Strategic action by employees building work-related identities in engineering

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1. Introduction:

Employers attempt to shape employees' work identities through the organisation of work. However, they are partly constrained by employee expectations related to education and training, the occupational structure and the labour market. Employees, individually and collectively, also attempt to influence how their work is performed and play an active role in shaping their own work identities. Work identities are therefore influenced both by structural factors and the agency of employers and employees. This article concentrates upon how individuals seek to shape their own work identities. However, an overview of the broad structural context of working in engineering and metal working in France, Germany, Spain and the UK is given below, followed by an outline of how employers sought to shape work identities.

2. Overview of broad structural context of working in the metal working sector:

There is a strong demand from employers across Europe for workers with technical skills allied to 'modern' skill sets, including abilities to work in teams and communicate effectively. In all the countries studied some companies had relatively stable workforces, whereas others experienced considerable variation, especially in the UK. In one company a radical reorganisation to the pattern and pace of work meant that over half the employees left in the space of a couple of years. In another case, an employer responded to major cost-downs from manufacturers by closing one factory and expanding production at another location close-by. Employees could transfer, on significantly reduced rates of pay, or take redundancy. Most staff chose the latter route. Many Spanish companies employed some workers on temporary contracts and this led to significant labour market mobility, and many employees experienced temporary work at some stage of their working lives.

Employers could draw their workers from the immediate locality or from much farther afield. Some companies drew almost exclusively from the locality and there were examples where employers attempted to lock employees into the company through paying highest rates in the area. Those companies that drew workers from farther afield included German employers employing workers from Eastern Europe. Larger employers, particularly in France and the UK and less so in Spain, had expectations that specialist and managerial staff would be prepared to move locations, even internationally, as required. Some intra-company transfers in the UK resulted in employees living hundreds of kilometres from their families during the week - a situation that was very unlikely to be expected or undertaken in Spain.

There are still promotion opportunities for skilled workers to supervisory or specialist positions in some companies in all the countries studied, but this depends on having 'modern' skill sets and/or undertaking further training. There are far fewer promoted positions because of organisational restructuring, particularly at supervisory and junior managerial levels, and there is increased competition for such posts particularly from graduates.

All companies have been introducing greater flexibility in work and expect staff to accept resulting changes in patterns of work organisation, often involving team working or attempts to improve manufacturing practice through a focus upon continuous improvement (and on

quality, costs and delivery). In the UK there were attempts to follow Japanese 'best practice', with an emphasis upon machine turn-round times, 'right first time' and so on. These changes are intended to improve competitiveness, and major manufacturers have been pressurising their suppliers, sometimes through the use of very aggressive year on year cost-downs. Overall, flexibility in work organisation has been a major goal of employers in the sector, although there are major differences in companies' attempts to achieve this.

Generally greater attention has been given to work-based learning, in relation to team-working, continuous improvement programmes and supervisory training. In France and Spain employers' hiring decisions acted as a strong incentive for prospective employees to obtain relevant initial technical qualifications, while the whole ethos of the German 'dual system' was to lock employers into support for initial craft and technician education and training. Craft qualifications are valued by employers in the UK too, but there were a greater variety of ways of becoming skilled, with the initial skills formation system being relatively under-developed.

In the UK some employer support for learning and development focused upon supply chain development, while in Germany some employers felt that such co-operation had been a long-standing feature of inter-company relationships. In all countries studied external training and/or qualifications are linked to work requirements, but some employers encourage all forms of learning as part of more general employee development programmes. Some companies in all countries were making greater use of graduate level entry for supervisory or production support positions.

Companies vary greatly in whether regular work activities provide a rich or poor learning environment, depending upon how work is organised, the nature of production and the size of the company. Different groups of workers may also have differential access to further education and training. Employers' commitment to learning is very variable, but general competitive pressures and actions across supply chains are driving at least some learning in the workplace.

Employers have been changing roles and responsibilities and experimenting with different patterns of work organisation (including team working, manufacturing cells and varying skill mixes). In some cases the emphasis is more upon work intensification rather than high performance. Other companies are shifting from direct manufacturing to provision of engineering services and this requires changing skill sets for employees.

In the UK in particular, organisational commitment rather than occupational identities drives much of the organisation of work, often with an explicit emphasis on flexibility and multi-skilling. These trends are noticeable to some extent everywhere, and some German companies viewed the attachment of workers to a single occupational perspective as problematic in attempts to introduce greater team-working. However, in all countries there are enormous variations in the degree of skill required of workers in different workplaces. Spain and the UK have in the past made more use of low skilled labour than France or Germany, particularly in small or medium size companies.

However, even in sub-sectors utilising considerable knowledge intensive high value-added work, as in aerospace, high skill, high performance is not the only paradigm to use in the organisation of work. Indeed one specialist aerospace company found that its most profitable component had a very low technical specification and could have been produced by any general engineering company. In contrast, the costs on its specialist knowledge intensive work, that perhaps only two other companies in the world could undertake, were so tightly controlled by the customer that it made very little contribution to company profitability. Similarly, one automobile manufacturer in the UK with a new factory and an ultra-modern

approach to the organisation of work was by far the least efficient company in the sector simply because it could not sell enough of its cars.

When considering the relationship between organisation of work and work identities it is important to distinguish between companies where skilled workers are a very small minority and production is largely routine and those where more highly skilled workers play more of a role in production, support and related activities. In the latter case companies were making different choices about the appropriate skill mix, particularly in relation to the employment of graduates or those with craft or other intermediate skills. However, the latter distinction was becoming blurred as countries opened up progression routes so that more individuals had both intermediate skills and graduate qualifications. Interestingly, with the under-development of intermediate skill formation routes and the massive expansion of higher education in the UK opportunities were available to develop intermediate skills as part of or subsequent to HE study, through foundation degrees, graduate apprenticeships and similar developments.

Some employers in all four countries studied seemed to have 'got the message across' to employees of the need to make changes in the organisation of work in order to make the company more competitive. There is a discourse based around an assumed global vision of effective working processes and practices, with employees in Germany, Spain and the UK all expressing satisfaction with their work despite significant work intensification. In some cases this was because a smoother production process had ironed out difficulties that had caused problems for workers in their jobs. However, some employees in all four countries also mentioned that they took a pride in the improved effectiveness of their companies even if this sometimes meant sacrifices upon their part.

There were other instances though where workers feel the organisation of work, pay and other conditions of work are all strongly weighted in favour of the employer. In Spain, some employees complained that their current pay did not recognise their training efforts, the hardship of their work, nor their responsibility at work. Shift work can be problematic and contract workers, in particular, may feel that they need to accommodate to all their employers' demands. Some employees in small UK companies too complained of work intensification and the redrawing of the boundaries of the wage-work nexus.

There seems to be a clear divide between those cases where most workers are being given more autonomy and responsibility and those where the manufacturing process is being even more tightly controlled, with an emphasis upon cost reduction. With all the changes to flexible working the traditional individual commitment to many particular occupations has been weakened. In some cases human resources staff are consciously trying to reshape the focus of commitment more towards the team. Identification with the company is encouraged, but often not to the extent of in the past (when workers were expected to work for an employer for a lifetime). This process is evident in all countries, but has probably gone furthest in the UK. Employers are trying to achieve balances between autonomy and control and identification with the company without over-identification (and dependence).

