

# FUTURE SKILLS ISSUES AFFECTING INDUSTRY SECTORS IN WALES



## Automotive sector



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**Contents**

**Executive Summary** ..... p4

**1. Introduction** ..... p6

**2. The Automotive Manufacturing Sector in Wales** ..... p7

**3. Sectoral Skills Issues** ..... p10

**4. Action on Skills** ..... p15

**Annex A: References** ..... p18

**Annex B: Sectors in context** ..... p19

**Annex C: The Supply of Manufacturing and Engineering Qualifications in Wales** .. p22



## Executive Summary

### Introduction

This document is one of a series commissioned by the Future Skills Wales Research Forum. The overall project aims to extend and complement the work begun by the original Future Skills Wales project, which forecast future generic skills needs across Wales using forecasting and survey data. The current project adds studies of future vocational skills needs within key sectors in Wales. Each sector study is based on desk research and qualitative interviews with practitioners and employers, and aims to provide an overview of the sector, the skills issues, and current and potential actions to further strengthen the sector.

Businesses and employees in each of the sectors studied have achieved great successes; that is why these sectors have become important for Wales. Our focus on current skills issues should not obscure these achievements or the determination of all concerned to meet current and future challenges.

### Sector Profile

This report covers only the manufacturing aspects of automotive related activity; retailing and aftercare are not covered.

The Automotive Manufacturing sector in Wales has important existing strengths. Due in part to sustained inward investment, there are over 80 significant manufacturers in the sector, the majority in the South-East and the Swansea/Llanelli area, with a smaller group in the North, mainly around Wrexham and Deeside. There are a few, locally significant, employers in Mid Wales. The sector employs at least 16,000, and (depending partly on definition) estimates range up to 26,000. Employment in the sector in Wales forms a greater proportion of employment in the UK sector as a whole than is the average for Welsh sectors.

There are prospects for further investment at some sites, and a recent forecast for the sector shows employment growth over the next ten years. This is in contrast to forecast employment decline in the UK sector as a whole, and should benefit particularly West Wales and the North.

However the sector also faces a number of shorter-term and mid-term challenges:

- the probability of declining demand from Rover/Phoenix;
- global consolidation of volume manufacturers and their supply chains;
- regulatory and consumer moves, such as the fuel price protests;
- demands for lower costs and higher added value products.

WDA information shows 34 former Rover suppliers employing around 12,000.

One response to future challenges is interest in techniques like Lean Manufacturing; but new product development, and the formation of new alliances and chains, will also be necessary for growth in the developing global market.

### Skills Implications

The changes taking place in the sector have forced a number of developments which will impact on the need for skills in the future:

- multi-skilled teams for flexible, high added value manufacturing;
- a greater development of Level 3 skills for supervision, team leadership;
- more emphasis on higher level entry skills (Level 2) and subsequent development;
- generic skills are at a premium at all levels;
- more need for Level 4 and 5 skills, including in technical areas for R&D and product/market development.

### Management and IT Skills

The implications for non-vocational skills include:

- increased importance for management skills for the development of global strategy and alliances;
- more focus on IT skills needs including e-commerce development.

### Action on Skills

There is a well developed sector group, the Welsh Automotive Forum, which has been working to address many of the above issues. Key themes for action are:

- supporting the changeover to lean manufacturing approaches, at management and professional levels;
- developing high level marketing and strategy skills;
- supporting skills development for lean manufacturing;
- developing team leaders;
- developing skills in the supply chain, especially in SMEs;
- addressing basic skills issues in the workforce and among new entrants;
- improving the work-readiness of workforce entrants at all levels;
- providing progression within the workforce;
- attracting new recruits into the sector;
- improving the supply and development of IT user and practitioner skills in the sector;
- addressing some specific areas of vocational skills shortage.

Some more detailed recommendations for action and further research are provided in the main report, and summarised in the table below.

## Themes and Recommendations

Theme No:	Rec. No:	Action	Timescale	Key Partners
1	1a	Facilitate cross-sector working group on lean techniques linking to existing initiatives	From 2000	Various fora
2	2a	Disseminate best practice in HE/FE in-service provision	2001	HE/FE/ Emps/CETW
	2b	Develop focused auto market intelligence network for Wales (Net-based)	2001	Emps/WDA
3	3a	Review vocational qualifications to check applicability to lean manufacturing	2001/02	NTO/CETW/ Emps
	3b	Review/update assessor training and awareness of lean paradigm	2001/02	NTO/CETW/ Emps
4	4a	Develop scope and availability of existing team leader programme	2001/02	Emps/CETW
	4b	Support proposals for free adult training to Level 2 and make workplace opportunities available	From 2000	Emps/WAF/ Assembly
5	5a	Compile and disseminate directory of existing support programmes for SME training	2001	WDA/ Bus. Connect
	5b	Build supply chain development into sector training cluster programmes	2001/02	WAF/CETW/NTO
	5c	Work to increase focus and profile of Business Connect services	2001/02	WDA/ Bus. Connect
6	6a	Work with Basic Skills Agency to implement common definitions and tests in recruitment and training needs analyses	2001	WAF/CETW/ NTO/ES
	6b	Promote LearnDirect and learning centre opportunities to workforces & jobseekers	From 2000	Ufi/Emps/ WAF/ES
7	7a	Actively seek partnerships with local schools, EBPs, FE and HE	Ongoing	Emps/WAF/EBPs CETW
	7b	Proactively offer teacher/pupil/student placements	2001	Emps/WAF/ HE/FE
	7c	Promote sector plans and prospects to schools, young people and communities	2001	Emps/WAF/ CS/EBPs
8	8a	Consider adoption of new simplified liP standard	Ongoing	Emps/WAF
	8b	Review progression structures and opportunities	Ongoing	Emps/WAF
9	9a	Use existing careers and skills events to promote sector to new recruits	2001	NTO/CS
	9b	Review feasibility of a Wales version of the UK Skills Show (NEC 5-9 July 2000)	Now for 2001	NTOs/Assembly/ UK Skills/fora
10	10a	FE/HE and employers to co-operate to link e-commerce techniques with sector applications	Autumn 2000	WAF/HE/ FE/CETW
	10b	Establish Welsh auto sector portal site for sourcing, information exchange, promotion and training delivery	From autumn 2000	WAF/WDA/ CETW/NTO
11	11a	Review adequacy of provision of Mechatronics training	2001	CETW/WAF

## 1. Introduction

- 1.1 This document is one of a series commissioned by the Future Skills Wales Research Forum. The overall project aims to extend and complement the work begun by the original Future Skills Wales project, which forecast future generic skills needs across Wales using forecasting and survey data. The current project aims to add studies of future vocational skills needs within key sectors in Wales.
- 1.2 Businesses and employees in each of the sectors studied have achieved great successes; that is why these sectors have become important for Wales. Our focus on current skills issues should not obscure these achievements or the determination of all concerned to meet current challenges.
- 1.3 The FSW Sectoral Skills project aims to take particular note of the importance of the manufacturing sector for the Welsh economy and for employment in Wales. In particular it covers four manufacturing sub-sectors (although for convenience in individual sub-sector reports we will refer to them as sectors). These are:
  - food processing;
  - aerospace;
  - electronics;
  - automotive manufacturing.
- 1.4 This report covers automotive manufacturing. It shares some elements with the other reports, and particularly with the other studies of manufacturing sub-sectors, but deals specifically with vocational and other skills issues in automotive manufacturing in Wales and Welsh regions.
- 1.5 Each of the individual sector reports is complemented by a report on management and information technology skills issues across the sectors studied. This reviews the situation in each sector and draws out common themes and implications.

## Method

- 1.6 The first phase of the study proceeded mainly by desk research and telephone discussions. An interview with Brian McCarthy of EMTA Wales was useful in setting the context for the sector within engineering and manufacturing more widely.
- 1.7 In the second stage, further meetings were held with sector representatives, and employer case studies were undertaken to extend and deepen the analysis of vocational skills issues.
- 1.8 The aim was not to conduct quantitative primary research, but to consult with sector representatives in order to identify perceived skills issues, the actions being taken in response to these, and the potential for further action or policy development. The published reports should therefore provide a clear introduction to the sector, a 'snapshot' of sector issues, and pointers to current and potential action.

## 2. The Automotive Manufacturing Sector in Wales

2.1 This report is concerned with the manufacture of motor vehicles and motor vehicle components, rather than retail and aftersales. In Wales, the sector consists of component manufacture rather than vehicle assembly.

### Characteristics

#### Number of firms

2.2 The Clifton survey (Clifton, 1999) based on WDA records, estimates that there are 70 first tier firms in Wales, 36% with turnover under £10m, 25% with £10-£20m, and 39% over £20m. This is fewer small firms and more large ones than in a 1990 study (Delbridge, 1990), and the 1999 list has 46% UK owned as against 75% in 1990. However some firms in the 1990 survey derived more than 50% of turnover from other sectors.

2.3 The current Welsh Development Agency website (WDA, 2000) lists 82 firms, of which 53 name specific volume manufacturers among their customers. In other words, these are 'first tier' components manufacturers, supplying the volume car assemblers direct.

2.4 What is not in doubt is that there is a substantial and important population of automotive component manufacturing plants in Wales, accounting for a significant proportion of the manufacturing activity in the Principality.

#### Locations

2.5 The main concentration of plants is in the M4 corridor and the valleys as far west as Llanelli, with a smaller group in the north around Flint and Wrexham, with outliers in Colwyn Bay (Quinton Hazell) and Caernarfon (Friction Dynamics).

