concerned, roughly half were classed as subsidiaries. This figure was raised to two thirds for medium-sized firms, and to all of the large-sized firms in the sample. Looking to the above table, we might agree with Redden (1975:37) when he notes that "irrespective of the type of firm, growth in sales appears to be inversely proportionate to company size". Furthermore, in terms of sales performance, it would appear that *independent* firms performed better than subsidiaries during this time period. A count of firms from the current survey may be made in a similar manner, and their sales performance evaluated over a 4-year period (see *Table 20* below).

Table 20. Changes in sales figures for 1993-1997 against firm size and affiliation

Affiliation	*Size of firm*	*Count*	*Sales in 1993*	*Sales in 1997*	*Percentage change*
Independent	Micro	3	£21,000	£206,000	+881%
	Small	14	£1,650,000	£2,277,000	+38%
	Medium	4	£13,945,000	£19,731,000	+41%
	Large	1	£184,000,000	£200,000,000	+9%
Subsidiary	Micro	-	-	-	-
	Small	10	£3,940,000	£8,150,000	+107%
	Medium	12	£15,094,000	£20,942,000	+39%
	Large	5	£94,400,000	£176,600,000	+87%

Comparing this directly with the Redden findings, we might disagree with that author's interpretation of the results, as aside from the experiences of the three micro-sized firms in the sample, there do not seem to be any substantial differences in the sales performance between independent and subsidiary medium-sized firms, whereas small-sized subsidiaries appear to outperform their independent counterparts

substantially. However, as before we may question this interpretation, as greater distinctions between different types of subsidiary may be made. In the current research, one of the variables specified was the *size of the parent company*. The data may be tabulated accordingly, as in *Table 21* (below).

Table 21. Changes in sales figures for 1993-1997 against firm size and affiliation

Size of firm	*Size of parent*	*Count*	*Sales in 1993*	*Sales in 1997*	*% change*
Micro	Independent	3	£21,000	£206,000	+881%
Small	Independent	14	£1,650,000	£2,277,000	+38%
	Micro	1	N/A	£5,000,000	N/A
	Small	1	£3,580,000	£4,800,000	+34%
	Medium	3	£1,417,000	£6,217,000	+339%
	Large	5	£6,314,000	£10,608,000	+68%
	Total	*24*	*£2,604,000*	*£4,724,000*	*+81%*
Medium	Independent	4	£13,945,000	£19,731,000	+41%
	Micro	2	£5,778,000	£6,700,000	+16%
	Medium	1	£5,080,000	£7,100,000	+40%
	Large	9	£18,278,000	£25,644,000	+40%
	Total	*16*	*£14,807,000*	*£20,639,000*	*+39%*
Large	Independent	1	£184,000,000	£200,000,000	+9%
	Large	5	£94,400,000	£176,600,000	+87%
	Total	*6*	*£109,333,000*	*£180,500,000*	*+65%*

As can be seen from the data, the current research suggests that while subsidiary firms tended to outperform non-subsidiary members, a distinction may be drawn also between holding companies (i.e. micro- and small-sized parents) and 'true' conglomerates (i.e. medium- and large-sized parents). In the case of the former, there was insufficient evidence to draw any firm conclusions from sales performance, although it did appear that holding companies performed worse than independent firms and those within larger groups. In the case of medium-sized companies, however, there appeared to be little difference between those in conglomerates and those that were independent, suggesting that the stronger contrasts found among smaller firms might be due to financial constraints, rather than operational outlook. Micro-sized firms appeared to grow exceptionally fast, possibly indicating recent formation and growth.

Of course, as the sample from the 1997-1998 survey is more heterogeneous than that used by Redden (1975), any conclusions drawn from the data alone are at risk of

statistical error. On the other hand, the (purposefully?) normative sample used by Redden may be questioned on the grounds of how representative it is of the automotive supply base in general. Furthermore, it may be argued – as above – that the classification of firms into "subsidiary" and "independent" assumes a single, normative relationship between a firm and the larger firm that owns it. By looking at the size of the parent company, however, it appears that the industry is more fragmented: the difference in size suggests different forms of parent company to the one assumed in the earlier study.

Dependency and the supplier base of a firm

Whether a firm belongs to a larger group or not, we might wish to consider the relationship with its customers in greater detail. For example, if a firm appears to be a dedicated supplier to a single automotive firm (e.g. a car manufacturer), we might wonder about the relative bargaining power of the two. Although the supplier might be an 'independent' firm in that it is not a subsidiary of another, it might be tied to a major (car manufacturer) client – a situation where its 'independence' was a relative concept (Sadd, 1998). Instead, the qualifier should perhaps be taken as the supplier-client relationship enjoyed by the firm in question and their firm's degree of freedom available through this: firms may exist as suppliers (of capital goods, services, or components) to a single assembler, with their design through production to delivery process being subsumed in a tied relationship. Thus in the current questionnaire survey, respondents were asked about their customers (as discussed above) but also about the degree of dependency on its major client(s). The results may be tabulated as per *Table 22* (overleaf).

Table 22. Level of dependency of firms from the 1997 survey on the type of customers to which they supplied

	Type of customer supplied				
Level of dependency	*Car manufacturers*	*Component assemblers*	*Retailers*	*Firms in group*	*Other*
Supply mostly to a single customer	-	-	-	-	-
Supply a few major clients	8	10	-	-	4
Supply general market	16	19	3	3	17
Total	*24*	*29*	*3*	*3*	*21*

What is notable from the statistics is that none of the 49 respondents considered their firm to be tied to a single major client. We may deduce from this that none of the firms in the survey was heavily dependent on the custom of another, yet the reasons behind this (such as whether the event was deliberate, desired, or even one that the firm wished to avoid) are as yet unclear. Again, any further deductions made here would be untenable as they would represent an outside opinion rather than that of the respondent, and thus it is intended explore the matter further in the interviews. On the other hand, it would appear from the above table that there was a tendency for firms in the survey to supply a more general market than a few major customers, and this may be read *tentatively* as indicative of an industry in which firms appeared (deliberately?) to avoid too great a dependency on their customers. Indeed, this also bears further investigation in that it would appear contrary to the discursive ideal of a 'rationalised supply chain', or perhaps part of the justification of the necessity of supply chain rationalisation.

Table 23. Levels of dependency of different-sized firms from the 1997 survey according to their customer base

Size of firm	*Count of firms*	*Supply a few customers*	*Supply general market*
Micro	3	-	3
Small	24	6	18
Medium	16	10	6
Large	6	4	2
Total	*49*	*20*	*29*

An alternative query might be to cross-reference the sizes of the companies involved and the level of dependency they had on their customer base (see *Table 23*). From this, we may note that although smaller firms (small- and micro-sized) exhibited a strong tendency to supply the general market, this position was reversed with larger firms (medium- and large-sized), who appeared to be more likely to be tied to a smaller customer base. Quite what impact these different scenarios might have on the performance of a company could be explored further if we were to tabulate the sales performance of the firms in the 1997 survey to arrive at *Table 24* (below).

Table 24. Average sales performance of firms from 1993-1997 compared to their relative dependency on their customer base

	Supply a few customers			*Supply general market*		
Size of firm	*Sales in 1993*	*Sales in 1997*	*% change*	*Sales in 1993*	*Sales in 1997*	*% change*
Micro	-	-	-	£21,000	£206,000	+881%
Small	£3,673,000	£3,378,000	-8%	£2,248,000	£5,173,000	+130%
Medium	£13,574,000	£21,430,000	+58%	£16,864,000	£19,320,000	+15%
Large	£124,000,000	£183,000,000	+48%	£80,000,000	£175,500,000	+119%

It would appear from the above figures that the customer base of a firm had a distinct effect on its relative sales performance. In the case of small-sized firms, for example, those operating "in the general market" experienced on average 130% growth in sales volume over the four-year period compared to those with a more defined customer base, whose average sales *fell* by 8% over this period. It would appear from this that the so-called 'rationalisation' of the supply base would threaten the growth of small-sized firms, unlike, for example, medium-sized firms which appeared to perform better with a smaller customer base (a statistic we might attribute to the relative bargaining strength of a larger firm). As large-sized firms showed strong sales growth irrespective of customer base, the enhanced sales performance of those supplying the wider customer base might be linked to factors other than that of relative bargaining power, such as channels of distribution

It is tempting to ascribe these findings to sectoral differences, but it is also possible to argue that the figures are indicative of a desire by smaller companies for increased independence, in that larger firms possessed greater resources and/or bargaining

power *vis-à-vis* their customer base – and in that smaller firms were in a correspondingly weaker position and therefore more wary of being tied too closely to a handful of clients. Given that both scenarios appear equally plausible as explanations, the questionnaire survey has in this instance furnished us with more questions than answers.

'Relative independence' and company performance

Thus far, the decision in the Redden study to compare firms in terms of whether they were "independent" or "subsidiaries" has been challenged. Two additional methods have been suggested, namely (1) a more detailed exploration of the role of the parent company, and (2) the level of dependency a firm had on its customer base.

National and international operations

A prime consideration in any direct comparison of the two surveys is that the earlier study, by Redden, concerns itself with the *exporting ability* of SMEs, whereas the current research is concerned with *national and international operations*. However, this does not so much invalidate a comparison, as if we were to phrase the comparison in terms of changing discourses of normative markets (i.e. that the 'national market' may now be Europe), then we could explore the difference in research focus in relation to (discursive) reality.

Changing views of national and international operations?

At the time of the Redden study, there was a relative decline in the export of cars (see *Table 25* overleaf) and a relative rise in the import of cars from 107,431 in 1969 to 485,169 in 1972. The Redden study can therefore be seen to be placing itself within

the construct of an industry in crisis. This sudden change in fortunes may be used to justify the focus of this "Export Research Study" into the headway being made by British firms into the European mainland.

Table 25. Comparing the number of units of motor cars manufactured in the UK with those exported, 1969-72 (after Redden, 1975)

Year	*Units produced*	*Units exported*	*% Units exported*
1969	2,182,793	952,786	43.6
1970	2,098,498	862,726	41.1
1971	2,198,146	915,841	41.7
1972	2,329,430	767,411	32.9

Indeed, the survey found that over half of the automotive component parts and accessory manufacturers in the West Midlands were exporters, and that the majority of these exported to other European nations. Although over 50% of the total exports were to Europe, this figure fell to 20% if the firm was small-to medium-sized. On average, exports amounted to 11% of the total sales of those firms exporting, and during the four-year course of the study, a progressive increase in both the volume and the number of firms exporting was observed. The two main problems encountered by firms in gaining export orders were price and delivery, with firms tending to obtain export business by direct contact with customers or through a distributor or agent.

Redden (1975) went on to investigate these findings by drawing both on the full questionnaire responses and, it is presumed, those from the interviews based on the questionnaire. As such, these may be compared with the findings of the current research: similar (but extended) questions were posed in the questionnaires pertaining not only to exports to Continental Europe, but to Pacific-Asia, and on associated operations (such as manufacturing or joint-ventures) as well.

Thus in the earlier study (Redden, 1975), it was found that exports to Western Europe accounted for just over 50% of the exports of West Midlands automotive firms, but only 20% of those of independent SMEs. The findings suggested further that independent SMEs experienced difficulty in mounting and sustaining the sales effort

required in exporting to Continental Europe compared to large companies or their subsidiaries. In contrast to these figures, the questionnaire study here found that smaller firms were no longer discriminated against in terms of export ability, with a large proportion (see *Table 26* below) exporting to Continental Europe and even Pacific-Asia (Sadd, 1998). In 1998, it was found that 71% of small-sized firms and 94% of medium-sized firms exported to Continental Europe. 21% of the small-sized firms and 38% of the medium-sized firms exported to Pacific-Asia in addition. Combining these figures, a total of 81% of SMEs were involved in the Continental European market, with 29% of the SMEs being involved in Pacific-Asia as well.

Table 26. International operations of firms in 1997

		European Operations		*Pacific-Asian Operations*	
Size of firm	*Count*	*Export*	*Manufacture*	*Export*	*Manufacture*
Micro	3	2	1	1	-
Small	24	17	2	7	-
Medium	16	15	4	8	1
Large	6	5	3	3	3
Total	*49*	*39*	*10*	*19*	*4*

On the one hand, this disparity may be read as a change in the exporting behaviour of small firms. But on the other, it speaks of the assumptions made by the Redden study that (1) exporting was the province of larger firms, and (2) Europe was a hostile market for British firms. In the Redden questionnaire, we might wish to draw attention to Question 31(g): "Do you find that quotations generally are not acknowledged? If so do you feel that this indicates that British suppliers are not favoured and that consequently no further action is worthwhile?" (Redden, 1975).

Relative independence and international operations

Turning again to the issues raised already concerning the 'relative independence' of companies, we might wish to ask what the implications of this might be for a firm's overseas operations. From the earlier Redden study (see *Table 2* overleaf), we could

note that proportionately, firms that were subsidiaries of others appeared more likely to export than independent firms (62% as opposed to 37%).

Table 27. Exporting behaviour of different-sized companies compared to their parental affiliation in the Redden survey (after Redden, 1975)

Affiliation	*Size of firm*	*Count*	*No. exporting*
Independent	Small	21	8
	Medium	6	2
	Large	-	-
	Total	*27*	*10*
Subsidiary	Small	19	8
	Medium	12	8
	Large	11	10
	Total	*42*	*26*

Furthermore, Redden drew on historical data to suggest that, between 1924 and 1973:

> [I]t will be seen that a general upward trend applies to both independent firms and subsidiary companies... The surprising feature emerging from this analysis is that, at all times, the ratio of subsidiary companies exporting has been consistently and at times substantially higher than that of the independent firms.
>
> (Redden, 1975:57)

This may again be compared with a similar table of data derived from the current survey (see *Table 28* overleaf), in which the number of companies with international operations are tabulated according to the size and parental affiliation. From these data, it would appear that independent companies were marginally *more* likely to export to Europe than subsidiaries (82% as compared to 78%), marginally *less* likely to manufacture in Europe (18% as compared to 22%), marginally *more* likely to export to Pacific-Asia (41% as compared to 37%), and *less* likely to manufacture in Pacific-Asia (5% as compared to 11%). Given the small size of the survey sample, however, these relative proportions are hardly definitive, but still suggest two strong distinctions with regard to the earlier Redden study: (1) firms in 1997 were considerably more likely to export to Europe, with the proportions exporting farther (e.g. to Pacific-Asia) being comparable with those exporting to Europe in 1975, but (2) that the strong distinctions between independent and subsidiary firms noted in the Redden study were no longer visible.

Table 28. International operations of different-sized companies according to their parental affiliation in 1997

Affiliation	*Size of firm*	*Count*	*European Operations*		*Pacific-Asian Operations*	
			Export	*Manufacture*	*Export*	*Manufacture*
Subsidiary	Small	10	6	2	2	-
	Medium	12	11	2	4	-
	Large	5	4	2	4	3
	Total	*27*	*21*	*6*	*10*	*3*
Independent	Micro	3	2	1	1	-
	Small	14	11	-	5	-
	Medium	4	4	2	2	1
	Large	1	1	1	1	-
	Total	*22*	*18*	*4*	*9*	*1*

Table 29. Relative independence and international operations of firms in 1997

Relative independence	*Size of firm*	*Count*	*European Operations*		*Pacific-Asian Operations*	
			Export	*Manufacture*	*Export*	*Manufacture*
Supply a few customers	Small	6	4	1	1	-
	Medium	10	9	2	4	-
	Large	4	4	2	2	2
	Total	*20*	*17*	*5*	*7*	*2*
Supply general market	Micro	3	2	1	1	-
	Small	18	13	1	6	-
	Medium	6	6	2	4	1
	Large	2	1	1	1	1
	Total	*29*	*22*	*5*	*12*	*2*

On the other hand, when the relative independence *as determined by the customer base of a firm* is tabulated instead, we may look to *Table 29* (above) for an alternative description of export behaviour. According to the tabulated data, it would appear that the relative independence of a company does not affect significantly the European operations of a firm in terms of the proportion of firms exporting (85% for the 'less independent', 76% for the 'more independent'), and nor does it appear to affect the Pacific-Asian operations of the same firms (35% for the 'less independent', 41% for the 'more independent') by the same measure. The same trends may be seen in the proportions of firms manufacturing in the regions (25% of 'less independent' manufactured in Europe compared to 10% in Pacific-Asia; 15% of the 'more independent' manufactured in Europe compared to 7% in Pacific-Asia). Although minor differences may be noted, it is argued here that these fall within the expected statistical errors for such a relatively small sample.

Unfortunately, the tabulated data from both the current and the earlier Redden study do not furnish us with much detail about the relative *qualities* of the international operations engaged in by the surveyed firms. Although it is possible to phrase the above proportions in terms of the value of their exports, we should bear in mind that these comparisons would be confusing given that no distinction between 'services' and 'goods' was made in the Redden study, and nor was it possible to do so in the current research. On the other hand, both surveys provided some information on the means by which firms exported, and these are explored below.

Contacting overseas clients: Evidence of intermediaries?

The subject of 'service sector' firms acting as *intermediaries* is one that has already served to challenge the 'supply chain' model of the automotive industry. Although the questionnaire surveys furnished little, if any, direct evidence of the role of these firms (although from the SMMT *Motor Industry Directory* lists and the firms in the current sample included firms described as 'agents', 'distributors', or 'consultants'), we can look for *indirect* evidence, as both surveys sought to investigate how firms communicated with their overseas clients in obtaining export orders.

Table 30. Methods used when first exporting by companies in the Redden survey (after Redden, 1975)

	Company size			
Method of exporting	*Small*	*Medium*	*Large*	*Total*
Customer contacts/visits	9	1	2	12
Agents	4	2	-	6
UK contacts	2	2	2	6
Approach from customer	2	-	2	4
Associated companies	2	2	-	4
Miscellaneous	1	4	3	8
Not answered	1	2	2	5
Total	*21*	*13*	*11*	*45*

According to the Redden study (see *Table 30* above), the most common source of establishing export trade appeared to be customer contacts and personal visits – a

variable accounting for a particularly high proportion of initial exports obtained by small firms. The use of agents and associated companies, we might note, did not appear to be as significant a source of initial contacts, but may still be assumed to facilitate trade. These statistics may be compared with the current research (see *Table 31* and *Table 32* below).