In many companies in all four countries there is a greater emphasis upon mutual support by employees, whether or not this is associated with team-working. The greater commitment being demonstrated to the company is thereby mediated by a desire not to let colleagues down. This means that although attachment (in the sense of an expectation of a long relationship with a particular employer) may be weaker than in the past, de facto commitment in terms of task completion and role fulfilment may be higher.

Overall changes in the structural context have meant that occupational identities in engineering and metal working are undergoing significant change, particularly in response to increased competition and changing patterns of work organisation. Occupational identities were particularly likely to be in flux for employees working in multi-functional teams, or as

change agents, team leaders, or supervisory staff whose influence had been reduced, or in companies that have shifted from direct manufacturing to providing engineering services. In all these cases the type of work undertaken and the mix of skills required were changing, in some cases dramatically.

3.   How employers sought to shape employee identities

Identification with challenging work
In some instances challenge was at the heart of the work being performed. This was more likely in some occupations and sub-sectors than others, but where it did occur employer and employee perspectives were generally in strong alignment on three central dimensions:
- Engagement with work activities: very high - challenging work; high levels of employee autonomy and responsibility; sense of pride in work processes and outcomes;
- Interaction with others: key relationship is with the employer with high trust and high commitment expected (for example, through willingness to give of own time - either directly, as in unpaid overtime, or indirectly, through thinking through problems or discussing them with others outside work);
- Learning and development: learning through working as a major form of development, but with training and support for key roles, such as project leaders and system engineers.

This was the classic form of 'professional engagement' of highly skilled workers. This was, however, not unproblematic. The focus upon quality, personal performance and identification with a particular type of work could in some circumstances be problematic, particularly where the employer was giving more emphasis upon balancing quality with cost and time considerations. Similarly where multi-disciplinary team-work had been introduced and workers were expected to be willing to undertake a wide range of duties, then strong attachment to particular 'traditional' occupational perspectives could generate tensions.

Increasing use of graduates
The increasing use of graduates in the sector was a widespread trend. In France, the principal driver for some large companies was the desire to get young, more highly qualified workers who were expected to be more flexible in their approach to work, easier to retrain as required, and willing to undertake a range of work. They were expected generally to display attitudes more in tune with 'modern workplaces.'

These trends were reinforced where companies were making more complex sub-assemblies and/or selling their expertise in collaboration over design and manufacture, not just selling components. Such changes, evident across Europe, though not in all companies, had resulted in the need for a more extended knowledge base, and this presented a significant challenge not only in terms of initial qualifications, but also in relation to a continuing commitment to learning and development. These changes favoured the employment of graduates. However, such graduates need not necessarily have entered higher education straight from school. In France, Germany and the UK there was evidence of employers encouraging progression routes that built upon work experience and work-based qualifications and led through to degree qualifications.

These shifts from a concentration almost exclusively upon production to a focus upon facilities management, expertise and collaboration, with an emphasis upon advice and development rather than just selling products, mean companies following a 'high value-added strategy' are increasingly dependent upon developing their specialist knowledge. Whereas the employment of more graduates was relatively unproblematic in France and the UK, this was not so in Germany. There such changes were potentially more disruptive, as they had major implications for those skilled workers looking to become Meisters. The whole structure of a progressive

work-based route could be undermined in those companies where work previously undertaken by experienced Meisters was now performed by graduate design and process engineers.

One German manager remarked that the company strongly preferred to recruit new graduates and train them in the company way, whereas in the UK the greatest demand is for graduates with some experience. The former was concerned with identity development, whereas the latter were more interested in skill utilisation - the more 'work ready' the graduate the better.

Employers can attempt to reshape work identities to accommodate various changes at the level of the individual company, but there may be longer-term sytemic implications, as in Germany in relation to the relative attractiveness of the dual system, Meister training and HE.

Desire for employees to have a greater range of communication skills
Employers sometimes wanted to reshape work identities so employees interacted more intensively not only internally through project teams and work groups, but also externally through supply chains. This had implications for interactions with others (including working with colleagues from other countries and/or other companies) and learning and development (of inter-cultural communication and co-operation). These trends were reinforced where companies were selling their specialist expertise, not just making things. Marketing in its broadest sense was also becoming more important and many employees had to be able to 'represent' the company when dealing with people from outside the company, including of course customers. This meant there was strong employer demand for employees to have a greater range of communication skills than in the past.

Accommodation to changing non-work values
Employers actively trying to shape employee identities, but some employers also sought to accommodate the changing non-work values of their employees. They recognised their employees' identities at work could be linked to other aspects of non-work identities. This could be manifest in support for various forms of employee development that did not link directly to organisational development. However, there were still many examples of employers sending explicit or implicit messages to staff that non-work activities (including family life or preferences of other family members) should not 'interfere' with work decisions. This was perhaps most evident in France and the UK where in some companies it was clear that a refusal to relocate could be held against you and harm your career progression prospects.

Relationship between employers' attempts to shape employee identities and the structural features of different national systems
In France employers' attempts to shape employee identities and the structural features of the national system seem broadly congruent. The structural features include the development of the vocational baccalaureate, the strengthening of technical education and training, greater attention being given to employer-directed continuing vocational training and employee self-directed continuing learning and development (including through the bilan de competence). These align with the changes consequent upon employers in the metal sector making greater use of more highly qualified labour, including graduates.

In Spain the apprenticeship system has recovered after a short period of decline, and continuing training, including that offered by suppliers or vendors, seems to be well-regarded. The hierarchy of employment conditions means that the desire to get permanent employment with the 'best employers' drives the demand for initial and continuing education and training in this sector.

In the UK apprenticeship and other intermediate skills development routes remain under-developed. However, employers appear to have adjusted to this in their organisation of work and where they are trying to follow a 'high value added strategy' or upgrade their skill base they have been making use of the expanded pool of graduates and/or using work-based development

strategies. The latter have sometimes been based around formulaic approaches to continuous improvement derived from Japanese manufacturing practices.

In Germany there is a sense of a system in flux. The metal working sector has traditionally been based upon strong institutional support, employer interdependence and complexity of (high value-added) products, but the dual system and Meister training are currently under strain. Also companies are finding that strong occupational attachments of workers are under pressure in relation to the need for new forms of interaction with customers and team working, and this has consequences for learning and development of communication skills and multi-disciplinary co-operation.

A wider question is whether employers' attempts to shape work identities aligns with societal 'offers' and individual perspectives in a sustainable way. For example, in Germany should the initial work identities of employees now be based around a more fully developed (graduate) knowledge base rather than on the traditional strengths of 'incremental' innovation, linked to the specialised knowledge of work processes and practices based upon advanced craft skills up to Meister level? The model of incremental innovation is itself linked to powerful societal and institutional support, including employer networks, related to the use of medium-level technology and the production of high quality products in established industries.

