

HIGH TECH MANUFACTURING IN LEICESTERSHIRE

A Study for Leicestershire County Council



**THE UNIVERSITY
OF BIRMINGHAM**

The Centre for Urban and Regional Studies

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EXECUTIVE SUMMARY

This report presents an overview of the 'high tech' sector in Leicestershire. In the process it reviews the major trends currently facing firms in this sector, examines the scale and structure of the sector in the county, and, through a sample survey, explores a number of issues facing Leicestershire high tech firms. Finally, the report identifies a number of policy areas that could be addressed in order to support the sector. The key points raised by the research are highlighted below.

- The high tech sector is recognised as one of the most dynamic segments of UK manufacturing and is seen as an important source of productivity growth, profits and innovation. Furthermore, forecasts predict relatively minor medium term job losses for the sector at a time when the overall employment in manufacturing is expected to continue declining rapidly.
- These factors have been recognised within Leicestershire and there is a significant commitment to the development of the sector.
- The county has a substantial number of high tech jobs (20,848), accounting for some 5.3% of total employment. By comparison the sector accounts for 5.0% of regional employment and 4.7% of total national employment.
- This large share of employment is built on strengths in the chemicals, electrical engineering, and precision engineering sub-sectors. There is also has a very significant R&D sector accounting for 61% of all R&D employment in the region. In contrast, however, the office machinery and PCs, TV and communications equipment, motor vehicles and other transport sub-sectors are under-represented.
- Employment across the sector fell by 2,511 (10.7%) from 1998 to 2000. This is a rate more than double that of the national picture for these industries. Whilst there were significant falls in the office machinery and electrical engineering sub-sectors, the vast majority of these job losses were accounted for by the motor vehicles sub-sector. In contrast, four sub-sectors experienced employment growth over this period with expansion in the R&D sector appearing particularly marked.
- It is anticipated that employment in the sector will fall by 1.4% in the period 2000 - 2010 whilst output will increase by 2.3% (LERP, 2001). The chemicals and precision engineering sub-sectors are expected to experience some of the heaviest job losses of all manufacturing sub-sectors in the county.
- High tech employment is centred around Charnwood and Leicester City. Charnwood's employment base is built on a number of large employers, whilst Leicester City has a substantial base of small and micro firms.
- The sector in the county is exceedingly diverse ranging from state of the art pharmaceutical R&D through the manufacture of cleaning products, to the production of automotive components and bespoke electrical machines. The degree to which high technology products and processes are present in each of the sub-sectors in the county varies and, whilst there is a clearly identifiable core of technologically-advanced R&D-intense firms, one could question the high tech credentials of many firms in some of the sub-sectors.

- The sector is dominated by large firms with 10 firms accounting for 39% of employment (8,212 jobs). These businesses are owned by a combination of UK and foreign-owned corporations. Investment by these employers in the county appears to have been driven by the existing firm and skill bases of the area and its strong engineering tradition rather than its cost base or the presence of a relaxed regulatory regime.
- The commitment of these firms to the county is evidenced by the number undertaking higher order activities there (though there is some degree of variation). However, owing to the manner in which these firms dominate the sector and its skilled workforce in the county it is important that they are firmly embedded in order to maximise the benefits of localised synergies.
- The large number of major employers in the sector is paralleled by a relative paucity of ‘micro firms’ (1 - 10 employees). The stock of micro firms in a local economy represents the ‘seed bank’ of firms that will grow on to form the future larger employers in the area.
- These structural factors - a diverse range of sub-sectors and a distinctive firm size profile - give the sector an ‘uneven’ appearance. This is apparent with respect to the differing levels of technology use, skills, patterns of employment change, firm size profiles, varying market types and locations and different supply chain patterns and issues present within the sector. Different firm types and different sub-sectors therefore face many markedly different issues and challenges.
- The relatively disparate nature of the sector is reflected in the under-developed linkages between sub-sectors and between firms within sub-sectors. In particular the weak nature of supply chain links between large high tech firms and SMEs in the county has been noted (Leicestershire County Council, 2001). Furthermore, the under-developed nature of links between the region’s R&D base, the majority of which is located in Leicestershire, and industry, has also been identified (ECOTEC, 2001).
- The relatively weak identity of the sector suggests that policy makers need to be aware of the distinct issues facing specific sub-sectors and the differing conditions and challenges experienced by the base of SMEs and the small number of large employers.
- Efforts are already in place in the county to address a number of the issues identified in this report. Initiatives such as LATI, the Loughborough Innovation Centre, the Lachesis Fund, PERA’s Innovation Park, the PRIME Faraday Partnership, PERA’s Manufacturing Advisory Service and East Midlands Medilink hold the potential to boost new firm start-ups, improve inter-firm networking and upgrade the quality of advice and information provided to high tech firms. Steps should be taken to build upon the activities and successes of these initiatives, rather than seeking to duplicate them with potentially competing developments.

Survey Findings

Sector Profile

- Many firms (42%) have experienced reductions in employment over the last 12 months. There was, however, a group of expanding firms with 33% of respondents claiming to have increased employment in this period.
- For such a fast moving sector there was a relatively small number of recent start-ups. The majority of firms (72%) had been established prior to 1990. This may illustrate the sector's engineering rather than electronic roots.
- Four groups of firms were identified, by activity type, from across the broad range present. These were: firms in mature industries producing relatively high volume, mass produced products; those involved in specialist manufacture of low volume, 'niche' products; those providing specialist industrial services for the high tech sector; and those undertaking only assembly and distribution activities. We observed a relative absence of firms in sectors that might be described as 'new' or 'rapidly evolving'.
- The 'high tech' status of a number of firms surveyed was questionable. Whilst the skilled nature of these firms' activities was clear there was frequently an absence of significant levels of technology in either their products or processes. A reappraisal of the manner in which high tech firms are identified in the county may be appropriate.

Market Linkages

- There was a strong exporting culture within the surveyed firms with 64% claiming to undertake this activity and 29% identifying overseas locations as their most important markets. Supplier links were more strongly focussed around the East Midlands and the UK. A number of firms reported difficulties in obtaining supplies owing to their small size and the specialised nature of their activities.
- There is little evidence from the study of strong supply chain linkages between firms – between say big players and local SMEs – within the County area.

Skills and Training

- Many firms (53%) reported difficulties in recruiting 'skilled' workers. Technical and professional engineering skills were especially hard to obtain. There was some evidence of competition with the South East and the 'M4 corridor'.
- The majority of firms provide some form of formal in-house training, though 33% had no such provision. Respondents used a wide range of external training provision in the county. Whilst there was general satisfaction with the quality many felt providers did not promote their services widely enough whilst others complained of confusion owing to the proliferation of providers and programmes.

Innovation and Collaboration

- The majority of firms (61%) undertook R&D and design activities. Respondents also appeared highly innovative with 72% claiming to have introduced technologically new or significantly improved products or services over the last three years. However, a significant proportion appeared to consist of short term incremental adaptations to products in response to customer or supplier requests,

rather than independent development of new products through research-base, knowledge-intense activities.

- Many firms had sought to overcome barriers to innovation through collaboration with other firms or organisations. Most interactions took place between firms and their customers or suppliers with little evidence of ‘horizontal’ collaboration between competitors or with service providers. In fact it was apparent that many firms were strongly adverse to this form of collaboration. There was also little evidence of collaboration by high tech firms with the R&D sector in the county. In contrast, there was more evidence of collaboration with Universities both locally and nationally.

Prospects and Challenges

- The majority of firms were upbeat about their future prospects with 61% expecting to increase employment in the next three years, 67% anticipating increased sales and 86% expecting to introduce new products. Whilst these findings are promising they may be optimistic, especially in relation to employment, given current performance and future forecasts. It was also possible to identify a group of more cautious firms (25%) expecting no growth in either sales or employment in this period. Motor vehicles firms were heavily represented in this group.
- Costs (81%), regulatory issues (75%) competition (72%) and skills shortages were the business challenges most frequently cited by firms. In terms of the *single most* significant barrier, however, skills shortages (20%) and competition (20%) were highlighted

Business Support

- There did not appear to be particularly strong links between firms and the base of business support organisations. Where there had been contact, many firms felt it had been of little value.
- Support for the establishment of a business-led forum was expressed by respondents (61%). The promotion of inter-firm networking was seen as a potentially key role for the forum. There were, however, concerns voiced over the possibility of it turning into a ‘talking shop’ or failing to reflect the national and international context in which many firms operate.

Policy Implications

Skills

- More and enhanced promotion of the area is required in order to offset the attractions of the South East’s labour market and improve the competitive position of Leicestershire in attracting and retaining workers.

Training

- It was apparent that HE and FE institutions could improve the manner in which their training services are advertised to firms in the county. There is an important role for local organisations in clarifying and co-ordinating promotional activities regarding training provision in the county area.

Employment Change

- It is important to recognise the divergent patterns of employment change between high tech sub-sectors. These divergences have clear policy implications. Sub-sectors with the greatest opportunity for employment growth should become the focus of policy attention.

Start-ups and Spin-offs

- Domination of the local high tech sector by large companies, and the relative absence of micro firms, indicates that priority must be given as a matter of urgency to the promotion of new small firms.
- The source of new ventures and entrepreneurs is likely to lie within the strong local R&D sector and amongst the skilled staffs of larger companies.
- Given the relative absence of high tech service activities such as computer services, local organisations should give attention to stimulating new firm start-ups and small firm expansions in this field.

Cost Reduction

- Given the general pressure across manufacturing to reduce costs, and the difficulty that some firms, especially smaller ones, face in achieving this, local organisations should embark on policy initiatives which encourage and facilitate efficiency improvements.
- For example, given the importance of e-commerce to the future of the economy, local organisations should investigate ways of helping firms to move onto and up the e-commerce ladder.

Sustainable Development

- Many companies are finding it challenging to adjust to international and EU environmental standards. However, adoption of more rigorous standards may well be beneficial to product development and manufacturing efficiency. Local organisations should consider ways of contributing to sectoral quality and efficiency by raising awareness and helping firms comply with new environmental legislation.

Inward Investment

- The priority for local policy makers should be upon new and small firm development. However, the importance of large global companies to the local economy, and its dependence on a relatively small number of these, suggests local organisations should consider ways of attracting a new generation of large inward investors.
- The locality has a particular strength in R&D activities, so local organisations should give priority to increasing their understanding of this cluster, strengthening and promoting it as part of this strategy.

Exporting

- Given the county's strengths in exporting, local agencies might wish to explore ways of celebrating and reinforcing this export expertise. For example, this could be profiled in the county's promotional thrust, together with the strength of local R&D activities.

Clusters

- The relative absence of local linkages, particularly in relation to collaboration for innovation, in the sector suggests that local organisations will need to use its proposed business forum and other initiatives to encourage closer co-operation between Leicestershire firms so embedding these in the locality.

Segmented Strategies

- It is possible to draw a broad distinction between ‘big players’ that have one or more plants in Leicestershire (such as Brush, 3M), and small or medium sized firms with a much greater focus upon the area. The SMEs themselves can be further divided, between ‘highly innovative’ and ‘traditional’. The findings that have emerged are different for these different groups of firms, and the policy stance of local organisations will therefore need to be segmented, with different policy goals and instruments.
- Additionally, it is important to acknowledge the divergent circumstances of sub-sectors within high tech manufacturing and so policies should also be segmented by sub-sector. Hence, R&D or pharmaceutical firms will require an entirely different set of initiatives from automotive and other transport activities.

Generating Intelligence

- Leicestershire has particular strengths in the R&D sub-sector. Local organisations should consider investigating the distribution and characteristics of these activities both in specialist firms and more generally in Leicestershire, in order to identify how linkages between this sub-sector and other firms can be strengthened. This is an area of critical importance to the future of Leicestershire’s high tech industry and knowledge economy that needs to be studied in more depth.
- This fast moving sector is faced with a rapidly changing business environment which is likely to vary from sub-sector to sub-sector. A ‘foresighting’ exercise, taking account of sub-sectoral differentiation, would provide a useful tool for anticipating future developments for the sector and their implications for the county’s economy. This activity would also provide a useful starting point to inform the activities of an industry-led forum.

Creating A High Tech Manufacturing Industry Forum For Leicestershire

- The survey has indicated that around 61% of the firms interviewed would be interested in becoming involved in a Leicestershire forum for the manufacturing industry.
- A number of firms felt that they had expertise and experience that could be of value to other Leicestershire firms and institutions as long as these were not competitors.
- There were concerns expressed by some firms that ‘this type of thing has been done before’. There was some concern expressed by firms generally about the ‘credibility’ of business support institutions.
- Some firms felt that they were not aware of the types of support and assistance that local institutions could bring to bear on their problems.
- It is important that complementarity with other regional initiatives is maintained. EMDA, for instance, is currently developing a variety of initiatives aimed at

businesses in this sector focussing on the sub-sectors of healthcare and high performance engineering. The likely relationship between any proposed forum and developments such as these should be taken into account.

- Likewise, the possible role in a forum of successful existing county-based initiatives such as the Loughborough Advanced Technology Initiative (LATI) should be considered.
- To summarise, although there is real evidence of interest in the industry forum idea, this is tempered by the view of some firms that the initiative should be 'industry credible' and not a rerun of any previous experience.

PART ONE

INTRODUCTION

This report presents the findings of a study of high tech manufacturing activities in Leicester and Leicestershire. The purpose of the study has been to provide the Council and its partners with a detailed analysis of the current status of high-tech manufacturing firms, and the opportunities and challenges they face, in order to determine the parameters that may guide economic strategies to promote industry led economic growth. The study has also considered how industry led fora and task groups can be formed to facilitate this growth.

Despite the general switch towards services, and the associated shift in policy emphasis, manufacturing continues to be important in many areas as a source of income, employment and innovation. Indeed Leicestershire is more dependent upon manufacturing in employment terms than the East Midlands generally, with 26.1% of employment compared to 22.1% in the East Midlands region and 15.1% in the UK. But it is particularly from amongst the more technologically advanced manufacturing sectors that we might expect future economic prosperity to be secured, and it is in these sectors that we may be able to discern the future shape of local and regional economies. High technology manufacturing industry has, therefore, been identified by the Local Organisations Council as a key sector alongside other strategic manufacturing sectors.

Throughout manufacturing, firms have experienced intensified change over the last decade, affecting markets, technology, skills, firm structures and employment. In addition macro-economic changes, such as the development of the European single currency and emerging low cost competitors overseas, are providing new challenges. High technology manufacturing firms have also experienced a number of specific challenges including:

- Intense competition from new and emerging global players
- Increasing customer expectations
- Ever more stringent environmental legislation
- Rapid technological change and the need for continued product and process innovation
- The need to recruit highly skilled people
- The need to source from high quality suppliers
- Increasingly short product cycles
- E-business imperatives

Those manufacturing firms most able to exploit changing circumstances are likely to employ innovative methods and improved technology that can add value to products and processes.

High technology manufacturing covers a wide variety of different kinds of businesses, and is difficult to operationalise sectorally. As defined here High Tech industry coverage includes chemicals, electrical machinery, communications equipment, precision instruments, motor vehicles, other transport industries and R&D (SIC 92 codes 24, 30, 31, 32, 33, 34, 35 and 73).

A variety of tools and techniques have been used to undertake this research. Firstly, the study has involved desk based data base research on target industry performance. Sources include a variety of regional and county economic studies, as well as official sources of statistics such as the 2000 Annual Business Inquiry. With the benefit of the information obtained from this we have examined the performance of a sample of local firms via a telephone survey.

The sample of target firms for telephone survey purposes was drawn up from the *data4business* database held at the County Council. A quota sample was identified and a total of 37 firms were interviewed. The sample was stratified by the above SIC codes to cover the range of different high-tech sectors, and also to cover firms of different sizes. Information gathered concerned:

- age, size and location,
- main products and services,
- trends in turnover and employment,
- product innovation and the innovation process,
- markets served including export markets,
- supplies required and supply chains issues (such as supplier dominance),
- recruitment and skills used,
- business challenges, prospects and pressures
- training issues
- business support requirements.

Data under these headings was analysed and forms the basis of most of the findings and conclusions from the study.

The report has an Executive Summary, and then six Parts. From the introduction (Part 1) we move to a general review of trends in manufacturing and especially high tech manufacturing worldwide and in the UK (Parts 2). Part 3 presents findings regarding high tech manufacturing firms in Leicestershire and the East Midlands drawn from a variety of secondary sources. Part 4 presents the sample survey results, analysis of these and key findings. Part 5 interprets these findings in the light of more qualitative comments from the survey questionnaires, whilst Part 6 draws general conclusions and identifies some policy implications.