Table 31. Source of most export orders to Europe in 1997

	Size of company				
Source of export orders	*Micro*	*Small*	*Medium*	*Large*	*Total*
Agents		2			2
Associate or subsidiary				2	2
Direct UK contact	1	9	5	2	17
Local representative		1			1
Own marketing			1		1
Through parent			1	1	2
Through UK org. of customer			1		1
Other	1	5	7		13
Total	*2*	*17*	*15*	*5*	*39*
Not applicable	1	7	1	1	10

Table 32. Source of most export orders to Pacific-Asia in 1997

	Size of company				
Source of export orders	*Micro*	*Small*	*Medium*	*Large*	*Total*
Agents		1			1
Associate or subsidiary				1	1
Direct UK contact		4	1	1	6
Local representative		1		2	3
Own marketing					
Through parent					
Through UK org. of customer		1	2		3
Other	1		3	1	5
Total	*1*	*7*	*6*	*5*	*19*
Not applicable	2	17	10	1	30

It would appear that a broadly similar situation emerged in the 1997 survey, with two notable distinctions: (1) that a direct UK contact had become, if anything, even more significant than in the earlier survey, and (2) that the "other" category accounted for almost as many responses. Indeed, as a sizeable proportion of firms chose the "other" option, it might be assumed that the possible responses allowed for by the author did

not match either the interpretations or terminology used by the respondents. This latter point, relating to the *language* used (i.e. what we might call the disparity between signifiers and signifieds), may be made by referring to the explanations offered in the questionnaires, which included "direct from customers", "direct from export customer", and "reputation" – answers which would have been assumed by the researcher to be accounted for in the choices offered.

Table 33. Methods of communicating with Western European customers in the Redden survey (after Redden, 1975)

	Company size			
Type of communication	*Small*	*Medium*	*Large*	*Total*
Letter	15	8	10	33
Visits to customers	11	9	8	28
Telex	8	9	9	26
Telephone	7	8	6	21
Visits from customers	7	8	6	21
Total replies	*48*	*42*	*39*	*129*

Regarding the method of communications used, it was argued in the Redden survey that visits, letters, and telexes were the principal means. The results may be seen in *Table 33* (above), although it should be noted that the method used in *answering* the original questionnaire differed between the two surveys, with respondents in the current one ranking the *principle* means of communication rather than *enumerating* all of the ones used. Even so, these results may be compared to the current survey (see *Table 34* overleaf), in which firms typically appeared to use the telephone, fax, and personal visits to their customers as the preferred means of communication – results immediately reminiscent of the above survey (with the fax having succeeded the telex).

Table 34. Communications method preferred by firms of different sizes that exported to Europe in 1997

Communications method	*Count of firms*	*Size of firm*			
		Micro	*Small*	*Medium*	*Large*
Telephone	12		6	6	
Fax	11	1	7	2	1
Personal visits to customer	12	1		5	3
Personal visits from customer	3		3	2	1
Other	1		1		
Total	*39*	*2*	*17*	*15*	*5*
Not applicable	10	1	7	1	1

Although options had been given in the questionnaire survey for 'more modern' means (e.g. the Internet), it would appear that forms of communication involving more direct interpersonal contact were preferred (i.e. the increased use of the telephone), as well as the use of the written word. In the case of firms which exported to Pacific-Asia, however, it was found that the use of fax machines eclipsed all other forms of communication (see *Table 35* below), with mostly the larger-sized companies being able to arrange personal visits. Unfortunately, the rationale for this disparity was not provided by the respondents, and thus any reading of meaning in this instance – as with so many others – would rely solely on the interpretation of the researcher, and one that may well draw on popular discourses (such as perceived cultural differences between Western and Pacific-Asian business practices). Indeed, it is readily conceivable that the firms in question were themselves acting in response to similar discourses rather than out of direct need.

Table 35. Communications method preferred by firms of different sizes that exported to Pacific-Asia in 1997

Communications method	*Count of firms*	*Size of firm*			
		Micro	*Small*	*Medium*	*Large*
Telephone	1			1	
Fax	12	1	5	4	2
Personal visits to customer	4		1		3
Personal visits from customer	2		1	1	
Total	*19*	*1*	*7*	*6*	*5*
Not applicable	30	2	17	10	1

Thus we might conclude that in both surveys, there was indirect evidence of firms relying on intermediaries for exporting: agents, distributors, local contacts, and marketing information. The distinction between the capabilities of small firms and large firms appears to blur, as firms of all sizes seem to rely on outside contacts for exporting – although in the case of firms belonging to multinational (groups of) companies, this intermediary might already be affiliated with the firm in question. These findings challenge the original conclusion drawn by Redden that smaller firms were restricted in their exporting ability due to their comparative lack of resources *vis-à-vis* larger firms, and it may be noted that the inclusion of *marginalised* voices from the survey indicates further that a firm's customer(s) may play a significant part in encouraging a firm to look outside of its immediate national market.

Summary: deconstructing the texts

The use of deconstruction to explore the Redden text and its comparison to the research presented here – by looking to the *margin* rather than the *centre* of the text – makes *explicit* the *implicit* role of the researcher as intermediary. Indeed, the degree of personal involvement by the researcher should not be marginalised by this work, as the higher response rate achieved by the 1997 survey may be attributed to direct, personal contact with the respondents (who were chosen, it should be noted, as they were listed in the *SMMT Directory* as the recommended contact for each firm). In the earlier study, however, this level of personal interaction is marginalised if not excluded completely from the text: 28 out of the total 71 respondents were approached in a manner that suggests a level of existing personal contact, and the fact that these respondents were "interviewed" would have animated discourses (and therefore explorations of signifiers) not referred to within the narrative. This gives rise to questions concerning the validity of the choice of subject material: to what extent may the participating firms be regarded as a statistical subset of the greater automotive industry, and to what extent should they instead – and by extension, the conduct and conclusions of the survey – be regarded as relevant for a specific and pre-selected subset? To the positivist, this is a damning situation, as it renders the analysis invalid. Yet to the post-structuralist, such a consideration is irrelevant, as statistical

validity is not regarded as central to the analysis: in the same way that marginalised issues may be made central within the analysis, so the central issues can be deprivileged.

The existing familiarity of the researchers for both surveys should be expanded on, as both were previously exposed to discourses surrounding the automotive industry. Indeed, when Redden (1975:34) states that the, "Analysis of questionnaire data was undertaken manually by the compiler of the report. This safeguarded any confidential information submitted and provided the opportunity to interpret replies to questions on a uniform basis", the process of researcher-interpretation of such replies should be emphasised, as the implication to a post-structuralist is that a structuralist assignment of universal meanings to such signifiers had been given, i.e. that the context given, rather than that of the particular discourses prevalent in the individual company, was that of the researcher, rather than the researched.

These points have certain implications relating to the conduct of conventional case study/interview research. In this situation, a questionnaire survey would be used to gain statistical data to *ground* the 'richer' data. But if, instead, a statistical analysis of a questionnaire survey is an *interpretation by the author* that draws on *external discourses* in so doing, then it may be said to be *embedding itself within existing discourses*. However, the aim of the post-structuralist stance adopted here is not to validate – or invalidate – this mode of data collection and analysis, but rather to reify it through a self-referential exploration and to open it up by challenging implicit assumptions and giving voice to the marginalised or the excluded within any text. The involvement of the research could be said to render an objective analysis invalid (which is, as argued here, the implication of a statistical analysis), but this does not preclude it from being part of the *subjective exploration* through a deconstruction: instead of excluding researcher involvement, the post-structuralist brings it to the centre of the analysis.

The implications of this may be regarded as twofold: (1) knowledge is not a discrete property within the data and has to be interpreted and communicated, and (2) this necessitates a familiarity with the contexts in which it is originally presented. In the examples given here, it was argued that the researcher drew on personal experience

with the terminology and culture of the (West Midlands) automotive industry in order to communicate with the survey participants before interpreting this knowledge for the reader. In the analysis of the tabulated data, the results were placed within a wider context drawn from outside of the text. Thus instead of making the positivist assumption that these 'objective' findings can be used to 'ground' more in-depth research (such as a series of interviews, as referred to in *Chapter 7* below), the post-structuralist would *explore* the *narratives* given by the survey participants in order to understand the *contexts*, or rather, how these narratives *positioned themselves through discourse* – thereby bringing the unspoken further into the initial analysis.

Chapter 7: Textual Analysis of the Follow-Up Interviews

Introduction

In the above chapter, the conduct and findings of two questionnaire surveys were explored. As a result of these discussions, the need for additional material was expressed. Indeed, this need could be read in terms of the existing methodological critiques from the *praxis* within the field, in order to expand a statistical analysis with the use of in-depth interviews or case studies. The use of such 'rich data' allows the researcher to explore issues in greater depth and to investigate statistical inferences in greater detail. However, the deconstructive approach taken here has highlighted the role of the researcher as *intermediary* in the interpretation of knowledge, and in the case of the two surveys, this role has been marginalised. After all, the interpretation of the statistical data was found to contain – either overtly or covertly – invocations of existing discourses, whether as external constructs or additional texts, which facilitated the conclusions that were being drawn. Without these external sources to interpret the statistical data in context, the relevance of any such observations could be questioned. It this therefore proposed to explore the wealth of texts furnished by the follow-up interviews and case studies below, again discussing the implications of deconstructive textual analysis as opposed to more traditional positivist interpretations.

The follow-up interviews as texts

Given the use of the conventional synthesis of statistical and richer data, the research work conducted here involved a series of interviews with 42 of the original 49 questionnaire respondents. These interviews, taking place between 17.10.1997 and 09.09.1999, were conducted mostly by telephone, although in some cases, a personal visit to the company was possible. The questions asked were of a semi-structured nature, building not only on the general issues identified through the questionnaire survey as a whole, but also on specific answers given by the particular firm. As the questionnaires offered respondents the opportunity to give reasonably detailed answers, these questions varied from firm to firm. General areas that were explored included therefore:

- The form of relationship the firm enjoyed with its parent company (if any), and the nature of that parent.
- The age of the firm and at least a recent history of its activities as an automotive supplier.
- The direction of its domestic (and international) exporting and manufacturing operations, including alliances, joint ventures, and mergers with other firms.
- Any forthcoming changes to its market that were expected by the firm, and its anticipated reactions to these.

Issues that had not been foreseen were explored similarly, as were those which applied only to a specific group of companies (e.g. activities as a 'service provider' or distributor), since the questionnaire survey had focused more strongly on manufacturing firms. The interviews undertaken were all recorded on audio tapes – from which detailed notes could be made subsequently – meaning that the flow of the interview could be kept as close to a conversation as possible. This also allowed for much greater interview speed and flexibility, as might be indicated by the high proportion of companies that were prepared to take part. 6 of these respondents furthermore agreed to subsequent interviews that involved the standard telephone interview as well as personal visits to the companies. By combining, for each company, the interview transcript(s) with the previous questionnaire answers,

company literature, and first-hand observations, a series of texts can be generated which may then be analysed.

Thus we are left with something of a quandary: the 'traditional' form of positivist data analysis in the management sciences would use case studies to 'add depth' to the 'ground' provided by a statistical, survey-based analysis, yet the above deconstruction has suggested the opposite may be true. How, then, could such 'rich' data be grounded, if not through triangulation? A post-structuralist argument would be that this question is based on a false premise: a correlation using specific signifiers is inherently impossible. Signifiers and signifieds are not necessarily related; texts need to be read in their locality rather than as part of a grand narrative.

The implication of this position for the data analysis would therefore suggest a continuation of the above deconstructions. By arranging the texts furnished by the interviews and case studies undertaken here within broadly similar categories to those explored in the questionnaire studies, readings of the narratives may be made and these analysed individually. The aim, after all, is to avoid the pitfall of assuming an external discourse and interpreting the data in accordance with this, rather than interpreting the texts in their own context.

Demonstrating textual analysis

The combination of interviews and questionnaire responses can, as argued above, be used to furnish us with a number of different narratives. But as has also been argued, it is proposed to explore these as texts (i.e. textual analysis) – in contrast to a more conventional treatment in which these interviews would be 'grounded' using statistical data derived from the prior questionnaire survey. Given that a multiplicity of issues could be explored in this way, it is proposed consciously to limit the following discussions to certain specific topics in order to demonstrate the conduct and implications of textual analysis:

1) Discourses of industry form, function, and structure, in which rather than classify firms into our own models of the automotive industry, we ask how the various respondents position themselves through discourses of function (drawing on the academic and industry discourses from the literature review in *Chapter 1: The British Motor Industry*).
2) The articulation of a further challenge to these authoritative discourses by exploring the responses given by small, specialist firms contacted in the survey, that moreover include members of the 'service sector'.
3) Discourses of a changing world, in which the narratives from respondents are discussed concerning perceptions of, and reactions to, the turbulent world of the modern automotive industry.

In contemplating the above explorations, it should be recalled that the position taken in this work aims to give 'voice' to firms within the automotive industry that might otherwise be marginalised.

Grand narratives and the automotive supply industry

An earlier consideration for pursuing a post-structural analysis invoked the argument that the automotive industry could be considered a symbolic industry, i.e. discursively representative of modern industry. If we were to look for narratives resonant with these discourses, we might draw attention to an explanation given by the managing director of the UK subsidiary of a European components supplier as to why he considered competition and sales demand to be the main constraints on growth for his firm:

> It's because we're in a diminishing sector. If you think of the old cash cow, that sort of thing... My strategy on that, which I have recently implemented, will be to diversify into other products within the motor industry as compatible as I possibly can, because my strength is in my brand name.
>
> (Company 26, interview on 03.08.1998)

Looking closely at the terminology employed by the respondent – "cash cow" and "brand name" – points us towards an invocation of discourses of marketing theory. In

a similar situation, we might note that the sales and marketing director of a components supplier similarly evoked the "Product Life Cycle" to describe the problems of a mature product in a mature market. These discourses of theory may be found to resonate more powerfully in the words of a purchasing and logistics director of a medium-sized components manufacturer interviewed:

> [O]ur market is heading away from the motor manufacturers and to the first-tier suppliers. I think we'll be dealing less and less with the actual car builders and more and more with the people supplying modules and systems to them.
>
> (Company 38, interview on 20.08.1998)

Thus the point made above can be reiterated: these cited interviews resonate with discourses of management theory, with the respondents framing and explaining their companies through popular theoretical models. We might well wonder about the impact that management theory has not only on the strategies pursued by firms, but also on the *Weltanschauung* of its managers. Yet if we were to take this argument a stage further – to the use of 'supply chain' terminology to *position* a company and its *role* when compared to another – we might go so far as to question just what is meant when we refer to the "role of a Tier-1 supplier". One respondent, the technical and commercial manager of a 'Tier-1' firm, said:

> We're a Tier-1 supplier. We will either design on their behalf if they want design and the complete package, or we're involved at the design concept stage and assist them, in which case they have the responsibility for design.
>
> (Company 19, 24.08.1998)

Rather than read this statement as a confirmation of what is 'known' about the automotive supply chain, the *identification* of his company specifically as such a supplier and coupled with the specific role this entails might be drawn on instead. Rather than being a quantifiable response, the above statement has greater implications, relating to an industry sector that perceives itself according to its own discourses. Not only has the language of the supply chain been assimilated, but so have the discourses relating to the *roles* of *tiered* firms, their duties and their responsibilities. Indeed, the managing director of a small supplier to "2nd tier component manufacturers" expressed similar views when he said:

> We're a 1st tier supplier to heavy industrial, and we have been involved in research and development as a 2nd tier organisation in injection moulded component parts. The 1st tier company may well turn to us for their own research and development when new motor products are being developed, but we certainly don't get involved after that in the production.
>
> (Company 25, interview on 24.11.1998)

Thus we may note that even if the supply chain tiering model is invoked to explain the strategies pursued by a firm, this may differ according to the specific industry about which the respondent is speaking. On a similar note, the former respondent (of Company 19) further explained that the key strategy in recent years had been "using our parent company a lot more... We're going global, basically, so that means more partnerships or more working with other smaller companies or other larger companies". A parallel might be drawn again in that "going global" is spoken of as implying greater co-operation between firms. It may therefore be speculated as to what degree such partnerships are entered into out of necessity, and to what degree this takes place simply because they have become perceived as part and parcel of a worldwide presence. Although this phenomenon will be explored further in a separate section, it is here useful to draw on the texts furnished by the interviews to discuss the implications of a specific grand narrative in more detail: discourses of quality systems such as BPR, TQM, or ISO 9002.

Discourses of quality systems

Quality systems, as discussed in *Chapter 5: Researching a Modern Motor Industry*, can be read on other levels than their ostensible pretexts (such as the extension of management authority and control). In order to explore the implications of these deconstructions for the firms taking part in the survey, the respondents were questioned regarding the historical origins of the implementation of quality systems by their firms. In one interview, the managing director of a small components manufacturer explained that:

> We have in fact got ISO 9000 and we have had it for 18-19 years because we set up the standards initially with BSI in the early '80s. The first intention was as a means of convincing UK manufacturers that UK-manufactured fasteners were of better quality and of better manufacture than imported fasteners... I suppose it was a defence mechanism: if we could show manufacture to a specific standard, we would

> have an advantage with UK manufacturers... It's moved on a long way since then, but that was probably the main reason initially.
>
> (Company 4, interview on 18.08.1998)

The introduction of quality systems in this case, then, had less to do with manufacturing standards than market protectionism. Indeed, the proprietor of a micro-sized specialist explained that ISO 9000 had been pursued by his firm as, "The market in which we operate is full of cowboys, and we didn't want to be tarred with the same brush" (Company 23, interview on 13.08.1998). The use of quality systems may furthermore, from another viewpoint, be read as:

> We have to have an increasingly regulated and traceable quality system and we're moving the automotive part of our business into the QS 9000 standard – the motor industry norm – and that is becoming something our suppliers have to subscribe to as well... In the pharmaceutical businesses that we supply, it's run different. They take it as given that you have a quality system installed, and are much more interested in your paperwork systems – particularly traceability... They have a totally different angle on the whole thing and that's true throughout Europe.
>
> (Company 2, interview on 28.05.1998)

On one level, this comment by a respondent whose firm does not supply primarily the automotive industry speaks of the different expectations between the two industries. However, what remains unspoken here is the control aspect for which the automotive industry uses such systems: not only are Tier-2 suppliers like the firm in question "regulated", but so are their suppliers. Contrasting this with the aims of the pharmaceutical industry – i.e. traceability – the unspoken aim of controlling authority has been marginalised.