The old skill formation system, however, was also highly gendered and slow to respond to the increasing cultural diversity of the workforce. In this sense work identity formation has to be linked to identity formation processes in the wider society. Some of the employee interviews though indicate the resistance encountered in everyday practice by those who challenge stereotyped work identities even when they are offered a job by employers looking for talent beyond the ranks of young German males.

4.   Strategic action by employees building their own work-related identities

The major aim of the Fame project was to answer the question of how employees respond towards changes in their working environment and working lives. So far structural changes and employers' attempts to shape work identities have been outlined. However, what are individuals' strategies for coping with these changes and how do they affect their work identities? The intention in this section is therefore to look at individuals' personal responses, reactions and interpretation regarding changes at work. This will be followed by a commentary upon the policy relevance of the findings.

The focus is upon the strategic actions of those working in metal work and engineering based upon the 'strategic biographies' of individuals. This biographical perspective is useful, as for many individuals the nature of their commitment and work-related identity changes over time. Our interviews highlighted that the relationship between individuals and the occupational roles they were required to perform could be represented in terms of their patterns of strategic action across a range of structural, cultural and social contexts (compare Pollard *et al.* (2000) doing this for pupils over their school career). Their careers could be mapped in terms of their patterns of relationships, orientation and adaptive response to work and it is possible to trace the dynamic development of individuals' characteristic repertoires of strategic action - their 'strategic biographies'.

> **Identification** represents the 'classical' form of adaptive strategy - the individual identifies more or less completely with work and the employing organisation. Through strategic compliance the individual seeks to satisfy expectations (of employer, colleagues and customers or clients) of how to perform her or his role. They usually accept the conventions of their workgroup and are integrated into their occupational and organisational life. They are likely to remain in the same job for a considerable period of time. For our interviewees this was probably the largest

category. But significantly we had a number of (mainly older) people for whom this relationship went sour.

In all four countries we also had examples of people starting work in production, maintenance or other technical areas and then time being promoted to, for example, a supervisory position. This could be seen as a natural progression and need not necessarily interfere with their initial occupational identification, although some promotions do result in a distinct break with the former occupation and involve a redefinition of an individual's role.

Long-term adjustment represents a more conditional form of adaptation - the individual may remain in an occupation and/or with a particular employer, but recognises this represents a compromise. Typically factors outside work (family commitments, attachment to a particular location) may 'hold' an individual in place. The individual may still seek to satisfy role expectations (of employer, colleagues and customers or clients), but typically has some reservations about work. The individual may stay in the job for a long time, but may move if the 'holding' circumstances change. Examples of reasons why interviewees felt 'locked into' their current work included accommodation to working patterns of a partner; attachment to a particular locality and attachment to their immediate work group. There were also cases of women who really liked their work, but could not fully identify with it because of the extent of the harassment they faced from male colleagues.

Short-term adjustment represents a fully conditional form of adaptation - the individual only intends to remain in an occupation and/or with a particular employer for a short time. Because of individual circumstances, choice, career plans or dissatisfaction with work, the individual is actively seeking alternative employment. Some interviewees were looking to change employers. The slack labour market in Germany meant that some companies recruited former engineering apprentices to work in areas like the warehouse and these employees adjusted to work requiring no engineering knowledge whatsoever, while hoping to get skilled work eventually.

Strategic careerists see their current occupational position and/or organisational attachment as one phase of a career that involves relatively frequent changes in the nature of work they do. They are committed to 'moving on' and see their careers as something that they actively construct (although sometimes the employer has a development plan for an individual on a 'career track'). Their attachment to their current role is partly influenced by the knowledge that they are only 'passing through'.
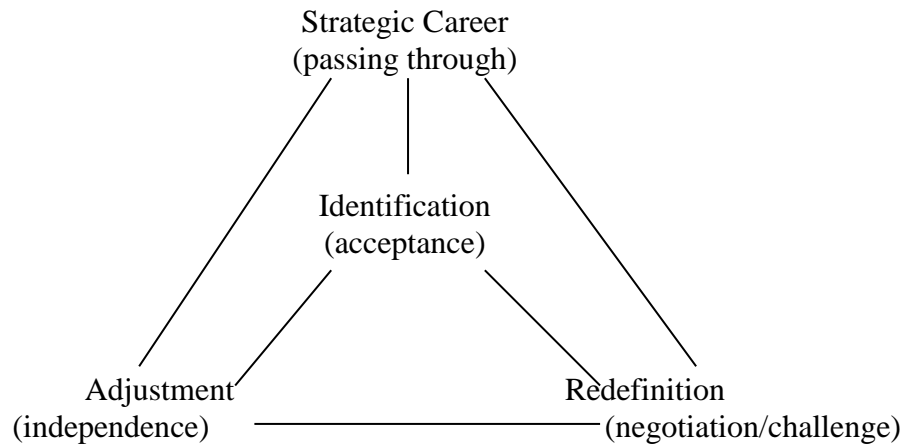
We did come across individuals who identified with their work, but who were active in **re-defining**, rather than passively accepting, work-related roles. **Re-definition** is associated with the same mainstream patterns of achievement and cultural norms as those exhibiting more passive forms of **identification** (Pollard et al, 2000). However, those using **re-defining** strategies are operating at the cutting edge of norms and expectations, pushing at the boundaries of expectations of employers, colleagues and others, typically negotiating, challenging and leading their peers in some respect. Such reshaping could come from 'within' a role and sometimes from 'outside' (or above), and, although rare, there were some examples of redefining their roles.

The second form of **re-definition** occurred when an individual sought to change their occupation and/or employer, because they wanted (or saw themselves forced) to change career direction. There were examples where individuals had changed career direction quite radically, both into and out of engineering.

It is possible, building upon these ideas, to construct a model of how individuals could relate to their work, possibly moving from point to point over time (see Figure 1).

Figure 1: A model of the forms of strategic action of individuals in relation to their work

Strategic Career
(passing through)

Identification
(acceptance)

Adjustment
(independence)

Redefinition
(negotiation/challenge)

In the following commentary we give examples of each of these forms of adaptation.

5.   Different forms of adaptation to work

5.1   Strategic careerists 'passing through' occupations:

There were former engineering apprentices who moved into commercial functions (like sales and marketing) very early in their career and then progressed into management. There were also examples of graduates working in engineering in the UK with degrees from other fields, including sports science. The former transitions were common in a number of different settings and national contexts. The relatively more open UK labour market, however, meant that graduates often felt that they had a relatively wide range of choice (e.g. accountancy firms will take graduates from any discipline and recruitment from engineering as a numerate discipline was not uncommon).

Engineer with strategic career moving between occupations and sectors
Richard is an engineering graduate, in his mid-forties, who worked in engineering, contract electronics, supply chain development and finally moved from the technical side into the commercial area. He worked for a large engineering company that had sponsored him at university. He worked for them for seven years mainly doing project work, and took a manufacturing management conversion programme for engineers. Richard then returned to another division of the company as a logistics manager. He had, however, become increasingly interested in electronics and decided strategically to switch to working in the expanding electronics industry. He worked in contract electronics, then in an IT company and eventually became a supply chain manager with a large company of drinks suppliers.

