

SKILL GAPS IN THE AUTOMOTIVE SUPPLY CHAIN IN THE WEST AND EAST MIDLANDS 2005

OCCUPATIONAL STRUCTURES

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3.1 Introduction

By setting out the research data on occupational structures among vehicle manufacturers and suppliers, and discussing the variations that occurred, this section informs the detailed analysis of changing workforce competences and skill issues that is presented from section 4 onwards.

3.2 Occupational structures

A decision was taken by Skills4Auto and BCTRA in the course of project preparation that, rather than using the Standard Occupational Classification (SOC), a more definitive representation of the actual occupational groups which exist in vehicle manufacturing and the supply chain could be achieved by using a revised occupational classification comprising the following groups:

- Directors and Senior Managers
- Manufacturing Operations
- Technical, Design and Engineering, including Maintenance.
- Purchasing.
- Receivables, Stores and Despatch, Supply Chain Logistics.
- Quality.
- Systems and IT.
- Sales and Marketing.
- Finance and Administration.
- Human Resources, and
- Training.

Various additional occupations were mentioned by survey participants, such as:

- Aftermarket logistics.
- Aftersales service and repair.
- Legal.
- Health and Safety.
- A retail showroom.
- A sport and racing section.
- A call centre, and
- Production and materials control (see Appendices 1 – 3: 'other occupations').

Although the occupational classification generally fitted quite well the organisational structure of the surveyed companies, not surprisingly there were variations according to the combination and co-location of different functions, the degree of multi-functionality, and the use of outsourcing (see footnotes, Appendices 1 – 3):

- Issue was taken by some firms with the inclusion of Maintenance with Technical, Engineering and Design, whereas frequently, for them, it was a separate function, or it was located within Manufacturing Operations.
- It was rare to find Design staff among the SMEs, but more usual for them to have Engineers responsible for Development.
- There was some functional separation between Receivables, Stores, Despatch, and Supply Chain Logistics. In some companies, Supply Chain Logistics did not exist (because it was outsourced to a partner company), or it was undertaken by the customer, or it was a separate function from Stores and Despatch.
- It was also possible to find Purchasing within the Receivables, Stores and Despatch division.
- For 2 vehicle manufacturers, there was no Purchasing department for parts and materials, as this was done by other parts of the group overseas. Similarly, the absence of Design or Sales staff indicates that this function was off-site.
- In some cases there was no separate Quality division. In a 1st tier, for example, Quality was located within Administration, Stores or Technical Engineering functions. Among the SMEs, one firm had a combined Technical/Engineering, Toolroom, Design and Quality department. The Managing Director of one of the smallest companies maintained that every employee was responsible for Quality.
- IT and Systems responsibility could be outsourced, or housed within other functions, such as Administration. In one vehicle manufacturer, there was no separate information systems department as this was done from Europe.

- Training was generally located within the Human Resources department (where this existed), but one of the 1st tiers had no Human Resources division at all as this function was housed within individual sections such as Production. This was unusual among relatively large companies (note: this was a multi-national company).
- The vehicle manufacturers tended to have their own training corps, in one case numbering as many as 32 people. In contrast, another firm mainly used external consultants for delivery. Unusually, one of the largest vehicle manufacturers had a workforce development department distinct from the Training section, and there were also process trainers within each workshop.
- It was common to find that the SMEs had no separate Human Resources or Training section. It was often the role of the Managing Director or another Senior Manager, in one case the Manager of the Toolroom.

3.3 Comparative sizes of occupational groups

Plotting the total numbers of employees and average numbers per company for vehicle manufacturers, 1st tiers and SMEs shows how many people were employed within

Occupational groups among the vehicle manufacturers, 1st tiers and SMEs	Average number of personnel per company among each of these three groups		
	Vehicle Manfrs.	1stTiers	SMEs
Directors and Senior Managers	51	9	7
Manufacturing Operations	1,643	202	44
Technical, Design and Engineering	626	63	5
Purchasing	36	5	2
Receivals, Stores, Despatch, Supply Chain Logistics	106	21	6
Quality	54	11	4
Systems and IT	37	4	1
Sales and Marketing	114	8	3
Finance and Administration	55	7	2
Human Resources	55	5	1
Training personnel	9	1	0.3

each occupational group (see Appendices 1 - 3). Some differences appear between these employer groups when the average sizes of each occupational group are plotted beside each other, as presented in Tables 3.1 and 3.2. These results have some significance as they can suggest where the relative strengths or limitations, or the lack of specialist expertise, exist in the available resources.