Furthermore, as the managing director of a medium-sized components supplier explained:

> The quality systems are not necessarily, shall we say, the design systems. We've got 9001 now, which we picked up a couple of years ago. Prior to that, 900 was probably adequate because we were far less involved in the design. But obviously as a design company, you do need the more appropriate qualifications. But then, of course, it goes on to QS 9000 which Ford and General Motors require as a condition of supply. And then it moves to 1401, the environmental standard, that is not a condition of supply at the moment – but it's only a matter of time.
>
> (Company 8, interview on 13.07.1998)

From this we may note two things: firstly, that design involvement is not considered part of the quality process; and secondly, that the requirements are in a constant state

of flux. Yet there is also a third point which may be made – this respondent sees his firm as being a "design company", implying thereby a distinction from a conventional supplier. Quite what this entails requires some thought. Or as the business manager of a large engineering conglomerate said, "it actually helps re-engineer our business processes. So we use it as a change mechanism, if you like" (Company 41, interview on 27.08.1998) – implying a different attitude altogether. Additionally, drawing from a text provided by the marketing manager of a precision die-casting subsidiary when asked why quality systems had been implemented:

> To control the business. It was very much that we've always worked with quality controls from the earliest times. Obviously, there is a lot of pressure from customers, especially when you work in the automotive [sector] to put in quality controls. But it's always been part of our disciplines within our business.
>
> (Company 12, interview on 19.08.1998)

Again, "discipline" and "control" are emphasised, but in this instance, we may look to the language used as speaking of *self-control* as well as control from an external source. Yet the point must be made that "you don't deal with the automotive industry unless you're fully qualified, and we have individual customer qualifications, such as the Ford qualifications" (Company 13, interview on 24.08.1998). Interestingly, the managing director of one specialist vehicle manufacturer commented that the most important factor in his company's approach to business was:

> Culture, I would say. Basically, there are a lot of management clichés that flow around that instead of providing focus, actually take focus away from the important things of business... Now, we don't use that cliché at all. We simply put our clients on a pedestal.
>
> (Company 33, interview on 28.07.1998)

Scepticism concerning the applicability of management theory to business practice in the UK is sometimes spoken of as constituting part of the British business culture. However, the respondent here makes a distinction between the *overt* goals of quality systems and their *effective* practice, "taking focus away" from what they, in his opinion, should be doing. Given that we have already questioned the unspoken aims behind such systems, we might argue here that these are jarring with the perceptions of one practitioner. As the sales director of a long-established supplier commented:

> We think that the emphasis should be the other way around... on the product and not only on the systems. If you read into some of these systems, you almost get the impression sometimes that consistency should be the key, and... if you set your standards low enough, you're bound to qualify!
>
> (Company 34, interview on 21.07.1998)

From this we might enquire about the concept of 'reversal' in the respondent's view of quality systems. Consistency, he argues, is not necessarily the same thing as a 'quality product', but perhaps the aim is more to reduce the risk. There are, it should be noted, very different rationales being cited by the respondents in these texts. Although we may find – as we might have expected from the analysis of discourses resonating through the literature examined in *Chapter 5: Researching a Modern Motor Industry* – that issues of power and control were uncovered here, we were faced also with the stance that it was 'simply the way of the world'. Thus we should be very careful about assigning a single rationale to the phenomenon as this would silence the voices of respondents, and should instead bear in mind that a rationale may well be purely local to a given firm.

Customer-supplier relations

We may find further cases of fragmented attitudes by looking to the diversity of views on customer-supplier relations, in particular among small firms. In the case of one small Tier-2 supplier, the managing director found that production capacity was a problem due to "the mix of business and what customers want us to do. They want us to have a fair degree of flexibility, but we can't afford to have unoccupied plant. So you juggle all the time" (Company 2, interview on 28.05.1998). The sales and marketing Director of a firm in a similar situation clarified this further:

> The issue that we're into is that we're a niche market operation, which means we operate between 0 and 100,000 crankshafts a year. Above 100,000 crankshafts and we're in direct competition with the OEMs... So the real thing that we've got to do – the real opportunity – is how much niche market stuff comes out of the OEMs, which is something they're no good at manufacturing, and we are.
>
> (Company 22, interview on 19.08.1998)

From these texts, it would appear that the customers of small suppliers – such as major Tier-1 sub-assemblers – draw on the greater "flexibility" of these firms in

manufacturing "niche" products. Yet more importantly, perhaps, we may note a demand for a wider range of produces – i.e. greater flexibility – than is possible. One of the sidelined limitations of smaller firms may be read from the response given by the marketing manager of a small accessories manufacturer, which was in a position of experiencing difficulties due to its suppliers:

> [A]s a manufacturer, we subcontract out quite a high proportion of the total manufacturing. It can be as high as 40% of everything that goes out of our gate... and it's simply a knock-on effect if a supplier lets you down, really. The more you're reliant on outside contractors, the more important it is to be confident in them and to control them. But inevitably, essentially, you're not always in direct control of that subcontractor. If he has problems, that obviously has a direct knock-on effect on your service to your customer.
>
> (Company 3, interview on 13.07.1998)

Judging by the prevalent discourses surrounding subcontracting by small lower-tier firms, this situation seems unusual. On the other hand, this firm was found to be in such a position. Yet there appear to be inherent difficulties in this: to be able to be "confident" in a supplier is linked to being able to "control them", with any problems which affect the (major?) customer of the firm subcontracting out being the potential result of failing in this "direct control". The same power relationships and attitudes we might expect from the car manufacturers and their suppliers appear again further down the tiers. Investigating why this small firm was subcontracting out quite as heavily as it did, the respondent explained:

> [O]ur manufacturing, if you like, is based in basic steel fabrication... But in design terms, we're moving much more into plastics, plastics injection moulding, and other materials as well. But we're not at a level yet of throughput on those where we would consider bringing in that facility... So, as I said, as a consequence of that, because we don't want to be limited by our manufacturing facility, a very high proportion of what we do in terms of manufacturing is done by somebody else.
>
> (Company 3, interview on 13.07.1998)

It is interesting to note from this that although such a large proportion of work is indeed subcontracted, this is still regarded by this firm as being too small to produce in-house. Ironically, this again sounds hauntingly familiar, in that a car manufacturer might make a similar case – the core business of the firm being seen as a car, yet as the *design* and *assembly* of that vehicle (with maybe the manufacture of certain choice components, like the body shell, engine, or transmission) rather than as the need to fabricate every component. Of course, as discussed in the above chapters, there are

cases where even the design, assembly, or even the concept itself, are contracted out to other firms. Indeed, asking what this firm here saw as its great strength:

> I don't know if it's the sort of thing you're looking for, but very much the way we operate is set and determined by the MD. He started the company ten years ago... and his key interest, if you like, and what he sees as the forte of the company – and I would agree with him – is our design ability... So it's, if you like, the way design has moved and the way our design facility has expanded that has governed an awful lot of what we're doing now... But essentially our culture... is very much part of the MD's thinking.
>
> (Company 3, interview on 13.07.1998)

Design, then, may be spoken of as the core business of this firm. Yet this is directly attributable – and this is not stated overtly in the above text – to the impact of the managing director. It may well be asked, when speaking of the same situation in a larger company, whether the same degree of personal influence in creating the core strength of a company may be linked with the leadership of any one individual. Power and authority, in the smaller firm, may therefore be linked strongly to a single person – such as the company's founder – who may also be credited as the driving force behind its particular speciality.

Further implications of specialisation and the customer-supplier relationship might be found by taking the example of one medium-sized Tier-2 supplier whose business development manager explained that although its business did not specifically involve joint-venture relationships:

> Effectively, we do support projects and do specific technical support on things... It's very much project specific, and we have specific technical support agreements with clients. So if they want to ask us any specific questions on any specific subject, we can do... On a project-by-project basis, sometimes we might temporarily locate staff to work at the start-up phase of a project in Europe. We're looking to possibly think about a European office. Again, that's something for the future.
>
> (Company 15, interview on 27.07.1998)

Essentially, the *services* provided by this firm were an important part of its manufacturing business. It is worthwhile noting that a merging of personnel between the supplier and its customers was a likelihood – and one dependent on the *circumstances* of a particular project rather than on a particular customer. This may furthermore be taken to imply that the relationship between one company and another – no matter how close it might be at a particular time (such as in the design phase of a

particular project) – could be a transitory phenomenon rather than a long term commitment.

Speaking again of the automotive industry as being subject to its own discourses, it is interesting to note that the sales and marketing director of a medium-sized Tier-1 supplier said of how closely his firm worked with its customers, "Not as much as we should do, and we're developing that a lot now" (Company 22, interview on 19.08.1998). Indeed, similar sentiments were expressed by the managing director of a small components supplier when asked if his firm worked closely with its customers:

> Oh very, very much involved, yes. Definitely. That's part and parcel of our job – application engineering for them. They give us an application and they tell us what they need. So we're very involved from the initial design right the way through.
>
> (Company 44, interview on 24.08.1998)

This close relationship between the customer and supplier will be investigated in more depth later, but it is instructive for the moment to recognise that there exists an interplay between *an increasing use of such relationships* and *an increasing awareness that such relationships are necessary.* But a firm's closeness to its customers – and the implied interdependency – was not necessarily described in a positive light. One of the concerns expressed by respondents was that they were too dependent on a single customer. These issues may be identified particularly strongly in the reply given by the marketing manager of an accessories manufacturer when he said:

> We have one large customer and we have many other much smaller customers. In fact, our marketing objective over the next few years is to secure another one, possibly two customers who can provide the size of business that we're now getting off this one customer... [C]urrently we have too many eggs in one basket. But it's also true to say that the market itself is obviously suggesting that we move in that direction if we're to actually succeed and survive. In the world of accessories... at the moment various importers control what they buy from local accessories manufacturers, [but] the [car] manufacturers are actually looking to take control of that...
>
> (Company 3, interview on 13.07.1998)

Although the issues of 'power' and 'control' are referred to overtly in this text, we should also note that the respondent is describing forces outside of his company "suggesting" that it should be increasingly dependent on an increasingly small number of customers. This issue was hardly unique to this firm, as the managing

director of yet another small firm explained, "we are dependent on some regular customers for 60% of our turnover" (Company 44, interview on 24.08.1998). This firm's recent growth was described as:

> Just aggressive selling. That's the only way we've been able to do what we do! Taking business off people. Adopting a very aggressive stance in the marketplace. We don't have any high technology products – they're very mature products. There's very little you can sell on in terms of features and benefits. It's purely a case of offering a competitive product in a better way than our competition... and overall aggressiveness in the marketplace.
>
> (Company 44, interview on 24.08.1998)

But it may also be asked whether firms may wish deliberately to tie themselves to a small number of customers, as may be looked at in a statement given by the director of a small research house:

> My feeling at the moment... is that we will end up doing more and more work for one or two UK-based manufacturers, simply because in the end it's easier to discuss and pull through a project when (a) you speak the same language and (b) you have the common ability to be at their office... in a fairly short period of time... And so my feeling is that we will probably end up very much like a sort of Valpina to BMW... That, I think, is an end product that whilst it tends to put all the eggs in one basket, it does in fact give probably a greater degree of security in the longer term.
>
> (Company 26, interview on 04.08.1998)

It is interesting to compare the different attitudes expressed by Companies 3 and 26 as part of a willingness to integrate with their major customers. Where Company 3 is fearful of the degree of control that could be exerted over it, Company 26 seems to welcome the "security" of becoming effectively an informal division of a car manufacturer. From these texts, we may again describe an industry in which what is perceived as an inevitable tide of 'rationalisation' is greeted with mixed reactions by smaller firms.

Challenging the 'supply chain': Small firms and the 'service sector'

Within the interviews, another of the topics explored with respondents was the relation of their firm to the 'automotive supply chain', and therefore by extension, the implications of this conceptual model. One respondent – the sales director of a small

company – raised the issue that suppliers, particularly of frequently-used components, often supplied more than one industry sector:

> The thing you've got to bear in mind here, is that you're predominantly interested in the automotive industry. You have to bear in mind that our product is used in a whole plethora of industries... So the questions that you've asked me, you might have asked from an automotive slant, and I'm answering from a more general perspective.
>
> (Company 18, interview on 08.07.1998)

The question of what exactly constitutes the automotive industry remains. Not only is a dedicated researcher affected, but so are all commentators. We might well ask how valid our 'findings' might be: if a respondent is involved in more than one industry sector, would he or she speak from, for example, an *automotive* perspective or a *general* perspective? Indeed, we may take the argument a step further by speaking of the product (or service) of a company and asking how 'automotive' it is. For while car manufacturers and their immediate Tier-1 suppliers might source fasteners (general assembly), lubricants, plastic hosing (hydraulic connectors), braised aluminium tubing (radiators), moulded plastics (trim and assembly), metal castings (engine components) and so forth, very similar product lines would be used in a variety of engineering-related industries. We may therefore question why 'lower Tier' suppliers are expected to be primarily automotive if their products are also used in other industry sectors as well. After all, major 'Tier 1' partner firms like Bosch (engine management systems, electricals, alternators, and so forth) are heavily involved in other industry sectors (e.g. white goods) and do not regard themselves as limited to the automotive sector.

Furthermore, as the sales director of one small Tier-2 supplier said:

> Some of the products which we're developing and/or importing are addressing different markets. Some have nothing to do with the automotive market at all. So yes, diversification is helping us because it's enabling us to spread our risk through a number of different industries. For instance, if I were solely a supplier to the automotive industry right now, I wouldn't be as comfortable as I am knowing that we're servicing many different industries.
>
> (Company 18, interview on 08.07.1998)

This narrative reminds us that, particularly for the smaller firm, there is a strong element of risk involved in restricting oneself to a small customer base or market niche – and thus if the company's product were marketable in other industry sectors, the firm in question would enjoy a degree of insulation from the economic situation in

any single industry (such as the 'rationalisation' movement within the automotive sector). Additionally, instead of looking to what is being said – the spreading of risk, a reasonable explanation – we might ask if there is more to it than that. Looking to the choice of words, the use of "comfortable" could be questioned, as an alternative reading might be that the spreading of risk was not *general*, but *specific*: the automotive industry as an *uncomfortable* sector in which to be based, and a *risk* to a company that relied solely upon it.

Small firms and their larger brethren

As one of the frequently-used descriptors of a company in this work has been one of relative size (in number of employees, although more involved classifications may be employed) it is useful to ask how the respondents perceived their firms in relation to others within the industry. For example, one of the most basic distinctions possible would be that between 'small' and 'large' firms and thus we would look to the discourses in which these differences are framed. The managing director of a small specialist vehicle manufacturer furnished one such text, when he said:

> [E]ffectively, small companies are able to perhaps adopt the culture and thought processes of one individual more than large corporations are. I happen to be committed, if you like, to the tenets of TQM... And I think there's a degree of company culture that tries to make it more complicated than is absolutely necessary. And the great joy of small business is that once you've had that experience, you can throw away that which you perceive to be chaff – as you have the right to make that decision, don't you?
>
> (Company 33, interview on 28.07.1998)

In exploring this narrative we might note that (as above) it is resonant with discourses of management theory and the unique position of smaller firms. Although the respondent may be talking of leadership, we might question whether this alone can account for the perceived difference in business culture. In the case of Company 46, a small-sized metal working firm, the managing director articulated a similar view which saw its "family culture" as a strength and therefore ensured that cross-training and job rotation were constantly in use so as to give each operator a familiarity with each major task on the factory floor. By giving a mixture of variety and autonomy to

its workforce, the managing director felt he was able to ensure that both interest in, and skill at, performing the standard metalworking tasks were maintained. Such a situation might well be reminiscent of 'best practice' management, and taken with the idea of 'leadership', we might counter our original question of whether small firms could take such measures on board by asking whether *larger* firms were more restricted in their capabilities – noting that the respondent from Company 33 appears to question his "right" *vis-à-vis* his management experience in a previous larger firm to make these kind of decisions.

In the literature review, i.e. discourses surrounding small firms (see *Chapter 4: The Distinctiveness of Small Firms*), an impression given was that small firms faced certain constraints due to the differences in resources available to them as compared to larger firms – in particular, finance. Yet certain of the narratives provided by respondents appear to contradict this view, as in one example the purchase and logistics director of a medium-sized components supplier spoke about how finance was not that much of a problem:

> [T]hat doesn't particularly restrict us in terms of organic growth because our profitability allows us to reinvest at the same kind of level as we can bring in new products anyway. So it's not a real restriction there. It's a restriction in terms of acquisitions.
>
> (Company 38, interview on 20.08.1998)

We might from this draw a distinction between the *natural* ("organic") and *unnatural* ("acquisitions") means by which firms can grow – and by implication, suggest that financial constraints were irrelevant in a *natural, normal* situation. Similarly, the sales director of a small firm spoke of his perceptions of the resource problems a small firm might face when compared to a larger one:

> Well, we might be in a minority here – I'm not sure, but we don't have that problem. We tend to finance our own growth and activity here, so the profits of the company are reinvested. We haven't yet come across a situation where we need to invest so heavily that we need to go outside for funding. Our machinery is on lease... because it's cheaper to acquire like that.
>
> (Company 18, interview on 08.07.1998)

On the first level of reading this text, we might note that a smaller firm isn't necessarily at a disadvantage with respect to capital investment, as in leasing machine

tools, for example, as opposed to buying them outright, a company is able to rely on internal sources. However, on another level, we might look to the implicit assumption of the respondent that this is an *unusual* situation, which points towards the power of discourses to shape perceptions even of an area quite alien to the respondent. In contrast, one small specialist vehicle manufacturer was described by its managing director as a "phoenix which rose from the ashes of liquidation" (Company 33, interview on 28.07.1998), and therefore in a financial position where "we have to cut our suit according to our cloth" – in other words, the company suffered from resource limitations due to circumstances that were acknowledged by the respondent as being atypical.