Richard has always been highly committed to his work that has often involved being part of a project team. He sought to increase his experience in areas that were business-led rather than technical, when he recognised he had much less international market experience than others in the commercial field. On the technical side he had gone as far as he was likely to go. This is a 'classic' example of a strategic career with little long-term attachment to either a specific occupation or a particular organisation. While this approach is in some ways identified as a

'modern' orientation, in fact this has long been a common route for those seeking to get into senior management positions in the UK.

5.2   Identification with occupation and employer

In all four countries studied many individuals had a strong attachment to their occupation and employer. The identification could be to their chosen technical profession ('I enjoy making things, solving problems and so on'), but the image of the company (precision engineers) or its products (aircraft or luxury cars) could complement their view of themselves as 'highly skilled.' This type of identification was most common early in a career, perhaps because there was less time for disillusion to set in or for people to feel they needed a change. However, it was perhaps most complete for those who had been working on more or less the same track for more than twenty years as the following examples illustrate. These particular examples are drawn from France and Germany, but almost identical cases could be drawn from Spain or the UK.

Skilled worker promoted to head of maintenance but with an unswerving identification with occupation and employer
Henri has been head of a production maintenance team of a major vehicle manufacturer for fifteen years. He is now in his mid-fifties and started with the company in 1976. His work involves planning, animating and co-ordinating the activities of the maintenance team in informal and formal interactions and establishing continuous links with other teams within the plant. Henri was initially trained as a 'fitter-toolmaker' at a vocational school. All his subsequent work-related training has been employer-directed, linked to the equipment used and technology introduced in the company. The training was intended to promote adaptability to new products, services, techniques and technological processes.

Henri has a good working relationship with management and enjoys a relatively high level of autonomy and responsibility in his job. He once exchanged his position as head of maintenance with the head of the production team for one year, allowing Henri to familiarise himself with the work of other departments and teams, enrich his personal know-how, extend his relational network and to feel his skills were transversal.

Henri is highly committed to his work, the company and the quality of the cars produced, and is quite satisfied with his career. He values job-stability (despite the structural and technological changes), relatively interesting work, and the financial and non-financial rewards his job offers. He believes in achieving a reasonable balance between his attachment to work, his own family and commitments towards his district community. He is active on the council of a local college parents' association and as a vice-president of a district association working to establish a socio-cultural centre.

Engineer promoted to team leader with an unswerving identification with occupation
Ludger is an engineer in his fifties and works as a team leader in a large European aerospace company with 1,200 employees in North Germany. After completing an apprenticeship as an engine fitter, he studied mechanical engineering at university for three years, because he thought that he was 'capable of doing much more than just being an engine fitter.' Thereafter, he continued at another university for another three and a half years and graduated as a mechanical engineer.

Ludger began work for the company in the late 1970s and 'still performs the same tasks' he did early in his career. He is currently a project co-ordinator, writing project proposals, supervising projects and carrying out necessary calculations and tests before completion of a project. Working in the aerospace industry requires special engineering skills and only a few universities teach the theoretical basics of space technology. This means that most of the special skills required have to be learnt on the job, especially through 'learning by doing'.

Working on several projects at the same time and supervising each project from beginning to end requires interdisciplinary thinking and working. Employees learn through training on the job, 'learning by doing' and through courses offered by the company. Currently he is working on 14 projects, ranging from small 'free research and development' projects through to the International Space Station. It is rather unusual to work on so many projects and in order to cope with the workload his team is being expanded.

Ludger works and make decisions independently and his team consists of 6 engineers. Officially the position of team leader no longer exists. It was axed in order to eliminate traditional hierarchies and facilitate better co-operation between engineers and their superiors. In practice, however, this position is still necessary and Ludger is still referred to as a team leader, someone who co-ordinates projects.

Since Ludger started work the tasks themselves have not changed so much, despite increasing computerisation, but what has changed are the work organisation and the time frame. Around 15 years ago time frames were less rigid and the full costs were agreed and paid only after the project was completed. This method allowed for integrating new ideas and accommodating adjustments and extension of time frames and budgets as required. Since then the company has been working on fixed price contracts where projects have to be completed on time and within budget. Another change is that Ludger (like most engineers) has to perform more administrative and organisational tasks and has less time for technical work.

Ludger believes that as an engineer he has the will and motivation to construct something new and see the results of his work. He strongly identifies with his work, the products and takes pride in the projects he sees through to successful completion. Formerly, he used to identify strongly with the company, but as a result of numerous organisational changes, including changing the name of the company, his core identity now lies solely with his work and work activities. One very important factor shaping Ludger's occupational identity is the recognition of his work by colleagues and from collaborating companies. Generally, Ludger is very satisfied with his work. He works independently, makes his own decisions and continuously develops his skills through 'learning on the job.' He sees new tasks as a challenge and an opportunity to learn more. Conflicts with colleagues in his team are rare.

There are some drawbacks, however. The most obvious conflict arose between Ludger's approach to work and new demands from senior management. He feels the need to work thoroughly and check and test a product for possible mistakes more often than officially required to be very sure everything is technically sound. This, however, contradicts with the pressure from management for not putting too much emphasis on one single product and not spending more time and money than necessary. In contrast, Ludger's conviction is that priority should be given to completing a project without mistakes. Although this may initially imply higher costs, Ludger believes it is cheaper in the long run since the clients and engineers can be sure that the product works thus considerably reducing the risks of a complete failure. But this principle puts Ludger in a difficult situation, as he is regarded as too cautious with certain technical 'solutions' and he fears that this might result in an exclusion of his knowledge and expertise. His decisions have to be well thought over, because he worries about the consequences of possible failures.

Time pressure also generates conflicts. The workload is constantly increasing and the time span of projects reduces. Formerly, one project would be completed before starting work on the next. Now several projects overlap and have to be handled at the same time making work more complex, interdependent, and interactive. This leads to an increase in stress, but can also be seen as an opportunity to learn to work on an interdisciplinary basis.

The extremely specialised skills means that 'once you are in this field, it is very difficult to change.' At one point Ludger worked for a few months in the U.S. for the same company. He

might have considered moving but only if there were feasible job opportunities in his field of specialisation. This, however, was not the case.

5.3 Long-term adjustment

Long-term adjustment occurs where an individual recognises that her or his current job and/or employer is not ideal, but all in all it is 'the best job they are likely to get'. Another form of long-term adjustment represents a 'more explicit compromise', when an individual could get a better job elsewhere, but is 'held' in place in their current job by factors outside work. The following give examples of both types of adjustment.

Work not ideal but likely to be 'as good as it gets'
Luis is a maintenance worker in the engine plant of a car factory in Spain. He is in his early thirties and has worked in many different posts at the company, at first in a temporary capacity, since he was 19. Initially after several years on the line, he volunteered to go to a different plant. When Luis was 26 he did a two year apprenticeship in electro-mechanics and now works as a technician repairing machines. The work is interesting and well paid and Luis now has a permanent contract. Unlike working on the line, Luis considers it to be real work with dignity. Now it is easy to disconnect when he leaves work. When he started on the assembly line he used to dream of the line. His work is more relaxed now because he controls the situation, although you have to give 100% attention. He thinks up to now he has done all right.