PART TWO

TRENDS AND ISSUES IN THE HIGH TECHNOLOGY MANUFACTURING SECTOR

Introduction

High technology manufacturing can be identified as those areas of manufacturing where advanced, and rapidly changing technologies, are present in the product itself, the manufacturing process – or both.

Often the description ‘high technology’ is assumed to apply primarily to new industries or where there is R&D intensive product development as, for example, in pharmaceuticals, medical instrumentation or ultra-high precision engineering. However, many traditional or mature sectors incorporate significant elements of modern technology within the manufacturing process, for example in design, simulation, testing and automation. The common feature is that of rapidly evolving technology and an on-going process of change driven by a strong R&D input.

The presence of a strong high technology sector has a number of advantages from a regional economic point of view. The sector generally involves clean processes, and is both high value added and profitable. It therefore creates high value jobs and regional wealth, has a positive effect on regional image and, since it involves highly skilled labour, is relatively insulated from low cost competition. However, the sector can also be vulnerable. Rapid scientific and technological changes, plus the high cost of development, necessitate high levels of investment (and re-investment). Also, as new technologies mature, they can be imitated or adopted elsewhere. At this point cost considerations and process improvements become increasingly important. High quality management skills are at a premium.

The remainder of this chapter is divided into four main parts. The first examines broad trends faced by high tech manufacturing firms in an increasingly globalised marketplace. The final three sections focus in more detail on the pressures acting upon firms in competing in three types of market - mass markets, specialist production in mature sectors and new or emergent markets.

Manufacturing Trends

Manufacturing industries have faced an increasing number of pressures over the last two decades. Some of these have been sector specific and concerned with particular organisational or technological changes. However, a number of common trends and issues can be identified as important for all manufacturing firms and for policy makers seeking to initiate and sustain regional business development. Such issues include intense competition on a global basis, continued cost pressures and increased customer expectations. In response manufacturing businesses in all sectors are adopting lean business models in which they seek to maximise the return on their assets and to minimise the costs associated with waste, i.e.,

- the return from their people by maximising the value added per person employed
- the return on their premises by maximising the utilisation of factory floor-space and speed and flexibility of product flow

- the return on capital investment by maximising the utilisation of machinery and equipment
- maximising the use of materials and minimising waste incurred through defects and high scrap rates
- minimising the capital tied up in inventory by introducing kanban or pull production systems allied to just in time deliveries to their customers - and from their own suppliers
- maximising efficiency of scheduling and delivery to customers

A recent trend of this lean model has been the replacement, within businesses, of vertically structured departments by a horizontal and integrated structure. In this model there is no longer a linear, “department to department”, product development process, (e.g. R&D to manufacture to marketing), but an integrated and simultaneous process. In mature industries this horizontal integration has often extended outside the firm with the growth of specialist suppliers. These range from knowledge intensive business services, such as design, finance and logistics, to manufacturers of whole units (modules) of the finished product. The horizontal model enables the above principles to be implemented more effectively through maximum utilisation of both people, (including a reduction in employment in absolute terms), and capital. The capability of the ‘partner companies’ is critical to the success of the model. As a result, customer companies set particular quality and operational standards for the suppliers.

Other pressures come about through the increasing pace (and cost) of technological developments, an increasingly stringent legislative framework, for example product emission testing (e.g. regarding solvent-based paints), health and safety regulation, and environmental legislation such as the climate change levy, which gives further imperative to the lean manufacturing agenda, and the need to recruit, up-date and retain skilled personnel. The development of global markets, with global purchasing, and the growth of e-business, has further accelerated the above trends.

The Leicestershire high technology manufacturing sector, as defined within the County Council’s Economic Strategy, comprises a diverse group of large and small businesses and sectors. For each there is a different context in which to apply business strategies for growth, development or, in some cases, survival. Overall these businesses can be broadly classified as follows:

Mature Mass Production Based Sectors

In these industries, for example the electronics or automotive industries, production is largely standardised according to flow principles. Recent years have seen the introduction of flexible systems and multi product flow. Standardisation has moved from individual components to modules or systems. To minimise costs, increasing amounts of work are outsourced to specialist producers. Economies of scale have driven mergers and acquisitions thus creating a relatively small number of global firms that manufacture at different locations according to markets and costs. For individual plants there may be relatively little scope for doing other than that required by the parent company. Although often part of global purchasing system these firms, never the less, usually have a significant level of interactions with local sub-contractors.

For the sub-contractors to such large businesses the main issues are meeting cost and capability requirements. These smaller businesses are usually working to their

customer's designs and competing solely on price. Often they are working simply to cover their variable costs with no room for investment (or thought). Hence there is little dynamism. Where innovation occurs it is usually process oriented in order to seek further price competitiveness.

For those concerned with developing business support, and trying to retain employment in these sectors, the main issues are how to provide an attractive business environment for the large businesses and support their local purchasing. Initiatives might include,

- working with supply matrix groups on process improvement for quality, cost and delivery, e.g. through (customer) hub and (suppliers) spoke models – possibly extending outside the local area encouraging local supply/purchasing interactions
- assisting strategic networking
- helping to improve local skills development
- assisting the introduction and use of e-business for manufacturing and purchasing
- helping sub-contractors to add value to their products
- helping sub-contractors develop new products or enter new markets
- assisting the set-up and growth of high value services to improve the regional “offer” to global companies

Specialist Production in Mature Engineering Sectors

There are a number of businesses in the County that produce bespoke equipment for individual customers or are suppliers of high value equipment or engineering services, e.g. electrical or mechanical machinery, and precision instrumentation. These firms, although not concerned with mass flow production, are, by virtue of the global nature of business, still subject to many of the same pressures described above, for example to use standard components as far as possible and to encourage cost savings within their supply base. Increasingly they will develop a standardised and modular approach – with outsourcing of activities which are seen as not core to the business nor sufficiently value added or where the development costs are high and can only be met by specialist businesses working with several producers. Since design is such a key part of their business these firms have a particular need to integrate their design, development and manufacturing activities if they are to remain competitive.

Smaller companies, and sub-contractors to the major businesses, have traditionally competed on the basis of their engineering capabilities. However, globalisation, and the possibilities of e-commerce, such as long distance data inter-change, means that price is increasingly an issue.

For policy makers many of the issues are the same as for the mass production sectors but with the additional need for development of a local pool of certain specialist and high-level skills. Our survey records a particular need for high level technicians and development engineers within the County. Working with, and encouraging networking by, colleges, universities and local LSCs is particularly important in this context

“New” or Rapidly Evolving Sectors

Large firms in these sectors are highly knowledge intensive and rely heavily on converting research and development activities into profitable product lines, for

example pharmaceuticals and other specialist chemicals. This R&D may be undertaken within their own organisation or may be accessed through interactions with specialist research laboratories and universities. The firms' managers seek to marry this science or technology push with the market pull. As with the above sectors, the competition is global, and just as intense, but has tended to be primarily product, rather than price, driven. Businesses in these sectors are, however, increasingly subject to the same cost pressures as those discussed above. A good example is to be found in the health care sector where purchasers are increasingly cost conscious – and aware of alternative suppliers. As a consequence the same trends and business models outlined above are increasingly evident.

Smaller companies in these sectors are, in the early stages at least, knowledge driven around a particular product or process in which they hold intellectual property. Unlike small companies in mature sectors they compete primarily on products – which may evolve very rapidly - and capability. However, as the science and technology, and the businesses themselves, mature the picture changes. Firstly, firms need to become more aware of the markets. Secondly, if they are to develop, they increasingly need to adopt elements of the lean business paradigm. They also have the added challenge of systems integration of their product design and development process with manufacture. For such firms it becomes imperative that they clearly identify their business costs, develop the management of specialist internal functions or outsource particular activities.

Without the adoption of a business culture, as opposed to one based upon science and technology expertise, access to finance for development and growth will be an on-going problem for firms.

Business support initiatives can help support these companies by,

- improving the regional base of high level skills
- initiating strategic business networking
- assisting businesses to become cost aware and cost effective
- supporting the effective supply matrix development
- assisting the adoption of e-business
- assisting smaller businesses to access development finance
- helping businesses address standards and regulation issues

PART THREE

THE HIGH TECH MANUFACTURING SECTOR IN LEICESTERSHIRE AND THE EAST MIDLANDS

Introduction

This section of the report presents an overview of the structure of the high tech sector in Leicestershire and the East Midlands based on secondary data sources. In this sense it provides a context for the more detailed review of firm activity and sectoral prospects in the following section.

It is divided into two main sections. The first presents data on the East Midland high tech sector with a particular focus on Leicestershire's role within it. The second section then examines the structure of the Leicestershire high tech sector in greater detail. All Tables and Figures in this section are for 2000. The terms 'Leicestershire' and 'county' are taken to cover the unitary authority areas of Leicestershire County Council and Leicester City Council.

The East Midlands High Tech Sector

A recent review of the East Midlands economy described it as "one of the wealthiest regions outside the Greater South East", with a GDP per capita in 1999 of 93.6% of the UK average (DTZ Pidea, 2002, p.31). The NUTS 2 area of Leicestershire, Rutland and Northamptonshire was identified as having a GDP per capita in 1998 some 3% above the national average. Other characteristics of the region included employment growth rates in excess of the national average and unemployment levels below it. However, the region was also seen to have relatively low earnings per capita, a low business formation rate and a gross value added (GVA) per capita figure in the bottom three of the UK regions. The recently published *Region in Figures* (National Statistics, 2002) suggests that these broad findings are replicated at a county level in Leicestershire.

Furthermore, as Table 3.1 illustrates, the East Midlands was identified as possessing a potentially weak economic structure. Some 22.1% of the region's workforce (26.6% in Leicestershire) is located in the manufacturing sector compared to a national figure of 15.1%. In this context it has been argued that,

"the East Midlands' bias towards primary and manufacturing sectors makes the region vulnerable to the secular economic shift towards services and low cost competition from overseas. Moreover, within the broad economic structure, the region's largest sectors are relatively low value activities, such as food and drink, textiles, retail and distribution, whilst it lacks higher value sectors, particularly in the service sector, but also in areas like electrical and electronics manufacturing. If the region is to develop a modern, knowledge-intensive economy to deal with a globalising environment then it needs to not only develop its service sector but also to move up the value chain" (DTZ Pidea, 2002, p.38).

These concerns apply, as Table 3.1 shows, in equal if not greater measure to the Leicestershire economy individually where manufacturing remains especially important.

Table 3.1: Employment by Broad Industry Group in Leicestershire, E. Mids and GB in 2000 (%)

	Agri.	Energy	Manu.	Const.	Dist.	Trans.	Bank	Pub. Admin.	Other Services
Leics.	NA	1.0%	26.6%	4.6%	21.3%	5.8%	14.7%	22.1%	3.9%
E.Mids	1.4%	0.9%	22.1%	4.6%	23.3%	5.4%	14.3%	23.8%	4.2%
GB	1.0%	0.7%	15.1%	4.5%	23.9%	6.1%	19.7%	24.1%	5.0%

(Source: NOMIS).

Whilst the importance of developing the high tech sector in the region is unquestioned concerns have been raised about the manner in which this task is proceeding in the region. A recent ECOTEC (2001) study, *European Regional Innovation Policy*, for instance, noted that the region had high levels of employment in the high tech sector accompanied by relatively low rates of innovation. It was suggested that this was characteristic of a transplant economy built upon the acquisition of technology developed elsewhere rather than indigenously. Whilst this is a valid way to develop a local economy concerns exist that the region lacks its own knowledge generating activities and these processes are increasingly identified as the motors of economic growth. The report concluded, in line with much recent writing, that steps must be taken to further link the knowledge-based activities of universities, research institutes and large firms with indigenous firms in the region. These objectives are particularly relevant in the case of Leicestershire which contains a substantial R&D base. Research and Development is defined here (by reference to the 1992 SIC codes) as research and experimental development on natural sciences (73.1), and research and experimental development on social science and humanities (73.2).

The high tech sector as defined in the original remit for this research covers a broad and diverse range of sub-sectors. These sub-sectors have been identified by their SIC codes and include;

- SIC 24 - Chemicals and Chemical Products
- SIC 30 - Electrical and Optical Equipment
- SIC 31 - Electrical Machinery
- SIC 32 - Radio, TV and Communications Equipment
- SIC 33 - Medical, Precision and Optical Instruments
- SIC 34 - Motor Vehicles
- SIC 35 - Other Transport Equipment
- SIC 73 - Research and Development

In 2000 there were 1,188,524 jobs across these sectors in Great Britain representing 4.7% of total employment. Some 86,739 of these jobs were located in the East Midlands representing 5% of total regional employment and accounting for 7.3% of the national total.

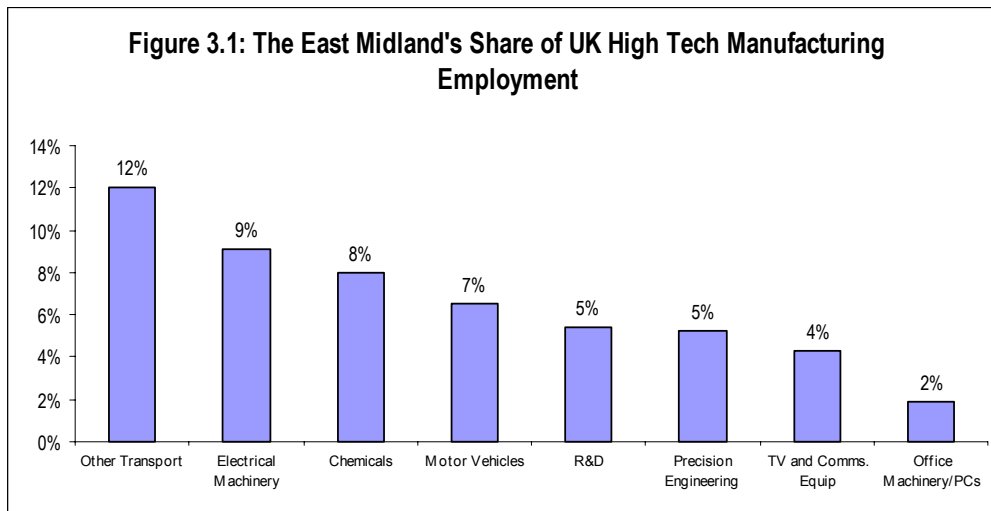
Table 3.2: High Tech Employment in the East Midlands

	Leicestershire	E.Mids	GB
Nos. of Jobs	20,848	86,739	1,188,524
High Tech as % of Total Employ.	5.3%	5.0%	4.7%
High Tech as % of UK High Tech	1.8%	7.3	-

(Source: NOMIS)

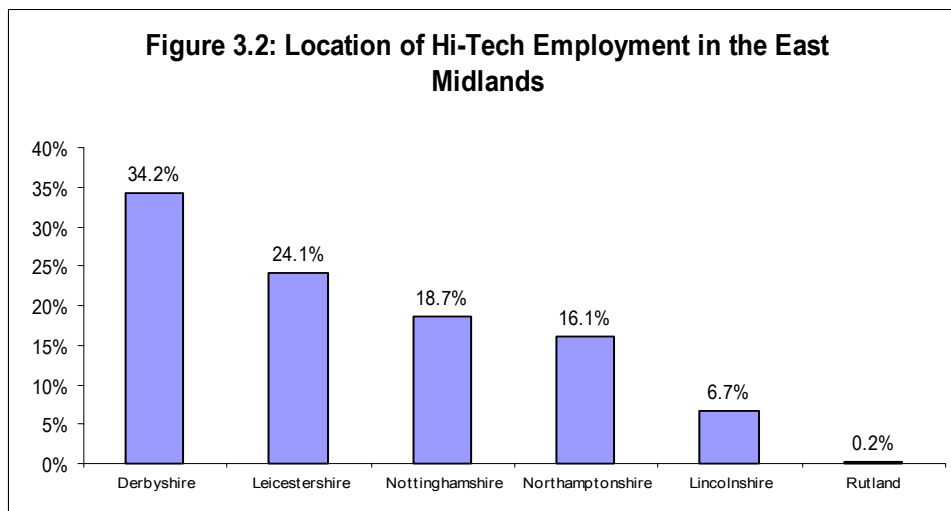
As Figure 3.1 shows the region has a particular strength in the area of ‘other’ transport equipment as some 12% of national employment in this sector is located in the region. These high concentrations of employment are reflected in the recent identification of automotive and machinery and industrial equipment clusters in the region (Trends Business Research, 2001). There were also relative regional strengths, in terms of

concentrations of employment in the sub-sectors of electrical machinery and chemicals. The region has relatively weak concentrations of employment in the sub-sectors of TV and communications equipment and office machinery and computers.