Could then the limitations facing firms be determined by factors other than scale alone? When asked about whether he felt his small-sized manufacturing firm perceived any disadvantages due to firm size or scale, the managing director commented:

> That obviously depends on what business you're active in. The scale tends to be relevant to the type of business; the things we do don't need a particularly large organisation. We're dealing with larger organisations buying from us, of course. I think the only concern we have is that in some of our marketplaces, our competitors are being organised into larger organisations or are being acquired by bigger organisations still. So my answer might be qualified by saying, "it might not always be so".
>
> (Company 2, interview on 28.05.1998)

Indeed, later on in the same interview, the respondent considered that in automotive component manufacture – the "second key business" of his firm – the company's position as a supplier of components to 'higher-tier' sub-assembly manufacturers:

> [T]hat is why we're much more vulnerable to the consolidation that is going on in the automotive component industry. The supply chain changes are quite profound and they do concern us because there are quite a number of key international companies of enormous size and they're constantly buying up businesses in the supply chain to become a completely integrated supplier. That tends to lock out companies of our scale, who would traditionally have been a sub-supplier or a sub-sub-supplier... The conclusion we've reached just now... is that we may need to ally ourselves with other businesses... as a partnership in some way.
>
> (Company 2, interview on 28.05.1998)

From these statements, a paradoxical situation may be read. On the one hand, the respondent speaks of the size of his firm as being 'of relevant scale', yet notes that his

competitors are merging with or being acquired by larger conglomerates. This consolidation appears to raise concerns for him, prompting him towards exploring the security offered by a potential alliance with another firm. The alternatives, it seems from this, are to be acquired or forced out of the market. Furthermore, it is interesting to note that the respondent describes the business niche of his company in terms of the supply chain, and that its relative position is spoken of as the source of the vulnerability; a situation where the supply chain model, as much as the nature of the industry and the scale of the firm, defines its strengths. To reify this analysis by means of Foucauldian deconstruction, we might wonder at the marginalised fear – that the respondent fears the vulnerability of his company in the face of the changes.

To extend, however, the concept of the vulnerability of a smaller firm as a *perception* rather than an *experiential reality*, we can look to the statement given by the marketing manager of a small Tier-2 component manufacturer:

> In terms of marketing, it tends to be a disadvantage in that many of the customers we're aiming at ourselves at are really looking for very well established companies who can offer a range of services. We believe we can offer those services, but possibly their initial perception of us as a small company goes against us... You tend to get pigeonholed for certain products, and whereas we have the capability and ability to do a far greater range of product than we're supplying to any one customer at the moment. You tend to find that because they're buying possibly two or three products from you... [that] they don't even consider you when they're looking at other products to go alongside those first products.
>
> (Company 3, interview on 13.07.1998)

Thus we are reminded that the existing perceptions (discourses) of the capabilities of smaller firms can be at odds with the product ranges or operations that such firms might offer. Although it could be argued that this might be attributed to a misrepresentation of their capabilities, it should be noted that if discursive reality constructs 'what is known' about an industry, then individuals will react according to their knowledge – in other words, if they read and hear and talk about small suppliers being essentially one-product firms and do not have access to other discourses (such as the flexibility of the said supplier), then the discourses of limited ability will be those that inform action. This dichotomy may be used as an example of *hyper-reality* (again a Foucauldian concept), in that social constructions (discourses) can be 'more real than reality'. The experiential reality from the point of view of the smaller firm may be 'true' as far as its marketing manager is concerned, but if this is not generally

known to its major customers, then this 'truth' has no power. A similar case can be made for the 'supply chain' concept: regardless of whether it is 'real' or part of a mythology surrounding the automotive industry, if it is 'known to be true' (widely spoken of), then so it informs action.

Holding companies

In addition to the relative size of the firm, another distinction made in the statistical analyses of the above chapter was that of independent, group-owned, and firms owned by holding companies. Quite what role the holding company played in these distinctions was ambiguous going solely from the questionnaire responses, and this therefore merits further exploration here. Although according to one respondent, "It's just paperwork. They don't have any other substance" (Company 2, interview on 28.05.1998), further detail revealed that the holding company had been the vehicle for a management buy-out, but left the company with "uncomfortable" finances "because our management buy-out was a very heavily leveraged one with a lot of funding from the parent that we moved out of... although it was perhaps the only way of going forward at the time".

In the case of the management buy-outs interviewed here, one may well wonder at the true degree of independence gained by so doing. Certainly, a legacy of poor finances seems to have been a major cost of doing this, and one that restricts the new company in its freedom to move. Yet we might question the attitudes of firms towards their holding company groups (or vehicles, as in this case), as this 'denial of substance' suggests a lack of any point or meaning to the relationship, other than in the "paperwork". We could ask whether similar holding companies were tallied as "groups" by researchers, or could similarly be confused with small holding company-owned groups of co-operating firms.

So should, perhaps, the holding company be related to the strategic decisions made by a firm? After all, if the holding company was (as in the above example) the vehicle through which a management buy-out took place, then should similar acquisitions

through holding companies be related to strategic growth? In the case of one small holding company-owned group of three, the sales and commercial manager explained that its acquisition of another company on mainland Europe:

> [W]asn't as strategic as it sounds. The German machinist was a large customer of the foundry and the machinist is supplying one company, and the machinist was in financial trouble because this machinist was the route for our foundry's castings to go to this German customer. And it was decided that the machinist would be bought to protect the foundry business.
>
> (Company 20, interview on 03.08.1998)

Yet on the other hand this impromptu acquisition would present difficulties as part of a vertical integration of the loosely-affiliated group of companies, as:

> It's difficult for us, and I'm speaking from the machining company's point of view. Our foundry, they supply a lot of European customers, and we tend to concentrate on our home market because we've got to be careful from a group perspective of a conflict of interest, because certain customers of our foundry would not take kindly to us invading their markets.
>
> (Company 20, interview on 03.08.1998)

The ostensible advantages of vertical integration might therefore be outweighed by this "conflict of interests", especially if the acquisition of the German company had been pursued to "protect" the main business. This example has indicated that there is no single strategic rationale to which holding company ownership should be rationalised, and nor should it be assumed that firms under a holding company umbrella were necessarily independent of each other. Indeed, in the case of a medium-sized engineering company that was part of a small, privately-held group of firms owned by one person who was also the chief executive of a larger PLC, the respondent explained that "although we are not connected in any way, there is cross fertilisation of information and of ideas between the public group and the small private group" (Company 27, interview on 24.08.1998).

If anything, further exploration through the interviews suggests that the respondents articulated their answers by drawing on popular industry discourses about the role of holding companies, as descriptions of their presence indicates that they are to a greater or lesser extent considered irrelevant to the day-to-day business of the firms.

The 'service sector'

A recurring query in the questionnaire survey related to the impact of including respondents from the 'automotive service sector'. Although the point was raised that, according to the SMMT *Motor Industry Directory*, a large proportion of the automotive supply industry engaged in 'service sector' operations – there appeared to be no 'fine line' between 'service' and 'manufacturing' operations. In the three examples presented here, however, we are now able to explore this situation further. Indeed, we may begin with an explanation given by the managing director of a small-sized distributor owned by a Swedish multinational:

> [W]e work directly with the OEMs or Tier-1s, and I've got a number of people who are working the design houses of, say, Ford. So I've got an engineer who works with the designers in Ford developing fastening solutions, and that also goes with our Tier-1 customers... As the consequence of that, we're also involved heavily with the purchasing people who are making sourcing decisions, and also with the logistics people... which is very, very important to today's automotive industry.
>
> (Company 6, interview on 28.08.1998)

This may lead one to question just what the role of a 'distributor' in the automotive industry might be, as the operations described by the respondent sound suspiciously like those made by a 'proper' supplier (i.e. one that actually manufactures its own products) – yet the respondent went on to describe his company as a "support business" and "definitely not a distributor, and we make that a strong distinction." Furthermore, the parent company was at the time considering the situation of its subsidiary in China which supplied Western telecommunications joint ventures. This facility had been asked by its customers to widen its product portfolio, and so the company was needing to choose between tying in with a distributor in China to do this, or setting up its own logistics system. Thus the trend here towards incorporating 'service sector' operations into manufacturing operations was not restricted to its 'Western' markets alone.

Although we have begun with an example drawn from a manufacturing conglomerate, we can look also to examples of firms whose operations were primarily 'service'-based. According to the director of one small firm:

> The company is basically now a research and development house for the OE manufacturers. In other words, we will be given a project by a motor manufacturer to develop some specific engine part of indeed to do some work on one of their engines... So really, our principal activity is research and development projects for OE manufacturers on engines.
>
> (Company 26, interview on 04.08.1998)

While we could explain this firm away as a simple subcontractor, there are wider implications that we can draw. Looking closely to the text, we can note that this 'supply-side' involvement is presented as an *evolutionary* step (i.e. "now a research and development house"), suggesting that the company in its current form owes its state to the formation of a new market niche – one created by car manufacturers sub-contracting out "research and development" to smaller firms. The engine, we should remember, is often regarded by car manufacturers as a key product, regardless of what else they might subcontract out (BMW and Jaguar represent strong examples of relatively small companies careful to maintain expertise in engines – even supplying engines to other car manufacturers, as Jaguar *diesel* engines were being exported to Germany before the company incorporated them into its own range of cars). Thus the subcontracting out of engine design and manufacture is not a decision taken lightly by the firm involved.

Among the firms taking part in the interview were also ones that described themselves as agents rather than distributors. Indeed, as the respondent of one micro-sized firm explained:

> We are a manufacturers' export agent/consultant. We are essentially specialists in that we know the territories, we know the languages, we know the product... We sell, for instance, reactive agents for a company that manufactures a specialised burner that goes into power stations. We also represent a company, or group of companies, that manufactures forgings... for Eastern Europe, the automotive industry. But we also from the other side represent a Czech manufacturer of forging equipment. So our links go both ways in this type of industry. But we're linguists, we know the area, we know the people.
>
> (Company 14, interview on 10.07.1998)

To hear the core business of an automotive industry member being described as 'linguistics' should shock the conceptualisation of an engineering-based industry even further. Yet the 'service' provided here forms the basis for the exporting and overseas manufacturing of more 'traditional' firms. What may be taken from this text is the idea of a firm as *intermediary*, fulfilling a knowledge-based function that – in this

instance – provides its customers with export markets they would otherwise lack the capacity to develop. By nature of a relationship, this necessitates a closeness between the agent and the manufacturer so that:

> [W]ith our main customers, we almost live in their office. Or we work to the extent that we will actually jointly develop the product they want. To enable our principal to gain a market edge, one has the ability to create a product that only they can supply. So in the beginning for the design of an engine, if you design within that engine a component that can only be made by one factory – which happens to be the one you represent in the UK – you hopefully have retained the manufacture of that component for the life of that engine.
>
> (Company 14, interview on 10.07.1998)

Although this situation might seem to be partisan on behalf of the agent, it may also be argued that it serves to create co-operation between firms that would otherwise remain unknown to each other – particularly due to the international element. In a sense, the agent operates by breaking down the barriers of national market knowledge, culture, and language for its customers. The role of the agent may therefore be read as providing an essential service to an *international* industry sector, particularly in facilitating the international involvement of smaller independent firms.

Conversely, we may look also to distributors as facilitators of *national* involvement. As the managing director of one small company, a member of a larger group, put it:

> It's a very complicated trade. You've got OEMs, got cash and carries, got retail outlets, wholesalers and distributors, super motor wholesalers. It's an over distributed trade, really. Years ago, when I first started in it, we just had garage-wholesaler-distributor.
>
> (Company 16, interview on 19.08.1998)

Furthermore, the nature of the British market necessitated a distributive element as:

> The market... has changed so much that there's probably no other market like ours in the world. We all drive different cars here. I mean, we drive anything and everything, don't we? And that's helped make the change, since manufacturers can't gear up for everything that we drive, hence they have to go abroad to manufacturers all over the world. Which is where [we] came in... I mean, you know, there's hundreds and hundreds of manufacturers out there and to source parts, you have to go all over the world, you've got to dig out the Hyundai ball joint and go to Korea and go to all sorts of places to find the component – because it's just not worth making it in the UK.
>
> (Company 16, interview on 19.08.1998)

The diverse nature of the UK market, in the words of this respondent, would therefore grant an economic justification to the existence of firms whose business was primarily distributive. However, we may extend the same rationale and ask whether a similar economic requirement could be found for distributors among OEM manufacturers as well as in the aftermarket. One respondent in the survey, the managing director of a specialist distributor, explained:

> [W]e are a distributor albeit with a technical bent. Our ability, you will find, is largely from a technical knowledge point of view, selling technical knowledge within a manufacturer... But of course there is also the desire among the auto people to lower the number of suppliers – particularly with one-stop-shops where one company can source many different products... We've focused on individual products in a limited number and with a limited supplier base.
>
> (Company 48, interview on 27.05.1998)

We may read from this that out of the 'rationalisation' movement instigated by the major automotive manufacturers, a niche appears to have developed for distributors. If a single firm can supply both a range of parts and give technical support for them – effectively providing a 'front' for a number of smaller, more specialist manufacturers – then the automotive customer gains the benefits of dealing with a single firm and yet, in a way, still being able to source from a wider base. Yet, looking more closely at this text, we might wonder whether the rationalisation movement, while ostensibly beneficial, may serve to alienate 'lower-Tier' firms: the respondent distances his firm from the "auto people". In the same interview, the respondent explains:

> Well, for us it's quite difficult. We're told we're in a vulnerable place. We're not a one man band... On the other hand, there are other large distributors in the UK who are obviously quoted PLCs, turnover is £100 million plus. They are able to invest a lot in logistics, warehouses, hangars full of stock to deal with the one-stop-shop... There's been so much cutting down the buying organisations within OEMs that now there's hardly a limit down to which a company doesn't look to outsourcing...
>
> (Company 48, interview on 27.05.1998)

Rationalisation, we might deduce from this, is a project aimed at reducing the number of suppliers irrespective of the loss of services (such as detailed technical support). The relationship of Company 48 with its own suppliers was described as being "to work ostensibly as the sales arm of our key suppliers" (Company 48, interview on 13.09.1999). In the case cited here, a small distributor *able to provide in-depth technical support* was facing tough competition from its larger cousins, ones whose strength lay instead in their logistics apparatus and financial backing – at the expense,

we may wonder, of a closer familiarity with the product lines carried. Rationalisation, rather than reducing the supplier base for a firm, can be read as creating the illusion of a smaller number of firms by dealing instead through intermediaries. In a later interview, the original respondent explained how his company had adapted to the changing market conditions:

> In this day and age, it is changing as I said, and recently it has been largely the case that we've had relatively few key suppliers. But in our market these days, where we have a lot of downsizing – this is the jargon of the supplier base to our customers – they are looking for individual suppliers to supply a wider range of products... But we have not thrown away by a long way, of course, our relationships we've built up... with our key suppliers.
>
> (Company 48, interview on 13.09.1999)

Thus we have seen that, contrary to popular discourses of the automotive industry as a primarily *engineering* based industry sector, the sample of firms in this survey (which considered themselves and were in turn considered by the official industry association, the SMMT to be automotive firms) included a significantly high number respondents from service-providers – distributors, agents, logistics providers, research and development houses – whose narratives resonated nevertheless with an automotive focus. The voices of these firms therefore serve to challenge popular descriptions of the industry.

Specialisation and supply chain relationships

An issue that has already been touched on perhaps is the growing expectation by manufacturers of being able to draw on the expertise of their key suppliers during the design stage of a new product. Indeed, the marketing manager of a small Tier-1 supplier spoke of the need for a close working relationship with its customers:

> Our main and oldest customer is Land Rover, and we're now getting involved with projects with them at a very early stage in the actual development of the vehicle, and everybody benefits from that. We can do a better product for them... That only really comes about through mutual trust and really both development teams working as a complete team. So yes, the closeness of the relationship is vital.
>
> (Company 3, interview on 13.07.1998)

Not only does the respondent's narrative offer information as to the benefits of this form of inter-firm co-operation, it presents this in an optimistic light: "mutual trust", "a complete team", "a better product". If we wished to look to the sub-text here, we might infer that the respondent's firm has become a key supplier. Through possessing a central role in the development of new models, the company's relative power has become stronger. The "benefits" of the relationship spoken of can perhaps be read as those of the respondent's firm rather than the 'mutuality' and 'trust'. Indeed, if we wished to look to similar relationships, we could draw on the text given by the managing director of a medium-sized component manufacturer, who explained:

> With some customers we provide a design service and are involved at a fairly early stage. You could say that Ford or Rover come into those categories. With the likes of Nissan and Honda for original equipment, you're intended to make a copy part that's originally been designed in Japan. You're not involved necessarily at an early stage, although even in Nissan, there's a growing sort of trend to allowing us to put a bit more in the designing than we used to.
>
> (Company 8, interview on 13.07.1998)

The closeness of a supplier's relationship with its major customers, it would appear from these texts, is evidenced through its design involvement. In the case of an engineering supplier, the respondent was asked about the close working relationship his company had with its customers:

> It did not until two-three years ago, where the emphasis now is going more onto people like ourselves either doing the design work outright, or supplying guest engineers to work with our customers' engineers on the designs. We can do both... Gradually, we're taking on more and more of the outright design work ourselves, based on the information the customer gives us. In order to do that, we have access to their design database...
>
> (Company 27, interview on 24.08.1998)

This text mentions additional issues involved with design co-operation between companies: the sharing of personnel, the sharing of information, and even "outright design work". With the acquisition or the exercise of unique knowledge, as Foucault might argue, there comes a related exercise through which *power* is lived. There are sub-texts of *centrality* in these cases, as the design firm gains authority *through* the process of design over other suppliers, and may be said to place itself at the invisible centre with its customer – an unspoken alliance.