As Tables 3.1 and 3.2, below, reveal:

- It is not surprising to find Manufacturing Operations in first place as the largest occupational group for vehicle manufacturers, 1st tiers and SMEs. But for both vehicle manufacturers and 1st tiers the Technical, Design and Engineering division was the second largest group, whereas among SMEs the Directors and Senior Managers formed the second largest group, with Technical functions in fourth place.
- Purchasing was slightly lower in the ranking among vehicle manufacturers for average size of occupational group than among either the 1st tiers or the SMEs.

Table 3.1: Comparison of average number of personnel in each occupation within vehicle manufacturers, 1st tiers and SMEs
Average number of personnel per company among each of these three groups

Cases: 6 vehicle manufacturers (max.), 10 1st tiers (max.), 7 SMEs.

Table 3.2: Ranking of average sizes of each occupational group in vehicle manufacturers, 1st tiers and SMEs (ranked 1 – 11, highest to lowest staff numbers)

Occupational groups among the vehicle manufacturers, 1st tiers and SMEs	Average number of personnel per company among each of these three groups		
	Vehicle Manfrs.	1stTiers	SMEs
Directors and Senior Managers	8	5	2
Manufacturing Operations	1	1	1
Technical, Design and Engineering	2	2	4
Purchasing	10	=8	=7
Receivals, Stores, Despatch, Supply Chain Logistics	4	3	3
Quality	7	4	5
Systems and IT	9	10	=9
Sales and Marketing	3	6	6
Finance and Administration	=5	7	=7
Human Resources	=5	=8	=9
Training personnel	11	11	11

Note: rankings relate to numbers of employees in each occupational group, one (first) is largest size (most employees), 11 (eleventh) is smallest size (fewest employees). Refer to Table 3.1 above for average numbers in each group from which these figures are derived.

- Among the vehicle manufacturers, Sales and Marketing comprised the third largest group, whereas in the 1st tiers and the SMEs it was sixth. Also larger among the vehicle manufacturers than among the other two employer groups were Finance and Administration, and Human Resources.
- Among the 1st tiers there was slightly higher representation in the Quality function than, respectively, among the vehicle manufacturers or SMEs.
- Firms were least likely to have Training staff.

3.4 Multi-functional Directors and Senior Managers

It is common knowledge that, among SMEs in particular, Directors and Senior Managers, and also non-managers, may fulfil multiple roles. Table 3.3 (overleaf) shows the extent of multi-functionalism in SMEs by Directors and Senior Managers, confirming that they were also likely to take responsibility for:

- Sales and Marketing.
- Financial Management.
- Quality, or
- Manufacturing Operations.

Table 3.3: Numbers of Directors and Senior Managers in SMEs, and their functional responsibilities

Occupational groups within SMEs	Numbers of Directors and Senior Managers also responsible for other functions: 7 SMEs combined
Directors and Senior Managers - total number:	
of which, also responsible for heading:	47
Manufacturing Operations	5
Technical, Design and Engineering including Maintenance	3
Purchasing	2
Receivals, Stores, Despatch, Supply Chain Logistics	1
Quality	6
Systems and IT	1
Sales and Marketing	8
Finance and Administration	7
Human Resources	1
Training	2

Cases: 7 (max.).

The confirmation of multiple roles is especially pertinent given the point made by one 1st tier that SMEs had a misunderstanding of what constitutes lean manufacture. It was asserted that SMEs equated it to becoming as lean a workforce as possible in order to reduce costs (rather than also investing in their workforces through training). They believed that consequently SMEs had no spare capacity and some staff did multiple jobs, so they possessed fewer specialist competences. The research also indicated that some smaller and/or mixed 1st and 2nd tier firms were likely to have problems in meeting vehicle manufacturers' expectations on implementing lean manufacture, not least due to their lack of resources, including specialist knowledge and expertise.