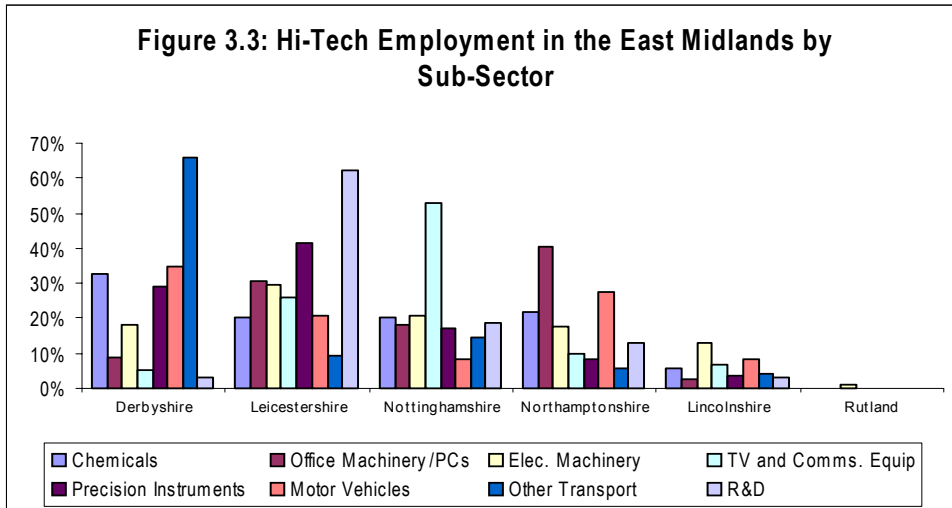
(Source: NOMIS)

Figure 3.2 illustrates the spread of employment in the high tech sector across the traditional county areas of the East Midlands. Derbyshire, traditionally the manufacturing centre of the region, enjoys the largest share of regional employment for this sector.



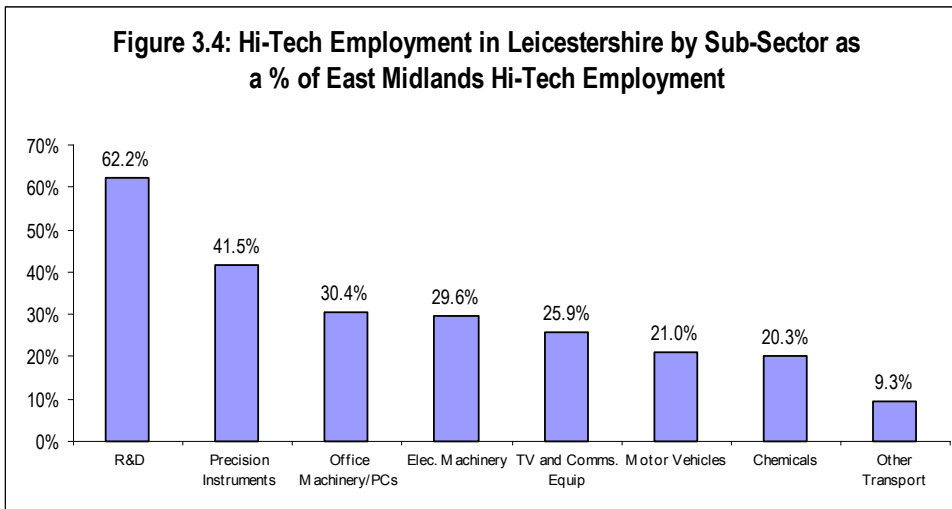
(Source: NOMIS)

Figure 3.3 demonstrates that Derbyshire's strength in this sector is built on its high level of employment in the other transport equipment sector. In contrast Leicestershire appears to have relatively strong concentrations of employment in the R&D and precision engineering sub-sectors accounting for 62.2% and 41.5% respectively of regional employment in these sub-sectors. This compares to the county's overall figure of 24.1% of employment across the entire sector. In general, Leicestershire is comparatively well represented across the majority of the sub-sectors in the high tech sector relative to the region as a whole.



(Source: NOMIS)

Leicestershire’s high tech strengths relative to the region are illustrated in Figure 3.4. Its strong R&D base through firms such as Advantica Technologies is clearly apparent. Its strength in precision instruments is also clear and this is built on the presence of firms such as Druck, Linread Northbridge, Sanyo Gallenkamp, Taylor Hobson, and BAE Systems. Whilst the county has a large proportion of the regional share of employment in office machinery and PCs and TV and communications equipment these represent only relatively minor numbers of jobs in absolute terms.

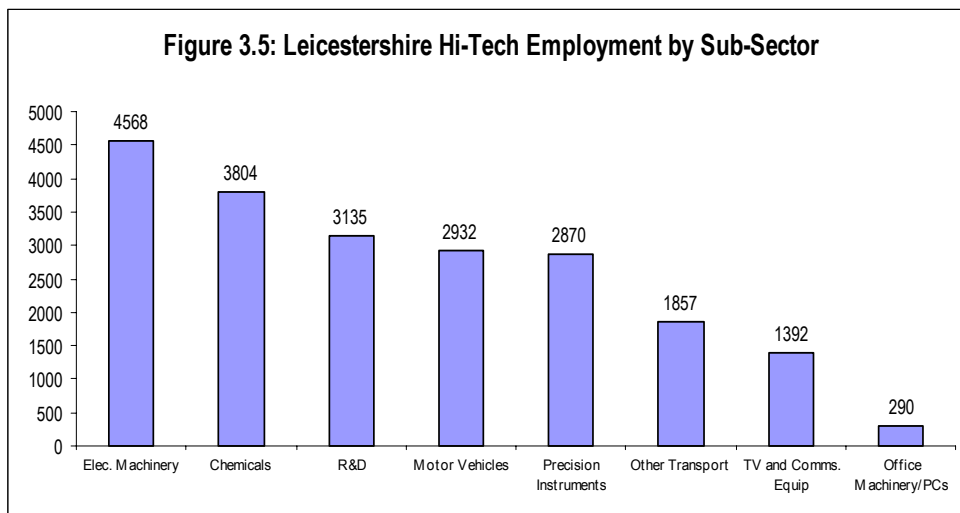


(Source: NOMIS)

The Leicestershire High Tech Sector

Size and Scale

The high tech sector employs 20,848 people (2000) in the county in 592 units. A breakdown of employment levels in each of the sub-sectors is shown in Figure 3.5. This indicates that electrical machinery (4,568 employees) and chemicals (3,804) are the largest sub-sectors within the county. As indicated previously, R&D activities also have a substantial presence in the county. In contrast, the county has only a low numbers of jobs in the TV and PC sectors and rather its high tech strengths are built on its light engineering heritage and the region's traditional strength in the area of chemicals and pharmaceuticals. In this sense the county appears to have a strong 'electrical' rather than 'electronic' employment base.



(Source: NOMIS)

Employment in the high tech sector accounts for 5.3% of total employment in the county - this compares to 5% across the region and 4.7% for Great Britain (see Table 3.3). This above average representation of high tech employment in terms of total employment is not surprising given the large share taken by manufacturing as a whole in the county (26.6%) compared to the region (22.1%) and Great Britain as a whole (15.1%).

However, Table 3.3 suggests that in the context of the county's large manufacturing base, high tech manufacturing is relatively under-represented in employment terms. High tech manufacturing accounts for only 19.9% of total manufacturing employment in the county, lower than that for the East Midlands (22.5%) and substantially below that of Great Britain (31.3%). This suggests that in employment terms the manufacturing strengths of both the county and the East Midlands currently lie in industries outside the high tech sector. It may therefore be possible to argue that Leicestershire does not have an overly significant concentration of high tech employment and rather that the size of the sector in the county is a reflection of its large manufacturing sector in general rather than any specific high-tech strengths in the county.

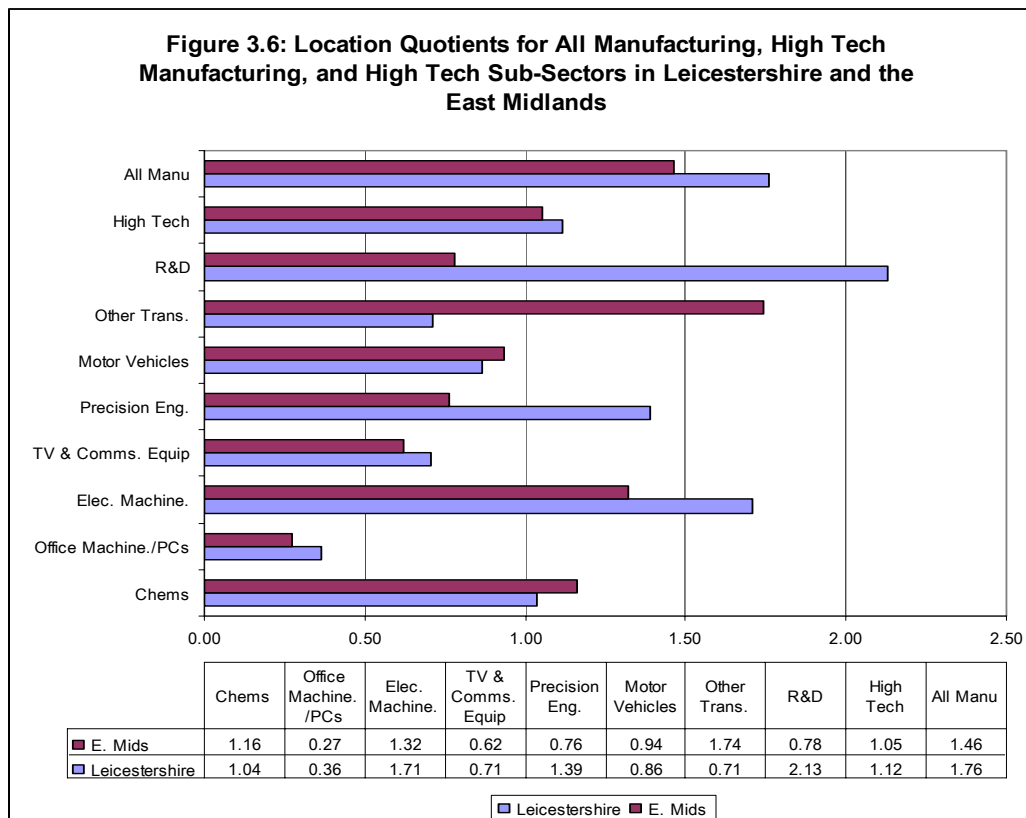
Table 3.3: The Concentration of High Tech Employment in Leicestershire, E. Mids and GB (%)

	Hi-Tech as % of Total Employ	Manu. as % of Total Employ	Hi-Tech as % of Total Manu. Employ
Leicestershire	5.3%	26.6%	19.9%
East Midlands	5.0%	22.1%	22.5%
Great Britain	4.7%	15.1%	31.3%

(Source: NOMIS)

Further analysis of the relative strength's of Leicestershire's sector are shown in Figure 3.6. This illustrates the results of a location quotient (LQ) analysis of all manufacturing, high tech manufacturing and high tech sub-sectors in Leicestershire and the East Midlands. LQs give a measure of employment concentration relative to Great Britain as a whole. An LQ of one represents an employment concentration equal to the national rate, whilst figures over 1.25 are regarded as representing a significant concentration of employment for that particular sector.

Figure 3.6 confirms the importance of manufacturing both to the region (1.46) and especially the county (1.76). It also demonstrates that high tech manufacturing is substantially less highly concentrated in Leicestershire (1.12) than general manufacturing. However, high concentrations of employment in the precision engineering (1.39), electrical engineering (1.71) and especially the R&D (2.13) sub-sectors are also clearly apparent. In contrast the county is shown to have weak concentrations of employment in the office machines (0.36), TV and communications equipment (0.71) and other transport sub-sectors (0.71). The county's high tech sector therefore has a combination of both highly concentrated and under-developed sub-sectors in employment terms.



(Source: NOMIS)

The analysis presented in Figure 3.6 and throughout this report is based on the SIC code definitions of the high tech sector provided by Leicestershire County Council. However, if one employs a different definition of the sector a different picture of the county's performance emerges. An alternative definition is the widely used Butchart model (Butchart, 1987). This excludes certain arguably 'medium tech' sectors such as automotive and other transport and includes computing services and telecommunications. Furthermore it is more selective in terms of its inclusion of certain chemicals and electrical engineering sub-sectors. Arguably this definition provides a picture of high tech firms only rather than both high and medium tech.

If one applies this new definition to Leicestershire the total number of high tech jobs in place in the county is reduced only slightly from 20,848 to 20,101 as the number of jobs in the alternative sectors is roughly equivalent to those in the excluded sectors (see Figure 3.4). However, the LQ of the sector falls significantly from 1.12 to 0.91. The implication is that Great Britain as a whole has a higher proportion of employment in these alternative sub-sectors than in the original sub-sectors. Leicestershire, in contrast, has slightly lower proportions of employment in these new sub-sectors. Therefore the county does not appear to be under performing when measured on indicators including 'medium tech' industries, however when these are removed and replaced with alternative high tech sub-sectors such as defence, aerospace, telecommunications and computer services then the sector in the county is clearly under-performing relative to the country as a whole. This must raise questions about the manner in which high tech firms are identified in the county and how progress in developing the sector is measured.

Table 3.4: High Tech Employment Levels in Leicestershire by Different Definitions

	High Tech Employment		High Tech Employ. as % of Total Employ.		High Tech Location Quotient	
	Current Def.	Butchart Def.	Current Def.	Butchart Def.	Current Def.	Butchart Def.
Leics.	20,848	20,101	5.3%	5.1%	1.12	0.91
E. Mids	86,379	81,699	5.0%	4.7%	1.05	0.84
GB	1,188,524	1,417,922	4.7%	5.6%	-	-

(Source: NOMIS)

Performance of the Leicestershire High Tech Sector

The sector is based on a restructuring of the county's engineering industries since the 1980s and is predominantly export-oriented, consequently it has suffered in the context of the weak Euro. Inward investment, both in terms of foreign direct investment and mergers and acquisitions, appears to have been a significant factor in the development of the sector. Recent high profile inward investors include Toyoda Gosei and BPW.

The sector appears to have experienced mixed fortunes in recent years. Table 3.5 demonstrates that in the period 1998 - 2000 it lost 2,511 jobs, some 10.7% of its total employment. This was roughly in line with the regional picture but over twice as bad as national performance. Analysis of the sub-sectors, however, indicates that employment loss did not occur across the board and was largely confined to office machinery, electrical engineering and motor vehicles segments. This latter sector in particular has experienced acute problems losing 4,051 jobs in this period, some 58% of its workforce.

(This figure has been provided by NOMIS from the 2000 ABI, however owing to its size its veracity may need to be confirmed independently within the county). This one sub-sector was largely responsible for the overall loss of jobs across the whole high tech sector. In contrast, other sectors have undergone little change in employment terms or, such as the TV and R&D sectors, have experienced significant growth

Table 3.5: High Tech Employment Change 1998 - 2000 (Nos. and %)

	High Tech	Chems.	Office Machine. /PCs	Elec. Machine.	TV & Comms. Equip	Precision Eng.	Motor Vehicles	Other Trans.	R&D
Leics	-2511	250	-446	-361	559	185	-4051	-139	1489
E. Mids	-9764	-3019	-628	-118	272	-355	-5767	-1191	1042
GB	-54735	-20264	2026	-12899	712	-7202	-18972	4187	-2323
Leics	-10.7%	7.0%	-60.6%	-7.3%	67.1%	6.9%	-58.0%	-7.0%	90.5%
E. Mids	-10.2%	-13.9%	-39.7%	-0.8%	5.3%	-4.9%	-29.2%	-5.6%	26.1%
GB	-4.4%	-8.0%	4.2%	-7.1%	0.6%	-5.2%	-8.1%	2.6%	-2.4%

(Source: NOMIS)

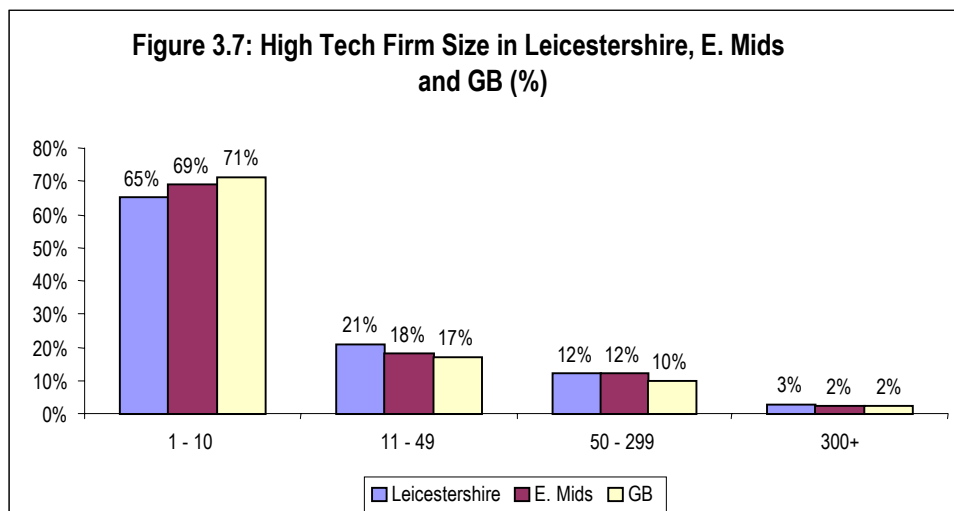
Output in the high tech sector is expected to grow by 2.3% in the period 2000 - 2010 whilst employment is forecast to decline by -1.4%. These figures contrast poorly with the East Midlands region (3.3% output growth, -1.0% employment change), and the UK (3.5% output growth, and -0.5% employment change). The county's economy is expected to under perform relative to the regional and national economy across all its key sectors, however (LERP, 2001).