In an overt example of an alliance, one joint venture uncovered in the interviews was a proposed alliance between a British specialist vehicle producer and its German counterpart. The factor driving it was, explained the respondent:

> [T]echnical know-how we didn't have. To acquire it in this country, basically, would have ensured that by the point we'd got it, it would have been redundant. And the only needful way of getting that technology was creating a relationship with someone who already had it, but was either unprepared or not in a position to sell from wherever they were located, in this country.
>
> (Company 33, interview on 28.07.1998)

In the above text, we may read even more strongly the power associated with specialised knowledge. In forming an alliance with its German counterpart, the company described here would have gained an advantage through "technical know-how" that should enable it to compete with the market leader (the sole UK possessor of this proprietary information). It is ironic, however, that the proposed alliance fell through due to the strength of sterling at the time.

Conversely, we may look to the other side of these situations – cases of firms *seeking* to subcontract specialist firms for their skills or products. As the respondent from one small "car design & specialist manufacturer" explained:

> I suppose the strategy that we're trying to adopt... is our ability to subcontract or to find suitable subcontractors. We are actively talking to other companies now, perhaps more than we've done in the past, in order to expand our operation through that means... We're almost solely UK, largely because... the logistics of actually getting around to see subcontractors is difficult enough in the UK. To introduce them overseas is more difficult. Also, it is difficult enough to locate suitable subcontractors even in our area, let alone the rest of the UK. To try to do it overseas would be very, very difficult.
>
> (Company 24, interview on 21.08.1998)

For a small firm, it would appear that the use of specialist subcontractors constitutes an entirely feasible policy, with the restrictions facing a firm of smaller scale being more logistics/communications boundaries rather than inherent ability. In another case uncovered in the research, a small accessories manufacturer subcontracted over 40% by value of its manufacture (primarily plastics moulding and finishing) so as not to 'limit itself to its production capabilities'. However, a firm's suppliers could have a knock-on effect in the 'supply chain', as the sales and marketing manager of a small accessories manufacturer explained:

> I don't think that's necessarily the case here, but we have instances where our supplier does hold us a bit. But generally in cases, we get what we want in the end. If it means that we can't get it from our original supplier and he has that kind of attitude, then it's our duty as we are the supplier to make sure that we find somebody else in the marketplace to provide that. So it's always a duty as we are the last supplier to the original demand that it's our duty to make sure that we fulfil these requirements.
>
> (Company 47, interview on 20.07.1998)

Thus a small firm might face the same limitations as a larger firm in its dealings with its supplier base. After all, just as a car manufacturer might have to halt its vehicle assembly lines if a just-in-time part failed to arrive on time (as was the case with Jaguar's production of the X300 model in 1995 when Bosch, hardly a small company, ran into logistics difficulties with delivering the required alternators), so a smaller firm might be, if anything, more vulnerable to its suppliers. The point, however, is that the *scale* of a firm was not spoken of by the respondents as restricting their firms' ability to subcontract in the same manner that larger firms are supposed to and nor were smaller firms unaffected by similar supply-side considerations.

Discourses of a changing world: Modernism and modernity

In the interviews, an issue brought up with the respondents was what they considered the coming years to hold for their company. As might be expected, the business manager of a large multinational engineering conglomerate was not alone when he raised concerns over the growing 'rationalisation' of the automotive supplier base:

> It's going to get awfully hard and the stakes are going to raise. The winners will see the quantifiable aspect of the winnings increase and the number of winners will reduce. So it'll be bigger fish in a smaller pond. And the size of the pond will reduce. There'll be a huge amount of consolidation. Those are generally held views, and we're seeing that in the industry generally.
>
> (Company 41, interview on 27.08.1998)

According to this narrative, the respondent envisioned greater consolidation yet also greater competition between the major players – implying moreover that these were popular discourses in his industry sector. Yet the project of rationalisation may be contrasted with the contradictory view that the industry would become more diverse,

as may be read from a statement made by the managing director of a small components manufacturer:

> We have, over the last 10-15 years, become more and more specialised. 15 years ago, we would have produced a standard product, and we'd have supplied into the general merchant area of the industry... [W]e are 100% specialist now. I can see it moving more and more that way, with us developing relationships with suppliers in the UK and Europe... But it will become a closer and closer relationship... More and more the pressure is on the first-tiers, I think, rather than the manufacturers to continue the development of the product... It's up to us to stay very close to the first-tier manufacturers and we will continue to work that way... I was reading a magazine only this morning... and there was an article in there showing that companies were moving towards where 90% (this is OE companies) rather than 40-50% of the components are bought-in.
>
> (Company 4, interview on 18.08.1998)

On the immediate level, a researcher might make the correlation that the industry is indeed becoming more specialised, that smaller companies are having to do so to compete, and that product development is requiring more and more alliances between the Tiers. This has been argued above. Yet what may, perhaps more significantly, be drawn from this text is the idea of an industry subject to discourses surrounding the route of progress. Not only is the respondent aware of such discourses, these can be seen to have a strong effect on his perceptions of his company and where it is heading. We can therefore, even from the above two texts, begin to envision an industry driven by two ambivalent and perhaps mutually exclusive discourses: one set speaking of greater rationalisation, the other of greater specialisation and fragmentation.

We should, however, be careful in our phrasing of the above argument, as it borders on totalising the discourses we seek to uncover into a model of two (literature-supported) paradigms at the expense of the multiplicity of voices we are seeking to uncover. An important issue not directly linked to either of the above discourses was raised, for example, by the managing director of a medium-sized Tier-2 supplier:

> I would say that the biggest strategic threat to this company is currently the strength of sterling and the implications of the common currency. And I suppose that my biggest concern is that if we don't go into the common currency or if sterling becomes – or remains – unreasonably high as it is, some of our major customers like Ford, Honda, and Toyota will vote with their feet to take production away from the UK... But that's hardly under their control. It's an inter-government issue.
>
> (Company 5, interview on 26-05-1998)

Such a situation is described as beyond the control of the firm. Unlike rationalisation or specialisation, issues concerning the European common currency and the strength of sterling are ones over which the automotive industry, even the largest car manufacturers, have little – if any – control. What can not be controlled can not be managed. This reminds us that the very (economic) environment in which the British automotive industry operates may shift in directions and force new considerations – and by extension, strategies – on its member firms.

In a similar way, we might argue furthermore that new technologies, as the sales and marketing director of an accessories manufacturer explained, have a similarly powerful impact on an industrial sector, such as:

> [A]ll the computer and the CAD systems. That obviously you can start to generate within those systems on a computer, that you can do away with quite a big drawing office, and you can obviously generate a lot of near soft prototypes on paper before you go to the hard copy. So I think that the development of that has helped a lot of engineering companies and even those sort of manufacturing companies.
>
> (Company 47, interview on 20.07.1998)

In this instance, the information technology revolution may be seen to simplify internal operations of a small firm. The significance of these changes should not be over-estimated, as we may see in the case of a die-casting subsidiary whose marketing manager interviewed commented:

> Our customers are changing rapidly, and technology in terms of product development is changing rapidly. For instance, with telecommunications which we supply – I mean, obviously, you know what has happened in the telecommunications industry and then the change in products there with the rapid growth of mobile communications and the rapid growth of volume computing, so really we're responding to our customers. That has been the biggest influence.
>
> (Company 12, interview on 19.08.1998)

Although we might note the importance of external change, e.g. in its customers, in influencing the direction and the technology of a given supplier, we should look also to the influence that *non-automotive* markets have on suppliers. After all, if car manufacturers and their key suppliers are drawing on their respective supply bases for innovation and product development, it may well be asked what proportion of these gains might be attributable to the suppliers' involvement in other industry sectors. In this example, Company 12's customers might be reaping benefits accruing from

developments in the telecommunications industry because of the firm's expertise (and perhaps stronger focus) in another industry. We may wonder also whether if bringing rationalisation to its fullest (i.e. replacing Company 12 with a dedicated supplier) might not diminish the possible developments and innovations that such suppliers could bring to the automotive sector. The drive for supply chain rationalisation would therefore appear to be antithetical to the drive for 'outsourcing' innovation, design, and development to the lower tiers.

As the respondent from a "1st-tier technology supplier" – a catalytic systems manufacturer – explained:

> I think it's fair to say that at the beginning of this venture, there was nothing quite like a catalyst within the motor industry. There was no understanding of it. It was a black box. It wasn't a particularly welcome black box, and the provider of the black box and the car industry spoke entirely different languages. I mean, basically we were chemists and chemical engineers, and they were a special branch of mechanical engineering. And there was no synergy, there was no understanding, and many engineers wanted in fact an engineering solution not a chemical engineering solution.
> (Company 30, interview on 25.08.1998)

In understanding this text, we need to realise that catalytic systems technology is at odds with the more conventional "mechanical engineering" environment of automotive manufacture: a catalytic system is unique as it needs to be tailored to a specific application (i.e. one model of car and a particular engine), the underlying technology is derived from an 'alien' industry sector (industrial chemical engineering), and – due to the materials used – a catalyst represents a significant part of the value of a motor car. We can infer therefore that, initially at least, there may have been some degree of friction between the major car manufacturers and the catalytic systems manufacturer, as their implicit authority was challenged through a reliance on an outside company whose engineers "spoke a different language" and *had* to be involved with the car manufacturer and its main supplier/partners from the design stage onwards in order for the technology to be integrated. Moreover, the respondent explained, "we're not a 1st-Tier supplier, we're 1st-Tier technology, because the tiers between us don't understand us and they never will" (Company 30, interview on 25.08.1998) – thereby also challenging the concept of the supply chain itself. The respondent continued:

> So we are technologically a Tier-1 supplier, we are in terms of commercial relationship virtually in all cases a Tier-1 supplier in that the prices are agreed with the car companies, but our supply chain is, with the exception of car companies that have in-house canning, via an exhaust systems producer who will often call himself Tier-1, and is Tier-1 for his exhaust system. But if he pays us at all, which is possible, then he pays us at the prices agreed with the principal – that is, the car company. So we regard ourselves as a Tier-1 supplier, but in the classical definition of it, we would not be regarded as such.
>
> (Company 30, interview on 09.09.1999)

The 'power', it would appear, of the catalytic systems manufacturer, places it in a very different 'Tier' to the exhaust systems supplier that it should be 'below'. More significant still, we might add, is the conceptualisation of a key "technology supplier" – a specialist firm writ large.

Indeed, Company 46, a metal-working company that supplied parts and body shells to car manufacturers (as well as operating in other industrial sectors), had found itself subcontracting out ever more work to a local laser-cutter to the value of £20,000 *per annum*. As laser-cutting machinery (not to mention the companies using it) was very rare in the area, the firm decided to invest in a system itself. The original laser bought by the company (a flat-cut type) soon became a significant part of its business. Indeed, within a short space of time, Company 46 became identified with the latest laser-cutting technology, and towards the end of the 1990s, moved decisively to retain this competitive lead through continued investment in order to stay "one step ahead of the game". With planar industrial lasers becoming more commonplace, the company added a '5-axis' machine (capable of three-dimensional cutting and machining) – the capabilities of which won the company a contract for supplying unique tubular grilles to a luxury car manufacturer.

The benefits of these technologies should not be divorced from their associated costs, as may be seen through the explanation of the director of a small, independent "research and development house" regarding the constraints faced by his firm:

> I think that the requirement for someone in our business is to have the very latest technology at all times. And that technology may be in the area of machine tools or in the area of computer technology, and it's frustrating that one can spend a great deal of money on today's item and its actual value is 10% of what you paid for it, and the new one is twice as expensive. This means that to do what we like to be able to do means that almost all our profit constantly gets ploughed back into equipment of all sort that doesn't retain its value...
>
> (Company 26, interview on 04.08.1998)

The pace of technological change thus would appear to affect firms within different markets in different ways, but it is important to note that the pressures faced by this independent specialist may well be those that prompted the original subcontracting out of such work by its customers in the first place. Given that this results in company accounts that appear to shareholders to show great inefficiency and poor profitability, such financial frustration may constitute the strongest threat to the service-sector firm.

On a very basic level, changes in automotive technology may also have a strong effect on *what* components are used in motor car manufacture as well as in *how* they are manufactured. One respondent from a small hose clamp manufacturer found that:

> [O]ur growth is very much dependent on the demand for clamping products in general. In many industries, hose clamps – which is what we're involved with – are being excluded these days because of different kinds of connectors that are available... In some instances, the rubber hose is made of such a material that it doesn't need a clamp... So to some extent, we're very much in the hands of engineers who are themselves being pressed to cost reduce their equipment.
>
> (Company 18, interview on 08.07.1998)

Although the respondent speaks of the changes wrought by new technology, we might question this by looking to what is being marginalised within the statement. Here, the idea of cost reduction is avoided, although this may be read as a more 'universal' driving force behind the pace of change. By *rationalising* the technology further, hose clamp manufacturers can be "excluded" from the supply chain.

The changes wrought by the growing use of 'quality' techniques in designing and manufacturing cars should be noted also, as a trend begun in the mid-1990s by car manufacturers was to provide a growing number of years of free parts and servicing for a new car (e.g. 3 years or 60,000 miles, whichever first occurred). The ostensible motives might be spoken of – as was the case with the Jaguar X300 model (the saloon that replaced the XJ40) – as restoring public confidence in the build quality of the car (the pre-Ford XJ40 had gained a reputation of 'spending more time in the repair shop than on the road'). Yet these assurances were not as generous as might be assumed: the service life of components was being extended at the same time. For example, where a cam belt might be rated at 30,000 miles during the late 1980s, cars of the mid-1990s might extend this to 90,000 miles. In the case of one distributor, the managing director pointed out:

> Cars are more reliable now than they ever used to be, so you're not selling certain components on certain engines as much as you used to. I mean, you've got the rogue engines that keep us going – some of the ones that continuously break down – but years ago, there were a lot more of them around. Engines are much better built these days.
>
> (Company 16, interview on 19.08.1998)

We might choose to explore the concept of a "better built" engine a little further. What is seen by the customer, after all, is the degree of servicing required and – as an immediately visible effect – the cost of replacement parts and the labour to fit them. By extending the life of components and the service intervals, the car would appear to be built to a higher quality *simply because it spends less time in the workshop*. For example, the standard service interval of 6,000 miles for the Ford Sierra (a model manufactured until 1992) was raised to 10,000 miles by its successor, the Ford Mondeo. Indeed, in the case of an ignition lead manufacturer, the managing director explained that the original equipment leads in recent-production cars not only had a longer life than older models, but that "a significant number of cars do not have ignition leads in them nowadays" (Company 39, interview on 29.07.1998). The managing director of a small component manufacturer added:

> We have tended to specialise on a quite well-defined range of components, and two or three of those components are changing through technology. For instance, intake manifolds have traditionally been aluminium and we machine-cast aluminium, and they're now going to plastic. So we're losing, you know, a reasonable share of the market because of that. Another one, flywheels, because we make traditional machine-tooled flywheels and they're now going to something called dual mass which is again going to exclude us from that marketplace. So those are our biggest challenges. Technology substitution by far the biggest.
>
> (Company 45, interview on 27.07.1998)

Yet on the other hand, the same respondent saw a change in the *pattern* of use, as:

> At the end of the day, they're not made so that they never break down. I think people are doing more mileage now than ever before. I think the cars are going up and down the motorway because it's quick to get to places... And stop-start – brakes need replacing. Brake disks are wearing out now because we go to asbestos-free pads. So, years ago, we never used to sell brake disks, but now you do... So there's always lots and lots of new opportunities coming up.
>
> (Company 16, interview on 19.08.1998)

From this, we can draw the conclusion that technological change is not necessarily going towards greater longevity, as this ignores legal changes (e.g. environmental laws) and social changes (patterns of use). The design, manufacturing, and

component-sourcing strategies pursued by car manufacturers may be dictated by factors outside their control (e.g. oil prices, government policy), and may therefore not necessarily be pursued for an immediate economic benefit. After all, the use of asbestos-free brake pads while being less of a health hazard, had effectively resulted in a rarely-changed part becoming one that required regular replacement.

We should not limit ourselves in this exploration to the effects of legislation, as political factors can have far wider-ranging – indeed dramatic – effects on the industry. In the case of one respondent company which acted as an agent specialising in Eastern Europe, the changing world has had profound effects:

> For us as a trading company specialising in Eastern Europe, it was far easier for us to trade while Western Europe did not want to go beyond the border. Not only that, under totality one was dealing with one trade organisation who would usually be in the primary city of each of the countries... Now you have to go to the thousands of individual little building companies... Now, with the ending of totality, financially, the companies are insecure... [B]efore '89... in effect we were selling to the government... and the banks would lend money automatically... Now, from a financial point of view, it is much more difficult... In 1989-1990, you have to understand that all our customers went into liquidation overnight. So that was dramatic – more than dramatic.
>
> (Company 14, interview on 10.07.1998)

As may be recalled from earlier arguments, the role of an agent may be pivotal to the international operations of smaller firms within the automotive industry. Yet in the text cited above, the implications of the turbulent events taking place in Eastern Europe were of consequence also for small firms already operating within the region. If an industry is becoming more international, then we should bear in mind that it will consequently be affected by political, economic, and social change taking place in nations other than the UK alone.