It is a responsible job, and when everything is working, Luis has autonomy and the power to decide on the most effective solution to a problem. The work is complex, but the company provides training and you learn from colleagues, and it takes about a year to reach full competence. Luis is fairly happy with his position, salary, the teamwork and he thinks it is a place where you learn a lot. He has friends in the industry, working in small workshops. There they work hard from day to day to survive.

When he started on the line it was a fairly chaotic, dark and very dirty place. You could not avoid the dust but it is much better now. Even in his current job, there are drawbacks: changing shifts affects meals and sleep; 'if you work at night you work under pressure, just when you are used to it you have to change again….. when working at maximum capacity, we do three shifts and weekends. It's definitely in my contract. I have worked on all the shifts possible. The best thing would be to have a fixed timetable.'

'Even so, this is the best job I have had - you are in control. Whereas in the first jobs I had, the machine controlled me, I was under its orders.' His current job 'requires skill and intelligence, but what I like most is to discover new things and know why and how things work. It's solving a problem, a personal achievement, and a challenge. For me work is very important, although on the negative side, this work takes up a lot of your personal time and I value the time I spend away from here a lot. For me the first thing is the family and after that everything else. Because of that, as regards time, there are more bad things than good things.'

Former engineering apprentice initially adapting to work because of family commitments, then deciding in his mid-thirties upon a strategic career direction
David is in his early forties and worked for the same company for 20 years. He started apprenticeship training with the local car manufacturer at 16. He continued with day release at college, leading to technical HE qualifications, and was eventually employed as an engineer working on engine development. David and his wife came from a small town close to the plant and had strong family and other local attachments. His wife was self-employed and had built a loyal client base, so he continued for eighteen years to work at the same plant, which was the only large engineering employer in the area. When they had two children the local links were intensified as both sets of parents provided 'family back-up' for child-care. He

finally decided to move: 'I think the only real reason I moved out was because I knew I'd be stuck in a dead-end job for the rest of my career.'

David transferred to another plant over a hundred miles away to take a more challenging job in engine design and development. His family did not move, and he commuted at week-ends. He worked there for five years and completed a part-time Master's degree in manufacturing management. He felt his combination of experience and qualifications were not recognised by the company, so he looked for other work. Going on the Master's course had extended his horizons and networks and he received various job offers.

David accepted a job with another car manufacturer on a 'contract basis', even further away from home, and he worked for them for two years. During this time a firm of consulting engineers offered him a job. Initially he refused, but a year later he 'was gently persuaded.' He recognised 'there were opportunities to get on in a young small company and I knew that with my strengths I could develop quite well, and the money was good.' The job as project operations manager for engine test operations was challenging, with responsibility for all stages of the design, delivery and test process, a large team to manage and considerable autonomy. After working on contract to broaden his experience it was also attractive to have a 'proper job (again) with benefits like pension schemes and health schemes - it was very tempting, the whole package.'

This type of work was only available as a consequence of a major policy change by the manufacturers. Previously each company would have kept development work in-house, now they favour strategic partnerships with suppliers who would supply specialist expertise in co-developing major components such as engines. Engineers therefore had to accommodate to these changed ways of working. For them the heart of the wage-work nexus was now the immediate value of their expertise rather than developing a longer-term career in the company. In a small company it is even clearer you look after your own career development. For this reason the 'company has a high turnover of staff ', as they cash in on their developing expertise by getting work elsewhere.

There was one major drawback with the job, the commuting involved journeys of four to five hours, starting at 3.30 on Monday morning and not getting back till 9 on Friday evening. He did this for nine months before finally the whole family did move. This time the location was similar to what they had been used to and there were good schools for the children and work opportunities for his wife. Even so it was still hard to move, but 'the travelling had been really hard: very very stressful.' He was for the first time really committing to a company.

Overall then, he identified with his work as an engineer, but for a long time he adapted rather than identified with his company because of the strength of his family and local attachments. With the new company he felt he belonged. Previously his travelling (and studying) had contributed to feeling that he did not really 'belong', and in the original company he 'belonged' to the area rather than the company. However, after making the initial decision to move he set about strategically building his career in ways that fitted to the new 'flexible' working patterns. He took temporary assignments, studied part-time, took contract work to broaden his experience and paid attention to building a network of contacts. It was one of his contacts, who was putting a team together at the engineering consultants in line with the new co-developing arrangements with major manufacturers, who offered him his present job.

5.4   Short-term adjustment

In cases of short-term adjustment an individual intends working in her or his current job for just a short period and is likely to be actively seeking other work. For example, two of our interviewees were being made redundant with relatively little chance of work in that sector in

that area, while a third had been unable to get back into permanent employment after a series of setbacks.

Short-term adjustment to problems at work and an employer switching production
Georgina is in her 30s and is a machine operator at an automotive component manufacturer at a factory in the North of England that was due to close. Production was being shifted to another plant a few miles away. The workers were given the option of transferring to the new facility but on greatly reduced pay, so Georgina, like most workers at the plant, was to be made redundant. She had until recently been a team leader with full responsibility for a components line, including introducing changes aimed at improving performance. However, because she did not get on with her line manager, she had asked to go back to being a machine operator.

Georgina had recently volunteered to participate in training designed to improve performance in the company's supply chain. The training involved workshops and practical experience of how to improve manufacturing processes and practices. She was part of a multi-disciplinary group looking at how to implement such improvements in the company and in its suppliers: 'I took the lead on data collection (on my line), and in using standard operating sheets - I had already started those. It was encouraging that people were picking out the same sort of ideas for the same sort of improvements.' Her self-confidence and communication skills improved markedly in consequence.

Georgina saw this as a valuable form of personal development. She had done lots of other courses with the company, but most had been employer-directed. The supply chain course involved a more structured approach, and it was much clearer that the individual could get considerable benefits too. The course was instrumental in rekindling her interest in more systematic learning: 'I would like more support in developing a structure for solving problems, rather than having to ask other people as now.' 'I would like to study more, but I am not sure what to do next. I am learning to be a driving instructor and I could combine that with part-time study, possibly for pre-school teaching'. She was making short-term adjustments and adapting to her changing work circumstances, while looking for alternative work.

5.5   Work role redefinition

Those using **re-defining** strategies are operating at the cutting edge of norms and expectations, pushing at the boundaries of expectations of employers, colleagues and others, typically negotiating, challenging and leading their peers in some respect. An example of this was a relatively young employee who nevertheless tended to know much more about all the new forms of technology than her colleagues and was recognised as the authoritative source of how to use the equipment in practice. This strategy is most viable for those who are recognised to have particular expertise, and/or formal authority and/or high social status.

Some interviewees who were 'change agents' had both formal responsibility and social influence and were influential in reshaping the identities of others as well as redefining their own role. Reshaping could come from 'within' a role and sometimes from 'outside' (or above). These were rare, but we did find a number of such examples.

Example of a dynamic young Turkish supervisor with highly developed communication skills and technical skills challenging the company stereotype of the background and age of someone in a senior supervisory position
Hasan is a 'Meister' in a German steel company with over 4000 employees. He is in his early thirties and of Turkish origin. His position involves supervising the four different daily shifts and leading the team of 'shift Meisters'. He works directly for the production manager and is responsible for 70 staff. Besides the overall management of the division, his responsibilities

include the co-ordination of overall shift personnel and resources. As a technical expert he supervises trouble shooting and technical problems of a new plant, with an emphasis on detailed documentation and fault analysis.