This examination of the occupational breakdowns of survey participants revealed that occupational structure could vary significantly according to the size of firm and its place in the hierarchy of vehicle production and supply. We have seen that it was not unusual to co-locate functions to form a combined division, and some rather unexpected juxtapositions occurred to improve rationalisation and reduce costs. Workforce multi-functionalism, adaptability and flexibility were visible not just among the SMEs, but were identifiable as key objectives across the vehicle manufacturing and supply sector more generally. With this insight in view, it is useful now to look at changing competences in the workplace and, firstly, at what was driving those changes.

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DRIVERS FOR CHANGING WORKFORCE COMPETENCES

4.1 Introduction

To understand the impetus for changing skill needs in the workplace, respondents were given a comprehensive list of factors and were asked to rate them for their significance in driving changes in the skills and knowledge that people need to do their jobs. They were also at liberty to nominate additional factors and to contribute further comments.

Using a 5-point rating to indicate the level of importance of these factors in driving changes in the competences firms required, they were questioned on the significance of:

- E-business.
- PC and software changes.
- New technology, processes or materials.
- Organisational changes in the business.
- Lean manufacture
- Cost reduction.
- Recycling and materials tracking legislation.
- Emissions standards legislation.
- *Other legislation was also highlighted by firms, particularly Employment Law and [Health and] Safety, and to a lesser extent Working Time regulations, Grievance and Disciplinary legislation, Corporate Social Responsibility, Security in Vehicles; Waste Disposal.*
- New services.
- New products or product changes.
- Market diversification.
- Overseas production links.
- [More] exporting.
- Knowledge of overseas manufacturers' operations in order to win new business.
- Greater customer service.
- Increased or changing customer requirements.
- Project management for customers.
- Changing ownership (if relevant).
- Competition from other firms in their field.
- Organisational changes in the business.
- Other drivers for change. These included:
 - *airport and fire brigade authorities' regulations which governed product specifications;*
 - *issues relating to the maintenance of quality levels;*
 - *the level of staff turnover, and the departing skill base which affected production operations in small cells;*
 - *recruitment problems concerning sales/marketing staff.*

The distinguishing features for vehicle manufacturers, 1st tiers, and SMEs are captured in Appendix 4, which ranks the key drivers for workforce skill changes, and in the chart series set out in Appendix 5 (a) – (i).

The general consensus was that, overall:

- Cost reduction and lean manufacture constituted the primary change drivers as they were 'very significant' to 17 and 15 firms (respectively) (see Figure 4.1).

Other key drivers were:

- *New technology (12 firms).*
- *Greater customer service (12).*
- *Changing customer requirements (11).*
- *New products (11), and*
- *Competition (10).*

Overall, the least significant factors in driving workforce skill needs included:

- *A knowledge of overseas manufacturers in order to win new business.*
- *New services introduced, and*
- *The use of E-business.*

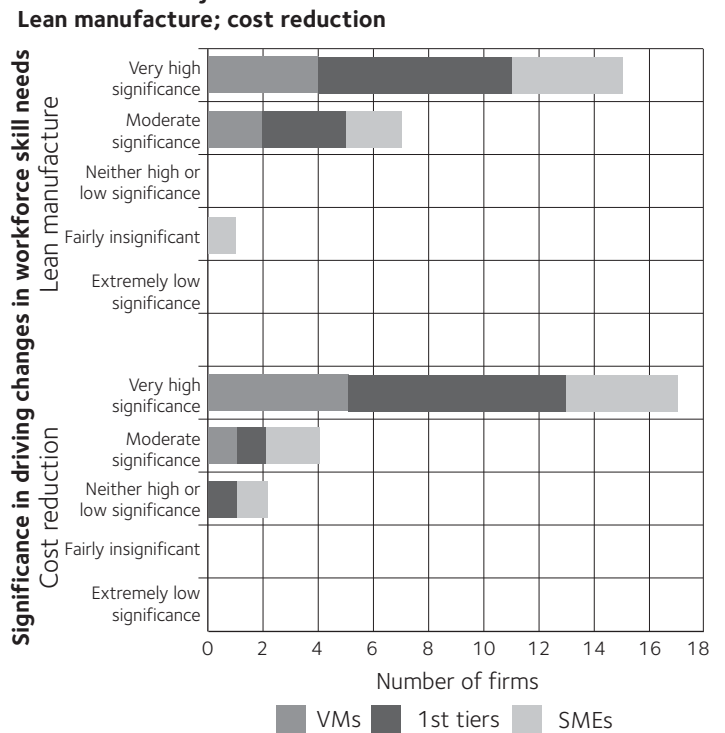
4.2 Cost reduction, lean manufacture and organizational change