A multiplicity of voices: Differing attitudes to employment and personnel

If we wished to find a further example of the heterogeneity of strategies pursued by firms within the automotive supply industry, then we could look to the differing attitudes towards the relative scarcity of labour, which constituted a recurring issue among the interviewees. Two (conflicting) discourses we can explore here are those

of the greater availability of labour within dedicated manufacturing regions (such as the automotive components manufacturing 'Porterian cluster' formed around Birmingham and Coventry), and those of the changing industrial nature of the British economy from manufacturing-oriented to service-oriented (i.e. the lack of skilled manufacturing labour).

In the first instance, we can look to the interview response given by the business development manager of a medium-sized Tier-2 supplier when he explained that labour was hard to find:

> Certainly for the right standard and the right quality. The standard of engineers is somewhat variable. The market is often very volatile. Sometimes you're tying to do a project and the people aren't available. Now that means that sometimes we've had to carry surplus capacity in-house. Sometimes you might need to contract staff in on a temporary basis for a very large project. But, you know, you're in the realms of the market now.
>
> (Company 15, interview on 27.07.1998)

Perhaps the difficulties in finding labour depend strongly on the market in which the firm operates. In a highly diverse industry, firms might experience problems, in locating skilled labour, yet others might have management or engineering lacks. After all, even a small manufacturer located in the West Midlands experienced difficulties in getting hold of the specific skill sets for which it was looking, as while Birmingham was one of the centres of automotive manufacturing, "Getting people to travel from down there to Droitwich, although it's only 20 miles, is sometimes difficult, and I don't have a reservoir of skilled labour within the Droitwich area of the kind of skills I'm looking for" (Company 4, interview on 18.08.1998).

In exploring the second premise, we can draw on the response given by the managing director of a Tier-2 plastics processor:

> We've been in one of the lowest unemployed areas of the South East... [with] just over 2% unemployed. The workforce here is mostly fairly well-educated and likely to commute to London or work in financial services... The enthusiasm for working in factories and other skilled jobs is very small. The pool of labour we're drawing from is competed for pretty fiercely by other manufacturing companies in the district. So it's a problem that will not go away.
>
> (Company 2, interview on 28.05.1998)

We might note from the above text that the region in which the company operates may have different constraints for different reasons. It would appear, looking again towards the unspoken, that manufacturing is not perceived by the potential workforce as being something for "well-educated" people – "skilled" jobs are for those without better qualifications. The social changes in the case of this company included furthermore, though, a change in the working population, as, "The area that we're centred in... tended to have a lot of plastics processing companies in the '70s and early '80s, but a lot of them have merged or moved or whatever".

In view of these various difficulties facing firms, we might well ask what strategies were being pursued by companies to combat them. Indeed, the use of internal training systems such as apprenticeship schemes was suggested by one respondent, as "we expect to get people with reasonable intelligence and equip them with skills. You can't simply go out and cherry pick these people" (Company 2, interview on 28.05.1998). In a second case, the respondent explained: "We're trying to overcome the skills shortage in the long term by developing our own people. We reintroduced apprenticeships five years ago" (Company 27, interview on 24.08.1998). Not only is a skills shortage being perceived, but respondents furthermore did not appear to believe that the situation would change – the ball is in their court, as it were, and a variety of options may be charted in this sample of firms. It is ironic to note the popularity of 'neo-medieval' apprenticeship schemes, as Company 46 was found to run similar programmes to train new and existing personnel in-house.

Although large and small firms alike appeared to suffer from skills shortages, there might be mechanisms in place in larger groups to arrange a transfer of personnel between companies:

> It is fair to say that we have a labour exchange as well. If we are very busy, they come over here, and if they are busy, we can send them labour over there. We can all do the same type of work within different areas. In fact, throughout the group. Europe as well... [A]bout a month ago, we had Portuguese, we had Japanese, Americans, Germans – we had them all working here.
>
> (Company 17, interview on 15.07.1998)

This might be an extreme case, but it serves to demonstrate that group membership may also mean that a firm can draw on resources external to it. Thus we have seen in

the above texts that the discursive construction of a shortage of skilled labour in the (automotive) manufacturing sector arises from a multiplicity of voices – and by looking to these, we may find a variety of strategies being pursued, both nationally and internationally.

Discourses of international operations

In the initial comparison between the 1997 questionnaire survey conducted as part of this work and an earlier study (Redden, 1975), one of the issues explored concerned the (growing) level of international operations undertaken by smaller automotive suppliers. In the interview texts discussed here, we may now explore the discourses pertaining to these.

It is ironic to note that whereas the Redden study in the early 1970s considered exporting to Europe as a relatively 'new' phenomenon, one respondent from the current survey described the European involvement of her firm (a large-sized Tier-1 supplier) as being "lost in the mists of time" (Company 1, questionnaire response). Furthermore, the managing director of one small components manufacturer explained that:

> The majority of customers we have in the EU will have come as a result of supplying the UK parent. Companies like Johnson Controls have other companies in Europe who make similar components and they recommend us as a source of supply to their subsidiary companies in Europe. I would say that 90% of our exports will have come that way... So the amount of direct exporting we do through actually going and finding new customers in Europe is actually extremely small. We're exporting by default, really.
>
> (Company 4, interview on 18.08.1998)

This leads onto the question of just what constitutes 'exporting'. At the time of the Redden study, the level of exporting to other European nations was a driving factor – yet in this later research, it would appear that respondents (as in the above text) saw this as having become inevitable, given that larger customers might be inter-European, if not international, in their manufacturing strategies: "exporting by default" being the order of the day. Or as the managing director of an ignition lead

manufacturer explained, "I know it's a trite thing to say, but the home market is Europe as a whole. Nobody can survive purely in the domestic market here unless the domestic market is Europe" (Company 39, interview on 29.07.1998). Indeed, the managing director of one company which was part of a larger group noted that:

> If we look at the current situation, it's critically important if you're part of the automotive industry to be part of a global structure. In other words, the present parent can supply to various parts of Europe... and it can also supply in the Americas... and it's also opening plants in China and India. It's able to meet, shall we say, Ford's global ambitions where everything is made by different plants in the world, and we're able to supply all those plants from a convenient spot.
>
> (Company 8, interview on 13.07.1998)

This may be read as an explanation for the interest by the automotive manufacturers in narrowing down their supply bases to key, global suppliers. Yet it is this very emphasis that should be questioned, as the implications for *existing* convenient, local suppliers is that the 'partnership suppliers' would take precedence. Power again comes into play. Yet the effects of rationalisation – in the establishment of ever fewer, ever larger customers – can be profound on smaller suppliers, as the respondent from one such firm stated:

> [I]t was a situation where a major manufacturer in the States had decided [to stop manufacturing these components]. I think he was bought out... What happened was that they'd first of all decided that they'd move from their previous location and there was a large debate going on within their organisation as to whether they would continue to manufacture or buy these things in. They bought an awful lot of products in a very short time, and that put terrific strains on us. We were struggling to keep up with that business...
>
> (Company 34, interview on 21.07.1998)

Furthermore, the same respondent cited cultural differences in the products they sold to North America as opposed to Europe, as the "different philosophy" of the American market preferred large, rear wheel drive vehicles that required lubrication on the prop shaft and thus a lubrication system no longer in use in Europe.

Furthermore, as argued earlier, discourses of 'rationalisation' may be read as being in conflict with other authoritative discourses such as 'just-in-time manufacturing' and 'specialisation'. As the purchasing and logistics director of a medium-sized components manufacturer summed up:

> In terms of globalisation and whatever... There seems to be two contradicting moods. One seems to be companies going more global, but it tends to be just the really big players who are trying to network manufacturers across the world. What's actually happening is that the suppliers to those first-tiers tend to be focusing more on supplying individual plants because there's a great need to be actually closer to the plant.
>
> (Company 38, interview on 20.08.1998)

We should be careful, as stated previously, in assuming that the automotive industry is subject to only a handful of authoritative discourses. Instead, we have discovered here that discourses may be both dominant and mutually exclusive or mutually supportive and self-contradictory. Yet more importantly, we have discovered that by giving voice to respondents from firms that are not regarded as 'proper' automotive suppliers: we have undermined the totalitarian authority of certain discourses by listening also to a multiplicity of other concerns, opinions, and issues.

A post-modern industry: Implications of a century of automotive manufacture

To conclude this exploration of automotive industry discourse through the interview texts, it may be useful to look to the implications of the length of time that the automotive industry has been established in the UK. Not only did we find, in the questionnaire survey, that some of the companies in the sample had operated in the early days of car manufacture, but some firms could trace their history even to the machine tool industry of the 19th Century. The implications of this, in terms of a mature – if not *old* – industry and the legacy of manufacturing systems, such as crafts workshops, that predated mass production, may therefore be explored in the texts below.

In the case of Company 9 (interview on 17.10.1997), a small machine tool re-manufacturer, it was found that its market niche went beyond simple refurbishment. Indeed, to say that the company merely refurbishes machine tools is inaccurate, as it provides a service through which older machine tools are re-manufactured and customised to the customers' requirements (e.g. tooling, components, standards) rather than simply being restored to their original specifications. Such 'upgrading' could involve improved tolerances, modern lubrication, pneumatic, and hydraulics

systems, and even the addition of modern computer control electronics and software: for example, an almost obsolete numerically-controlled machine tool could therefore be made into a customised CAD/CAM system. Therefore, in addition to competing on grounds of low investment costs and reduced delivery times *vis-à-vis* new machine tools, the company competed on craftsmanship and customisation. Of course, as well as re-manufacturing a machine provided by a customer, the company also supplied (rebuilt) machines itself, meaning that the distinction between manufacturing and servicing – when applied to this firm – becomes increasingly blurred. It is ironic to note that some vehicle manufacturers were not really 'manufacturers' in the classic sense, as the managing director of a small specialist vehicle producer explained, "The word 'make' perhaps is somewhat slightly erroneous. We are essentially vehicle converters and body builders. We take an OEM van or an OEM chassis cab and either convert it or rebuild it into a specialist vehicle" (Company 33, interview on 28.07.1998).

Another supplier providing a similarly highly-customised product was a micro-sized firm "supplying bespoke systems, i.e. comprising hardware, software – basically computer-based systems – used for vehicle testing in the automotive industry production line environment. So we invariably build specials" (Company 10, interview on 10.07.1998). Interestingly, it was found that despite this firm being a supplier of key equipment to a car manufacturer, it did not possess any of the quality certifications normally regarded as necessary, such as Ford's Q1 accolade: "We have our own internal audit-type systems, but no qualified systems... Somehow we got away with it. Because we do a quality job, I suppose we've never been brought into question."

From this, we may well wonder why such an exception is made. Apparently, the 'craftsmanship' factor is seen by the car manufacturers to render official quality systems unnecessary. If a "quality", "special" product can be supplied without such accolades, then – it may well be asked – why is so much emphasis placed on ISO 9000-to-9002 and private systems like Q1? Perhaps, as has been suggested earlier, 'quality control systems' have more to do with *control* than *quality*. In addition, the historically high status attributed to 'master craftsmanship' may still be holding strong in this new/old industry.

Summary: The implications of textual analysis

In *Chapter 6: Deconstructing the Questionnaire Survey*, the implications of a post-structuralist stance were introduced, and its uses demonstrated through a comparison and deconstruction of two questionnaire-based surveys. It was suggested that a conventional statistical data analysis did not in itself provide sufficient information to interpret the tabulated data, and that such interpretations – or 'readings' – drew on external discourses for their constructs. Thus, in the above exploration of 'rich data' (consisting of interviews, company visits, and company documents) a similar post-structuralist treatment was employed. In a more conventional analysis, perhaps, the interviews would have been correlated with one another and 'grounded' by means of a previous, statistical analysis. Yet as argued in *Chapter 6*, a direct correlation of signifiers would be based on a false assumption, and if the statistical interpretations relied on external constructs, then this form of data analysis would again be *an interpretation by the researcher that drew on external discourses*. In view of this, care was taken here to *read the texts in their own context*.

This *textual analysis* has suggested readings in which otherwise marginalised or avoided issues – such as that of power and control – are brought to the centre. Quality systems and the tiering of firms within a supply chain construct may alternatively be read as efforts by the major manufacturers to exert control over smaller companies that they might ignore under other circumstances. Furthermore, the advancement of supply chain management through information systems as a concept is betrayed by its own inherent contradictions as another means of enforcing that control. This may explain why smaller suppliers describe the process of rationalisation as a threat, and suggests grounds as to why firms are seeking new ways to remain small, independent suppliers.

Yet more significant, it might be argued, has been the post-structuralist aim of 'giving voice' to the deprivileged – listening to those who would otherwise go unheard. In this instance, narratives have been explored from respondents coming from firms that might not be considered 'typical' automotive manufacturers, in particular those from the 'service sector'. In these narratives, we have uncovered issues and sub-texts that

have enabled us to challenge further the authority of popular discourses such as those concerning 'rationalisation' or 'specialisation'.

Chapter 8: Conclusions

Method and methodology

This work has drawn on post-structuralist critiques in seeking to formulate a challenge to authoritative discourses of the British automotive industry. The use of critiques of the so-called post-modern turn does not, it has been argued, imply that more traditional forms of research conduct and data analysis should be replaced. Rather, it calls for a shift in focus or change in attitude *vis-à-vis* the analysis, incorporating the use of discourse theory, deconstruction, and reversing the positions of centre and margins of the text. To achieve these aims, the post-structuralist position aims to dissolve barriers between disciplines, and draws analytical tools and concepts from linguistics, sociology, and psychology.

Indeed, in pursuing these aims, mention should be made of alternatives, as the intentions of post-structuralism are to 'open up' the field and not to preclude any particular stance that might be taken: we should be aware, for example, that concepts from fields as seemingly remote as evolutionary biology may prove useful. The "Red Queen Hypothesis", for instance, was formulated originally to explain biodiversity through the simple statement, "You have to evolve as fast as you can just to stay in the game" (Mathews, 1996). Equally well, the principles of Darwinian or Larmarckian evolution might be used in relation to market niches (Boden, 1994). Similarly, the use of cladistics, employed in the same field to construct evolutionary trees, is potentially applicable to the study of industry concepts, although it is ironic to note that the concept originated in linguistics.

The post-structuralist position

This work, however, restricted itself self-consciously to an exploration of the particular contributions of philosophers such as Foucault and Derrida, drawing then, on the work of 'classical' post-structuralism for its analytical methodology. It was considered necessary to present these in an introductory manner, as while the use of similar techniques has become commonplace in other fields, their use represents a departure from familiar paths in the study of the motor industry. Yet the usefulness of such alternative schools of thought has been demonstrated, with associated concepts such as modernity and modernism facilitating an exploration of the symbolic power of the motor industry.

In a more 'conventional' treatment, Helper (1991) has argued that the significance of the automotive industry is twofold: firstly, car production is a large sector of the industrial economy, and secondly, the industry has been working longer than most to develop closer supplier relations following an early exposure to the Japanese challenge. Given that car manufacturing involves extreme complexity and long lead times, as well as the past use of adversarial supplier relations, this transition to new methods has been more painful than most: "Thus the auto industry case throws into high relief the benefits and problems of moving toward long-term supplier relations" (Helper, 1991:15). Yet in this work, the authority of discourses such as these has been challenged, throwing into question the underlying constructs. Instead, we might say that the car industry differs from many others in that it is symbolic of the modern world and thus subject to an interplay of texts concerning its *modernity* – a phenomenon of particular significance when investigating how the car industry is perceived and how it perceives itself.

Implications for survey by questionnaire

In discussing the implications of the philosophical position taken here, the use of deconstruction was demonstrated initially in the course of reifying the initial literature reviews to the state of a literature analysis. Yet deconstruction and its aims were

shown not to be limited purely to the realms of methodological *theory*, instead having certain mandates for methodological *praxis* also. By comparing and contrasting the conduct and analysis of the questionnaire survey undertaken as part of this research and a similar study conducted in the 1970s, it proved possible to draw attention to important distinctions. Firstly, the research itself was conducted in a consciously analytical manner, taking account of the need to deconstruct existing discourses instead of constructing its own. Secondly, its aims – seeking to challenge privileged discourses – were made overt rather than being marginalised.

The implications of these two distinctions may be seen in the initial choice of the sample, with firms being selected randomly from the SMMT lists – constituting, then, those firms that considered themselves (and were, in turn, considered by the official industry association) to be part of the automotive industry. This can be contrasted with the deliberate selection of 'representative' firms in the Redden study. Similarly, the process of selection in the current research included firms whose voices would otherwise have been marginalised: micro-sized firms, those with 'service sector' operations, and those that were 'not sufficiently automotive' in their dealings. Furthermore, by treating the tabulated data as constructs – texts – rather than as scientific facts, it became possible to demonstrate how easily the role of the researcher, in interpreting and communicating knowledge, can instead end up creating a narrative resonating with authoritative discourses. Hence, it has been the intention in the current research to place findings in their own context.

Implications for interview conduct and analysis

A vital means of fulfilling the above aims lay in the conduct of a series of interviews aimed at exploring further issues suggested by the analyses of the literature and questionnaire surveys. The post-structuralist stance of employing deconstruction was pursued further here, in that the resulting narratives were treated as 'texts that had to be read'. At the same time, the post-structuralist aim of giving voice to the marginalised was pursued further also, as evidenced by the presentation of narratives provided by respondents whose companies would typically not be considered 'proper'

automotive suppliers, and whose voices might usually be drowned out by those of larger firms. This textual analysis marked a departure from more conventional case study approaches, and made it possible to extend the analysis to areas that are usually overlooked, such as (external) discourses and sub-texts.

A 'modern' motor industry: The study of British automotive suppliers

It has been argued that the automotive industry has acquired symbolic weight – both in general terms, as an industry exemplifying modern manufacturing technology, and more particularly, as a producer of a product seen to exemplify the modern lifestyle. Accordingly, it can be described as subject to discourses surrounding these issues.