Chemicals (SIC 24) and electrical and precision engineering (SIC 30) are expected to be the fourth and fifth fastest declining sectors in employment terms in the county between 2000 and 2010. None of the other five SICs in the high tech sector is expected to grow significantly in employment terms in this period (LERP, 2001).

The data on current performance and future expectations suggests that divergent growth patterns are anticipated for many of the high tech sub-sectors. Accordingly, strategies that recognise this differentiation may be required. EMDA have adopted this approach within their strategic economic thinking, dispensing with the notion of a single high tech sector and instead focussing on the distinct areas of healthcare and high performance engineering. Likewise, activities such as lower order automotive have not been identified as priority sectors.

The Structure of the Leicestershire High Tech Sector

In addition to these broad figures one can identify a more detailed picture of the sector in the county. For instance, a key feature of the sector is the size structure of firms. Figure 3.7 suggests that there is a marked 'top heavy' profile to the structure of the sector with a large number of larger firms and a relative paucity of micro firms. This raises a number of issues. Firstly, owing to the dominance of larger firms, in employment terms at least, the health of the sector appears to largely dependent on the activities of a handful of firms. Secondly, the stock of micro firms in a local economy represents the 'seed bank' of firms that will grow on to form the future larger employers in the area. The relative absence of firms of this type may raise question about the future sustainability of the sector in the county. Likewise, it also raises issues about the entrepreneurial environment of the county.



(Source: NOMIS)

Table 3.6 confirms the dominant role played by major employers in the high tech sector in the county. It illustrates that the 10 largest employers in the high tech sector in 2000 accounted for over 8,200 jobs. This was equivalent to 39% of employment in the sector as a whole.

Table 3.6: The 10 Largest High Tech Employers in Leicestershire

Firm	Sub-Sector	No. of Employees
Alstec Ltd	Other Transport	1,246
Astra Zeneca	Chemicals	1,200
Caterpillar	Other Transport	1,200
Brush Electrical Machines	Electrical Engineering	875
3M Healthcare	Chemicals	791
Metzeler	Motor Vehicles	650
Triumph	Other Transport	650
Druck Ltd	Precision Instruments	600
Advantica Technologies	R&D	600
Toyoda Gosei	Motor Vehicles	400
Total		8,212

(Source: LERP, 2001; data4business database; company websites)

Following on from this firm size analysis it may be possible to identify two distinct types of firm within the county's high tech sector each encountering substantially different challenges. The first includes the group of major firms mentioned above employing large numbers of workers, linked into global markets and supply chains, backed by significant resources and utilising the knowledge and technology resources of their global networks. These firms may be undertaking a variety of activities ranging from higher order, high value adding tasks such as product development through to lower order, lower technology activities such as assembly or distribution.

The second type of business encompasses the bulk of firms in place in the sector in the county. These firms are largely small (10 - 49 employees) or micro (1 - 9) businesses and it is likely that these firms are faced with many different issues to those encountered by the group of large firms mentioned above.

A number of further issues are raised by the dominant role played by this small group of substantial employers. Firstly, linkages between large and small firms are by no means automatic and it would be naïve to assume that the activities of the major employers are underpinned through supply chain linkages with the network of smaller firms in the county. Indeed, global sourcing is prevalent to such a degree amongst these firms that substantial supplier links within the county are unlikely to be overly common. A healthy large firm sector is not necessarily an indicator of similar conditions amongst smaller firms.

Secondly, one should also not automatically assume that the presence of a major high tech sector firm in the county implies that high tech activity is necessarily taking place at that site. Indeed, the global strategies of many of these firms are such that their networks of plants undertake a variety of tasks from highly skilled and technologically advanced R&D to more prosaic tasks such as assembly or logistics. The nature of activities occurring at a particular firm and the degree to which it will embed itself into local supplier networks is therefore heavily influenced by the nature of its ownership, corporate history and corporate strategy.

A brief review of the major firms in Table 3.6 indicates that a variety of activities are undertaken by high tech firms in the county including higher order activities such as those undertaken by Astra Zeneca at their R&D centre in Charnwood. Furthermore, the corporate history of many firms is relatively favourable. The presence of foreign owned firms appears to be different to that to local economies such as Telford where inward investment has occurred principally through foreign direct investment (FDI) and has largely been driven by the low cost base, financial incentives and relaxed regulatory environment of an area (Burfitt et al, 2001).

Arguably, different processes have occurred in Leicestershire. Whilst there are examples of FDI in the county these firms may well have located here in order to take advantage of existing skills and traditions in the region (3M, Caterpillar, Druck, Sanyo Gallenkamp) or to supply nearby OEMs (Toyota Gosei, Metzeler) rather than simply to exploit the cost base of the county. There are also examples of inward investment through merger and acquisition (Linread Northbridge, Brush Electrical Machines, Thales Sensors) designed to exploit the existing strengths of an indigenous firm. In addition, there are also instances of major UK firms with substantial investments in the county (Advantica, Alstec, Astra Zeneca, and BAE Systems). Finally there are local firms who have become global players in their own right (Taylor Hobson, Triumph).

The sector therefore does not have the worst characteristics of a full transplant economy. However, there is substantial evidence of inward investment and therefore it does appear as suggested by the ECOTEC (2001), that the high tech sector in the county is currently dominated by firms employing knowledge and technologies brought into the region. This raises questions about the knowledge-creating ability of the indigenous firm base and places an imperative on ensuring that meaningful links are developed between in-coming and local firms in order to maximise spill-overs.

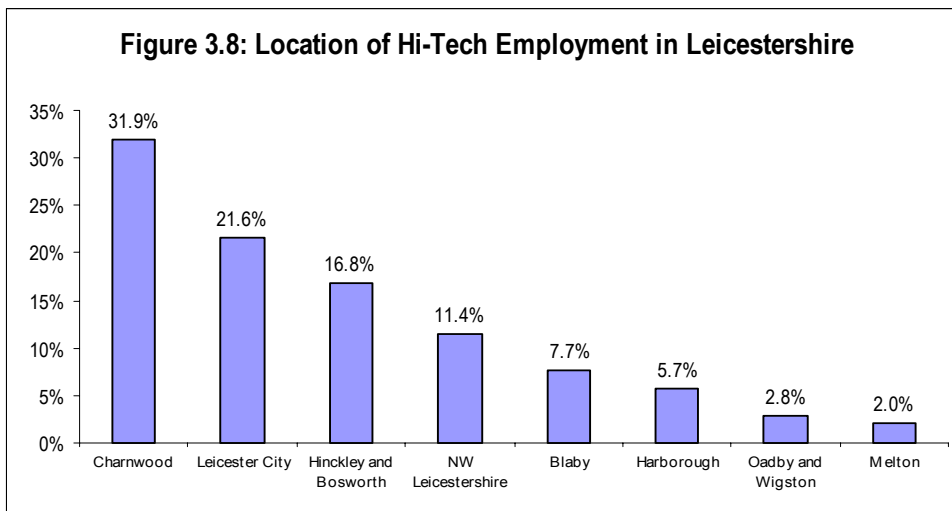
The one clear advantage the county does have in this respect is its substantial R&D sector, however. This clearly represents a valuable source of indigenous knowledge creation, product and process innovation and firm spin-out and steps must be taken to

ensure that these spill-over activities become rooted in the area in order to maximise the full potential of this sub-sector.

These findings also raise questions about future strategic directions within the county. The county has clearly been successful in attracting inward investment, both in the form of FDI and mergers and acquisition. Indeed, this success has been so great that these incoming firms dominate the sector (consuming resources, skills and entrepreneurial skills). In contrast, questions have been raised both about the manner in which these firms are embedded in the region (ECOTEC, 2001) and also about the county's ability to generate new high tech firms. Whilst inward investment will always remain a viable tool for economic development these latter two elements may now need to be considered more earnestly.

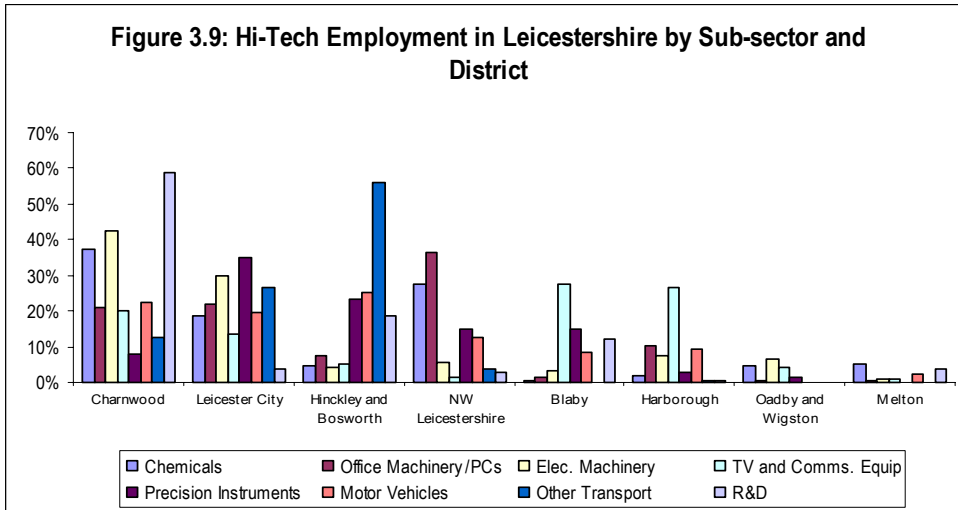
Location of the High Tech Sector in Leicestershire

Figure 3.8 indicates that the high tech sector in the county is centred around the its traditional manufacturing heartland in Charnwood where manufacturing in general represents some 29% of total employment. NW Leicestershire, also a manufacturing stronghold in the county (27% of total employment) has a far lower concentration of high tech employment, however.



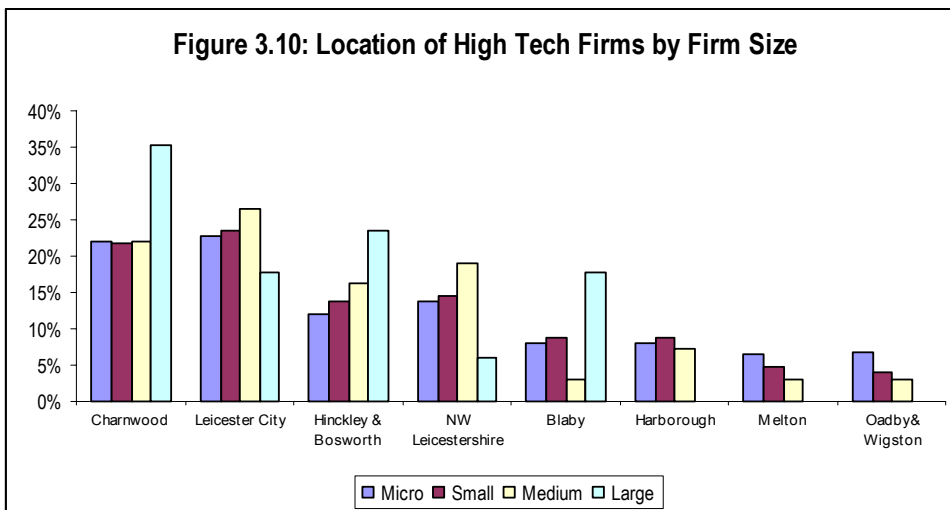
(Source: NOMIS)

A breakdown of high tech employment by district and sub-sector is provided in Figure 3.9. This demonstrates that Charnwood's strength in this sector is built on its concentrations of chemicals and electrical machinery employment, the two sub-sectors with the highest absolute numbers of jobs in the county. Charnwood also dominates the county's R&D sub-sector. Other district level concentrations of employment include precision instruments in Leicester City, other transport in Hinckley and Bosworth and office machinery in NW Leicestershire. The county's small TV and communications equipment sub-sector appears to be centred around the districts of Blaby and Harborough.



(Source: NOMIS)

Figure 3.10 indicates that Charnwood’s large employment base is built on the presence of a number of large firms in the district. Whilst its SME base is important it is exceeded by the number of firms in Leicester City. Both Hinckley and Bosworth and Blaby are also important locations for large firms in the county.



(Source: NOMIS)

PART FOUR

LEICESTERSHIRE HIGH TECH MANUFACTURING SECTOR SURVEY FINDINGS

Introduction

This chapter presents the findings of a telephone survey of a sample of high tech Leicestershire firms. It was undertaken by the University of Birmingham through May and June 2002.

Survey Methodology

Using the data4business database held at the County Council (which includes some 270 high tech firms) a random quota sample of companies was drawn. This sample was stratified proportionally by sub-sector in order that the number of survey responses by sub-sector would reflect their presence in employment terms in the county.

The sample survey objective, as stated in the project remit, was to achieve 30 to 40 interviews. Some 120 contact letters were sent to firms and followed up with phone calls. In total 37 structured telephone interviews were obtained. This represents 7% of high tech manufacturing firms in the county (excluding R&D institutions). A sample size such as this is large enough to perform a variety of non-parametric tests of statistical significance. However, owing to the 'qualitative' rather than 'quantitative' nature of the survey these have not been pursued. The survey has therefore allowed for the identification of a series of trends, issues and concerns prevalent within the sector, particularly amongst the SME base, within a statistically significant sample. Many of the conclusions from this approach echo and inform findings from the secondary data.

Firms were questioned on a variety of topics including their:

- Age, size and turnover
- Products and activities
- Market linkages
- Skills and recruitment issues
- Innovation activities
- Challenges and prospects
- Business support

Table 4.1 illustrates the responses by sub-sector and relates them to each sub-sectors' share of high tech employment in the county. This demonstrates that the survey responses, with the exception of the other transport sub-sector, are roughly proportional by sub-sector in employment terms to the sector as a whole across the county. Despite contacting 15 firms from the other transport sector the survey team were unable to obtain any interviews from this group of firms.

Table 4.1: Survey Responses by Sub-Sector

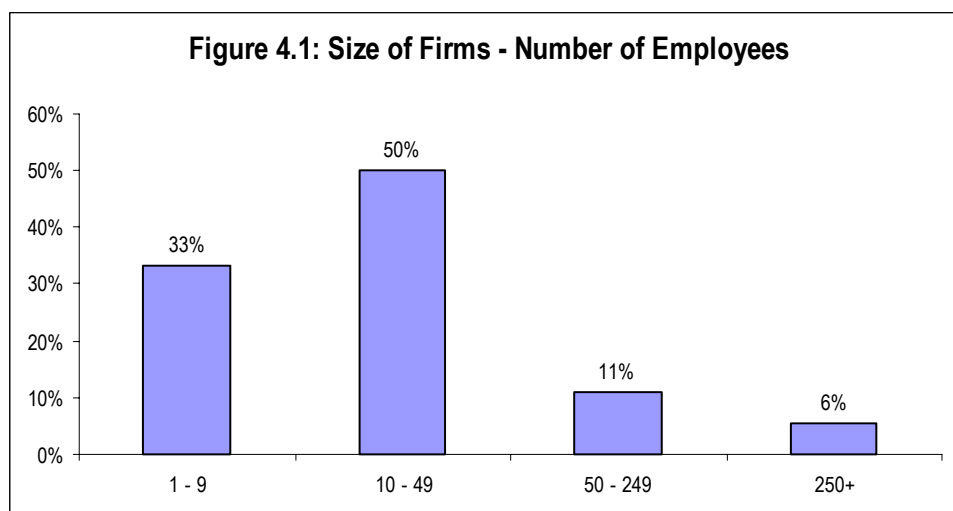
	Chems	Office Machines	Elec. Machines	TV/Comms Equip	Precision Instruments	Motor Vehicles	Other Trans
Number of Interviews	8	2	11	3	6	7	0
% of Survey	21.6%	5.4%	29.7%	8.1%	16.2%	18.9%	0%
% of High Tech Emp.	21.5%	1.6%	25.8%	7.9%	16.2%	16.6%	10.5%

Firms from within the R&D sub-sector were initially included in the survey but were later removed following a number of interviews. This group of what were originally thought to be ‘R&D’ firms provided by the County Council, proved on more detailed examination to be made up of an assorted group of self employed consultants and researchers alongside a number of conferencing, educational and management training entities. Therefore, whilst secondary evidence suggests that there is a significant R&D sector in the county this is not reflected in the data4business database held at the County Council. Furthermore, a questionnaire that was designed to capture information about the manufacturing sector was inappropriate for the company’s identified as R&D. These firms and organisations undoubtedly are key elements in the high tech sector in the county but their distinct characteristics may require specific research programmes to be developed for them.