2.6 There are generally smaller but locally significant plants in Powys, including Transtec Wales in Llanidloes and Kay at Presteigne, both producing aluminium castings, Traltec at Welshpool (plastic mouldings), Grayman at Llanfyllin (pressings) and Truedsell at Newtown (wiring systems). Lucas SEI at Ystradgynlais is also in Powys although close to the main concentration of firms in South Wales.

2.7 There is a sprinkling of firms around Swansea, Neath and Port Talbot, but little further west (with the exception of Dowty Auto Seal at Milford Haven).

#### Workforce Size

2.8 Estimation of the size of the sector workforce in Wales is complicated by difficulties in classifying some activity. For example components suppliers often supply the aerospace or domestic appliances sectors as well as automotive manufacturers. Because of this estimates of employee jobs in the sector can vary between about 12,500 and 20,000, depending on the definition used. To support the York Consulting sector studies, Business Strategies Limited (BSL) produced estimates and forecasts of employment in all the sectors. The BSL figure for employee jobs in the automotive manufacturing sector in 2000 is 12,830; this represents a fall from a peak estimate of 14,210 in 1996.

2.9 A separate estimate states that over two-thirds of employment is in foreign owned plants (Welsh Office estimate of 1998, quoted in Clifton, 2000).

2.10 The workforce figures given in the WDA list, however, show a total of 25,900 in the firms listed. The disparity illustrates the difficulty of assigning workforce numbers to the sector, given that many components suppliers also sell to other manufacturing sectors. For analytical purposes it is probably safer to use the smaller totals, but one should bear in mind that changes affecting the automotive sector may not be confined in their effects to the workforce of 12,800 or so within this narrower definition.

2.11 The smaller BSL total represents around 1.1% of the Welsh workforce (using the BSL estimate of 1.206 million employee jobs in 2000).

2.12 Using the BSL figures, one can calculate the employment quotient of the sector in Wales. This is done by calculating the extent to which employment in the Welsh sector is proportionate to employment in automotive manufacturing for the UK as a whole, given the relative sizes of the Welsh and UK workforces. An employment quotient of 1 indicates that the sector in Wales is roughly the size one would expect in employment terms; scores below 1 indicate under-representation of the sector in Wales.

2.13 The BSL forecast shows an employment quotient of **1.35** for the automotive manufacturing sector in Wales in 2000. This indicates the strength of the sector in Wales in employment terms, relative to the rest of the UK.

#### Markets

2.14 The first tier suppliers listed by the WDA name a wide variety of volume manufacturers amongst their customers. These include:

- Rover (34 firms);
- Ford (31 firms);
- Honda (16 firms);
- General Motors/Vauxhall (14);
- Jaguar (12);
- Nissan (10);
- Toyota (7);
- Saab (6);
- Volvo (6);
- BMW (5).

2.15 Others also supply direct to vehicle manufacturers such as truck and earth moving equipment specialists. The rest occupy lower positions in the supply chain, delivering to first or lower tier components suppliers. In many cases, these firms also supply a substantial proportion of their output to other sectors, particularly the electronics and domestic appliances sectors. This makes for some difficulties in classifying them and their workforces, as noted above.

#### Exports

2.16 To date no figures are available for exports from the sector as defined here, although many of the firms

in the WDA list mention global or European automotive markets as key markets for their products.

**Investment and Turnover**

2.17 Since 1981, 16% of the £800m regional selective assistance to industry (i.e. around £128m) has gone to automotive and transport equipment – 50% to non-UK owned firms (Clifton, 2000). An example was the support provided for investment at Ford Bridgend.

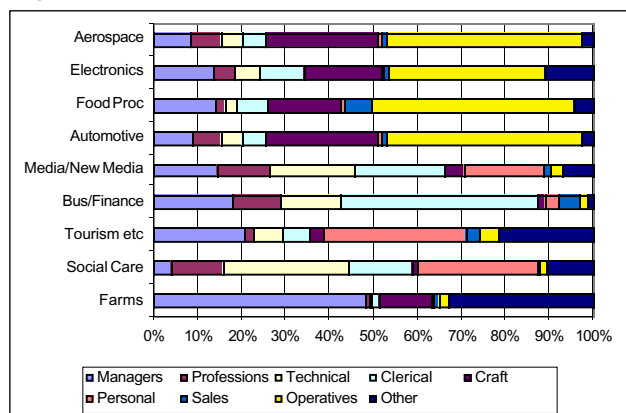
2.18 An estimate of sales by the sector is £2bn (Clifton, 2000, from Harman, 1996).

**Workforce Characteristics**

2.19 No figures on the gender or other demographic characteristics of the workforce have been identified. Information on qualifications is included in Section 3.

2.20 Recent forecasts by Business Strategies Limited, provide an estimate of the broad occupational profile of this and the other sectors studied by York Consulting. **Figure 2.1** below compares the profiles. Like the other manufacturing sectors, the automotive sector is characterised by large proportions of operatives and craft level workers. In Wales it is closest in profile terms to the aerospace sector.

**Figure 2.1: Sector Occupational Profiles, 2000**



Source: BSL sector forecasts, 2000

**Sources of change**

**Technological**

2.21 ‘Vehicle manufacturers are focusing on their core competencies, transferring significant responsibility for component design and development to their first tier supply base’, (Rhys, 1996, quoted in Clifton, 2000). First tier ‘full service’ suppliers are supplying complete systems ready for integration.

2.22 The assemblers’ core competencies are powertrain, integration of subsystems, assembly, styling and marketing (Rhys/Clifton). They now operate a policy of almost total outsourcing of, for example, water pumps, exhausts, brakes, seats, and fuel tanks.

2.23 Suppliers therefore need to pursue R&D and effective new product development strategies.

2.24 To sustain this suppliers need to address the global market to fund development and meet price limits.

2.25 Suppliers also need to find a place in smaller supply chains and closer supplier relationships – volume assemblers are using fewer direct suppliers (PwC, 2000).

2.26 Between 1986 and 1992 supplier numbers changed as follows for key manufacturers:

- Ford Europe - from 1250 to 1000;
- General Motors - from 2000 to 1200;
- VW – from 1700 to 1200 (Lamming, 1993, quoted in Clifton, 2000).

2.27 Other potential sources of change are as follows:

- competitive – consolidation of volume manufacturers; impact on inward investment opportunities;
- regulatory – environmental and road safety regulation;
- consumer developments such as the UK pricing issue and the development of fuel price protests across Europe;
- sector activity – lean production initiatives.

2.28 The ‘lean production paradigm’ (Clifton, 2000) envisages manufacturing processes based on the principle of ‘no cost without added value’. This involves eliminating all delays, stockholding, or process costs which are not strictly necessary to the achievement of the end product. It is a key theme in strategy and operations across the automotive manufacturing sector; it is also prevalent in other manufacturing sectors, notably aerospace.

**Prospects for the Future**

2.29 Forecasts for the sector must take into account assumptions and forecasts affecting the manufacturing sectors overall. For the UK the issues centre around the costs of manufacturing and the viability of the UK as a base for supplying Europe. The UK exchange rate, sterling value, and prospects of entry to the currency union, are central issues; assumptions about these will influence forecasts to a significant extent.

2.30 For the automotive sector in Wales these factors are particularly key as they affect not only the performance of existing units, but also prospects for further inward investment. Given the importance of foreign investment for the sector, this is likely to be a key determinant of future growth or decline in the sector.

2.31 Domestically, the prospects for Rover/Phoenix are a further key factor. The 34 Rover suppliers identified in the WDA list are shown as employing a total of 12,000 staff. The scale of ex-Rover operations under Phoenix remains to be seen, and will presumably have a significant effect on these suppliers and on smaller suppliers further down the chain. It seems clear that there will be a decline in supply to the successors of Rover and that this must have an effect on the Welsh sector; what is not yet clear is the extent of the decline and this impact.

2.32 Informal estimates by the Welsh Automotive Forum members have suggested that a total of 1,500 jobs in Welsh plants are directly under threat from the decline in Rover business; this figure would be likely



to be increased by indirect effects on other jobs down the supply chain.

2.33 In terms of the overall future scenarios for the sector in Wales, the possibilities are:

- growth in output and employment – this will require an effective response to current challenges; cost pressures seem likely to force new manufacturing jobs in less value added activities into very low wage areas such as Eastern Europe. This scenario would probably require further and significant inward investment. The main prospect for this currently is the introduction of new engines at Ford Bridgend, which has been signalled publicly by the company. Growth is also envisaged, for example, as a result of new product introduction at Toyota Deeside. However it is not yet clear whether new jobs associated with these developments would be sufficient to offset erosion amongst, for example, former Rover suppliers.
- growth in output with stability in numbers employed: this is a possibility if Welsh manufacturers can continue to increase productivity as a response to market pressures;
- a decline in numbers employed, which may be accompanied by decline or even some growth in output; this reflects the Rover situation, and continuing efforts by the volume car manufacturers to reduce supplier numbers and costs. This is in line with general forecasts for a continuing decline in employment in the manufacturing sectors.

**Employment Forecast**

2.34 The BSL forecasts produced for this study support the first and most positive scenario, envisaging growth in employee jobs in the sector from 12,830 in 2000 to 15,290 in 2010. Of the 2,460 additional jobs, the largest share (1,020) is forecast to go to West Wales (which includes Bridgend), with 830 in South East Wales and 590 in North Wales.