Indeed, the symbolic power of the industry has resulted in attracting the attention of government policies aimed at establishing a variety of objectives (as was the case in Britain in the 1970s, as documented in *Chapter 1: The British Motor Industry*). In the US, policies such as those aimed at promoting the use of "minority-owned" suppliers (i.e. ones with at least a 10% share ownership by "a member of a socially and economically disadvantaged ethnic group") have influenced the operation of the major industry members (Green *et al.*, 1998). More general examples may be found in initiatives aimed at protecting the environment, as the motor industry has found itself subject to an increasing body of environmental legislation across the Triad nations (whether or not it is deserving of the heavy onus placed on it), necessitating the introduction of new technologies such as catalytic converters, EMS, and (particularly in California) alternative fuel sources (i.e. electric, hydrogen fuel cell, and natural gas-powered cars).

Re-evaluating the literature

In addition to the above, this work has explored how the automotive industry is embedded within further discourses that create and build upon a number of

'mythologies' – that is to say, things that 'everyone knows' about the industry. These can be said to include:

- The primacy afforded to the Fordist innovation of the moving assembly line and its promotion as the main source of the Ford Motor Co.'s early competitive advantage. This has served to obscure the early car industry's reliance on its immediate suppliers and the advantages that such relationships were originally seen to bring.
- The 'Japanisation' of the motor industry, in which a body of disparate manufacturing techniques and technologies have been attributed to Japanese car manufacturers. While this served to promote such measures as an imperative in an industry faced (as it was in the 1980s) with the substantial 'threat' posed by Japanese entrants into Western domestic markets, it has similarly obscured the historical origins of such systems: group technology, flexible manufacturing, statistical process control, customer focused marketing, and just-in-time logistics were not entirely 'new' to the industry.
- The obsession with the supply chain, a more recent phenomenon in which models developed originally to conceptualise the production process and the relationships between firms have come to dominate ways of thinking about these latter to the exclusion of alternatives. Likewise, with the concept of 'tiering' now having entered the language commonly used within the industry, firms have become categorised by tier in a manner which frequently confuses the importance and form of their relationship with their customers.

As has been shown in the research concerning these examples, the extent to which certain discourses surrounding the automotive industry enjoy currency can strongly influence both external and internal conceptions of industry norms.

Deconstruction in practice: Findings of the questionnaire survey

In deconstructing the 1997 survey and comparing it to the earlier Redden study, the centrality of the researcher as intermediary was uncovered. This was found to be

instrumental in achieving the high response rate of both questionnaire surveys, with the interaction of the researcher with the respondents further animating discourses which, whether or not referred to overtly in the text, enabled greater contextualisation of the data interpretation.

Furthermore, the post-structuralist stance adopted in the conduct of the 1997 questionnaire survey demonstrated that, in taking a random sample of those firms that *considered themselves* to be involved in the automotive industry, a number of almost exclusively 'service sector' firms would be attested. Over and above this, almost 40% of the sample appeared to supply *outside* of the 'acceptable' boundaries of the automotive industry. Thus it could be noted that the definitions between 'service' and 'manufacturing' operations were blurred within the industry base, as were those between 'automotive' and 'non-automotive' involvement. Indeed, by looking closely to the data collected, it could furthermore be suggested that evidence existed of the involvement of other 'service sector intermediaries' in the pursuit of international operations – although this could be deduced only indirectly.

Continuing this exploration concerning how a model of the industry might be constructed, it was found that exporting to Europe had become commonplace across the sample of firms in general, and that small – but significant – numbers of firms exported to geographically more remote regions (such as Pacific-Asia) and even possessed overseas manufacturing facilities. Accordingly, small independent firms appeared particularly likely to export abroad, and these results suggested that these firms' capabilities had changed dramatically since the time of the earlier Redden study.

However, when the concept of 'relative independence' was explored, it was found that there alternative variables existed that could be chosen in place of the relatively arbitrary division between 'subsidiary' and 'independent' firms - such as taking into account the breadth of a firm's customer base or making the distinction between firms in *holding companies* and firms in *larger groups*. Thus findings, or rather, their analysis, served also to challenge the concept employed by Redden (1975) of 'independent' and 'subsidiary' firms, suggesting that 'independence' was a relative concept not necessarily related to parental affiliation.

With the analysis of the questionnaire survey(s) having suggested that (external) discourses resonated through, and were instrumental in, the interpretation of the primarily statistical data, it might well be wondered whether the concept of 'grounding' the 'rich data' of the follow-up interviews could still be seen to represent a valid approach – or whether, ironically, the reverse could be said to be the case. In an exploration of the narratives furnished by the follow-up interviews, it was demonstrated that respondents, through the terminology they employed and the concepts they invoked, were drawing on various popular and academic discourses surrounding the motor industry. This implied, as has been suggested already, that those working in the industry positioned themselves through discourses of *how the industry functions* and *what the industry should be* – even when, ironically, these discourses conflicted with respondents' own experiences.

By examining some of the texts concerning, for example, the implementation of quality systems in a firm, it was demonstrated that, by granting voice to respondents from firms that were 'traditionally' marginalised (e.g. distributors), strong sub-texts concerning power and control could be identified. Further sub-texts were uncovered through discussions of other issues, such as the relationships between firms and their customers, giving rise to a multiplicity of overt and covert discourses surrounding such industry movements as 'supply chain rationalisation' – a construct that evoked both fear and delight among companies in the sample. Indeed, while 'rationalisation' was regarded as a threat by some respondents (influencing them to diversify away from the 'risks' of the automotive sector), other respondents spoke of how the movement had created new market niches (such as for the 'one-stop-shop' distributors), or how the design or technology relationships of their firms with the car assemblers or Tier-1 suppliers had brought their firms to positions of new importance.

In summary, then, it may be suggested that it is in fact extremely difficult (if not impossible) to identify an automotive industry *per se*, since – contrary to the perceptions afforded power through popular discourses – the industry involves a diverse cross-section of firms and overlaps considerably with other industry sectors.

In the findings of this research, just such a multiplicity of voices were listened to. Furthermore, it became apparent that the relationships between discursive constructions of the industry ('how it is spoken of and thought to be') and experiential reality ('how it is experienced') are complex and often ambiguous. While this work has sought to challenge some of the enduring 'myths', it has at the same time taken care to acknowledge the power and influence that these hold over this industry of industries, not least in terms of the continual invocation and reaffirmation of its symbolic importance in and for the modern world.

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Appendix I: The Questionnaire used in the 1997 Survey

The following text comprises a copy of the questionnaire sent out and collected in 1997 as part of this research. It should be noted that any references to specific page numbers referred to within the questionnaire have been changed to those currently assigned in its position as part of this work; the original questionnaire would have referred within its 37 pages.

ASTON
BUSINESS SCHOOL

About the Questionnaire

The questionnaire is divided into four sections.

i. The first consists of basic questions about your firm.
ii. The second consists a first part, 2(a), with questions about trade and export to Europe, and a second part, 2(b), with questions about international production and technology transfer. If neither of these sections apply to you, you need only answer the question on the front cover for each of these.
iii. The third consists of a first part, 3(a), with questions about trade and export to Pacific-Asia, and a second part, 3(b), with questions about of international production and technology transfer. If neither of these sections apply to you, you need only answer the question on the front cover for each of these.
iv. The fourth and final section asks questions about any international operations you might have in China. Again, if this section does not apply to you, then please fill in only the question on the front cover.

The questions asked are of three main types:

- **Short answers.** Please answer the question in as few words as possible in the space provided
- **Tick boxes.** Please tick the boxes that apply to you. If you feel there should be another option, please label it in the line marked (other) and tick it.
- **Tables.** Please fill in the information in the table. If you feel there should be another option, please label it in the line marked (other) and answer in the same way as the rest of the table.

After you have completed the questionnaire

Once you have answered all four sections, the questionnaire will be complete, and we ask you to return it to us in the stamped addressed envelope provided. If you have any comments on the questionnaire, have suggestions for questions you feel we should have asked, or wish to elaborate on any of the answers you have given, please do so on the back of the questionnaire.

Section 1: About your Firm and its Products

This section asks basic questions about the nature of your firm and its products. The information here will be used to better understand your answers to the later parts of the questionnaire by providing background detail, and will also be used to gather statistical data on British automotive suppliers. Please complete the contact information table below before answering this section.

If you wish to make any comments about the questions in this section, or elaborate on any of your answers, please do so at the bottom of this page.

Contact Information

Please note that this will only be used for our records, so that we can be certain we have contacted you, and will be able to follow up on any questions you answer (subject to your agreement).

Company Name and Address	Contact Name
	Position
	Telephone No.
	Fax No.
	E-mail

1. Please state type of organization (e.g. partnership, private company, public company, etc.)

2. If a subsidiary please state name of parent company or group

3. Year established

4. Was your company once a division in another, and if so, with whom? (e.g. you were once part of Ford or British Leyland, but have since become an independent company)

5. Please indicate total number of employees in the whole company by ticking one of the boxes in (a) below. Combine if more than one location.

   (a) People employed by your company

   ☐ Between 1 - 9 people employed
   ☐ Between 10 - 99 people employed
   ☐ Between 100 – 499 people employed
   ☐ More than 500 people employed

   (b) If you are a subsidiary, please give separate figures for the people employed by your parent company or group (optional)

   ☐ Between 1 - 9 people employed
   ☐ Between 10 - 99 people employed
   ☐ Between 100 – 499 people employed
   ☐ More than 500 people employed

6. Please tick the boxes that describe the customers for your products

   ☐ Car assembler (e.g. Ford or Rover)
   ☐ Component manufacturer (e.g. Lucas)
   ☐ Independent retailer (e.g. Halfords)
   ☐ Other division of parent company or other firm within group

   ☐ Other (please specify) _____

7. Please tick the boxes that describe the way you supply your products

   ☐ Only supply one firm (e.g. you only make engine blocks for Ford)
   ☐ Supply a few large or specialist firms (e.g. you manufacture for both Ford and Rover)
   ☐ Have many customers (e.g. you supply anyone who places an order with you)

8. Please give the annual total sales for the following years (if the figures for 1997 are not available, please give the most recent ones you have e.g. 1996 and make a note of this):

   (a) The financial year ended 1993 £_____

   (b) The financial year ended 1997 £_____

9. How do you control the quality of your products at various stages? Please answer by giving the standards you have implemented (e.g. ISO 9000) and any approved lists you are on (e.g. you are a Ford Q1 supplier)

10. Please outline products by category shown and indicate what percentage of your total output each category represents:

Category	**% of Output**
Branded (i.e. a licensed design)	
Own design	
Customer's design	
Joint effort of customer and yourself	
Design by parent company or group	
Other*	

*Please specify

11. Please indicate (by ticking) what in your views are the strong and weak points of your products and company.

	Strong	**Weak**
Design		
Quality		
Reliability		
Price		
Delivery		
Service		
International Commitment		
Other*		

*Please specify

12. Please indicate in respect of deliveries

(a) Average or typical lead times

(b) Reliability of delivery promise

(c) Factors adversely affecting delivery promises (e.g. delivery problems, material shortages, internal labour troubles)

(d) Are customers advised of delivery delays?

13. What are your main constraints on growth? Please rank in order of importance from 1=most problematic and give a brief description of each difficulty.

Constraints	**Rank**	**Why?**
Finance		
Labour		
Material Supply		
Production Capacity		
Sales demand		
Competition		
Product substitutes		
Other*		

* Please specify

Section 2(a): About your Firm's Trade and Export Involvement in Continental Europe

Please answer this section if you

- export any products to a Continental European customers
- sell products in Continental Europe which are also manufactured there by you

If you do not sell your products outside of the United Kingdom, please answer the question below and skip this section.

Please note:

The definition of "Continental Europe" used here excludes the United Kingdom, but includes the European Union, NAFTA, etc.

If you have not previously exported

➢ If you have not previously exported, are you considering the possibility of doing this? (If so please indicate countries, if not please give reasons)

Now please go to **Section 2(b): About your Firm's International Operations in Continental Europe** on page 270.

1. In respect of your competitors in the UK and Europe do you have a detailed knowledge of their:

	Answer
Products?	
Prices?	
Policies?	
Practices?	

2. Please indicate your direct export sales to Continental Europe for the last financial year by value, or percentage of total exports.

3. If known, please give the percentage market shares for your products:

Country/Region	**% Market Share**
United Kingdom	
Continental Europe	

4. When did you first export and how did this come about?

5. What languages are used in communicating with European countries? (Please answer by ticking the boxes below)

☐ English
☐ Local language

☐ Other (please specify) _____

6. Where do most of your export orders come from? Please answer by giving the approximate percentage of the total obtained from each source.

Source	(%)
Direct contact from UK	
Local representatives	
Agents	
Through parent company	
Through UK organization of foreign customer	
Through licensing arrangements	
Own marketing company in country concerned	
Associate or subsidiary company in Continental Europe	
Other*	
Other*	

*Please specify

7. Please rank the importance of these principal types of communications with both existing and potential customers (please answer by ranking 1=most important)

Communications	Rank
Telephone	
Telex	
Fax	
Letter	
Personal visits from customer	
Personal visits by you to customer	
E-mail	
Other internet (e.g. world-wide web)	
Other*	

* Please specify

8. How often do company representatives make sales visits to different countries? (Please answer by ticking the boxes below)

- ☐ Daily
- ☐ Weekly
- ☐ Monthly
- ☐ Four times a year
- ☐ Twice a year
- ☐ Less than once a year

☐ Representatives do not make sales visits in person

☐ Other (please specify) _____

9. What are your principal sources of marketing information concerning Continental Europe?

10. Do you know the location, size, and growth rates of Continental European markets for your products over recent years? (Please specify countries if known – do not give figures)

11. Please indicate any export problems experienced in Continental Europe under the headings shown, specifying where possible countries and customers

(a) Terms of trade

(b) Customs

(c) Documentation

(d) Shipping

(e) Quality

(f) Reliability

(g) Price

(h) Delivery

(i) Receiving payment

(j) Language

12. Please specify any particular problems you have experienced in exporting to Continental Europe and state how these were overcome

13. Which export organizations did you find the most helpful?

14. Would further assistance in exporting be welcomed? E.g. market information, contacts, etc. Please specify

15. In your experience, which of the following factors are important in obtaining orders from Continental Europe? (Please rank in order of importance with 1=most important)

Factor	Rank	Comments
Price		
Delivery		
Quality		
Service		

16. When quoting to countries in Continental Europe:

(a) Are quotations translated into the customer's language?

(b) Are prices given in local currency showing rate of exchange used?

(c) Are product samples supplied?

(d) Are optimistic delivery promises made to secure orders?

(e) What percentage success rate is achieved in converting quotations into orders?

(f) Are persistent efforts made to obtain orders after quotations have been submitted?

(g) Do you find that quotations generally are not acknowledged? If so do you feel that this indicates that British suppliers are not favoured and that consequently no further action is worthwhile?

(h) Do you have an electronic system in place to organize orders from customers?

17. What is your pricing policy and practice regarding the

(a) Home market?

(b) Export markets?

18. Are the direct costs of your products known and, if so, do these influence export prices to Europe?

Section 2(b): About your Firm's International Operations in Continental Europe

In this section we are asking about:

- Any joint ventures your company may have with another European firm
- Any technology transfer / R&D alliances your company may have with another European firm
- Any manufacturing your company might be undertaking in Continental Europe

As before, if your company is not involved in any of the above ways, please answer the question below and skip the rest of this section.

If you have no operations in Continental Europe

➢ If you have not previously entered into any joint ventures with European companies, engaged in international production, or transferred technology to a European company, then are you considering the possibility of doing this? (If so please indicate countries, if not please give reasons)

Now please go to **Section 3(a): About your Firm's Trade and Export Involvement in Pacific-Asia** on page 276.

Manufacturing in Europe

Please only answer this section if you are involved in manufacturing in Europe. If you do not manufacture in Europe, but have alliances or joint ventures with other firms in Europe, please skip these questions until you reach the heading **Alliances and Joint Ventures** on page 18.

1. Please tick the following boxes which best describe the activities of your company in Europe

   ☐ Exporting to Europe
   ☐ Manufacturing in Europe
   ☐ Undertaking research, design and development in Europe

2. Please give a brief description of the project(s) in Europe your company is involved in

3. In what year did your first European project begin? (e.g. the year you opened a plant in France)

4. Please give a brief description of what your products are, or what your area of activity is

5. Please give a brief indication of what you think the future market situation will be

   (a) The size of the market will

   ☐ grow
   ☐ contract
   ☐ not change

   (b) The market situation will

   ☐ become more competitive
   ☐ become less competitive
   ☐ not change

6. Please tick the following boxes which best describe the reasons for choosing the location you did for your presence in Continental Europe

   ☐ Supply an existing customer (e.g. a Just-In-Time necessity)
   ☐ Take advantage of the local infrastructure (e.g. shipping/air/rail routes)
   ☐ Take advantage of cheaper local labour
   ☐ Take advantage of cheaper raw materials
   ☐ Because other similar firms are there
   ☐ Because your suppliers are based there
   ☐ Because your customers are based there
   ☐ To be close to an allied partner firm
   ☐ Incentives (e.g. local government grant, tax advantages)

7. Please indicate total number of people employed by your company in the whole of Europe by ticking one of the boxes below. Combine if in more than one location.