Hasan started as an apprentice in the company and then worked in maintenance. After six years he felt he could do more and that his job was not sufficiently fulfilling, and to enhance his career he embarked on three-year 'craft Meister' training, rather than the more traditional two year 'industry Meister'. The latter was 'what everybody does' and if he wanted to increase his chances for a better position he would be better qualified with a 'craft Meister' qualification. The three years proved to be extremely hard, because it was difficult to meet the conflicting demands of a five-shift working schedule, Meister training and a young family.

In his final year of training he applied for a Meister position for a new project, that involved the construction of a new plant. He got the job 10 months before the end of his training upon the condition that he successfully completed the training. The last ten months of his training were a real challenge. This was because he had started a new job with a high level of responsibility, the new plant required a lot of work and commitment (he often worked 10-12 hours daily), and he was in his examination period to finish his Meister qualification. However, he managed this difficult situation successfully.

The construction of the new plant required highly qualified workers and a lot of reorganisation of personnel. Hasan had great technical interest in this field and put a lot of effort into supporting work processes and structural changes. In the change process he was promoted again to technical specialist for the new plant, and is increasingly acting for the production manager. He feels he has achieved a lot. The next step would be production manager, but he feels that he is not yet qualified to do that job and he needs to gain further experience in his current position. He can imagine maybe changing employer after some years, but at the moment he personally is attached to the plant that he helped to build.

Hasan is a committed and ambitious worker. Although he does not perform manual work any more, he makes sure he spends a few hours in the factory each day rather than the office. His technical expertise still provides the basis for his work, even with the managerial tasks. The biggest challenge is the management of personnel in two aspects. First, staff shortages create a lot of pressure and increase the workload for all staff as all shifts have tight staffing levels. Second, sometimes there are conflicts with other personnel because they have problems accepting him as a very young Turkish supervisor. Older employees can sometimes be very critical. On the other hand, some Turkish colleagues expect favourable treatment from him, because of their common ethnic background. In any case, he always needs to handle staffing issues and interpersonal conflicts extremely carefully. This has not yet become an issue, because the atmosphere and interaction between employees and supervisors is generally very good in his division, a factor that contributes towards his motivation and commitment.

Hasan points out that work intensification is the most obvious change in the work context. More work has to be accomplished with considerably fewer staff and work has become much more disciplined with tighter work schedules. But employees show a much more committed work attitude, because responsibilities are delegated and transferred to the individual worker, which also motivates them more.

Example of significant changes of role and personal redefinition (as a result of personal choice and as a consequence of discrimination)
Steffi works in the same steel company, but in another division to Hasan. She is in her late 20s and is currently in charge of planning the servicing and repairing of machines, a position that requires the Meister qualification (for a process or production engineer). She is doing this job in a team of 3, each employee being responsible for a division that comprises approximately 15-20 staff working on a certain set of machines and rollers. The three

planning specialists are supposed to substitute for each other in case of sickness or leave. About 80% of Steffi's work is computer-based. The tasks also involve cost analysis and budgeting as well as co-ordinating staff and contracted firms for specific repair jobs.

Steffi trained as an engineering apprentice in the same steel mill. She initially studied accountancy and secretarial work at a commercial school but did not like it. As her father worked in the company he encouraged her to apply for an apprenticeship as a material tester in the laboratory. When she did not pass the entry test the company offered her to start training as a skilled worker in mechanics and she accepted.

At that time she was the first female engineering apprentice in the company, a situation that caused considerable practical problems, as there were no toilet facilities for women. She faced considerable discrimination that led her to being very close to leaving a couple of times during the first year. Often, division managers wanted to place her in the office instead of giving her mechanical work. As an apprentice and as a skilled worker she hardly received any support from her male colleagues except for one, who encouraged her to persevere. This discriminatory situation continued after completion of her apprenticeship when she faced difficulties being recruited on a permanent basis. Finally, one division accepted her, although it was not an area in which she trained so she had to start a completely new learning process. Working there was very hard and she was given the toughest work and was constantly discriminated against. Her immediate supervisors and colleagues hoped that she would give up. Despite her qualification she was never accepted as an equal, although she received some support from her senior manager.

Steffi put up with this situation for 4 ½ years even though it affected her health (her hair was falling out and for months she had a major outbreak of eczema on her neck). Her decision to start a Meister qualification was motivated by hoping to find a way out of this discriminatory working situation, although she got very little support from her supervisors. When the demands of shift working and parallel training became too much, she changed to working on the day shift. When after completing Meister training the situation with her male colleagues escalated in an impulsive reaction she decided to ask for work in another division where her boy friend worked. They initially recruited her into a position as ordinary mechanic. There, the working conditions were much better and the colleagues to a certain degree accepted her. After one and a half years she applied for her current job, planning repairs and maintenance of machines, that required the Meister qualification and got the job.

Steffi enjoys her current job and is very satisfied with the working conditions and colleagues. She is happy with working more independently and not being directly supervised all the time. She particularly likes the challenges involved in major repair jobs that require independent organisation and complex planning and co-ordination, where plans and schedules her own time and work commitment. But most of her work involves the planning of the regular servicing of machines with some repair work.

When looking back Steffi feels that although the first nine years were extremely difficult and nerve wracking she was right to stay on and work through it. She feels that the harsh working climate has formed her and she is now much more self-confident and assertive. She always liked the work, even the physically very demanding jobs, and that made her stay. She is proud of her achievements, and although she sometimes misses the physical work, she enjoys working on the computer and 'assembling parts and tools in her head'. She still needs to continuously apply her technical knowledge.

Work forms an important part of her overall identity and links with being independent, financially self-sufficient and able to face challenges. She also values the external recognition her work brings. Steffi hopes to stay with the company until retirement. She believes her work profile may change, but it will not become redundant. She is confident that her skills will be

needed in future. If she decided to start a family, she would try not to be away for more than 2-3 years, otherwise returning would be difficult, given the speed of technological change.

Regarding future career prospects there are two areas that interest her. One would be to specialise in a specific type of machine or maybe plan the construction of a new plant or machine where she could bring her own ideas and creativity into the planning process. The other would be to become a trainer or instructor only there are specialised areas, like hydraulics, where she would not feel competent, because it is not her area of expertise. She would feel uncomfortable to talk about things she is not familiar with in-depth. She cannot imagine herself studying further in order to increase her career options.

Successful 'change agent' whose role and responsibilities were redefined
The first two examples of redefinition concerned cases where it was individual characteristics related to gender or ethnicity allied to impressive work performance that presented other workers with challenges to their ideas about who should undertake particular roles. In the following case, however, it is the performance and potential of a single individual that caused the company to reshape their role definitions so as to optimise his value to the company.

Edward is in his middle 30s. He has recently been appointed business development and personnel manger at a precision engineering company in the UK that has 200 employees and produces pumps for industry. He has worked for the company for 20 years since leaving school. He completed his apprenticeship, worked on machines for two years, then planning production and was quality manager for seven years, before combining roles as business development and quality manger for a year, prior to being given his current job.