2.35 As noted earlier, the BSL forecast shows an employment quotient of 1.35 for the automotive manufacturing sector in Wales in 2000. This has increased by 2010, when the employment quotient has risen to 1.67. In other words, the forecast suggests that the sector in Wales is currently relatively strong in employment terms, and that it will experience employment growth, which will make it still stronger relative to the UK sector as a whole. This reflects the BSL forecast for falling employment in the sector across the UK, from around 221,000 in 2000 to less than 213,000 in 2010.

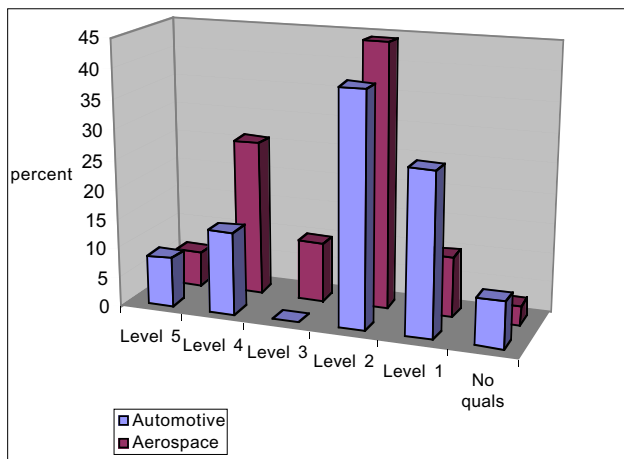
<b>Summary Sector SWOT</b>	
<b>Strengths</b>	<b>Weaknesses</b>
Critical mass of existing plants	Environment of exchange rate volatility
Skills and experience of current workforce	Weak UK volume assembly performance
Global and diverse markets	Reliance on overseas investors
Sectoral initiatives	Some lower value added activity
Strong history of inward investment success	
<b>Opportunities</b>	<b>Threats</b>
Increasing competitiveness if weaker pound	Rover/Phoenix demand declines
Global consolidation of supply chains	No entry to Euro/foreign withdrawals
Build on lean manufacturing initiatives	Global supply chain consolidation
Enter integrated first tier supply networks	NPD investment demand and market risk
New product/materials development	Environmental regulation
Further investment at key sites	International trade restrictions
	Higher social costs with EU integration

### 3. Sectoral skills issues

3.1 The Labour Force Survey (LFS) produces estimates of qualifications levels by industry (based on Standard Industrial Classification, or 'SIC', codes). These have been used to produce workforce qualification profiles for each of the sectors studied in the FSW Sectoral Skills project. These need to be treated with caution, as in many cases sample sizes are inadequate to provide firm estimates. Nevertheless, they do provide some broad indication of qualifications levels as a basis for any further investigation.

3.2 For the automotive sector in Wales, the profile is shown in **Figure 3.1**.

**Fig 3.1 Estimates of Highest Qualifications – Automotive and Aerospace**

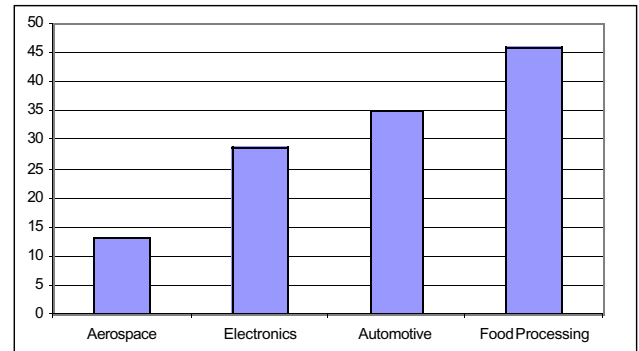


3.3 The aerospace and automotive sectors have a similar overall profile – large numbers qualified at craft level (Level 2), and a significant proportion qualified at Level 4, but with lower proportions at the supervisory Level 3. The comparison shows the lower estimated proportion of automotive workers with Level 2 qualifications, and higher proportions of those with Level 1, compared to the aerospace sector.

3.4 The comparison also suggests a particularly low proportion of workers qualified to Level 3 in the automotive workforce (an estimate of zero from LFS reflects inability to report a percentage due to the low likely numbers involved). This does not entirely reflect the findings from the qualitative research, where Level 3 skills and qualifications seemed to form an important component of the workforce in the *large organisations*. Although these estimates must therefore be treated with considerable caution, they do suggest a key skills issue for some parts of the automotive sector – the **relative weakness of the supervisory level in the workforce**. The comparison also suggests that, although this feature may not be unique to the automotive part of the manufacturing sector, it is particularly marked in the automotive workforce.

3.5 Allied to this is the relatively **high proportion of workers qualified to Level 1 or lower** in the automotive workforce. **Figure 3.2** compares the estimates for these proportions in the four manufacturing sectors studied. Only food processing (where one might expect that larger numbers of less qualified workers will be engaged in volume processing tasks) has a higher estimated proportion of these workers.

**Fig 3.2 Percentages Qualified to Level 1 or Lower**



3.6 What does this mean in the context of the sector future? The key message is that the scenario for future development of the sector points to increased globalisation and fiercer competition based on more efficient addition of value to the component supply process. This will require:

- extremely effective **management** with an international perspective;
- an increasingly key role for **non-manufacturing staff** (strategy and marketing professionals, logistics and supply chain managers, product research and development teams, HR and training professionals);
- efficiently organised and led **manufacturing teams**, able to implement 'lean' approaches, and flexible enough to cope with rapid change and redeployment.

3.7 This implies a general increase in skills and qualifications levels in the sector, but especially:

- an increase in the proportions of those with Level 4 and 5 skills within the sector, at management and professional/senior technical levels;
- a significant increase in supervisory and team leadership skills among the manufacturing workforce, closely allied to high levels of vocational or craft skills;
- an increased incidence of multi-skilling throughout the manufacturing workforce, to permit increased flexibility;
- the development of high levels of generic skill in areas such as problem solving, team working, and communication, at all levels in the workforce.

3.8 This scenario would also envisage the establishment of a clearer continuum of skills levels, and of career development, within these firms. This would mean, for example, that fewer workers would stop adding to their skills and qualifications when they reached Level 2. More would aspire, (and have the ability), to move up to Level 3, and from there onwards.

#### Vocational Qualifications

3.9 Because of the diversity of components and materials involved in the automotive sector in Wales, the list of potentially relevant vocational skills and corresponding qualifications is a long one. Those relevant only to vehicle retail and maintenance have been omitted, as these activities are not the focus of this study.

3.10 Initial examination of the ACCAC qualifications lists illustrates the wide range of NVQs relevant to the sector:

*Level 1 and 2: Manufacturing:*

- Processing Rubber (general rubber goods ) – for seals, gaskets etc
- Performing Manufacturing Operations
- Forming Ceramic Items (Automotive)

*Engineering: Various Levels:*

- Automotive Glazing
- Cable and Wiring Loom Manufacture
- Electronic Product Assembly
- Engineering Construction – Maintaining Plant and Equipment
- Engineering Design
- Engineering Maintenance
- Engineering Material Processing
- Engineering Installation
- Engineering Manufacture
- Engineering Production
- Welding
- Process Engineering Maintenance
- Project Control

- 3.11 In non-technical areas of the business, qualifications in the following areas are also likely to be important:
- Providing Goods and Services (Information Systems Acquisition, Analysis, Design and Programming, Development; Key Account Management);
  - Providing Business Services (Environmental Management, Implementing IT Solutions, Installing and Operating IT, Operational Management, Project Management, Quality Management, Strategic Management, Supporting Workplace Organisation and Representation);
  - Developing and Extending Knowledge and Skill (Personnel Management, Strategy and Support, Training and Development).

**Future Skills Demand**

- 3.12 General remarks on future demand trends for vocational skills have been made above. The scale of this demand for the automotive sector will of course depend on which of the possible scenarios comes to pass. The BSL forecast suggests rising employment in the sector (paragraph 2.34 above).
- 3.13 However it is important to appreciate that, even if overall employment in the sector declines, there will be a significant demand for workers to replace those retiring or moving to other employment. Annex B illustrates the point with an analysis showing UK replacement demand projections for Skilled Metal and Electrical Trades (Annex B, Figure B.5).
- 3.14 We have no similar formal projections of replacement demand for the automotive manufacturing sector in Wales. However it is possible to construct some estimates, which, although crude, might serve to indicate the issues involved in estimating future needs at this quite detailed level.
- 3.15 **Annex B** suggests a replacement demand across

the six years 1998-2004, for skilled metal and electrical trades in Wales, of 7,600. This is itself a rough extrapolation based on the ratio of jobs in Wales and the UK. In order to translate this into demand in the Welsh automotive manufacturing sector, we would need to know what proportion of persons working in these trades are in this sector. Taking an estimate of 12,800 employed in the sector (1998), we can say that this represents roughly 6.3% of the 203,000 or so employees in Welsh manufacturing plants with over 10 employees (source: National Assembly for Wales, 2000). If we apply the same percentage to the 7,600 figure for replacement demand in skilled metal and electrical trades, this gives a replacement demand for these trades in the Welsh automotive sector of around 480 over six years.