Concerns about skill issues relating to cost reduction and lean manufacture pervade the entire survey findings, and, as we shall see later, they also strongly affect the comments on skill needs among individual occupational groups. One vehicle manufacturer commented that it was *“hard to separate cost reduction from lean manufacture.”* For an SME, the emphasis on improved efficiency was through processes in particular. Becoming leaner, too, meant *“huge organisational changes”* as one 1st tier pointed out, since there were fewer people to execute tasks. Various vehicle manufacturers and 1st tiers highlighted the need to attain more multi-skilling and flexibility. Another intended to become a matrix organisation, and commented that they were heavily overstaffed. More outsourcing, and some devolution of centralised responsibilities was evident, including:

- The devolution of Human Resources responsibility to line managers (note: this had already been achieved by another 1st tier), and
- The internal transfer of certain personnel e.g. administrative functions.

Among the SMEs, more cell working was highlighted. Another commented that getting employees *“to do more for themselves”* was a key objective, not easy to achieve when they were reluctant to embrace change. Shifting people around was a fact of life in small organisations. Another SME had made *“minor organisational changes”* (though perhaps with considerable implications for specialist expertise) whereby the Quality Director had become the Sales Director. In a small 1st tier firm, the Commercial Director was now the Purchasing Director.

Figure 4.1: The significance of lean manufacture and cost reduction in driving change in how people do their jobs.



Cases for Figures 4.1 – 4.6: 6–7 vehicle manufacturers, 10–11 1st tiers, 7 SMEs.

Comments on organisational change indicate, too, that reducing cost and implementing lean manufacture were not solely a way of cutting out waste, duplication and over-staffing, and achieving greater production efficiency, but of instilling a new way of working – new approaches were required across the whole business. For one vehicle manufacturer, the key issue was *“how to get everyone working to the group’s common philosophy”* which was driving changes in their internal processes and required people to benchmark themselves and analyse their weak points.

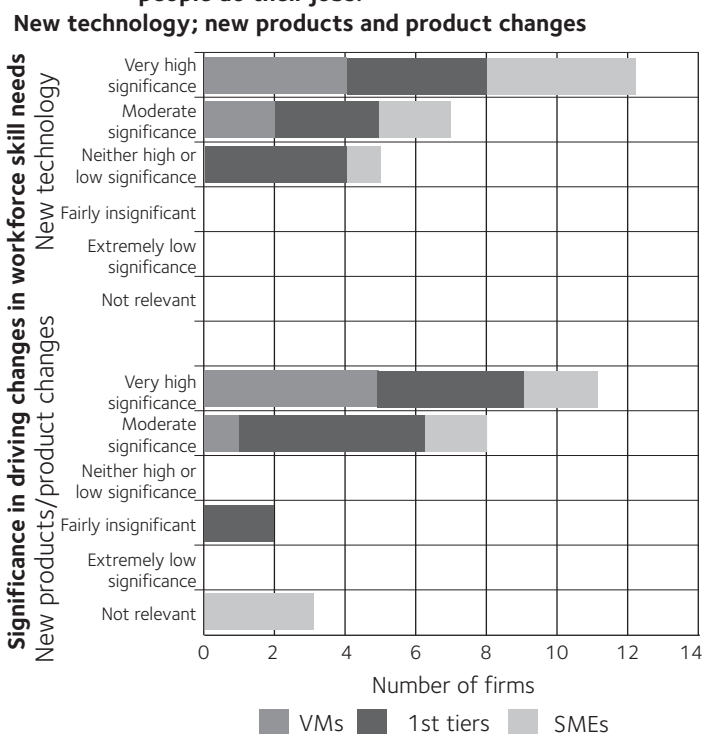
Standardisation of structure and process across all parts of multi-national groups was a major concern for certain firms. One vehicle manufacture had changed their plant’s structure in order to standardise manufacturing divisions and functions across all the group’s manufacturing plants. Another needed to achieve: *“a closer working relationship with other parts of the group.”*

Among the vehicle manufacturers due to undergo a major restructuring, one was focused on becoming “a hybrid organisation – retailers, logisticians, experts in global economics and distribution, focusing engineering on lean product development (so selling the knowledge dimension of engineering).”