Industry Structure

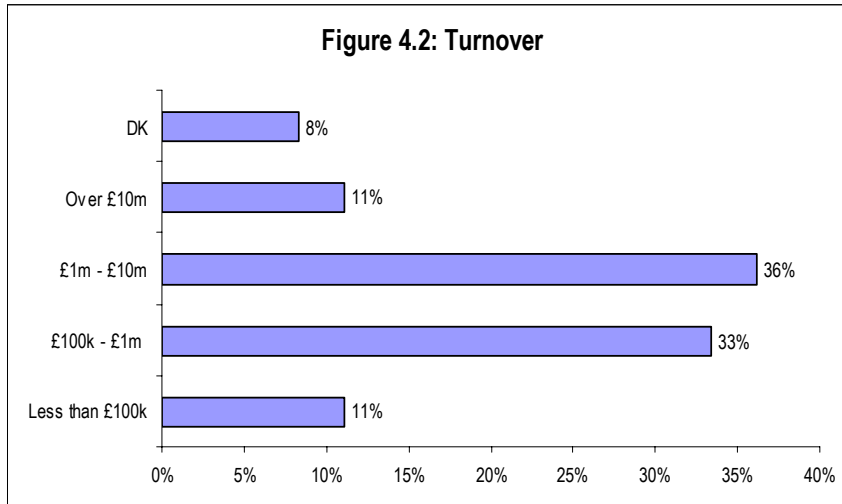
Firm Size

Figure 4.1 illustrates the firm size of respondents. The majority (83%) of the 36 firms that were interviewed employed less than 50 workers at their Leicestershire sites. Most (50%) were in the 10 - 49 employee size category.



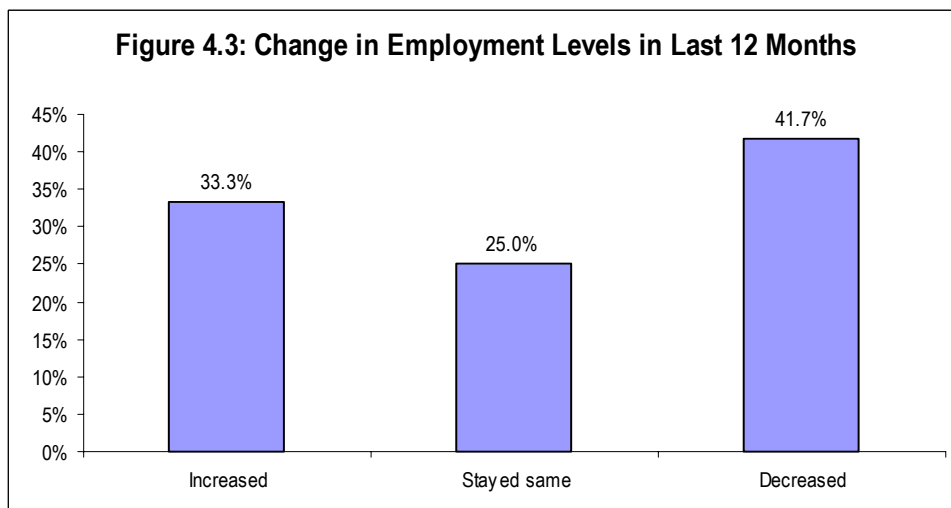
Turnover

Figure 4.2 shows that 11% of companies in the sample had a turnover of less than £100K with the same proportion turning over more than £10million. The turnover of most companies in the sample (36%) was between £1m-£10million.



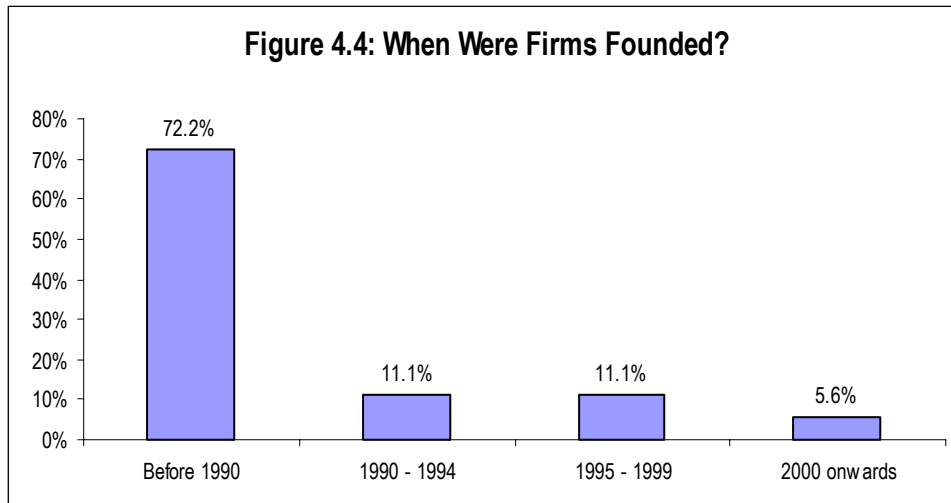
Employment Trends

A substantial proportion of firms (42%) reported that employment levels had decreased over the last 12 months (see Figure 4.3). For 58%, however, employment levels had either increased or stayed the same.



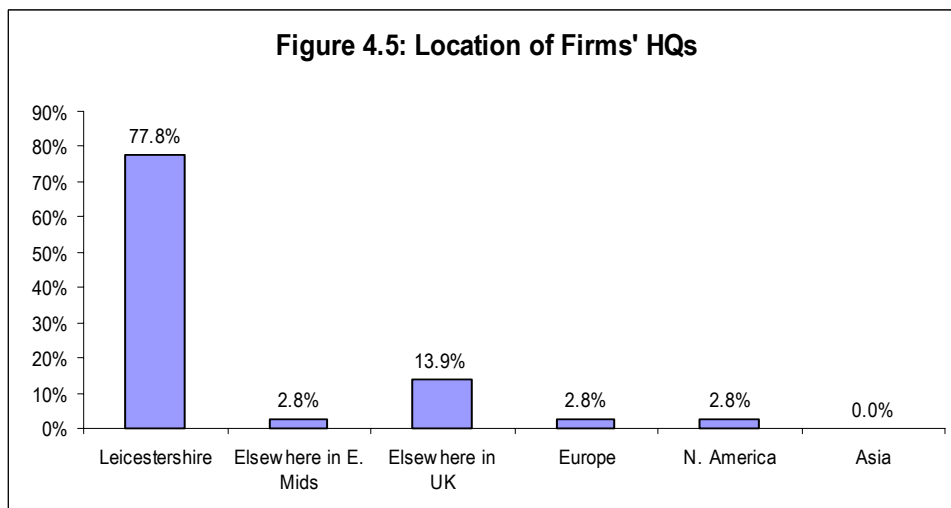
Age of Firms

The majority (72%) of firms had been started up before 1990. Only 6% had been set up since 2000 (See Figure 4.4). For a relatively dynamic sector such as this one might expect a greater proportion of firms to have been started up within the last 10 years. The chemicals, electrical machinery and TV/communications equipment sub-sectors had particularly low rates of new firm formation. The office machinery and PC sub-sector, in contrast, had a far greater proportion of newly established firms.



Location

Nearly all the firms (83%) had been started up in Leicestershire or the UK (11%). This is reflected in the location of firms' HQs (see Figure 4.5) which suggests that ownership of the sector is predominantly local or UK based. Whilst this Figure may be a representative reflection of the nature of the sector in the county in terms of ownership levels by business numbers, it under-represents the importance of foreign owned firms in employment terms, however. Foreign (and UK owned firms) tend to be far larger than Leicestershire start ups.



Just over a third (36%) of the surveyed firms operate on more than one site. Of these, more than half operate on more than three sites. Six firms (17%) have sites abroad in a number of countries in Europe, North America and the Middle East. Many of these firms had multiple foreign locations.

Products and Activities

The broad areas of activity of firms in this sector have been detailed by SIC code sub-sector in the previous chapter. In general, firms' activities coincided with their SIC code classification. Within these broad SIC code groupings, however, the survey identified a

series of product groupings including; medical equipment; specialist measuring, calibration, control and testing equipment; electrical engineering services; electrical machines; specialist automotive vehicles and automotive services; adhesives and sealant products; specialist electrical products and services; and shop display manufacturers. There was therefore a diverse range of products produced by the firms in the survey.

Firms undertook a number of different activities with respect to the production of these products. It was apparent, for instance, that four firms (11%) undertook no manufacturing or assembly activities and were solely distributors. The majority of the remaining respondents were involved in direct product manufacture however, and there was only minimal evidence of firms undertaking assembly activities. In addition there were also a number of firms providing specialist services for industries in their sub-sectors. Several firms, for instance, were involved in the upgrading, modification, repair or re-calibration of specialist equipment.

There was widespread evidence of firms pursuing design and development activities (discussed in following sections). These activities were particularly prevalent amongst the group of low volume manufacturers who were present across all the sub-sectors. These firms were producing high spec, niche products such as specialised commercial vehicles, professional recording equipment and custom-built machines for industry. These firms were often small, highly skilled, highly innovative and involved in low batch production of bespoke products. Alongside these firms were a larger group of more substantial firms undertaking less specialised, large volume production.

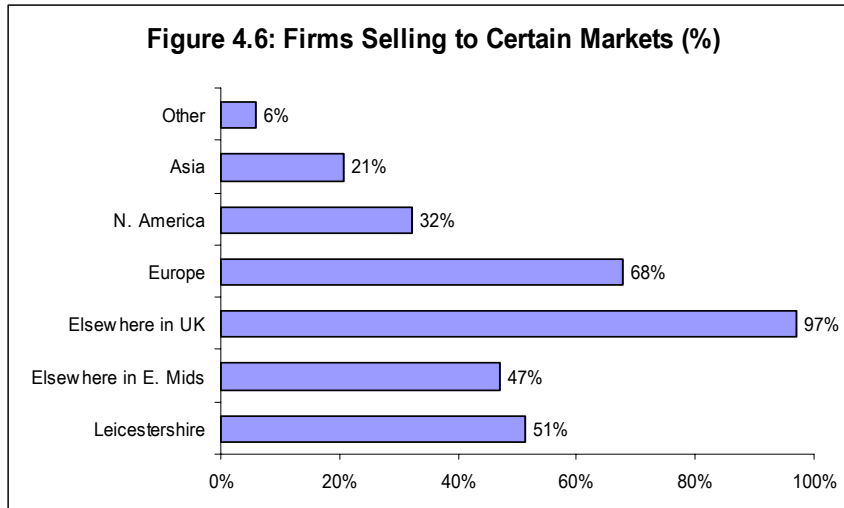
Overall, therefore, four groups of firms were identified, by activity type, from across the broad range present. These were: firms in mature industries producing relatively high volume, mass produced products; those involved in specialist manufacture of low volume, 'niche' products; those providing specialist industrial services for the high tech sector; and those undertaking only assembly and distribution activities. We observed a relative absence of firms in sectors that might be described as new or rapidly evolving.

The survey also raised questions about the designation of a number of firms as 'high tech'. Chapter 2 of this report adopted the definition of a high tech firm as one, "where advanced, and rapidly changing technologies, are present in the product itself, the manufacturing process – or both". Whilst this was quite clearly the case with respect to many firms in the survey it was also apparent that a number of firms fell outside this definition. This was particularly the case with respect to firms in the chemicals sector, and the automotive and other transport sub-sectors. A reappraisal of the SIC codes used to identify high tech firms may be appropriate in this light.

Market Linkages

Markets

Around 64% of the firms stated that they exported. Some 64% of companies in the sample sell to Europe, 40% to North America and 21% to Asia (see Figure 4.6). Other markets include the Middle East, Africa and Australia (6% of firms).



Looking at the proportion of annual sales going to customers in the various locations, Figure 4.7 below shows that on average 24% of the firms' sales are to overseas markets. Typically, 76% of sales goes to the home market.

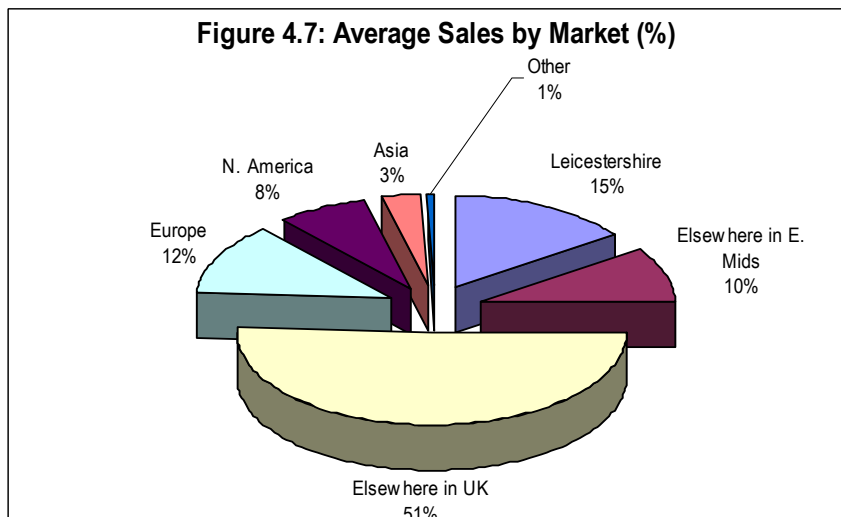


Figure 4.7 presents an average of the aggregate of annual sales by location for the surveyed firms. The variation between individual firms in terms of market location is quite considerable, however, and companies exhibit different patterns of sales. For instance, amongst exporting firms there are substantial differences in the degree to which firms undertake this activity. Some 26% of exporters claimed to generate less than 10% of their annual sales from overseas markets. In contrast 39% of exporting firms (25% of all firms) generate over 50% of their sales from abroad. Therefore, whilst

many firms are involved in exporting, for many it is only a relatively minor activity. In contrast, there is also a group who are quite clearly ‘export-led’.

Arguably, one can identify three core groups of firms in terms of their primary market location. Using this analysis some 24% of firms had their most substantial market located in the East Midlands, 47% had them located in elsewhere in the UK and 29% had them abroad.

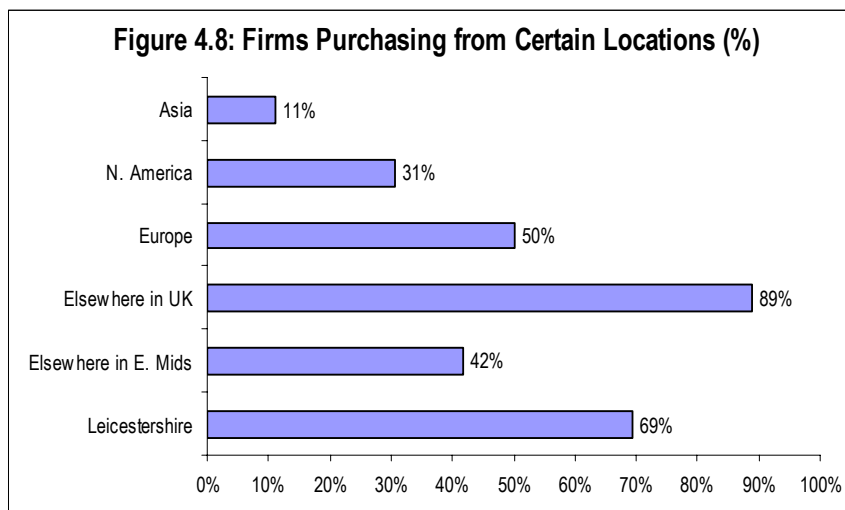
In general, firms with strong regional markets were micro firms selling to other micro and small firms. There was little evidence of strong links between the SME base and the large firms in the sector and this is reflected in the importance of UK and export markets amongst the survey respondents. However, there was some indication that firms in the electrical engineering sub-sector had stronger supplier links between SMEs and major employers in the county.