- 3.16 This would not include other, non-skilled or semi-skilled manual occupations, or non-manual occupations, which would considerably increase the overall replacement demand for the sector. The recent BSL forecast for additional jobs in the sector over the same six years is modest (430), but this number would be swelled by the need to replace retiring workers or those moving into other sectors.
- 3.17 This is necessarily quite a crude estimate, but given the uncertainties inherent in estimating, for example, expansion or contraction in the sector even across this short period, it seems unlikely that a much more reliable figure could be constructed. It does at least give an idea of the kinds of numbers likely to be involved.
- 3.18 The employers participating in the case studies reported few if any vacancies, small apprentice programmes, and in some cases declining workforce numbers over the last year or so (see Case Study boxes). These limited qualitative indications tend to support the suggestion that replacement demand in the sector is likely to be quite limited in scale for the foreseeable future, except in individual cases where significant new investments are involved.
- 3.19 The case studies do, however, indicate the importance of improving the quality of the workforce in terms of skills and performance at all levels. This will depend in part on ensuring that new entrants to the workforce are highly qualified and prepared. Hence, though the numbers of these new entrants may be relatively limited, the quality of their training is a key factor for the sector.
- 3.20 Similarly, there will be an ongoing need to provide training to the existing workforce, to meet the need for increased flexibility, multi-skilling and efficiency.

**Provision and Supply**

- 3.21 The qualitative fieldwork gave few indications of current or near-term difficulties in supplying the needs of the sector, as far as recruitment of qualified workers is concerned.
- 3.22 Concern tended to be stronger in the smaller firms employing significant numbers of lower skilled operatives, and centred on deficiencies in terms of employability (reliability, commitment, and initiative).

- 3.23 Employers with significant training needs have often formed effective relationships with local colleges, supplementing these, especially in the largest sites, with some in-house provision. Where employers were working with local colleges they appeared generally content with the capacity and performance of these suppliers.
- 3.24 To supplement the local and employer structures, the Waterton Technology Centre at Bridgend has been established. This is a large, well-equipped facility, which enjoys the support of sponsoring employers and the Welsh Automotive Forum. It seems likely that this facility remains relatively under-used, perhaps due to the distracting effects of current upheavals within the sector.
- 3.25 There were a number of reservations concerning the details of the current vocational training framework:
- a factor mentioned by a number of consultees was the lack of funding to support training for adults over the age of 25;
  - NVQs, though generally accepted, were restricted in terms of their use in training or developing existing workforces. The main difficulties mentioned were the cost and complexity of planning and assessment, and in particular the amount of 'paperwork and bureaucracy' involved.
  - An associated issue was the recognition that NVQs are a recognition and certification of competence, and can be achieved in some cases (depending on the existing competencies of the candidate) independently of additional vocational skills development.
  - There was a proposal for the development of a 'Lean Manufacturing' NVQ or other qualification, to inculcate and accredit understanding of the principles and implementation of this approach.

### The Scale of Provision

- 3.26 If we examine the scale of appropriate provision, it is less clear that the future supply of new skills (as measured using course enrolments or qualifications) will be adequate in numerical terms. Annex C contains a comparison of provision and demand for manufacturing as a whole, which suggests that the supply of new manufacturing related qualifications may not match replacement demand in manufacturing in the future.
- 3.27 In the case of automotive manufacturing, this problem may be lessened to some extent due to the existence of specialised provision, particularly in the FE sector, and in TEC funded provision, near key employers. For example, in 1999/2000, 669 of the 4,003 Modern Apprenticeships funded by South East Wales TEC, and 259 of the 3,770 National Traineeships, were automotive related.

### Skills Issues

- 3.28 The Case Studies included here provide some illustrations of the points made above. The cases selected are very different, and suggest the range of situations faced by employers of different sizes and in different positions in the supply chain. They also suggest some of the differing strategies adopted in response to current market developments –

focusing on core businesses, moving to the quality end of the volume market, or occupying lower-volume, higher-margin market niches. These strategies each have their impact on skills and workforce development needs and approaches.

- 3.29 Throughout the cases there is a common theme, which one might characterise as the application of lean techniques to training and development. Cost pressures make it difficult for manufacturers to provide or support training which does not ultimately add value for the customer. This link needs to be established with some degree of certainty, in order for expenditure to be justified.

### Key Points from the Case Studies

- 3.30 Particular points to note from the cases include:
- the probable new engine introductions at Ford Bridgend – this could have a significant impact on employment there and on the scenario for the sector overall;
  - clear trends in two studies towards a 'retreat' from high-volume, low-margin manufacturing, to premium or other niche markets – but with slightly different skills implications in the two cases;
  - particular interest in ways of developing team members and team leaders for cell or team based production using the lean manufacturing paradigm.

**Case Study: Caerbont Automotive Instruments**

Caerbont Automotive Instruments employs around 110 people in Abercrave near Ystradgynlais – geographically in Mid-Wales, although relatively close to Swansea. It is a result of a management buy-out in 1993, and remains independent. The company supplied gauges and instruments to clients including Land Rover, Dennis and Leyland Daf Vans. The higher volume end of this market has become more difficult to supply due to the level of investment required in plant and quality compliance. Caerbont therefore refocused on lower volume niche markets where higher margins were available – a strategy which is providing profits but which initially involved some decline in workforce numbers.

The higher volume market was seen as requiring a lower level of operative skills (for loading and minding automated processes) but was dependent on a smaller team of more highly skilled workers. This, plus the level of investment required to automate production, was not available, therefore forcing the adoption of a strategy requiring more modest investment, few highly skilled workers, but a higher average level of shop floor skills. Operatives are generally semi-skilled across a range of areas, with highly developed job-specific skills for intricate assembly tasks.

The outlook is now for stability in workforce terms – turnover is low and the average age of workers is in the low 40's, so 'there will be replacement needs in ten years or so'. There is currently one Modern Apprentice, but the main need is to continuously develop the skills of the existing workforce. In-house training is focused on understanding the business and customer needs, general manufacturing skills (building to assembly lists, using assembly jigs, calibration, working to limits and tolerances) and job-specific skills.

NVQs are not used – potential team leaders are trained using the NEBS Supervisory Management qualification with support from Mid-Wales TEC. An external tutor works on-site, with trainees released during the day and offered overtime for project work. This is seen as 'similar to an NVQ but not as bureaucratic'. NVQs are seen as requiring more time to provide structures, agree training plans, communicate with assessors and support learners. The NEBS approach is seen as more efficiently packaged.

Caerbont has been a strong proponent of an NVQ in Lean Manufacturing, and has discussed this with others in the Welsh Automotive Forum (it was mentioned also by Ford Bridgend). This would serve as a means of recognising workers who were attuned to team working, waste minimisation, problem-solving, and competitive advantage via manufacturing flexibility and efficiency. There is a perception that existing qualifications do not necessarily indicate possession of these qualities. The proposal appears to have met with some resistance from EMTA, on the (reported) grounds that such 'soft skills' were difficult to assess and certify, and should anyway be embodied in existing qualifications.

**Case Study: Ford at Bridgend**

Ford is involved in a global race for volume and market presence with Daimler Chrysler, General Motors and the other remaining global players. It is acquiring competitors in key markets such as Asia, and is divesting itself of component manufacturing activities, often by transferring them to new joint venture companies part-owned by existing suppliers. It recently floated a large part of its component manufacturing operation as Visteon. The core competencies for Ford in the future will be marketing, new model design and introduction, and the sourcing of product from the supplier chain.

Engine manufacture remains very much a part of core Ford plans. The Bridgend plant, building a range of petrol engines for Ford and Jaguar models, employs around 1350 workers. Possible additions to the range of engines were suggested by Ford when the Dagenham redundancies were announced, but as yet no detailed announcements have emerged. It is possible that output and employment at the plant could grow significantly as a result of these new requirements. Currently 80% of output is exported.

The plant 'pays significantly above regional rates so has never had a problem getting quality people'. It employs more skilled men with degrees than any other plant in Ford Britain. Labour turnover is very low. There is a fairly small apprentice programme – around 5 per year. These can be selected from as many as 800 applicants, all qualified to Level 2. They are trained partly at the Swansea Training Centre, in what is now the Visteon site; this also trains other Ford and Visteon apprentices. Apprentices progress from NVQ3 to HNC.

Ford is keen to provide development opportunities for the existing workforce. NVQs are 'not much used', partly because so many of the workforce already hold qualifications. However it is acknowledged that, for the industry in general, 'there has to be a place for BTECs and assessment-driven provision allowing the non-graduate to find his or her place in the sun'.

The company is deeply committed to lean manufacturing principles, and this shapes the provision of training for existing workers. The emphasis is on training for flexibility, with additional allowances available for skilled tradesmen who train in a second trade. The majority of skilled workers are now multi-skilled in both electrical and mechanical trades. They are organised in teams where the traditional boundaries between engineers, tradesmen, and supervisors are slowly becoming blurred. There is a clear progression from semi-skilled workers, to 'integrated manufacturing specialists', to adult apprentices and assisted engineering degree programmes. The plant has strong links with Pontypridd College, West Glamorgan College, and Cardiff University Business School.

Ford is also keen to help develop the capacity of its supply chain. The company has been a partner in the establishment of the neighbouring Waterton Technology Centre, and has worked via the Welsh Automotive Forum, the WDA and TECs, to 'share blue-chip experiences with SMEs – to fast-track them to best practice'. However some SMEs have had difficulties releasing trainees for longer courses, creating a need to re-design or modularise existing Ford provision.

**Case Study: Harman International**

Harman International is a US owned group manufacturing entertainment systems for a range of OEM, professional and consumer markets. The Bridgend plant designs and manufactures speakers for the automotive market under a range of brand names. Customers are car manufacturers such as Mercedes and BMW. Rover was a significant customer, but orders from this source had dropped by one third in a four month period; the company expected to be further affected if the Rover 45 was discontinued. However the main factors affecting the workforce are the need to cut costs and streamline production, and the introduction of new technology to achieve this. In 16 months numbers fell from just under 500 to around 350 employees. It was expected that any further decline would be limited, although as numbers stabilised productivity would need to rise.