4.3 New products and new technology

The crucial importance of getting new or changed products onto the marketplace and positioning at the leading edge of new technology were also among the key drivers (see Figure 4.2). For some this involved new model launches or updated systems. In some cases it concerned the skill implications of adopting or developing a radically new technology or material. A small SME, for example, had diversified from plastics into metal and ceramic injection moulding where there was less competition. Another SME commented that they did not have a product, but would like to, clearly aware that they had no prior experience.

Figure 4.2: The significance of new technology, new products and product changes in driving change in how people do their jobs.



A vehicle manufacturer described new products and new technology as “very significant” to their future, explaining that:

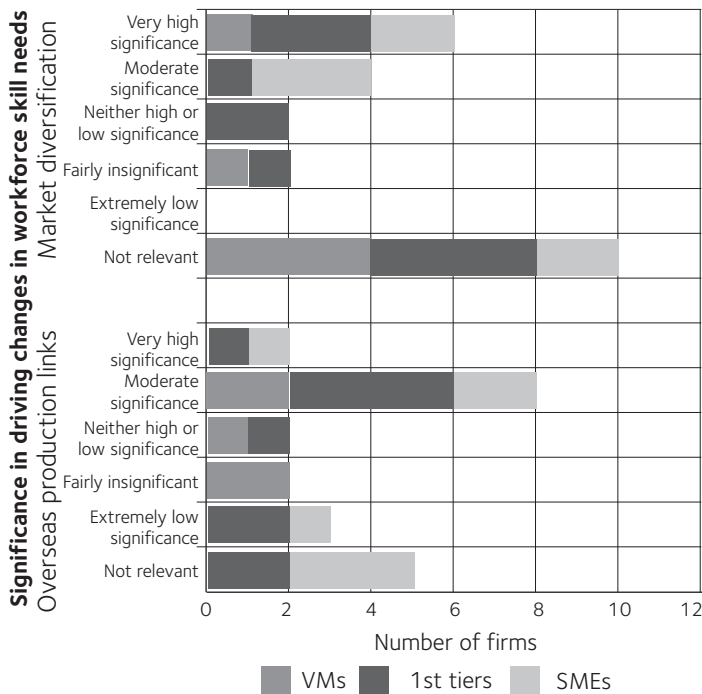
“Cars have more sophisticated technology and features and we need to have a better understanding of global markets. We need to be knowledge managers in engineering development. We need to develop our product creativity and design. Creativity needs to be harnessed. We shall make cars digitally which other people manufacture so we can reduce the lead-in times. Therefore we will build fewer prototypes because it is done on-screen. And so the development process will shorten, so reducing development costs and we can focus more on sophisticated technology – advanced technology and features, and new power (fuel cells) which we could develop ourselves.”

4.4 Overseas production links, market diversification, overseas knowledge and more exporting

Overseas linkages such as production alliances, the need to have better knowledge of overseas manufacturers in order to win their business, to export more, and to achieve a more diversified market base were not particularly strong drivers for skill changes overall, although were singled out by a minority (see Figure 4.3 and Appendix 5g).

Figure 4.3: The significance of market diversification and overseas production links in driving change in how people do their jobs.

New technology; new products and product changes



Those concerned about the skill implications of overseas production links included vehicle manufacturers, 1st tiers and SMEs. Linkages included overseas sister plants of multinational groups (in relation to intra-group supply, for example). One company pointed out that they needed language skills to communicate with their operations in Hungary, Poland, China, India etc.

Joint ventures were also a priority for some.

“We can’t rely on manufacturing expertise alone,” said a vehicle manufacturer, adding: “So we need to understand the commercial value to be gained from joint venture partnerships to develop and sell products with international partners. So we can build cars relatively cheaper and can focus our money on design/development rather than on components. We need to further our knowledge of global economics.”