Unsurprisingly, larger firms appeared to undertake more substantial exporting. However, there was evidence of exporting amongst smaller firms and 22% of small firms (10 - 49) claimed to generate over 50% of their annual sales through exports.

Supplies

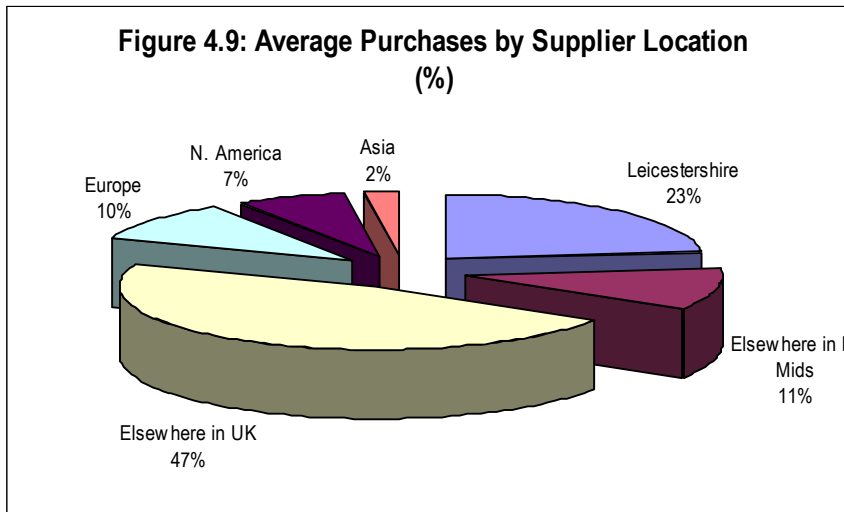
Most companies (86%) stated that they have autonomy over purchasing and that decisions were taken at the company site. As Figure 4.8 shows, 69% of firms said they purchase supplies from within Leicestershire, whereas nearly 90% used suppliers from elsewhere in the UK.

Fewer firms said that they bought supplies from overseas. Indeed, only 50% bought supplies from Europe, 31% from North America, and 11% from Asia. However, some companies mentioned that while they bought from within the UK, the goods were imports, bought from agents. This means that the scale of purchases from overseas maybe higher than the figures would suggest.



Looking at the average purchasing profile, 23% of firms’ purchases come from within the county (see Figure 4.9). On average, 10% of firms’ inputs come from Europe. Overall, however, firms buy proportionately more from outside the county than from within the area. Similarly to sales, the amount of goods bought from the market areas differs between the firms.

Analysis of firms' primary sourcing location indicates that 36% used the East Midlands as their primary source for supplies, 50% used elsewhere in the UK and 14% used sourcing locations abroad. This illustrates a distinct difference to firms' sales patterns where overseas locations figure more prominently and the region is viewed as less significant. However, as mentioned above, locating the true source or final market of a product is exceedingly difficult owing to the use of agents and distributors.



Overall, arguably, one can identify three dominant sets of market linkages. These are firms with: their main sourcing locations and markets located within the region (21%); those with them located elsewhere in the UK (32%); and those with their major suppliers located either elsewhere in the UK or abroad, and their main markets abroad (21%). Firm size appeared to be the defining factor in allocating firms between these groups, particularly with respect to the first group, though there were examples of small and micro firms in the last group. Owing to the small number of firms present in some sub-sectors in the survey it was not possible to identify any patterns by sub-sector.

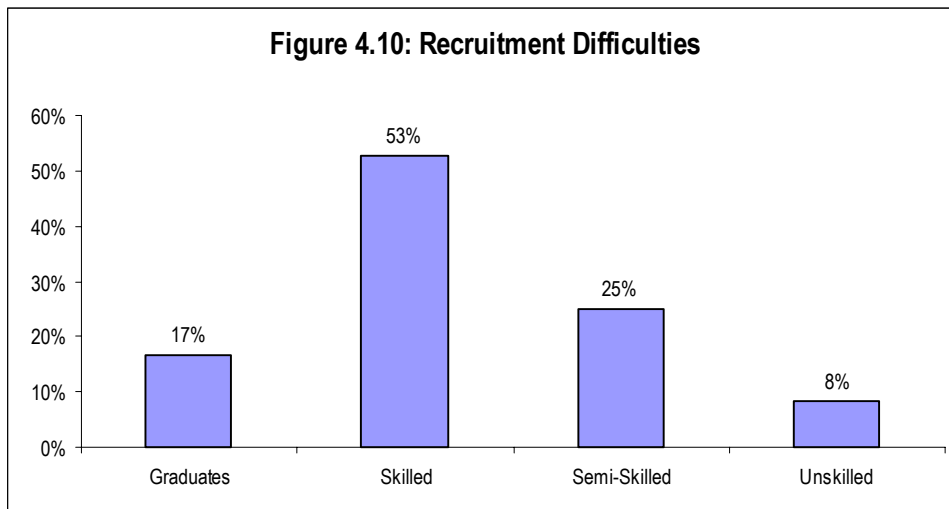
Some 90% of companies said that the main reason that they do not purchase more from within Leicestershire is the lack of availability of the supplies that they require. This reflects the specialised nature of firms' supply requirements.

There was also some evidence of firms having difficulties obtaining supplies from outside the region. This was particularly so with respect to small firms undertaking specialist or niche manufacturing or servicing tasks. These firms were frequently faced with suppliers ending production of certain lines without notification or prioritising larger orders over them. Other concerns related to the difficulties of obtaining very small orders. Frequently firms in these circumstances would resort to visiting high street distributors to obtain supplies. Many specialist firms also reported difficulties in obtaining discontinued products (several respondents manufactured specialised products involving old components, whilst others undertook repairs of machinery that had subsequently become obsolete) whilst others noted the rapidly changing nature of certain products and the multiplicity of standards.

Recruitment, Skills and Training

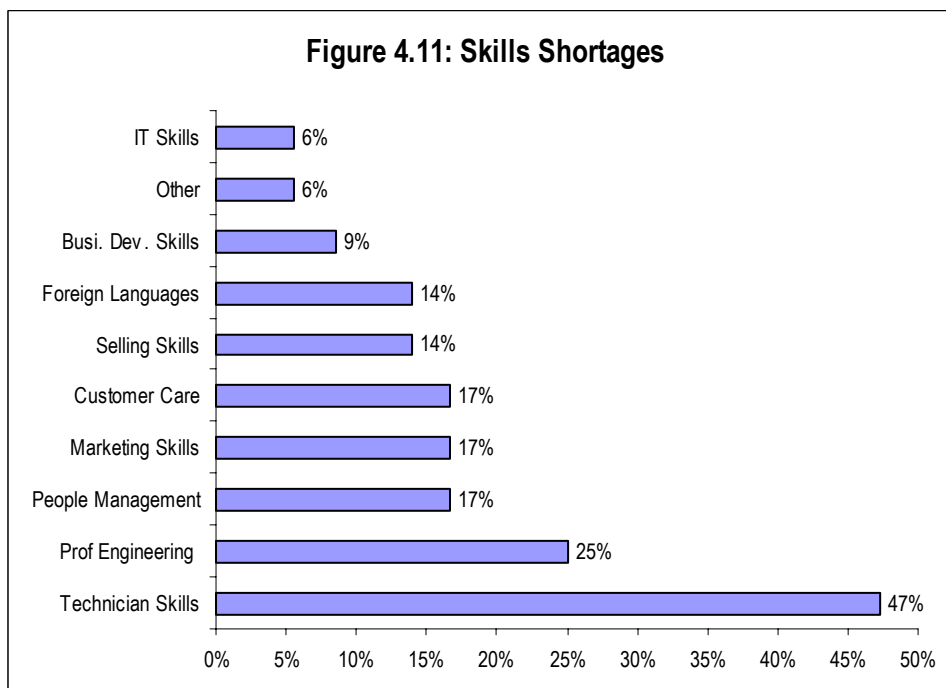
Recruitment

Some 53% of firms said that they had experienced difficulties in recruiting skilled workers whilst 25% had difficulties in recruiting semi-skilled workers (see Figure 4.10). Finding graduates or unskilled workers presented less of a problem. In many cases this was because smaller firms did not employ this type of worker, however. Of the firms that said that they had recruitment problems, 80% said that skilled workers were the most difficult to recruit compared to the other types of workers.



Skills

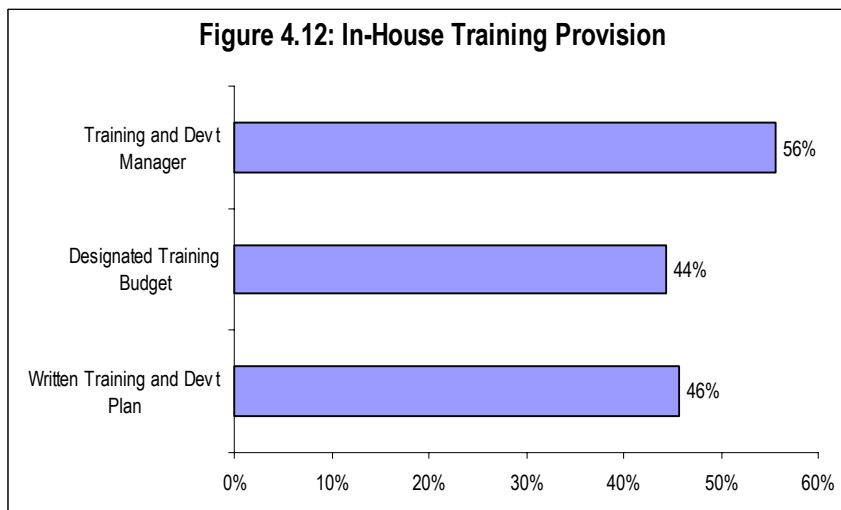
Figure 4.11 illustrates the proportion of companies that said that they had difficulties in recruiting workers with particular skills. Technician (47%) and professional engineering (25%) skills were the most frequently cited as being difficult to recruit.



Respondents identified recruitment problems relating to a wide range of job specific skills including: general engineering skills; electronics skills; Computer Numerical Controlled machine operators; radio engineers; electrical engineers; chemists; printers; and field service engineers. In many cases firms were either too small to afford the necessary skilled employees or were unable to compete on wages with other local firms. There was also a perception amongst certain firms that local firms were competing against the South East and the M4 corridor for certain skills and this in turn was driving up labour costs.

Training

There appeared to be a reasonable degree of in-house training taking place within the survey sample (see Figure 4.12). Some 56% of companies in the sample said that they had a training and development manager, 46% had a written training and development plan, and 44% a designated training budget. However, it was also apparent that 33% of surveyed firms had none of these. These businesses were all micro or small firms. Whilst for a number of firms in-house training may be undertaken in an informal manner it nonetheless illustrates the variable nature of in-house training provision in this sector.



The majority of firms (68%) stated that they had used external training facilities in the county. A wide range of organisations and institutions were mentioned by respondents. Local FE colleges tended to be the most frequently cited organisations though firms also mentioned Business Links, Chambers of Commerce, De Montfort and Loughborough Universities and a number of private training providers.

In general firms were satisfied with the quality of training provision available from these organisations, though there were instances where programmes had failed to meet firms' expectations. Furthermore, there was some evidence that firms were unsure exactly what training provision was available within the county and a number of firms felt that colleges and especially HE institutions could be more proactive in promoting their services to industry. There were also comments that there was a proliferation of training bodies and that firms were frequently confused over who was providing what, and which grants were available for which services.

Innovation

Product Development

Some 75% of firms said that they were currently developing new products or services at their site. In addition, 72% reported that during the three years 1999-2001 they had introduced technologically new or significantly improved products or services that were new to their firm. This is a particularly high rate of product innovation.

R&D

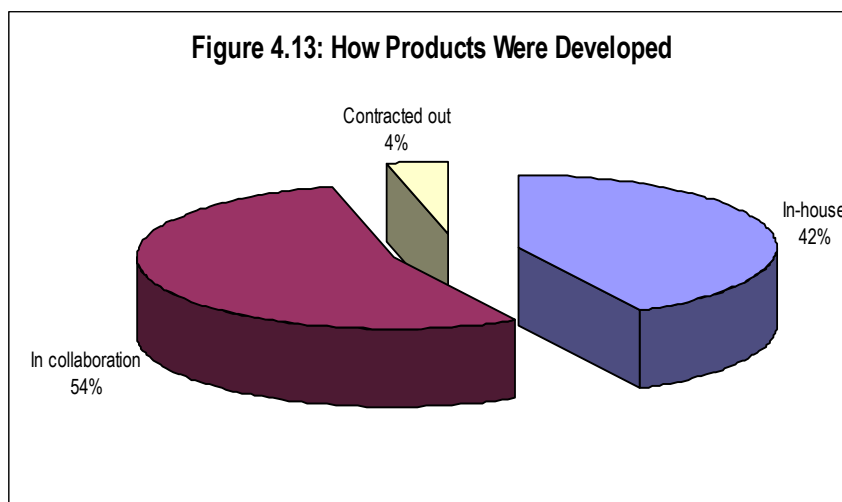
While a third of all companies said that they spent nothing on R&D, 17% allocated over 10% of their turnover to R&D activity (see Figure 4.2). It should be noted however that some firms that did not have a specific R&D budget said that they were involved in developing prototypes and that the whole business revolved around innovation. Other firms with no R&D budgets tended to be distribution or manufacturing arms of larger corporations.

Table 4.2: Percentage of turnover spent on R&D

% of turnover	% of firms
0%	33%
1 - 5%	33%
6 - 10%	11%
Over 10%	17%
DK	6%

Collaboration

Of the firms that had introduced new or significantly improved products over the last three years, 54% had developed these by collaborating with other firms or institutions (see figure 4.13). Some 42% developed new products and services in house, whereas 4% contracted out product development.



Among these innovative firms, the innovation partners were most frequently cited as being other firms (88%) (see Figure 4.14). However, it was clear that the collaboration was either with suppliers or customers, that is, that they were firms up and down the supply chain, rather than horizontal collaboration with competitors or with service

providers. Few firms collaborated with innovation related organisations, although just over 40% of the innovative firms said that they had collaborated with universities.



Innovation partners were widely spread. Half of the innovative firms in the survey claimed to have collaborated with firms and organisations in the region, 65% said they had done so with those elsewhere in the UK, and 31% stated that they had been involved in collaborations with international partners.

Barriers to Innovation and Collaboration

Whilst innovation rates were particularly high amongst the surveyed firms it was also clear that many faced a variety of barriers that inhibited their propensity to innovate. Respondents cited a number of factors including; risk, lack of capital, lack of skills, inadequate/unsuitable premises and the nature of their corporation's strategy. In many cases it was apparent that firms had latent innovative potential that they were unable to realise due to these factors.

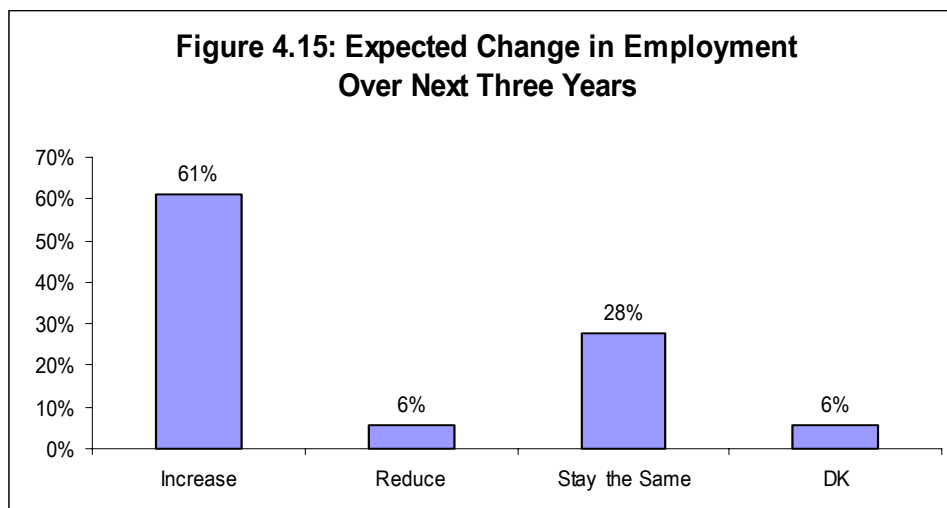
Collaboration is a common method of overcoming these barriers to innovation and whilst firms were happy to undertake vertical collaboration by working with customers and suppliers many firms were unwilling to consider horizontal collaboration - co-operation with competitors or service providers, viewed by many commentators (and within many RDA and government policy statements) as the most fruitful form of collaboration (giving rise for example to clusters of interdependent subsectors in some industrial districts). Many firms were simply not open to the idea of co-operation with these types of firm or organisation and had adopted stances of fierce independence. Many had identified a variety of concerns surrounding collaboration such as confidentiality, competitive threats and control over intellectual property rights and patents that prevented them from pursuing it further.