The plant cannot compete on cost with units in Eastern Europe, but has built a quality and performance based strategy. It manufactures many product lines in small batches, so needs to build workforce flexibility and minimise downtime and changeover delays. Workforce reliability and commitment is vital. Widespread technical change had been implemented in order to reverse turnover decline, and sales growth is foreseen – some production is due to be transferred from Germany, though more is going to Hungary.

Although there is little current recruitment, the company has experienced difficulty in obtaining good Mechatronics skills (combinations of electronics, mechanical and robotics skills used for process automation). As a result less automated workstations have had to be introduced. There are difficulties in introducing recruits directly from degree courses – ‘usually they are too specialised or narrow, and not totally up to date with technology, and they may not have other skills needed in the workplace’. Cardiff University was seen as an exception to this, with relevant, modern provision. Better HE and EBP links to industry are needed. School leavers at 16 and 17 are perceived as very poor in terms of basic skills and attitudes to work. Any future recruiting will include basic skills tests.

Harman supports HNC and HND qualified technicians to study for degrees via the Open University, by paying for fees and study leave and providing mentoring. Line managers are pursuing OU Effective Management courses. The majority of operatives have NVQ2 in Performing Manufacturing Operations (EMTA), and this is seen as providing encouragement to further learning. Last year nine took up an offer of support to study IT at GCSE.

Harman has been involved with the development of an ‘NVQ on CD-ROM’ which aims to streamline the NVQ process.

The company has benefited from TEC partnership and support and feels that similar employer involvement needs to be ensured within the replacement CETW structures.

**Case Study: Toyota Deeside**

The Toyota engine plant at Deeside is a division of Toyota Motor Manufacturing UK. It employs around 350, but the centre of gravity for Toyota in UK is in Burnaston, Derbyshire, where around 3,000 are employed. Most training and human resources development activities are therefore located in Derbyshire.

Toyota is an example of a global operation where training and development have been largely internalised and integrated with a total operational philosophy. The Toyota approach to manufacturing is clear, comprehensive and systematic and embodies ‘lean manufacturing’ principles. It determines how operations are conducted, and this in turn determines training and development needs.

The selection process for production members (the Toyota term for staff) focuses on attitudes, personality and learning ability. Teamwork and quality awareness are seen as central attributes. These are measured in a half-day assessment centre which includes psychometric tests. Successful candidates enter a one week induction to Toyota philosophy and procedures, conducted at Deeside if numbers permit, or at Burnaston when numbers are small.

Maintenance team members are externally recruited with apprentice level qualifications, or selected internally from production team members who progress via in-house training programmes to become fully qualified maintenance members. Most technical training in areas like pneumatics, hydraulics, and process control is conducted at Burnaston in a purpose-built technical training centre. Such training includes NVQ3 awards.

Maintenance members are expected to be multi-skilled. Engineers can access in-house provision to chartered status, and may also undertake technical courses to facilitate co-operation and flexibility with maintenance teams.

Recruitment difficulties can be experienced for maintenance members, partly because of a tendency for candidates to display narrow technical skills, and because of the demands of the Toyota shift systems. No real problems are experienced at graduate and production member levels. The workforce in the area is relatively skilled in manufacturing work due to the presence of companies such as BAe, BICC, Ford and General Motors across the border in the North West of England.

The workforce is likely to expand over the next 2-3 years with the introduction of new engine lines, from 350 to approximately 500.

## Management and IT Skills

- 3.31 The analysis so far suggests that Management and IT Skills development will be central to the success of the automotive sector during the next phase of restructuring. Not mentioned so far, but important, is the likely central role of e-commerce throughout the sector. This is already an issue of strategic concern for the volume car manufacturers, who perceive a real threat to the existing distribution structures from net-based vehicle purchase.
- 3.32 It is likely that volume manufacturers will embrace e-commerce, not only to sell and communicate with the purchaser, but also as a key tool in establishing and developing the more closely knit global supply chains which we have already described. Therefore Welsh component suppliers will also need to become leaders in e-commerce in order to maintain competitive position against overseas suppliers.
- 3.33 An early example of this is the Ford, GM and Daimler-Chrysler collaboration, COVISINT, described as a 'business to business web portal', intended to provide component sourcing, and 'ordering parts and sub-assemblies from the shop floor over the internet' (from @Ford, the company in-house magazine, June 2000).

## Current and Potential Impacts of Skills Issues

- 3.34 The need to address skills issues in the automotive sector is very real and probably also urgent. This is due to the strong pressures for change in the sector, allied to the uncertainties affecting the general competitive environment for manufacturing in the UK. There is a clear need to maintain and increase productivity growth, and to cope with increasing demands for flexible supply of a range of integrated component systems.

## 4. Action on Skills

- 4.1 Much excellent work is being taken forward by the Welsh Automotive Forum (WAF) and others, to address the issues outlined so far.
- 4.2 The Wales 2000 Project is an example of action designed to improve the acquisition and application of management and IT skills by small and medium sized enterprises (SMEs) with under 250 employees. By these means it aims to help these firms identify and respond to current and anticipated skills shortages within their sectors. The project aims to support 34 SMEs in the automotive sector, out of a total of 160 companies trained. The initiative is funded by the European Social Fund (ESF).
- 4.3 However there remains a need for the various players in the public and private sectors to agree an integrated approach to skills issues in the automotive sector. There is a need for:
  - a collective and agreed statement of the key issues;
  - a closer dialogue and partnership between employers, providers, and national or regional public sector bodies;
  - based on this partnership and dialogue, an agreed strategy to address the skills issues via a specific schedule of activities by each partner.
- 4.4 This Skills Strategy for the Automotive Sector in Wales should dovetail with more general skills strategies for each region and for the manufacturing sector as a whole. These in turn should form part of the national skills action plan which will be developed as an aspect of the national economic development strategy. But the priority for actors in the sector is to start work on a sectoral strategy which can form the basis of early action while these wider relationships are being worked out.
- 4.5 Clearly the representatives of the sector, meeting within the Welsh Automotive Forum, will be key to this development work and subsequent implementation.
- 4.6 Based on our desk research and fieldwork, there are a number of key themes for action. Many of these themes also appear in our reports on other manufacturing sectors, particularly aerospace and electronics. They are as follows:
  - 1: supporting the changeover to **lean manufacturing at management and professional levels**;
  - 2: developing **high level marketing and strategy skills** and practice;
  - 3: supporting the development of **skills for lean manufacturing**;
  - 4: developing **team leaders**;
  - 5: developing skills (including management skills) in the **supply chain**, especially in SMEs;
  - 6: addressing **basic skills** issues in the workforce and new entrants;
  - 7: improving the work-readiness of school leavers and intermediate and higher level entrants to the workforce;
  - 8: providing progression within the workforce;

- 9: attracting new recruits into the sector;
- 10: improving the supply and development of IT user and practitioner skills in the sector;
- 11: addressing specific current or potential vocational skills shortages.

4.7 In relation to these we make specific recommendations.

- It would be possible to establish a cross sector working group on lean techniques and the implications for training and qualifications; there may be common ground between sector bodies, employers, and educationalists, which will permit a closer match between needs and provision in this area.
- The sector should identify and disseminate existing best practice in FE and HE provision; there have been a number of developments in Wales which can be usefully promoted within and beyond the sector; some are mentioned in this report, but there are likely to be others to be identified.
- There are some existing websites providing useful intelligence on the sector in Wales, notably the WDA site referenced in this report. However it would be useful to develop or add to these to produce a source of current intelligence for employers, employees, careers advisers and potential recruits to the sector. Information from employers would be a crucial input to this site, although intelligence from other bodies such as WDA, CETW and the Future Skills Wales Unit would also be important.
- Some employers feel there is scope to focus more sharply on the delivery and assessment of skills for lean manufacturing. There is scope to review the situation and if necessary to reflect the lean manufacturing approach more explicitly in frameworks and assessment practice.
- An existing team leader programme has been well received by some employers in the sector (see Case Studies); this could be developed and made more widely available throughout Wales.
- Some employers are concerned at the costs of training adults over 25; there is some prospect of a change in policy on this issue at national level; representation from the sector could strengthen support for these potential changes.
- The large number of existing SME training support programmes, while positive in itself, may present problems for employers wishing to access help. A central source of information for this and other sectors is needed, as part of current and future work on business support in Wales.
- There is some existing sectoral training activity via the Automotive Forum; this can be extended to cover current issues affecting the supply chain, such as development and integration issues and the impact of electronic commerce.
- Some employers report deficiencies in basic skills amongst job applicants, and in some cases are planning to include basic skills tests in recruitment programmes. The Basic Skills Agency is leading work in this area which will be of direct relevance to such employers.
- Other opportunities for adult learning, including basic skills provision, will arise from the initiation of Learndirect programmes. Employers can join with other agencies such as the Employment Service in encouraging their staff to take advantage of these new opportunities.
- Although much good work is being done, there are opportunities to work more widely, and across a wider range of employers, to establish links to education at all levels, and to promote the sector to educationalists and learners.
- Employers should review, where appropriate, the new Investors in People standard, as part of a general assessment of their human resource development strategies; the progression aspect of this work is particularly key in developing team leaders and future managers.
- Existing careers and skills events can be used to promote the sector; in addition, the recent UK Skills Show at the NEC in July 2000 showed how a major event focused on vocational skills can attract large numbers and showcase the potential for personal and career development. It would be possible to combine the Welsh finals of the constituent skills competitions to produce a Welsh version of this event (the co-ordinating body, UK SKILLS, would be a key player in such an initiative, together with Welsh FE colleges, National Training Organisations, and employers).
- Practical experience with e-commerce is needed by suppliers in order to meet manufacturer requirements. FE and HE institutions with existing skills can co-operate with employers to establish electronic networks and applications in non-critical areas. This would link to the earlier recommendation for a sector intelligence site or portal.
- Some employers felt that existing training in Mechatronics was a relatively weak area of provision. It was not possible to substantiate this to any degree within the study, but it may be an area for future review.