Being identified as the company 'change agent' meant he was working closely with a major customer, undergoing a mix of training and learning through working on problems throughout the supply chain network, and he started to get 'more ideas of the problems and solutions of other companies.' This led to swapping development ideas and he found that: 'personally this has given me a new lease of life and a new learning focus. It has also led to recognition in my own company…. I also now have increased patience following the change agent training, better organisational skills and I am more willing to challenge fixed ideas.' Edward believed this was significant in terms of his own personal development: 'I will consider furthering my education. I hope to expand my business development role to director level. There have also been benefits to me in my out of work roles.'

The company was going through a tough time and 'there have been 25 redundancies - hence my current dual role. We could use more people in the business improvement teams. We are looking at our own suppliers too - they are at the crux of some of our own non-delivery problems. The improvements will pay for themselves if we can sustain 80% Overall Equipment Efficiency.' He is therefore seen as crucial in bringing about change in the company. Edward is enthusiastic and committed to his work and the company. His success has led the company to redefine his last two work roles, and the current combination of business development and personnel manager was specially designed for him.

5.6   Personal redefintion

The second form of **re-definition** occurred when an individual sought to change their occupation and/or employer, because they wanted (or saw themselves forced) to change direction. Examples of this included people with a short-term attachment following or prior to a major redefinition. The example given below, however, represents not only a substantive personal redefinition, but also involves a role redefinition from an organisational perspective.

Major career change

This is an example of a woman who became very purposeful about her own career development after the age of 30. She has highly developed communication and organisational skills and challenges the company stereotype of a production manager. Her gender and lack of a technical background led her to redefine the role of production manager in an engineering company.

Sally is in her early 40s. She completed a Sports Science degree in England, worked in outdoor pursuits for a year and then chose to train as a PE teacher because she fancied long summer holidays. She chose the course because was having a problem getting a decent job, and didn't know what else to do: 'it was a way of putting things off for a year', but her teaching career lasted less than a year: 'I discovered I didn't like kids.' She took a job instead with local authority leisure provision. Through the next five to six years, she held various posts starting with life saving in a public baths and moving up into junior management in baths and parks facilities.

She left her last post with a plan to live abroad, but this plan did not work out. She needed work, so did some temping (involving temporary office work) for a couple of years. One of these jobs was with a small German-owned specialist automotive components manufacturer. She started as a temporary clerical worker in 1990 and then got a permanent job in 'Customer Scheduling'. The job consisted of calculating and costing customers' requirements and keeping track of what was being produced and what had been dispatched. She took the job because she needed the work and it seemed to be a reasonable company.

Sally was eager to leave her first job there as she felt it was not utilising all her skills, and did not give her the level of responsibility which she wanted. After three years she was promoted to 'Head of Logistics' managing six clerical staff. The only company training she received was at her own instigation; she asked to go to Head Office for a two-week period to orientate to the work of the company. They gave her this time, but it was left to her to structure this period for herself. She spent the time walking around the factory and talking to people, finding out for herself what was being done and by whom and why. She found this period very informative and helpful.

She was promoted twice more: first to logistics specialist and then in 1995 to Production Manager for a major customer group with complete responsibility for resourcing the production and delivery of orders for this car manufacturer. She manages 100 permanent, mostly full-time, staff on a three shift system, plus 7 support workers based in the office. Her work involves the ordering and control of all materials, responsibility for the production process itself, staff management and customer liaison. When the post became vacant, she had been encouraged to apply for it by her then bosses, and she got the job, although 'I encountered huge difficulties as I had no knowledge of engineering production whatsoever. I knew nothing of production planning or engineering prioritising. Nothing.'

Sally had had no university training relevant specifically to her new job: 'My skills acquisition at this time was mainly on the job training; finding out as I went along.' The company did provide training opportunities over time to help her to cope with her new responsibilities. She found the training very relevant, and it helped her to build skills to tackle her job. It was as she began to '*get a handle*' on her job that she decided to do a Master's degree so as to gain a greater understanding of the underpinning of the technical work of her department. On her own initiative, she had enrolled for two evening classes - one on the Japanese view of the auto industry. This was a disappointment because the other students consisted mainly of retired men who talked about their experiences of Japan in the war. The other course was on leadership and self-management, and was useful.

Sally chose post-graduate study in engineering to get the technical underpinning she was seeking to underpin her management role in engineering: 'I wanted to understand what lay beneath what I was seeing on the shop floor, and what I was controlling in my job.' One of her bosses had done the course and endorsed her decision and the company paid for the course. Sally particularly valued the modules on 'leadership' and 'industrial engineering quality management'. Much of what she learned on the course was relevant at three levels - business, technical and operational. She has now fully grown into the job as a production manager, and is well paid.

When Sally reflects on her career she says: 'my career has gone every which way. It has gone differently to what might have been expected. I think there was a lot of luck involved in finding myself as a temp at my present company - being in the right place at the right time.' Sally considers she has come a long way in the last ten years. She is very satisfied with her salary and enjoys her job, although there are frustrations linked to working in what is still very much a man's world. 'It's not so much a glass ceiling as a huge steel ceiling.' She felt she could have done more but for gender prejudice. Indeed the prevailing environment constrains her: 'I find myself coping with it by taking on some of the male attitudes, and this makes me feel guilty. I think I confront it with aggressive behaviour, and people don't always understand why this is happening.'

Sally had never expected to enter the engineering world. 'The last place I wanted to work was a factory. … but I have come to realise is that it doesn't much matter what the workplace is, or where it is, or what it makes, most of the processes for getting something resourced and produced and delivered are the same.' She is still looking to develop her skills: may be in assertiveness to deal with the gender problem. 'Some influencing skills' training is probably what I need.' She also wants to follow-up on work she did on the MSc around issues in leadership and dealing with frustration. 'I need to learn how to deal with getting shouted down if I confront issues around gender discrimination.'

She has been very proactive in building her career after 30: a sharp contrast with her earlier drift. However, even with restarting at thirty, she is doubtful that she would want to have missed the good times she had. Sally enjoyed her Sports Science course and being at university, and quite enjoyed some of her work in the leisure industry. She feels she has learned a lot through her various experiences, and whilst things have gone differently than she might have expected, she is where she is now … 'and I'm fairly happy with that'.

6. Implications for policy and practice

An individual's pattern of strategic action regarding work could and did change over time. An individual may become disillusioned leading to a change from identification to adjustment, or an individual may follow a strategic career path for part but not all of their working life. Reactions to work could also change in response to particular events, such as promotion or redundancy, or changes in other areas of life (birth of children, death of a spouse and so on). The identification of different forms of strategic action did help us give meaning and shape to our interviewees' career histories by outlining what we found to be typical and relatively coherent repertoires of strategic response to the challenges of constructing work-related identities.

Occupational identity formation processes and patterns of strategic action relate to a number of issues at the level of the individual, the organisation and society as a whole. For example, there is a degree of interdependence between the structures of the labour market, the work environment and working conditions and occupational identity of employees. The product market is important here: where a sub-sector is undergoing very rapid change, especially in its product markets, then companies may wish for employees to have flexible occupational identities. In these circumstances great attention is then given to learning while working.