They were enhancing their knowledge of global economics via their links with the Technology Innovation Centre.

Suppliers were also keen to forge new links. An engines 1st tier observed: *“This is an issue now as most OEMs are overseas.”* But they mused that: *“No-one from overseas has said yet that they want us to set something up overseas.”* Some SMEs already had overseas links through buying products direct from overseas manufacturers or distributors. Three others were intent on forging new links. Establishing overseas manufacturing facilities were on the cards: *“We have none at the moment but it is a driver because we need to forge links abroad to manufacture parts”* commented a prototypes and sheet metal worker. *“We have got to learn how to outsource to low cost countries and establish a plant and joint venture overseas”* asserted another SME.

In relation to market diversification, intentions included straightforward expansion of customer numbers as well as new types of customers. In one case a move had started into supplying to off-highway vehicles and potentially into marine vehicles. For vehicle manufacturers, diversification also involved developing and selling new vehicle ranges to a different type of end-consumer. For an SME, diversifying their customer base entailed developing new technologies and processing skills.

Clearly, for some the emphasis was devoted more overtly to overseas manufacturing link-ups. But, in terms of [more]exporting, one small 1st tier firm did comment that this entailed a better knowledge of Intrastat commodity codes to supply information to customers. Little was said here on the need to have a knowledge of overseas manufacturers in order to win their business but, in relation to skill gaps, as we shall see later, any overseas links accentuated the lack of language skills and cultural knowledge.

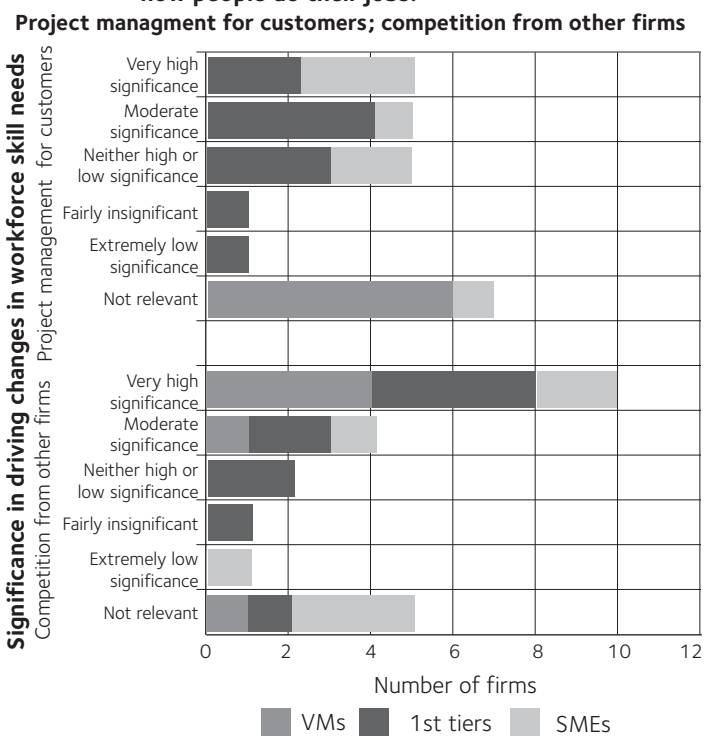
4.5 Competition

Significantly, battling against fierce competition was highly important and clearly underpinned the other major concerns for vehicle manufacturers, Although, for the 1st tiers and SMEs, other issues overrode this consideration (Figure 4.4) the comments that were contributed clearly show that:

- Suppliers found competition “very severe”, were concerned about “keeping in business” and were affected by the “loss of work to low cost competitors” in particular.

Competition, as one supplier pointed out, could arrive from other parts of their group. Getting products to the marketplace quicker than their competitors was vital, noted a vehicle manufacturer. Both vehicle manufacturers and suppliers viewed quality and efficiency improvements as a major element of achieving that competitive edge.

Figure 4.4: The significance of project management and competition from other firms in driving change in how people do their jobs.