4.8 Recommendations for action under these themes are summarised in **Table 4.1**.

4.9 The potential impacts of action if taken forward are considerable – they could provide a basis for continued growth and success in the sector into the future, especially in the light of forecast growth in employment.

**Recommendations for future research**

4.10 In general there is good, publicly available information on the Welsh sector, particularly from the Centre for Automotive Industry Research at the University of Wales Cardiff. However as regards the workforce, information tends to be available for the engineering or manufacturing sectors more widely, reflecting to some extent the NTO structures in existence.

4.11 The first requirement is agreement on the number and definition of sectors which are to form the objects of strategies and action by the Assembly and public and private sector partners. Given the importance of the automotive sector for employment and output in Wales, we recommend that it is defined as a distinct sector, within manufacturing, for these purposes.



**Table 4.1: Themes and Recommendations**

Theme No:	Rec. No:	Action	Timescale	Key Partners
1	1a	Facilitate cross-sector working group on lean techniques linking to existing initiatives	From 2000	Various fora
2	2a	Disseminate best practice in HE/FE in-service provision	2001	HE/FE/ Emps/CETW
	2b	Develop focused auto market intelligence network for Wales (Net-based)	2001	Emps/WDA
3	3a	Review vocational qualifications to check applicability to lean manufacturing	2001/02	NTO/CETW/ Emps
	3b	Review/update assessor training and awareness of lean paradigm	2001/02	NTO/CETW/ Emps
4	4a	Develop scope and availability of existing team leader programme	2001/02	Emps/CETW
	4b	Support proposals for free adult training to Level 2 and make workplace opportunities available	From 2000	Emps/WAF/ Assembly
5	5a	Compile and disseminate directory of existing support programmes for SME training	2001	WDA/ Bus. Connect
	5b	Build supply chain development into sector training cluster programmes	2001/02	WAF/CETW/NTO
	5c	Work to increase focus and profile of Business Connect services	2001/02	WDA/ Bus. Connect
6	6a	Work with Basic Skills Agency to implement common definitions and tests in recruitment and training needs analyses	2001	WAF/CETW/ NTO/ES
	6b	Promote LearnDirect and learning centre opportunities to workforces & jobseekers	From 2000	Ufi/Emps/ WAF/ES
7	7a	Actively seek partnerships with local schools, EBPs, FE and HE	Ongoing	Emps/WAF/EBPs CETW
	7b	Proactively offer teacher/pupil/student placements	2001	Emps/WAF/ HE/FE
	7c	Promote sector plans and prospects to schools, young people and communities	2001	Emps/WAF/ CS/EBPs
8	8a	Consider adoption of new simplified liP standard	Ongoing	Emps/WAF
	8b	Review progression structures and opportunities	Ongoing	Emps/WAF
9	9a	Use existing careers and skills events to promote sector to new recruits	2001	NTO/CS
	9b	Review feasibility of a Wales version of the UK Skills Show (NEC 5-9 July 2000)	Now for 2001	NTOs/Assembly/ UK Skills/fora
10	10a	FE/HE and employers to co-operate to link e-commerce techniques with sector applications	Autumn 2000	WAF/HE/ FE/CETW
	10b	Establish Welsh auto sector portal site for sourcing, information exchange, promotion and training delivery	From autumn 2000	WAF/WDA/ CETW/NTO
11	11a	Review adequacy of provision of Mechatronics training	2001	CETW/WAF

4.12 Our recommendation is further that EMTA or a consortium of researchers including the NTO, should commission quantitative research to establish current workforce numbers and characteristics in the automotive sector in Wales. Unless there are existing data sources which we have not identified in this study, this will require primary research with manufacturing employers in Wales.

4.13 In principle this can be a fairly simple postal and/or telephone survey, which should be as nearly as possible a census of all significant operations in the

sector. It should be possible to enlist the co-operation and support of the Welsh Automotive Forum to facilitate this process.

4.14 This research could be combined, for efficiency, with similar work on other manufacturing sub-sectors, particularly aerospace and electronics, where similar information also appears lacking. The results, as well as informing strategy development for these sectors, should be useful to EMTA in the task of producing and updating a workforce development plan with a distinctively Welsh character.

- 4.15 The qualitative approach undertaken in this study is invaluable as a means of exploring issues within a sector and interpreting developments which, although expressed in similar language across sectors, often translate into quite different realities in each. We recommend that a similar methodology is used to examine further Welsh sectors in future, and, as suggested above, that it be used as a precursor and foundation for focused quantitative research.
- 4.16 Other recommendations for research on management and IT skills issues, which will affect the automotive sector, are contained in the separate report on management and IT skills issues.

## Annex A: References

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Clifton, 1999:

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**'Digest of Welsh Local Area Statistics 2000'**,

The National Assembly for Wales.

PWC, 2000:

**'Over 700 Tier One Component Suppliers will Go as Restructuring of the Motor Industry Accelerates'**:

article by PriceWaterhouse Coopers, May 18, 2000, on [www.just-auto.com/features](http://www.just-auto.com/features).

Rhys, 2000:

**'The Automotive Sector and Wales'**,

Professor Garel Rhys OBE, Director of the Centre for Automotive Industry Research, Cardiff University Business School.

WDA, 2000:

The Welsh Development Agency (WDA) maintains information on companies in the automotive manufacturing sector in Wales on [www.autoline.org/WDA/datasheets](http://www.autoline.org/WDA/datasheets)

## Other Key Sources

The Centre for Automotive Industry Research (CAIR), Cardiff Business School, Cardiff University; information on research and publications on [www.cf.ac.uk/carbs/research/cair](http://www.cf.ac.uk/carbs/research/cair).

The Wales 2000 Project, European Business Management School, University of Wales Swansea.

## Annex B: Sectors in context

### A Brief Overview Of The Relative Size And Importance Of Welsh Sectors

This paper presents an overview of the sectors selected for study within the Future Skills Wales Sectoral Skills project. It aims to give the relative scale of the sectors involved and some idea of their relative importance in Wales.

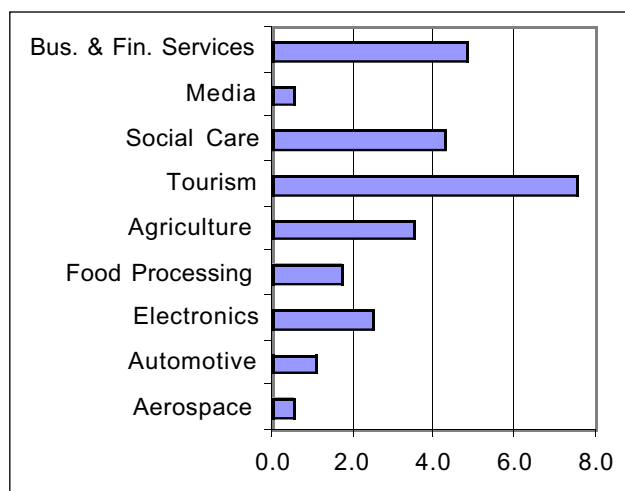
The data on employment used in this section is taken from the latest estimates from Business Strategies Limited (August 2000). Data on business units are taken from NOMIS. Some of the values given (for example for the number of businesses within Wales, or the size of the workforce, for a given sector) will not agree with estimates or calculations from other sources. This is due to differences in the detailed definitions of sectors, or in methods of estimation. However by using one source in this discussion, consistency in measurement or estimation is established, and better comparability is ensured. This is appropriate since here we are concerned with the relative sizes of sectors and their workforces, as much as with absolute numbers.

#### Sector Size: Workforce Numbers

Figure B.1 shows the employment figures for each of the sectors (employees and self employed) as a percentage of the total for Wales. By this measure Tourism, Leisure and Hospitality is the largest of the selected sectors, followed by Business and Financial Services, Social Care, and Agriculture and Farm Enterprises.

Together, the nine sectors selected for study in this project provide work (either as employees or in self employment) for around 26% of people working in Wales. This indicates the scope and potential importance of the exercise for the understanding of skills issues in Wales and the formulation of policy responses. (The rest of employment in Wales is accounted for by a large public sector, including government, education and public sector healthcare, and by the primary, construction, transport and distribution sectors, including retail).

**Figure B.1: Employment as a percentage of Welsh Employment: by Sector**

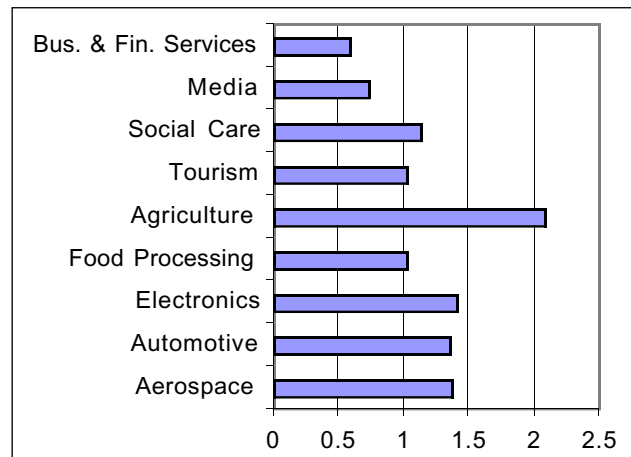


Source: BSL FSW Sector Forecast

### Employment Location Quotients

Figure B.2 provides a different view of the sectors, in terms of their importance within Wales relative to the UK as a whole. It does this by comparing the employment location quotients for the sectors. Employment location quotients are used to express the degree to which employment in a given sector is located in a selected region. To calculate a location quotient, an average percentage is first calculated for all employment in the region. Using the BSL estimates, for example, one finds that 4.3% of all employment in the UK is located in Wales.