There were, however, a further group of firms who had considered competitor collaboration but had so far been unsuccessful. Many of these firms were working in specialised markets, however, and identifying suitable partners was a difficult process.

Challenges and Prospects

Prospects

Many firms were upbeat about their prospects in the short to medium term. Figure 4.15 illustrates that the majority of firms expect their employment levels to increase over the next three years.



Firms were also optimistic with respect to future business growth. Table 4.3 illustrates that 67% of respondents anticipate increased sales over the next three years.

Table 4.3: Expectations of change in sales over the next three years (% of firms)

Expectation	% of firms
Increase	67%
Reduce	3%
Stay the Same	25%
DK	6%

The large majority of firms (86%) also indicated that they expect to introduce new products or services from their Leicestershire sites over the next three years. This indicates a commitment to investing in the county over the medium term.

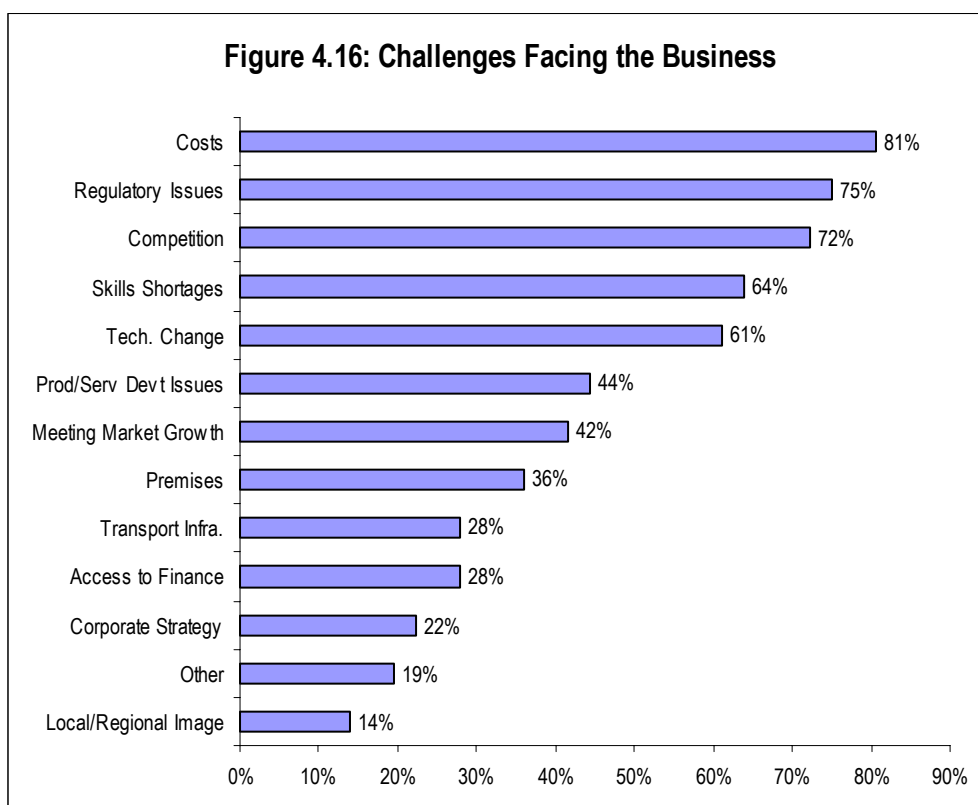
Whilst in general firms were positive about their future prospects there was a group of businesses that was slightly more circumspect. Firms, therefore, fell either into groups that were anticipating expansions in employment and sales, and those expecting either reductions or no change. Some 25% of respondents fell into this latter group stating that both sales and employment would either fall or remain static over the next three years. This group was varied by sub-sector and size. Arguably, therefore, it is individual firms rather than whole sub-sectors or size categories, that are anticipating a period of no growth. One exception, however, related to the motor vehicles sector. Over half of the respondents in this sub-sector (4/7) forecast no growth in employment or sales over the next three years, by far and away the most pessimistic outlook of any sub-sector.

Business Challenges

Firms were asked to identify major issues and challenges facing their business over the next three years. Figure 4.16 illustrates that 81% of firms said that costs were an issue

whilst competition was highlighted by 72% of firms. Regulatory issues was seen as a key challenge for the business by 75% of the firms. In particular, EU regulations covering for example emissions, is an issue for a number of firms in the sample. Local or regional image was a concern for only 14% of firms as an issue facing companies, though there were statements that firms had problems attracting labour owing to the area's image relative to the South East.

It was also apparent that the importance attached to each issue varied by sub-sector. Firms in the electrical engineering sub-sector, for instance were most likely to cite skills shortages as an issue. In contrast, firms in the chemicals sub-sector were more affected by costs and competition. These differentiations perhaps reflect the differing nature of each market that sub-sectors may be competing in - specialist versus mass production for instance.



When asked to identify which single issue represented the greatest challenge to their business, respondents stated that of these factors competition and skills shortages were the most important challenge (see Table 4.4). This suggests that whilst costs and regulatory issues were the most general and widespread pressures, those relating to costs and skills shortages were most acute and keenly felt by firms.

Table 4.4: The Single Most Important Business Challenge Facing Firms

Competition	Skills Shortages	Costs	Finance	Reg. Issues	Other	Meeting Demand	Tech. Change	Premises	Trans. Infra.
20%	20%	11%	11%	11%	11%	6%	3%	3%	3%

As a further measure of the sector's prospects, firms were asked as to whether their current Leicestershire site could support their business objectives over the next three years. The vast majority (86%) indicated that their current site and location were adequate. Of the 14% of firms (five firms) who are unhappy with their current premises three intend to relocate within the county, two, however, plan to relocate elsewhere. Therefore, whilst a number of firms appear to have issues relating to their premises, only a very small minority of firms have concerns with Leicestershire as a location for business.

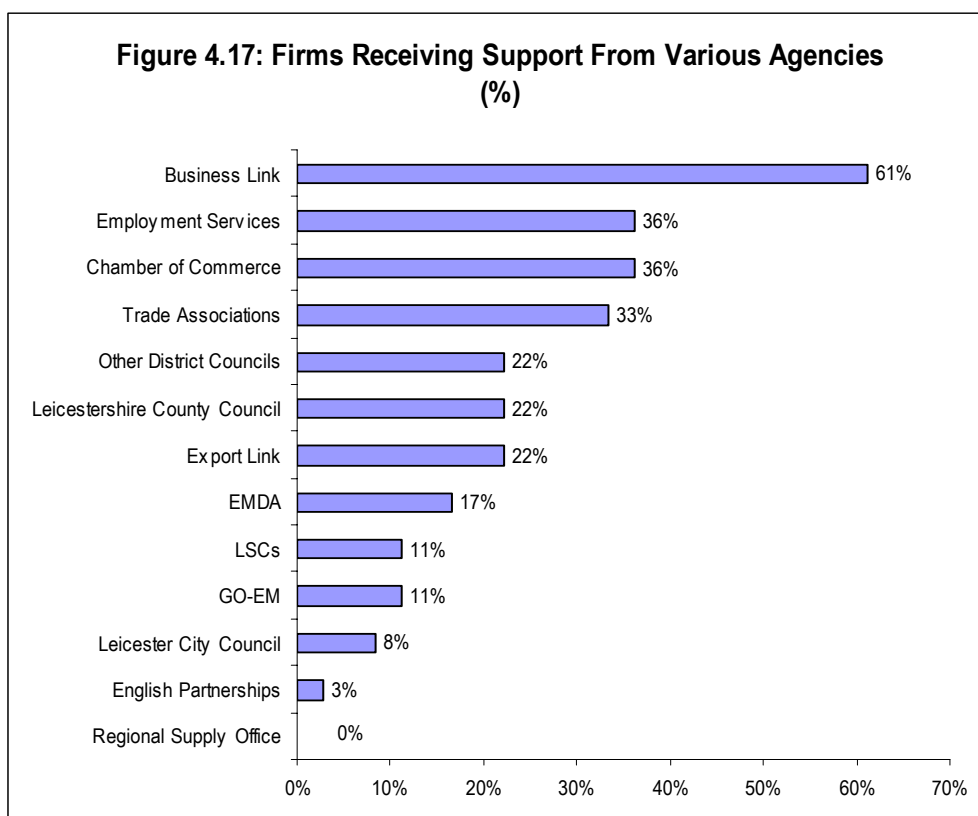
Business Support

Local Support Agencies

Some 56% of firms in the sample belong to a business association. These were a diverse range, from industry specific to general associations, such as the Chamber of Commerce, and the CBI.

Firms were asked which of a range of business support agencies and organisations they had received support from (rather than simply having had contact with). Some 61% of firms said that they had received services from Business Links. However, no respondents had had contact with the Regional Supply Office. This finding has implications for the creation of inter-company trading links in the locality.

Overall, Figure 4.17 suggests that links between firms in the survey and business support organisations in the county are not especially well developed. As indicated earlier in the analysis, the majority of firms in the survey are relatively old and in this period one might have expected a stronger series of relationships to have developed between these firms and the county's support network.



Firms who had had contact with and received services from each of these organisations was then asked to rate how important they had been for their business. Table 4.5 illustrates that in the majority of instances firms did not view the services offered by these organisations as of being particularly important to their business performance. The best performing organisations in this respect were the trade associations (58% of firms who had received assistance from them viewed it as having had an important outcome for their business), the Chambers of Commerce (39%) and Leicestershire County Council (38%) and the district councils (38%).

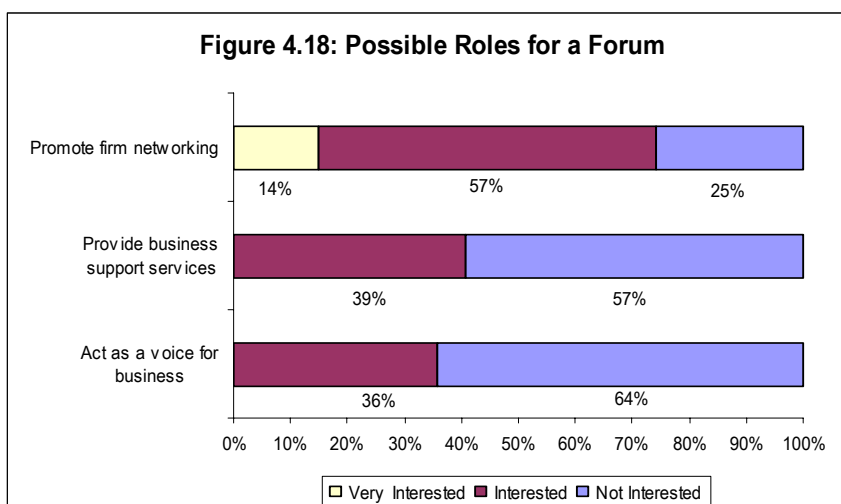
Table 4.5: Importance of Business Support by Organisation

	EMDA	Leics County Council	Leics. City Council	Other DCs	BLs	CoCs	Employ Service	EP	Exp. Link	GO-EM	Trade Assoc
Unimp.	50%	13%	33%	13%	53%	23%	29%	100%	25%	50%	17%
Neither Imp. or Unimp.	33%	50%	67%	50%	24%	39%	43%	0%	50%	50%	25%
Imp.	17%	38%	0%	38%	24%	39%	29%	0%	25%	0%	58%

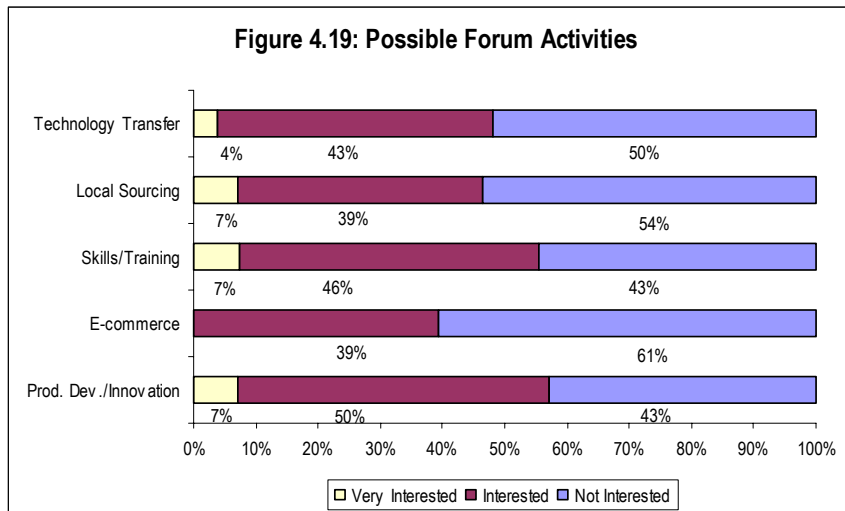
Specific comments made by respondents indicated that amongst many firms there was a general lack of awareness as to what support might be available in the county. These firms claimed either to be too busy to find out or not to need any support anyway. Amongst firms that had received support concerns were raised over the quality of business advice provided by certain organisations and the qualifications of their advisors. Respondents mentioned “woolly”, “unrealistic” and “unactionable” advice. Other comments suggested that support was often too general and there was a lack of focussed support, particularly that relating to manufacturing. Finally, it was clear that regulatory issues are of growing importance to firms in this sector, and this topic area was clearly identified as an area in which firms required additional support.

A Business Forum?

Finally, firms were asked their views over the possible creation of a business-led forum within the county. Some 61% of companies stated that they were interested in participating in such a body. Of the firms that were interested in the forum concept most thought that its main role should be to promote inter-company networking. Over 70% of those who responded to this question said that they were either interested or very interested in the forum undertaking such a role (see Figure 4.18).



Firms were then asked to indicate from a list of other possible activities what areas the forum might cover. Figure 4.19 indicates that 53% of those that responded said that the focus of activity for the forum should include skills and training issues, whilst product development and innovation were mentioned by 57% of respondents. Additional areas that the forum might address included regulations and EU legislation.



Overall there was a reasonable degree of support for the concept of a business-led forum. However, firms were unequivocal that its creation must lead to actions and that it must avoid simply becoming another ‘talking shop’. There was also concern that the forum should reflect the national and international context in which the majority of the firms operate and in this sense a number of firms expressed scepticism as to the extent to which such a forum could have value for them.

PART FIVE

ISSUES AND OBSERVATIONS

Sector Profile

Arguably one can identify four groups of firms by activity type, from across the broad range present. These were: firms in mature industries producing relatively high volume, mass produced products; those involved in specialist manufacture of low volume, 'niche' products; those providing specialist industrial services for the high tech sector; and those undertaking only assembly and distribution activities. We observed a relative absence of firms in sectors that might be described as new or rapidly evolving.

For such a fast moving sector there was only a relatively small number of recent start-ups. The great majority of firms (72%) had been established prior to 1990. This perhaps illustrates the sector's engineering rather than electronic roots. Many firms (42%) have experienced reductions in employment over the last 12 months. There was a group of expanding firms, however, with 33% of respondents claiming to have increased employment in this period.

The 'high tech' status of a number of firms was questionable. Whilst the skilled nature of these firms' activities was clear there was frequently an absence of significant levels of technology in either their products or processes. A reappraisal of the manner in which high tech firms are identified in the county may be appropriate.

Market Linkages

There was a strong exporting culture within the surveyed firms with 64% claiming to undertake this activity and 29% identifying overseas locations as their most important markets.

There is little evidence from the study of strong supply chain linkages between firms – between say big players and local SMEs – within the County area. Furthermore, some firms experienced difficulties in accessing the goods and services they require. Sometimes this was down to their small size in relation to large and dominant suppliers of (for instance) transponder chips (Texas Instrument), and the favoured position of larger customers of these components. Hence one respondent said "suppliers that are dominant will force you to wait for the delivery of goods". Another said "there are too many sole suppliers". In some cases firms were concerned that their sole suppliers were in a precarious position and may go out of business. A number of firms reported difficulties in obtaining supplies owing to their small size and the specialised nature of their activities.