On the upside, a small wiring harnesses 1st tier supplier had picked up work as their competitors went bust, but this put them in a more prominent position as regards supply to their major customer. As a small company they were perhaps even more concerned about competing against larger, more highly resourced and efficient rivals:

“A lot of smaller manufacturers in our field are disappearing so we are compared by customers to large global suppliers. So our skills and knowledge are very important and we need to carve a little niche for ourselves with our main customer in order to keep their business. So we need to achieve a quick turnover, fast turnaround and are nearby.”

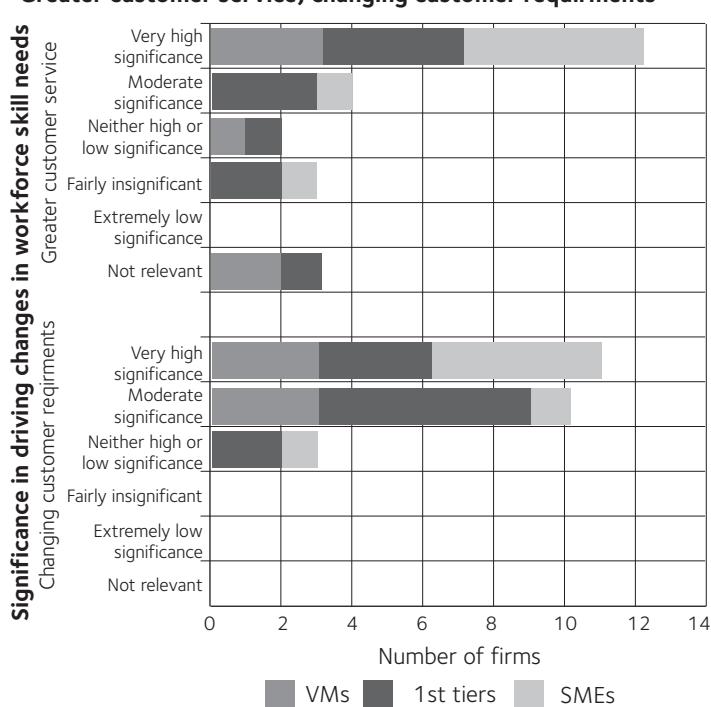
Consolidation between 1st tiers was an issue, too, for a company who saw both a threat and an opportunity in 1st tier component suppliers getting more into consultancy by doing design, making bodies, interiors, and assembling cars.

4.6 Customer-facing skills, new services and project management

It is interesting to see that:

- ‘Greater customer service’ and ‘changing customer requirements’ had high significance among the vehicle manufacturers, less so among the 1st tiers, but were the chief change drivers among the SMEs (Figure 4.5).

Figure 4.5: The significance of greater customer service and changing customer requirements in driving change in how people do their jobs.



'Customers' for vehicle manufacturers are of course the purchasers of vehicles they produce, and catering to their changing and individual tastes and expectations was a vital consideration for them in selling successfully against a proliferation of competing models and features. *"The customer demands more as regards quality and reliability, so we need to build to the right standard all the time"* noted a large vehicle manufacturer. This was leading to an upskilling of their production capability. For another vehicle manufacturer, selling through dealers placed an emphasis on skills to service and repair cars and provide spare parts.

But for 1st tiers and SMEs 'customers' are of course the vehicle manufacturers and other suppliers they are contracted to. The SMEs among the survey participants were particularly sensitive to the skill impacts on their businesses of improving their ability to serve their customers, and responding to changing customer demands, not just in relation to technological, specification and materials changes to the components supplied, but also including the frequency, sequencing, packing, labelling and traceability of that supply. *"If they ask for something, we try to give more"* said one SME.

Undertaking project management for customers was not relevant at all in driving workforce skill needs in the vehicle manufacturers, though of some significance to the 1st tiers and more so to the SMEs who were probably less accustomed to this task and aware that new competences were required of them. A small 1st tier wiring harnesses firm commented that their main customer was driving 6 Sigma through their operations and were looking for team members to work on projects for and with them. They were very aware of the skill issues for themselves. But forging closer working relationships with a customer was difficult when you were dealing with a large multinational and purchasing decisions were separated from their logistics, strategic and manufacturing needs. Operations were globalized and purchasing decisions were not site-driven by the proximity of suppliers. Suppliers were selected on the paperwork evidence of their capabilities.