**Figure B.2: Employment Location Quotients for Wales: by Sector**



Source: BSL FSW Sector Forecast

Therefore, if employment in a given sector is distributed evenly over all regions of the UK, one would expect 4.3% of its employment to be in Wales. The sector's Welsh employment percentage, at 4.3%, will be equivalent to the average employment percentage for Wales.

To calculate the employment location quotient, the sector's percentage is expressed as a ratio of the Welsh average percentage. For example if a sector has 5.2% of UK employment, the employment location quotient will be the ratio of 5.2 to 4.3, or 1.2. Quotients of more than 1 therefore indicate over-representation of employment in the Welsh sector relative to the UK as a whole. Quotients of around 1 indicate that employment in the sector in Wales is much as one would expect given the overall distribution of employment across the UK; and quotients below 1 indicates that the sector in Wales is relatively under-represented in terms of employment.

Figure B.2 shows that the strongest Welsh sectors, in these terms, are Agriculture, plus three of the manufacturing subsectors – Automotive, Aerospace and Electronics Manufacturing. UK employment is relatively concentrated in Wales for these sectors, despite the fact that some of them are small in relation to Welsh employment as a whole (Figure B.1). The Social Care sector also shows employment strength, while Food Processing and Tourism, Leisure and Hospitality are approximately in line with the Welsh share of UK employment.

Media and New Media, and the Business and Financial Services sector, are both under-represented in Wales in employment terms, with employment location quotients well below 1.

**Sector Size: Number of Businesses**

An alternative method of comparing sectors is by the number of business units in each sector. This can be less straightforward than the employment location quotient method used above. Here we are using data on business units in Wales and for Great Britain as a whole, provided in NOMIS. The main difficulty is the definition of a business unit within the published figures. This does not make a distinction between separate businesses, and locations representing branches or sites within one business. It also omits small ‘one-person’ business sites without formal employees.

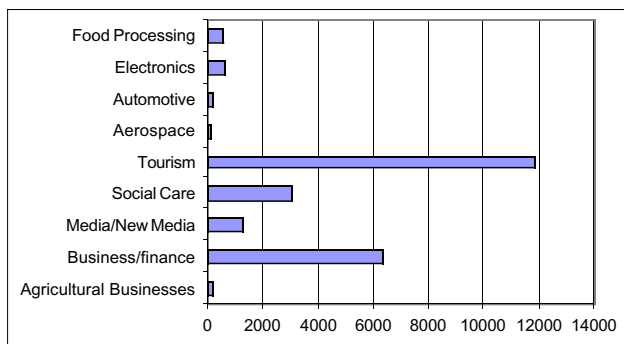
This means, in particular, that these figures are apt to be misleading as applied to the agricultural sector, since they represent agricultural businesses with employees, rather than all farms. They therefore greatly under-represent the number of agricultural enterprises in Wales. Although the business unit figures for agriculture have been included in the following analysis, they are therefore **not a reliable guide to agricultural sites in Wales.**

**Figure B.3** shows the sectors studied in terms of the number of business units in Wales. It shows that, by this measure, the Tourism, Leisure and Hospitality sector is by some way the largest. According to the NOMIS figures, this sector contains 12.4% of all Welsh business units, - around 1 in every 8.

A further 6.6% of Welsh business units are in the Business and Finance sector, and 3.2% in Social Care. The next largest sector, Media and New Media, includes a large number of businesses classified under ‘Other computer related services’. Many of these may be ‘New Media’ businesses within our study definition. Others, however, may be providing services which are not relevant within this definition. As explained above, the figures for agriculture do not represent the farming sector accurately.

In total the sectors covered by the study account for over 25% of business units located in Wales.

**Figure B.3: Number of Business Units – Selected Sectors**



Source: NOMIS

**Site Location Quotients of Welsh Sectors**

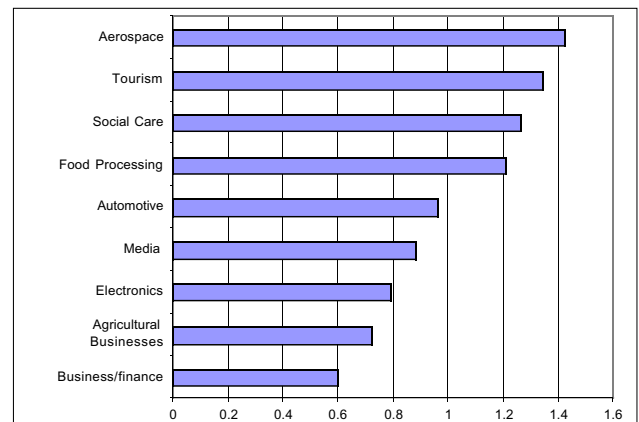
**Figure B.4** shows the site location quotients calculated for the sectors covered by this study. These are calculated as for the employment location quotients used earlier, but using business unit figures instead of employment numbers. Four of the sectors have quotients greater than 1. In other words, these sectors are ‘over-represented’ in Wales relative to what one might expect taking Great Britain as a whole. These quotients represent a degree of concentration of business units in

these sectors within Wales. These sectors are Aerospace, Tourism, Hospitality and Leisure, Social Care, and Food Processing.

The Automotive Manufacturing sector in Wales, with a location quotient of 0.96, is close to the size one might expect (in terms of numbers of business units). In other words, Wales has ‘a fair share’ of business units in this sector, according to these NOMIS figures. At the other end of the scale, the Business and Finance sector, with a site location quotient of only 0.6, is under-represented within Wales – confirming the findings of the first Future Skills Wales study in 1998.

Again, the quotient for ‘Agricultural Businesses’ reflects the limitations of the method, although it may indicate that Welsh farms and agricultural businesses tend to be smaller than the average for Great Britain, inasmuch as fewer of them are large enough to be included as business units.

**Figure B.4: Site Location Quotients**



Source: NOMIS

**Selection of Sectors for the Study**

The above discussion sheds light on the reasons for selecting this set of nine sectors. The reasons vary, but can be simply expressed as follows (some sectors are selected for more than one reason):

- sectors with significant proportions of Welsh businesses and/or workforce (Tourism, Business and Finance, Social Care);
- sectors which are important components of manufacturing industry within Wales (Aerospace, Electronics, Automotive, Food Processing);
- sectors which are relatively strong in Wales (Aerospace, Tourism, Social Care, Food Processing);
- sectors which are relatively weak in Wales, but are important for future growth (Business and Finance, Media/New Media);
- sectors with particular significance for Welsh culture and communities (Agriculture, Media/New Media).

**The Manufacturing Sector**

Manufacturing has been more important in the Welsh economy than for the UK as a whole. In 1998 employment in manufacturing (including but not limited to the sectors studied in this project) accounted for 19.7% of Welsh employment. This contrasted with 16.6% for the UK – a difference of 3.4 percentage points. Projections for 2004 show manufacturing employment as a lower percentage of employment in both cases – 17.3% in

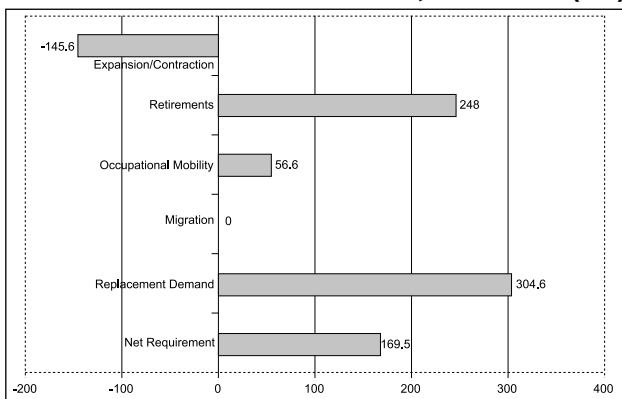
Wales, against 14% for the UK. Although the percentages are smaller, the difference between Wales and the UK, at 3.3 percentage points, remains almost unaffected. (DfEE, Skillsbase/IER, June 2000).

Although these projections show a fairly significant decline in the size of the manufacturing sector as a percentage of overall Welsh employment, the absolute numbers involved change less significantly. This is due to a projected rise in the total numbers employed in Wales over the period 1998-2004. Thus, the figure of 227,000 for those employed in manufacturing in 1998, becomes 205,000 in 2004 – a decline of 22,000, or just under ten percent.

When considering the future demand for skills it is important to keep in mind that, as illustrated above, relative decline in the manufacturing sector does not imply lack of future demand for manufacturing skills. This was one of the insights behind the original Future Skills Wales project methodology.

This point is further illustrated by the replacement demand projections for occupations associated with manufacturing. **Figure B.5** shows the replacement demand projection for skilled metal and electrical trades (SOC 52) for the period 1998-2004, across the UK. In this period, 145,600 jobs in these trades are expected to disappear – part of the overall decline in employment in manufacturing noted above. However, losses from these trades are projected consisting of 248,000 from retirement, and 56,600 from occupational mobility (movement into other jobs), a total of 304,600 workers to be replaced. This more than offsets the effects of declining employment, leaving a net requirement figure of 169,500. This represents the requirement for new, trained entrants to these trades in these six years. These may be new entrants to the workforce, or existing workers who have upgraded or added to their skills and qualifications.