☐ Between 1 - 9 people employed
☐ Between 10 - 99 people employed
☐ Between 100 – 499 people employed
☐ More than 500 people employed

8. Please tick the boxes that describe the destinations of your products

☐ Car assembler (e.g. BMW)
☐ Component manufacturer (e.g. Bosch)
☐ Independent retailer

☐ Other (please specify) _____

9. Please tick the boxes that describe the way you supply your products

☐ Only supply one firm (e.g. you only make engine blocks for BMW)
☐ Supply a few large or specialist firms (e.g. you manufacture for both Renault and BMW)
☐ Have many customers (e.g. you supply anyone who places an order with you)

10. Please outline products by category shown and indicate what percentage of your total output each category represents:

Category	**% of Output**
Branded (i.e. produced under license)	
Own design	
Customer's design	
Joint effort of customer and yourself	
Design by parent company or group	
Other*	

*Please specify

11. Please give the annual total sales for the following years (if the figures for 1997 are not available, please give the most recent ones you have e.g. 1996 and make a note of this):

(a) The financial year ended 1993 £_____

(b) The financial year ended 1997 £_____

12. How do you control the quality of your products at various stages? Please answer by giving the standards you have implemented (e.g. ISO 9000) and any approved lists you are on (e.g. you are a Ford Q1 supplier)

13. Please indicate (by ticking) what in your view are the strong and weak points of your European operation and its products.

	Strong	**Weak**
Design		
Quality		
Reliability		
Price		
Delivery		
Service		
International Commitment		
Other*		

*Please specify

14. Please indicate in respect of deliveries

(a) Lead times

(b) Reliability of delivery promise

(c) Factors adversely affecting delivery promises (e.g. delivery problems, material shortages, internal labour troubles)

(d) Are customers advised of delivery delays?

15. What are the main constraints on growth facing your Continental European operation? Please rank in order of importance from 1=most problematic and give a brief description of each difficulty.

Constraints	**Rank**	**Why?**
Finance		
Labour		
Material Supply		
Production Capacity		
Sales demand		
Competition		
Product substitutes		
Other*		

* Please specify

Alliances and Joint Ventures

The following questions are about any alliances or joint ventures your company might have with another firm. If you are not involved in any joint venture arrangements in Europe, you should ignore these remaining questions and go on to the next section of the questionnaire (overleaf).

16. Please indicate what type of technical know-how or technology your company is contributing to this relationship

- ☐ Product design
- ☐ Production organization
- ☐ Plant and equipment
- ☐ Labour force and personnel
- ☐ Capital
- ☐ Specialized machinery and/or processes
- ☐ Engineering assistance
- ☐ Specialist knowledge
- ☐ Management know-how
- ☐ Market information

☐ Other (please specify) _____

17. Please indicate the contribution to this project made by your European partner

- ☐ Product design
- ☐ Production organization
- ☐ Plant and equipment
- ☐ Labour force and personnel
- ☐ Capital
- ☐ Specialized machinery and/or processes
- ☐ Engineering assistance
- ☐ Specialist knowledge
- ☐ Management know-how
- ☐ Market information

☐ Other (please specify) _____

18. If your European partner seeks capital investment, please indicate what form (loan, equity, etc.) and amount

19. Please describe briefly the form of collaboration (e.g. technical assistance) you have entered into with your European partner.

Section 3(a): About your Firm's Trade and Export Involvement in Pacific-Asia

Please answer this section if you

- Export any products to Pacific-Asian customers (as defined below)
- Sell products in Pacific-Asia which are also manufactured there by you

If you do not sell your products in Pacific-Asia, please answer the question below and skip this section.

Because this study is concerned with exporting to certain regions of the world, we must explain our definition of Pacific-Asia. We consider Pacific-Asia to include the nations of:

- China
- Hong Kong
- Japan
- Malaysia
- Singapore
- South Korea
- Taiwan
- Thailand

If you have not previously exported

➢ If you have not previously exported, are you considering the possibility of doing this? (If so please indicate countries, if not please give reasons)

Now please go **to Section 3(b): About your Firm's International Operations in Pacific-Asia** on page 283.

1. In respect of your competitors in Pacific-Asia do you have a detailed knowledge of their:

	Answer
Products?	
Prices?	
Policies?	
Practices?	

2. Please indicate the direct export sales by country of destination for the last financial year by value, or percentage of total (world-wide) exports.

Region or Country	**Value (£)**	**% Export**
China		
Hong Kong		
Japan		
Malaysia		
Singapore		
South Korea		
Taiwan		
Thailand		

3. When did you first export and how did this come about?

4. If known, please give the percentage market shares for your products:

Country/Region	% Market Share
China	
Hong Kong	
Japan	
Malaysia	
Singapore	
South Korea	
Taiwan	
Thailand	

5. Where do most of your export orders come from? Please answer by giving the approximate percentage of the total obtained from each source.

Source	(%)
Direct contact from UK	
Local representatives	
Agents	
Through parent company	
Through UK organization of foreign customer	
Through licensing arrangements	
Own marketing company in country concerned	
Associate or subsidiary company in Pacific-Asia	
Other*	

* Please specify

6. What languages are used in communicating with Pacific-Asian countries? (Please answer by ticking the boxes below)

☐ English
☐ Local language

☐ Other (please specify) _____

7. Please rank the importance of these principal types of communications with both existing and potential customers (please answer by ranking 1=most important)

Communications	Rank
Telephone	
Telex	
Fax	
Letter	
Personal visits from customer	
Personal visits by you to customer	
E-mail	
Other internet (e.g. world-wide web)	
Other*	

*Please specify

8. How often do company representatives make sales visits to different countries? (Please answer by ticking the boxes below)

☐ Daily
☐ Weekly
☐ Monthly
☐ Four times a year
☐ Twice a year
☐ Less than once a year

☐ Representatives do not make sales visits in person

☐ Other (please specify) _____

9. What are your principal sources of marketing information concerning Pacific-Asia?

10. Do you know the location, size, and growth rates of Pacific-Asian markets for your products over recent years? (Please specify countries if known – do not give figures)

11. Do you know the total annual value of exports from the United Kingdom to individual Pacific-Asian countries for your own product ranges or the industries you supply? (Please specify countries if known – do not give figures)

12. Please indicate any export problems experienced in Pacific-Asia under the headings shown, specifying where possible countries and customers

(a) Terms of trade

(b) Customs

(c) Documentation

(d) Shipping

(e) Quality

(f) Reliability

(g) Price

(h) Delivery

(i) Receiving payment

(j) Language

13. Please specify any particular problems you have experienced in exporting to Pacific-Asia and state how these were overcome

14. Which export organizations did you find the most helpful?

15. Would further assistance in exporting be welcomed? E.g. market information, contacts, etc. Please specify

16. In your experience which of the following factors are important in obtaining orders from Pacific-Asia? (Please rank in order of importance with 1=most important)

Factors	Rank	Comments
Price		
Delivery		
Quality		
Service		

17. When quoting to countries in Pacific-Asia:

(a) Are quotations translated into the customer's language?

(b) Are prices given in local currency showing rate of exchange used?

(c) Are product samples supplied?

(d) Are optimistic delivery promises made to secure orders?

(e) What percentage success rate is achieved in converting quotations into orders?

(f) Are persistent efforts made to obtain orders after quotations have been submitted?

(g) Do you find that quotations generally are not acknowledged? If so do you feel that this indicates that British suppliers are not favoured and that consequently no further action is worthwhile?

(h) Do you have an electronic system in place to organize orders from customers?

18. What is your pricing policy and practice regarding the

(a) Home market?

(b) Export markets?

19. Are the direct costs of your products known and, if so, do these influence export prices to Pacific-Asia?

Section 3(b): About your Firm's International Operations in Pacific-Asia

In this section we are asking about:

- Any joint ventures your company may have with a Pacific-Asian firm
- Any technology transfer / R&D alliances your company may have with a Pacific-Asian firm
- Any manufacturing your company might be undertaking in Pacific-Asia

As before, if your company is not involved in any of the above ways, please answer the question below and skip the rest of this section.

If you have no operations in Pacific-Asia

➢ If you have not previously entered into any joint ventures with Pacific-Asian companies, engaged in international production, or transferred technology to a Pacific-Asian company, then are you considering the possibility of doing this? (If so please indicate countries, if not please give reasons)

Now please answer **Section 4: If your Firm has International Operations in China** on page 289.

Manufacturing in Pacific-Asia

Please only answer this section if you are involved in manufacturing in Pacific-Asia. If you do not manufacture in Pacific-Asia, but have alliances or joint ventures with other firms in Pacific-Asia, please skip these questions until you reach the heading **Alliances and Joint Ventures** on page 31.

1. Please tick the following boxes which best describe the activities of your company in Pacific-Asia

   ☐ Exporting to Pacific-Asia
   ☐ Manufacturing in Pacific-Asia
   ☐ Undertaking research, design and development in Pacific-Asia

2. Please give a brief description of the project(s) in Pacific-Asia your company is involved in

3. In what year did your first Pacific-Asian project begin? (e.g. the year you opened a plant in Thailand)

4. Please give a brief description of what your products are, or what your area of activity is

5. Please give a brief indication of what you think the future market situation will be

   (a) The size of the market will

   ☐ grow
   ☐ contract
   ☐ not change

   (b) The market situation will

   ☐ become more competitive
   ☐ become less competitive
   ☐ not change

6. Please tick the following boxes which best describe the reasons for choosing the location you did for your presence in Pacific-Asia

   ☐ Supply an existing customer (e.g. a Just-In-Time necessity)
   ☐ Take advantage of the local infrastructure (e.g. shipping/air/rail routes)
   ☐ Take advantage of cheaper local labour
   ☐ Take advantage of cheaper raw materials
   ☐ Because other similar firms are there
   ☐ Because your suppliers are based there
   ☐ Because your customers are based there
   ☐ To be close to an allied partner firm
   ☐ Incentives (e.g. local government grant, tax advantages)

7. Please indicate total number of people employed by your company in the whole of Pacific-Asia by ticking one of the boxes below. Combine if in more than one location.

☐ Between 1 - 9 people employed
☐ Between 10 - 99 people employed
☐ Between 100 – 499 people employed
☐ More than 500 people employed

8. Please tick the boxes that describe the customers for your products

☐ Car assembler (e.g. Ford or Rover)
☐ Component manufacturer (e.g. Lucas)
☐ Independent retailer (e.g. Halfords)

☐ Other (please specify) _____

9. Please tick the boxes that describe the way you supply your products

☐ Only supply one firm (e.g. you only make engine blocks for Ford)
☐ Supply a few large or specialist firms (e.g. you manufacture for both Ford and Rover)
☐ Have many customers (e.g. you supply anyone who places an order with you)

10. Please outline products by category shown and indicate what percentage of your total output each category represents:

Category	**% of Output**
Branded (i.e. produced under license)	
Own design	
Customer's design	
Joint effort of customer and yourself	
Design by parent company or group	
Other*	

*Please specify

11. Please give the annual total sales for the following years (if the figures for 1997 are not available, please give the most recent ones you have e.g. 1996 and make a note of this):

(a) The financial year ended 1993 £_____

(b) The financial year ended 1997 £_____

12. How do you control the quality of your Pacific-Asian products at various stages? Please answer by giving the standards you have implemented (e.g. ISO 9000) and any approved lists you are on (e.g. you are a Ford Q1 supplier)

13. Please indicate (by ticking) what in your view are the strong and weak points of your Pacific-Asian operation and its products.

	Strong	Weak
Design		
Quality		
Reliability		
Price		
Delivery		
Service		
International Commitment		
Other*		

*Please specify

14. Please indicate in respect of deliveries

(a) Lead times

(b) Reliability of delivery promise

(c) Factors adversely affecting delivery promises (e.g. delivery problems, material shortages, internal labour troubles)

(d) Are customers advised of delivery delays?

15. What are the main constraints on growth facing your Pacific-Asian operation? Please rank in order of importance from 1=most problematic and give a brief description of each difficulty.

Constraints	**Rank**	**Why?**
Finance		
Labour		
Material Supply		
Production Capacity		
Sales demand		
Competition		
Product substitutes		
Other*		

* Please specify

Alliances and Joint Ventures

The following questions are about any alliances or joint ventures your company might have with another firm. If you are not involved in any joint venture arrangements in Pacific-Asia, you should ignore these remaining questions and go on to the next section of the questionnaire.

16. Please indicate what type of technical know-how or technology your company is contributing to this relationship

- ☐ Product design
- ☐ Production organization
- ☐ Plant and equipment
- ☐ Labour force and personnel
- ☐ Capital
- ☐ Specialized machinery and/or processes
- ☐ Engineering assistance
- ☐ Specialist knowledge
- ☐ Management know-how
- ☐ Market information

☐ Other (please specify) _____

17. Please indicate the contribution to this project made by your Pacific-Asian partner

- ☐ Product design
- ☐ Production organization
- ☐ Plant and equipment
- ☐ Labour force and personnel
- ☐ Capital
- ☐ Specialized machinery and/or processes
- ☐ Engineering assistance
- ☐ Specialist knowledge
- ☐ Management know-how
- ☐ Market information

☐ Other (please specify) _____

18. If your Pacific-Asian partner seeks capital investment, please indicate what form (loan, equity, etc.) and amount

19. Please describe briefly the form of collaboration (e.g. technical assistance) you have entered into with your Pacific-Asian partner.

Section 4: If your Firm has International Operations in China

In this section we are interested in finding out about any international ventures you might have. We consider activities such as overseas production, technology transfer contracts, joint ventures, and research or production alliances to fall into this category.

In completing this section, please give answers relating to the most recent contact you have had (if you have had more than one). As before, if this section does not apply to you, please answer the question below and ignore this section.

If your firm has no operations in China

- If you have not previously entered into any joint ventures with a Chinese company, engaged in production in China, or transferred technology to a Chinese company, then are you considering the possibility of doing this? (If so please indicate your plans, if not please give reasons)

1. Please state name of Chinese joint venture

2. Please state name of Chinese company involved

3. Year in which first project with China began

4. Please give a brief description of the project(s) in China your company is involved in

5. Please give a brief indication of what you think the future market situation will be

6. Please indicate what type of technical know-how or technology your company is contributing to the project

- ☐ Product design
- ☐ Production organization
- ☐ Plant and equipment
- ☐ Labour force and personnel
- ☐ Capital
- ☐ Specialized machinery and/or processes
- ☐ Engineering assistance
- ☐ Specialist knowledge
- ☐ Management know-how
- ☐ Market information

☐ Other (please specify) _____

7. Please indicate the contribution to this project made by the Chinese partner

- ☐ Product design
- ☐ Production organization
- ☐ Plant and equipment
- ☐ Labour force and personnel
- ☐ Capital
- ☐ Specialized machinery and/or processes
- ☐ Engineering assistance
- ☐ Specialist knowledge
- ☐ Management know-how
- ☐ Market information

☐ Other (please specify) _____

8. If you are manufacturing in China, please give the planned production capacity for both local consumption and for export out of China

   (a) Planned production capacity for local consumption

   (b) Planned production capacity for export

9. Please give the annual total sales of the joint venture for the following years (if the figures for 1997 are not available, please give the most recent ones you have e.g. 1996 and make a note of this):

   (a) The financial year ended 1993 £_____

   (b) The financial year ended 1997 £_____

10. Please indicate total number of employees in the joint venture by ticking one of the boxes in (a) below.

    (a) People employed by the joint venture (if you do not manufacture, please give the number of your employees involved in providing the service instead)

    ☐ Between 1 - 9 people employed
    ☐ Between 10 - 99 people employed
    ☐ Between 100 – 499 people employed
    ☐ More than 500 people employed
    ☐ Don't know

    Please indicate total number of employees in the Chinese partner company by ticking one of the boxes in (b) below.

    (b) People employed by Chinese partner

    ☐ Between 1 - 9 people employed
    ☐ Between 10 - 99 people employed
    ☐ Between 100 – 499 people employed
    ☐ More than 500 people employed
    ☐ Don't know

11. Please tick the boxes that describe the way you supply your products (if you provide a service instead, then please answer for the way you provide the service)

    ☐ Only supply one firm (e.g. you only make engine blocks for your Chinese partner)
    ☐ Supply a few large or specialist firms (e.g. you manufacture for both Ford and Rover)
    ☐ Have many customers (e.g. you supply anyone who places an order with you)

12. Please tick the boxes that describe the EXPORT destinations of your products

    ☐ Car assembler
    ☐ Component manufacturer
    ☐ Independent retailer
    ☐ Don't produce for export

    ☐ Other (please specify) _____

13. Please tick the boxes that describe the LOCAL destinations of your products

☐ Chinese car assembler
☐ Chinese component manufacturer
☐ Chinese independent retailer

☐ Foreign or foreign joint venture component assembler
☐ Foreign or foreign joint venture car assembler
☐ Foreign or foreign joint venture independent retailer

☐ Don't produce for local consumption

☐ Other (please specify) _____

14. Please outline products by category shown and indicate what percentage of your total output each category represents (if you provide a service like technical assistance, please choose the option which best describes the service)

Category	% of Output
Branded	
Own design	
Customer's design	
Joint effort of customer and yourself	
Design by parent company or group	
Other*	

*Please specify

15. Please indicate (by ticking) what in your view are the strong and weak points of the joint venture and its products, or the service you are providing.

	Strong	Weak
Design		
Quality		
Reliability		
Price		
Delivery		
Service		
International Commitment		
Other*		

*Please specify

16. Please indicate in respect of deliveries of goods or services

(a) Average or typical lead times

(b) Reliability of delivery promise

(c) Factors adversely affecting delivery promises (e.g. delivery problems, material shortages, internal labour troubles)

(d) Are customers advised of delivery delays?

17. Please describe briefly the form of collaboration (e.g. technical assistance) you have entered into with your Chinese partner.

18. How do you control the quality of your Chinese joint venture's products at various stages? Please answer by giving the standards you have implemented (e.g. ISO 9000) and any approved lists you are on (e.g. you are a Ford Q1 supplier)

19. What are the main constraints on growth affecting your Chinese joint venture? Please rank in order of importance from 1=most problematic and give a brief description of each difficulty.

Constraints	**Rank**	**Why?**
Finance		
Labour		
Material Supply		
Production Capacity		
Sales demand		
Competition		
Product substitutes		
Other*		

* Please specify

20. If your Chinese partner seeks capital investment, please indicate what form (loan, equity, etc.) and amount