The most common reason why firms across all sub-sectors reported that they were unable to increase their purchases from within Leicestershire was limitations upon local availability (for example, of electronic components). Some respondents cited local prices or the quality concerns. Sometimes items were purchased from the West Midlands where there is a stronger components network fostered by the automotive industry. There was little or no awareness amongst local firms of the Regional Supply Office function of EMDA.

It is very difficult in many cases to determine the actual level of exporting products and importing of components, because these activities often occur through agents based in

the UK. A typical comment might be “we sell (components) to companies based in the UK and don’t know where the product ends up”.

A couple of respondents suggested that Leicestershire is the national centre for the manufacture of point-of-sale displays for retailers. Although frequently rather ‘low-tech’ (made of plastic, wood and metal), this activity includes design and production of bespoke displays which increasingly incorporate elements of electronics. However there is considerable rivalry between these firms and therefore limits to their willingness to collaborate, at least with each other.

Skills and Recruitment

Several firms identified skill shortages as a primary issue or challenge. These firms were in fields ranging from manufacture of electronic control panels and retail displays through to rotary dye cutters.

The skill shortages that companies mentioned were largely of skilled workers, and few firms recorded difficulty in recruiting graduates. Many firms (53%) reported difficulties in recruiting ‘skilled’ workers. Technical and professional engineering skills were especially hard to obtain and there was some evidence of firms having to compete with the South East and the M4 corridor to obtain these types of workers. The skills that appear to be generally difficult to recruit include skilled technicians, electronics, radio frequency engineers, professional engineers or electricians (e.g. for control panel wiring) through to semi-skilled carpenters and unskilled trainees for manual work.

The majority of firms provide some form of formal in-house training, though 33% have no such provision. Respondent firms used a wide range of external training provision in the county. Whilst there was general satisfaction with its quality many firms felt providers did not promote their services widely enough whilst others complained of confusion owing to the proliferation of providers and programmes.

One respondent said “electronics skills are missing in Loughborough”; another said that “better promotion of the area might encouraged skilled people to come to Loughborough”. A third firm, however, said they place considerable emphasis upon training in order to compensate for the absence of skills in Leicestershire. A recruiter of unskilled workers said “better education in schools is needed, especially regarding business awareness”.

There was however some evidence that, to recruit or retain the skills they needed, firms would need to pay higher salaries and wages. Hence some retention difficulties were acknowledged: “we cannot afford to keep the workers with skills because after a time they are attracted to larger firms”. The most frequently cited skill shortages were of skilled workers with technical skills. There were one or two indications that firms which do a considerable amount of in-house training are less concerned about skill shortages in the local labour market.

Innovation and Collaboration

Considerable innovation is occurring in certain sub-sectors, such as Electrical Machinery; Medical, Precision and Optical Instruments; Motor Vehicles (SICs 31, 33 or 34 respectively), and even amongst firms that do not have identifiable R&D budgets. The majority of firms (61%) undertook R&D and design activities. Respondents also appeared highly innovative with 72% claiming to have introduced technologically new or significantly improved products or services over the last three years. Very small

companies will, for instance, often be involved in producing prototypes and new design solutions to meet their customers' requirements (for example in retail displays). In some cases very small batches of specific items (e.g. machines) are produced, each batch designed afresh to solve particular problems for the customer.

Whilst these findings are encouraging questions were raised about the nature of some of this innovative activity. A proportion of it appeared to consist of short term incremental adaptations to products in response to customer or supplier requests, rather than the independent development of new products through research-base, knowledge-intense activities. Some sub-sectors (such as Chemicals and Chemical Products - SIC 24) appear to have a higher proportion of relatively non-innovative companies, whose business – whilst successful – does not necessarily require constant modification or replacement of products.

There is apparently little collaboration around innovation at present between local producers or service providers in the same business – what we might call 'horizontal collaboration' – who are presumably regarded as potential competitors, in any of the sub-sectors identified. Most firms undertook most of the research and development work they required in-house. There is, however, considerable collaboration around innovation with customers – 'vertical collaboration' – with whom in many cases there is joint development work. There was little evidence, however, of collaboration by high tech firms with the R&D sector (SICs 73.1 and 73.2) in the county. In contrast, there was more evidence of collaboration with Universities both locally and across the country. It is not clear why there were relatively undeveloped linkages to specialist research establishments.

Challenges and Prospects

The majority of firms were upbeat about their future prospects with 61% expecting to increase employment in the next three years, 67% anticipating increased sales and 86% expecting to introduce new products. Whilst these findings are promising they may also be over optimistic, especially in relation to employment, given current performance and future forecasts. It was also possible to identify a group of more cautious firms (25%) expecting no growth in either sales or employment in this period.

Costs (81%), regulatory issues (75%) competition (72%) and skills shortages (64%) were the business challenges most frequently cited by firms. In terms of the *single most* significant barrier, however, skills shortages (20%) and competition (20%) were mentioned most often.

There were some concerns about inadequate premises, and about regulatory changes that were requiring new approaches to products and production. Most respondents seemed to accept regulation as a fact of life, few were actively hostile to strengthened European regulation, and one respondent said that "the UK is behind Scandinavia and others in adopting best environmental and production practices, and needs to catch up".

The vast majority of companies expressed general satisfaction with their location in Leicestershire, and very few said they were planning to leave the area. The transportation issues that were mentioned include complaints about the A5, by a firm offering a 24 hour service, saying that it was a dangerous road subject to frequent disruption. Location is constrained in several cases by the need to retain skilled workers.

Regional or local image was rarely mentioned as a business issue. On only a few occasions did respondents refer to this. However at the same time there was no strong

sense of satisfaction at the local image either (one firm said “skills and image are running a bit behind in Loughborough ... the County needs to work out the strengths of the area and market these ... there seems to be no big emphasis upon revitalising the area”).

Business Support

There did not appear to be particularly strong links between firms and the business support base. Where there had been contact, for many firms this was felt to have been of little value.

Most respondents had had contact with only a small number – perhaps three – of the 13 local business support agencies identified in the questionnaire. Typically they would have had some dealings with the local authorities, Business Link and perhaps the Chamber of Commerce. Contact with local authorities would however usually be around rates or rents rather than business assistance. However, hardly any firms felt that they had unmet needs for support, and there was a general spirit of independence amongst the firms interviewed. One firm said that training provision in the county could be improved by “publicising the availability in one format to all businesses a list of available short courses for craft skills”.

Support for the establishment of a business-led forum was expressed by respondents (61%). The promotion of inter-firm networking was seen as a potentially key role for the forum. There were concerns expressed, however, over the possibility of it turning into a ‘talking shop’ or failing to reflect the national and international context in which many firms operate.

PART SIX

CONCLUSIONS AND IMPLICATIONS

Conclusions

The preceding chapters have painted a picture of a large and diverse sector faced with a wide range of threats and opportunities. In order to capture succinctly the main elements and issues of the sector a SWOT is presented below.

Strengths	Weaknesses
<p>Large number of high tech firms and jobs.</p> <p>Strong engineering tradition.</p> <p>Strong representation in precision engineering, electrical engineering and especially R&D.</p> <p>High quality HE base.</p> <p>Strong skills base.</p> <p>Many major world class firms most of whom undertake higher order activities in situ.</p> <p>Strong track record in attracting inward investment.</p> <p>Substantial exporting base.</p> <p>Evidence of innovation activity occurring.</p> <p>Number of cutting edge high technology firms across all firm sizes.</p> <p>Strong commitment to the sector from the County Council and RDA and other local, county and regional partners.</p>	<p>Some sub-sectors are experiencing rapid employment decline.</p> <p>Divergent growth patterns and expectations by sub-sector.</p> <p>Little evidence of high technology products or processes in some firms and sub-sectors.</p> <p>Shortage of skilled workers in certain occupations.</p> <p>Domination of sector by small number of major employers.</p> <p>Relative lack of 'seed bed' micro firms.</p> <p>Lack of 'collaboration culture'.</p> <p>Concerns over county's entrepreneurial capacity.</p> <p>Lack of certain high tech service activities such as computer services.</p> <p>Weak links between major employers and SME base, and between R&D base and firms.</p> <p>Under-developed links between business support services and firms, and concerns over quality of service provision.</p>
Opportunities	Threats
<p>Potential for developing the R&D and HE profile and focus of the local economy.</p> <p>Capacity for generating new innovative start-ups to be spun out of the existing HE, R&D and major employer firm base.</p> <p>Latent innovative capacity of SME base.</p> <p>Capacity to attract further inward investment particularly in pharmaceuticals and R&D.</p> <p>Developments such as the PRIME Faraday Partnership, LATI, the PERA Innovation Park and Loughborough Innovation Centre hold potential to boost start-ups and strengthen R&D links with industry.</p>	<p>Exposure to global sourcing and competition in certain sub-sectors such as automotive.</p> <p>Skills competition with South East.</p> <p>Exposure to potential relocation decisions from current inward investors and major employers.</p> <p>Likelihood of continued job loss across sector.</p> <p>Vulnerable to continued exclusion from the Eurozone.</p> <p>Possible impact of on-going EU and UK environmental directives.</p>

Policy Implications

Following on from the survey work and the analysis there are a number of possible areas where policy development can take place.

Skills

More and enhanced promotion of the area is required in order to offset the attractions of the South East's labour market and improve the competitive position of Leicestershire in attracting and retaining workers.

Training

It was apparent that HE and FE institutions could improve the manner in which their training services are advertised to firms in the county. There is an important role for local organisations in clarifying the co-ordinating promotional activities regarding training provision in the county area

Employment Change

It is important to recognise the divergent patterns of employment change between high tech sub-sectors. These divergences have clear policy implications. Sub-sectors with the greatest opportunity for employment growth should become the focus of policy attention.

Start-ups and Spin-offs

Domination of the local high tech sector by large employers, and the relative absence of micro firms in this sector indicates that priority must be given as a matter of urgency to the promotion of new small firms.

The source of new ventures and entrepreneurs is likely to lie within the strong local R&D sector and amongst the skilled staffs of larger companies in the area. But new businesses can be promoted, especially in the more technologically advanced activities, from wherever they originate.

Given the relative absence of high tech service activities such as computer services, local organisations should consider stimulating new firm start ups and small firm expansions in the field.

Existing initiatives in the county such as the new Loughborough Innovation Centre and the Lachesis Fund run by Loughborough University may prove to be powerful tools in attempting to fulfil these tasks. Likewise the PRIME Faraday Partnership in place in the region and PERA's new Innovation Park are potentially significant developments in promoting new firm start-ups and spin-offs.

Cost Reduction

Given the general pressure across manufacturing to reduce costs, and the difficulty that some firms face, especially smaller firms, in achieving this, local organisations should embark on policy initiatives which encourage and facilitate efficiency improvements.

For example, given the importance of e-commerce to the future of the economy, local organisations should investigate ways of helping firms to move onto and up the e-commerce ladder.

These tasks could be pursued through existing mechanisms such as the Loughborough Advanced Technology Initiative (LATI) and the new Manufacturing Advisory Service run by PERA in the county.

Sustainable Development

Many companies are finding it challenging to adjust to international and EU environmental standards. Nevertheless, adoption of more rigorous environmental standards may well be beneficial to product development and manufacturing efficiency. Local organisations should consider ways of contributing to sectoral quality and efficiency by helping firms to comply with these new environmental requirements.

Inward Investment

Although the priority for local policy makers should be upon new and small firm development, the importance of large global companies to the local economy, and its dependence on a relatively small number of these, suggests local organisations should review their strategies to consider ways of attracting a new generation of large inward investors.

The locality has a particular strength in R&D activities, so local organisations local organisations should give priority to increasing their understanding of this cluster, strengthening and promoting it as part of this strategy.

Exporting

Given the county's strengths in exporting, local agencies might wish to explore ways of celebrating and reinforcing this export expertise. For example, this could be profiled in the county's promotional thrust, together with the strength of local R&D activities.

Clusters

The relative absence of local linkages, particularly in relation to collaboration for innovation, in the sector suggests that local organisations will need to use the proposed business forum and other initiatives to encourage closer co-operation between Leicestershire firms so embedding these firms in the locality.

Segmented Strategies

It is possible to draw a broad distinction between two main types of firms in the high-tech sectors examined here, between '*big players*' that have one or more plants in Leicestershire (such as Brush, 3M), and small or medium sized firms with a much greater focus upon this area. The SMEs themselves can then be further divided, between '*highly innovative*' on the one hand, and '*traditional*' on the other. The findings that have emerged from the study are different for these different groups of firms, and it is advised that the policy stance of local organisations will therefore need to be segmented, with different policy goals and instruments into at least three categories.

Additionally, it is important to acknowledge the divergent circumstances of sub-sectors within high tech manufacturing and so policies should also be segmented by sub-sector. Hence, R&D or pharmaceutical firms will require an entirely different set of initiatives from automotive and other transport activities.

Generating Intelligence

Leicestershire has particular strengths in the R&D sub-sector. Local organisations should consider investigating the distribution and characteristics of these activities both

in specialist firms and more generally in Leicestershire, in order to identify how linkages between this sub-sector and other firms can be strengthened. This is an area of critical importance to the future of Leicestershire's high tech industry and knowledge economy which needs to be studied in more depth.

This fast moving sector is faced with a rapidly changing business environment in the future, and this is likely to vary from sub-sector to sub-sector. A 'foresighting' exercise, taking account of sub-sectoral differentiation, would provide a useful tool for anticipating future developments for this sector and their implications for the county's economy. This activity would also provide a useful starting point to inform the activities of an industry-led forum.

Promoting Networking: Creating A Manufacturing Industry Forum For Leicestershire

In considering both the value and practical aspects of creating a new forum for the manufacturing industry in Leicestershire a number of issues need to be borne in mind:

- The survey has indicated that around 61% of the firms interviewed would be interested in becoming involved in a Leicestershire forum for the manufacturing industry.
- A number of firms felt that they had expertise and experience that could be of value to other Leicestershire firms and institutions as long as these were not competitors.
- There were concerns expressed by some firms that 'this type of thing has been done before'.
- There was some concern expressed by firms generally about the 'credibility' of business support institutions.
- Some firms felt that they were not aware of the types of support and assistance that local institutions could bring to bear on their problems.
- A recent national survey of barriers to growth and survival of small firms in the UK has found that some 50% of UK SME's are dissatisfied or very dissatisfied overall with the quality of business support (University of Strathclyde, 2002).
- It is important that complementarity with other regional initiatives is maintained. EMDA, for instance, is currently developing a variety of initiatives aimed at businesses in this sector focussing on the sub-sectors of healthcare and high performance engineering. The likely relationship between any proposed forum and developments such as these should be taken into account.
- Likewise, the possible role in a forum of successful existing county-based initiatives such as the Loughborough Advanced Technology Initiative (LATI) should be considered.

To summarise, although there is real evidence of interest in the industry forum idea, this is tempered by the view of some firms that the initiative should be 'industry credible' and not a rerun of any previous experience.

We would suggest that the notion of a new manufacturing industry forum, its membership and topic focus should be rigorously tested at the meeting of the focus group where firms will be asked to comment upon and validate the findings of the CURS (draft) final report presented above.

Assuming that the firm focus group validates the research findings on the notion of creating a Leicestershire manufacturing industry forum, then the following broad ‘good practice’ principles need to inform the overall approach:

Leadership/Ownership

- There should be a clear and unequivocal commitment from local organisations at the highest level to the forum, although firms must feel that they ‘own’ the initiative in order to maintain their engagement over the longer term.

Continuity

- Local organisations should be prepared to make available – or access from other sources - appropriate resources (people and money) in order to enable the forum to function credibly over the medium term.
- The forum should seek to complement and not compete with other manufacturing industry initiatives in the locality (EMDA, SBS etc).

Topic Based Approach

- To avoid ‘aspirational overload’, the work of the forum in the short to medium term should focus on a restricted number of topics which meet industry needs and requirements. Forum topics should ultimately be decided in close consultation with industry.
- The CURS survey findings suggest that the forum could in the first instance usefully look to address and engender inter-firm discussions around:-
 - Quality, cost and delivery issues - as highlighted in the section above on manufacturing trends and by the survey respondents (81%)
 - Encouraging local supply/purchasing interaction
 - Skills issues – technical training provision
 - Innovation issues
 - SME regulatory issues, e.g., Climate Change Levy

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