**Figure B.5: Replacement Demand: Skilled Metal and Electrical Trades, 1998-2004 (UK)**



Source: DfEE Skillsbase/IER

Based on the assumption that Wales would require about 4.5% of this number (this being the approximate size of the Welsh workforce relative to that of the UK), this implies a net requirement for some 7,600 skilled metal and electrical tradespeople over this period for Wales.

## Annex C: The Supply of Manufacturing and Engineering Qualifications in Wales

It is far from straightforward to produce meaningful figures on the provision of skills in relation to sector skills needs. However it is at least possible to look at the provision of qualifications in the Welsh FE and HE sectors, and to examine the profile of these in relation to overall demand in the manufacturing sector in Wales.

The latest comprehensive figures on Welsh provision are published by the Wales Funding Councils and relate to the academic year 1997/98. In other words they describe provision which will generate skills and qualifications which typically became available to the labour market from late 1998 and (in the case of students in the earlier years of three year courses) in 1999 and 2000. Figures for 1998/99 should be published in late 2000.

The 1997/98 figures for all of Wales show that within Further Education, around one per cent of students were pursuing qualifications relating to Manufacturing. This represents some 5,441 students from a total of 398,044 enrolled at Welsh FE institutions. (These figures and those below are based on both full and part-time student enrolments).

In addition to this, approximately 4 per cent of FE students (16,543) aimed for Engineering qualifications.

These proportions are broadly reflected in the figures for the Welsh regions (Table C.1). There are slight variations: Manufacturing qualifications, for example, are more strongly represented in West Wales, and Engineering in the North, perhaps reflecting the emphasis of local demand.

As for the rest of the UK, Wales displays a **strong gender bias** to this enrolment pattern. Of those aiming for Manufacturing qualifications, 83% were male (4,529). Of those seeking Engineering qualifications, almost 94% (15,506) were male. This contrasts, for example, with the case of IT qualifications, where males represented just under 43% of the students enrolled.

For 1997/98 and the succeeding years, this total of 21,984 students enrolled will form the main input (from Further Education) of new skills and qualifications which are specific to the manufacturing sectors. This input will be complemented by entries to manufacturing of FE students with less sector specific qualifications and skills in, for example, sales and marketing, science and mathematics, or IT.

In Higher Education, there are no comparable figures for Manufacturing related subjects, but student enrolments are recorded for Engineering and Technology. The total enrolled for these qualifications in Welsh Higher Education Institutions in 1997/98 was 7,800. These enrolments are concentrated in institutions in the South-East and South-West of Wales (Table C.2). The main exception is North East Wales Institute, with 857 enrolments, though Bangor also has 233 enrolments in these subject areas.

Again, there is a very pronounced gender bias in terms of enrolments - 92% of students in this subject area are male. Only 1.6% of female students are enrolled in these subjects, as against 15% of male students.

In 1997/98 a total of 990 first degrees were awarded in Engineering and Technology by Welsh Higher Education Institutions (HEIs), mostly by full time and sandwich study. A further 776 other undergraduate qualifications were awarded, the majority via part-time study, giving a total of **1,766** awards at undergraduate level. Postgraduate qualifications were awarded in **256** cases.

There are no comparable published figures for **awards** by subject area from FE. Estimation of qualifications awarded per annum in Manufacturing and Engineering would need to take account of the average length of courses and the retention and attainment rates for these subjects. From the 22,000 students enrolled, for example, assuming two year courses, a retention rate of 83% (the average for all subjects), and an attainment rate of 60% (actual rates vary between 49% and 70% by qualification type), we can construct a rule-of-thumb estimate for annual output of these qualifications by FE. This would be  $11,000 \times 0.83 \times 0.6$ , or 5,480 awards.

**Table C.2: Engineering & Technology Enrolments, 1997/98**

Institution HEI	Enrolled in Engineering & Technology	Total Enrolled at HEI
University of Glamorgan	2,014	15,148
University of Wales Aberystwyth	0	9,743
University of Wales Bangor	233	10,017
Cardiff University	1,394	20,294
University of Wales Lampeter	0	2,313
University of Wales Swansea	1,323	13,085
Univ. Wales Coll. Of Medicine	0	3,208
Univ. Wales Institute Cardiff	415	7,853
Univ. Wales College Newport	976	7,757
North East Wales Institute	857	4,952
Swansea Inst. of Higher Ed	588	4,272
Trinity College Carmarthen	0	1,590
Welsh Coll. of Music & Drama	0	599
<b>Total for Welsh HEIs</b>	<b>7,800</b>	<b>100,831</b>

**Table C.1: FE Enrolments in Manufacturing/Engineering by Region 1997/98**

	SE	W	Mid	N	Totals
Manufacturing	1,697 1%	2,721 3%	174 1%	849 1%	5,441 1%
Engineering	7,204 4%	3,728 4%	824 3%	4,787 5%	16,543 4%
<b>Totals</b>	<b>8,901</b>	<b>6,449</b>	<b>998</b>	<b>5,636</b>	<b>21,984</b>

Taken with the 2,000 outputs from HE, this gives a figure of around **7,500** qualifications in manufacturing, engineering and technology subjects per annum at all levels. A complication is the relative lack of data on student destinations. Especially for Higher Education awards, students receiving the relevant qualifications may leave Wales before entering employment. This may be partly balanced by inflows of Welsh students who have completed studies at other UK universities. Therefore this is in many ways a rough estimate, but it does provide some basis for comparison with the size of the manufacturing sectors now and in future.

To this figure we also need to add qualifications obtained via non FEFCW funded provision – primarily vocational qualifications gained in sixth forms, and those gained via study with employers and private sector training providers, funded by the Welsh TECs. The yearly cohort size for pupils aged 18 or over leaving Welsh schools is around 12,000 (Digest of Welsh Statistics, 1999, National Assembly for Wales/Government Statistical Service, Table 3.2). However most of these will leave with non-vocational qualifications and skills; no figures for vocational awards were available at the time of reporting.

We do not have a comprehensive set of figures for qualifications gained, by vocational subject area, via TEC funded provision. Figures provided by Mid Wales TEC and South East Wales TEC suggest that a total of around 1,000 students per annum enter manufacturing related vocational courses in these two regions (at Modern Apprentice and National Traineeship level: adult training not included). Given the preponderance of the population in the South-East, one might assume that not more than another 1,000 per annum enter across West and North Wales. This gives a maximum estimate of 2,000 per annum for possible outputs of learners with manufacturing specific vocational skills and awards from TEC provision.

Taking all the key sources of supply, therefore, we arrive at a rough estimate of 9,500 for the annual supply of new people with manufacturing specific skills and qualifications.

### Manufacturing Sector Employment Demand

We can compare these estimates for annual supply with the BSL forecast for job opportunities in Wales, included in the original Future Skills Wales report. **Table C.3** shows gross job opportunities per annum in occupations which are closely related to the qualification subject areas analysed above (The Future Skills Needs of Wales, All Wales Report, Table 6.8). These figures take into account the effects of expansion or contraction in these occupations as well as retirement or movement out of the occupations due to occupational mobility.

The table shows that the forecast for new entrants needed in these largely manufacturing-specific occupations was **18,200** per annum – almost double our estimate of the annual supply of people with directly relevant and newly acquired training and qualifications.

### Manufacturing Specific Skills/Qualifications: Supply versus Demand

Given that our estimate of an annual supply of 9,500 is roughly correct, this implies that the remaining **8,700** new entrants to these occupations per annum will fall into one of the following categories:

**Table C.3: Forecast of Who Will Take Up Job Opportunities in Wales, 1997-2007**

(000s per annum)			
Occupation	Gross Job Opportunities p.a	People already working in Wales	Others (new entrants)
Skilled Engineering	3.7	1.8	1.9
Other Skilled Trades	7.9	3.7	4.3
Industrial Operatives	14.4	6.8	7.5
Drivers/Machine Operatives	5.6	1.1	4.5
<b>Total</b>	<b>31.6</b>	<b>13.4</b>	<b>18.2</b>

*Source: FSW All Wales Report, BSL 1998 (ONS and LFS data)*

- people with no training or qualifications;
- people with training or qualifications not in relevant vocational areas;
- people with relevant training and qualifications from outside Wales.

To this extent, one might speak of a **mismatch between supply and demand** for vocational manufacturing skills in Wales. However, more qualitative evidence from employers suggests that they are often concerned about the quality of skills on offer, rather than the numbers of people applying with qualifications in the right area and at the right level. We must be cautious, therefore, in drawing conclusions about the need to change the balance of provision, based on the estimates presented here.

There is little in the analysis to suggest that the relationship between supply and demand will be significantly different in different Welsh regions. It does suggest, however, that the supply of people with manufacturing qualifications is strongly biased towards males – a situation which is unlikely to assist in the elimination of existing gender imbalances in the manufacturing sector workforce as a whole. In particular it would seem that workers with relevant qualifications – and therefore a better chance of progressing within the workforce – are much more likely to be male.

This attempt to analyse the fit between supply and demand has indicated some of the difficulties arising from limited current availability of provision data, and some of the complexity inherent in this task. While such an analysis can probably not provide a complete and accurate basis for provision planning (which, anyway, will be strongly affected by student demand), it does serve to indicate the relative scales of provision and occupational and sector needs. In the case of manufacturing, it provides food for thought about the balance of provision.