New services were particularly insignificant in driving changes in skill needs among the vehicle manufacturers (see Appendix 5e). Neither were many comments received from the 1st tiers, apart from a small 1st tier company which anticipated delivering systems direct to their customer's production lines, raising the prospect of greater skill needs for themselves in

relation to logistics, and attaining greater efficiency. New services were more relevant to SMEs who in some cases clearly linked improved customer service with adding value through their production capabilities. *"We want to finish, assemble and bend tube"* said a tube components SME. *"We want to get into new processes"* said a machining and fabrications SME, adding: *"More and more of what we are doing is going to China."*

4.7 E-business and PC and software changes

The use of e-business had few skill implications, though one vehicle manufacturer believed it would become more significant to their business. A 1st tier highlighted the use of electronics systems relating to Just in Time (JIT) delivery. The use of e-purchasing was raised by a tube components SME, who stated: *"People are increasingly using internet auctions"* adding: *"Our commercial people need to know how they work."* Another SME commented, too, that they would get more involved in e-business.

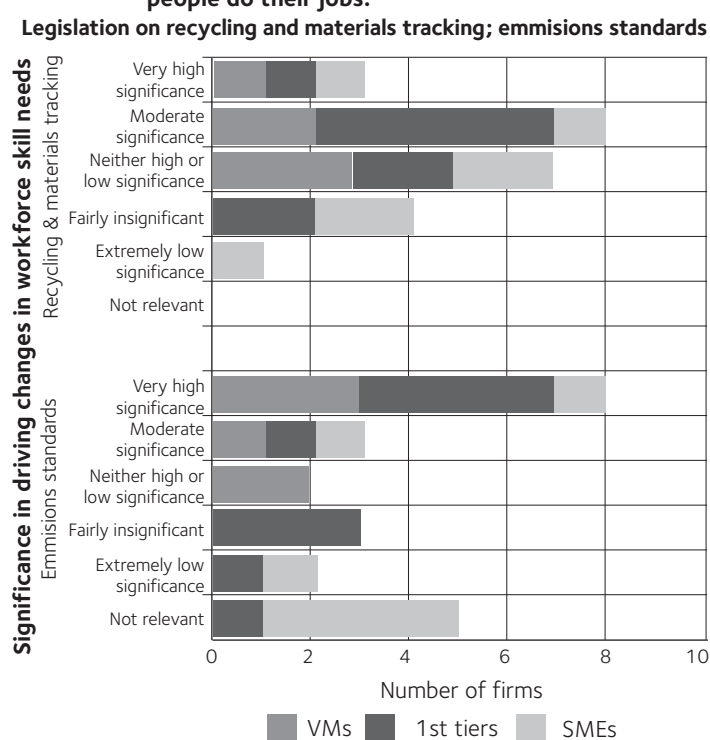
PC and software changes were generally of moderate rather than high significance, and had various applications from financial systems and billing, to internal communication systems, and technological, design and communication advances. The need for IT/software training was highlighted by two vehicle manufacturers and an SME. A large vehicle manufacturer commented on their organisation's conservatism in relation to IT and software changes, saying: *"We don't exploit this very well."* On the other hand, they had removed email from team leaders and below so that people had to talk to each other.

Another vehicle manufacturer commented that the use of digital technology was crucial to their company. They highlighted Catia S, needed links to software writing companies, and funds to buy this and other advanced software.

4.8 Emissions standards and recycling

Meeting the increasingly stringent emissions standards was an important consideration, notably among the vehicle manufacturers; recycling was a lesser issue (see Figure 4.6).

Figure 4.6: The significance of recycling and emissions standards legislation in driving change in how people do their jobs.



'Emissions' had differing connotations including limiting noise from electronics (electro-magnetic interference); lowering emissions from furnace operations; and design to achieve reduced engine noise.

Recycling was of moderate rather than high significance. It included the recycling of scrap, 'cradle to the grave' product traceability and the impacts of the End of Vehicle Life directive. *"We are very aware of this"* said a vehicle manufacturer. *"We need to be compliant on IMDS online documentation"* indicated an SME.

This completes the discussion of drivers for changes in workforce competences. Section 5 now appraises the changing expectations and roles of each occupational group, and the consequences for their evolving skill needs.