Considerable resources and support for skill development and socialisation go into the formation of initial occupational identities, but all parties (employee, employer and state) should recognise that the reshaping of these identities to fit changing contexts also constitutes a major task.

While continuing education and training can play a role, it is perhaps more important to support processes of learning while working. This could be achieved in formal ways through support for systems of mentoring. However, it could also be achieved through paying close attention to the composition of development teams, such that employees taking on new, and especially hybrid, roles can be given some support in moving towards full engagement with the new roles. This could be accomplished through association and working with those further on in the process. The interesting point here is that development is a process and focusing upon outcomes such as qualifications may draw attention away from the process. For example, in the UK it is clear that employees, especially graduates early in their career, learn by moving from company to company, and this process leads to a transfer of 'tacit knowledge' that can benefit both the employee and the companies (Mason and Wagner, 2000). 'Teaching company schemes' are another example of where there is support for a process - in this case (mainly engineering) graduates are attached to small companies to give the firms access to skills and expertise they do not normally possess. The graduate should act as a 'change agent' facilitating processes of business improvement (Senker and Senker, 1997). The key point for identity formation is that from the outset the (new) graduate learns that her or his role is about producing change - forging an identity, creating a role, helping others change - rather than fitting into a pre-ordained 'slot'.

Whilst some companies have found a high-value niche positions in traditional markets, many firms still operate with fairly fixed product systems and produce to demand predictions. However, even then there are pressures on employers to achieve greater flexibility in their patterns of work organisation. This means many individuals are being expected to use hybrid skill sets. Organisational considerations rather than occupational identities often drives the organisation of work, with particular emphasis being given to flexibility and possession of a broad set of skills and competencies. One consequence is that technical skills increasingly need to be aligned with business skills and social skills, particularly for those operating in customer facing settings.

Changing patterns of work organisation have frequently led to increased delegation of responsibilities, greater team working and the need for learning processes, which are related to more complex thinking and to assuming a broader responsibility for the whole production process. Once again this means that technical skills need to be developed in combination with the development of communication skills, the ability to learn independently and in teams, IT skills, business skills and abstract thinking. One implication of this for initial VET is that such skills may best be taught in combination and in context. This is one factor behind arguments for the development of complex learning environments within apprenticeship training in Germany. Elsewhere there are similar arguments on the need to focus in initial VET on the core problems of practice that have these mixes of skills embedded in authentic problems. Such arguments emphasise that an occupational identity needs to be forged in engagement with the complexities of practice, not something that is developed prior to such engagement. The latter approach seems to store up trouble for many individuals because of its naive model of skills transfer and development.

In the longer term, it may be that people with 'modern' skill sets able to undertake a range of work may look for horizontal mobility across occupations or sectors rather than vertical mobility. This can be facilitated by allowing individuals greater access to careers guidance and personal skills auditing such that they are encouraged and supported in looking across the labour market for opportunities to use their skills, rather than necessarily remaining within particular sectors and specific patterns of thought. Overall then, if individualisation is a trend,

it is important to develop guidance to support the individual in successfully responding to demands for flexibility and mobility and to enable the individual to move between occupations. The intention would be to give individuals confidence in their own abilities and to empower them to become agents of their own professional development (aspects of the French 'bilan de competence' may be relevant in this respect).

The foregoing is not an argument against the initial development of a strong technical knowledge base - this remains important. Indeed it was noticeable that most employees in the German sample stated that they had no problems in keeping up with technological innovations and the required technical learning processes. This capability is surely rooted in the advanced technical skills that the German skilled worker acquires during her or his apprenticeship. [Indeed in a slack labour market, as in Germany, employers can stipulate a formal skilled qualification is required even for less skilled work. The rationale for doing so is that such employees are quick learners and are easier to motivate.]

One further consideration in thinking about the identity formation processes of skilled workers in metal-working relates to the issue of career development. Should a skilled qualification be seen mainly as a final qualification or should it be regarded as a stepping stone for further development for those interested in progression. In Germany the 'Meister' position is critically discussed and in some companies already replaced where work organisation uses flatter hierarchies. However, the 'Meister' qualification is generally still required in order to assume a team leading position. It also enhances chances of employment when changing employers or of keeping employment if a company sheds labour. The 'Meister' qualification also entitles the skilled worker to become self-employed and to employ and train other skilled workers, and it also entitles the skilled worker to study in a related field at a technical college or even university. The latter development is now common across Europe as a qualification as a skilled worker needs to allow both further technical development and progression into higher education. Although these routes are open, they could be more actively promoted, for example, through the provision of greater financial support for individuals following these pathways.

Employees working in the metal-working industry predominantly identify with their work tasks and related skills, the company and the professional community. However, the very strong identification and attachment of a generation ago are less common with the realisation that you are no longer effectively guaranteed a job for life. Identification with the 'output', as in the aerospace and automobile industries, or the 'process', if their work was particularly challenging and required specialised skills, could be important. Challenging work can still generate identification and commitment - significant numbers of people still want work-related identities that give them a sense of control, purpose and direction. States have traditionally been reluctant to intervene in what happens inside a company, but maybe public policy should seek to support companies that do offer challenging work.

Trade unions used to play an important role in the sector and still do to some extent. It is an interesting question the extent to which one of the key components of the 'bundles' of practices of the high-performance workplaces that European policy is so keen to promote is 'high involvement' and whether this will lead to a re-invigoration of the role of trades unions. The trade union role could also be strengthened in regard to supporting members' interest in further learning and development.

In the metal-working sector in all the four countries studied the business environment was changing rapidly and new or adapted product development was often vital. Companies were keen to discover new ways to create added value for their customers and this sometimes included sharing or selling their developing expertise. This often meant that key staff had to shift the focus of their attention. They were being expected to identify with a broader supply network rather than a single company, with the supply network covering the full range of

activities involved in the planning, sourcing, making and delivery of products and services to final customers.

The need for more developed forms of supply network management feeds back into changes in the roles and identities within companies. Traditional forms of organisations where business functions such as production and purchasing are operated in almost total isolation mean those companies are now operating with some significant disadvantages. The lack of cross-functional co-operation and the traditional low trust, adversarial links between business areas make the co-ordination of information and materials flows through the organisation difficult. As businesses have come to realise the benefits available from integrating functions and co-ordinating actions, they have sought to build and manage linkages both internally and across organisational boundaries.

Integrated supply network management involves crossing organisational boundaries and dealing more intensively with customers and suppliers. Some firms have established a new paradigm in supply chain management, where they are taking a holistic, fully integrated approach incorporating the dynamic flow and management of products, information, cash and even ideas. The shift towards networked thinking has further increased the complexity of the total system, placing even higher demands on the integration and management systems. Some companies believe that in future networks of inter-linked firms will be more important in meeting specific customer needs. This would mean employees should see the network as their crucial frame of reference rather than offering commitment to a single organisation. While companies can be expected to invest significant resources of their own, it may be helpful if public policy were to support the development of and learning within supply networks, including through support for forms of learning and socialisation that implicitly and explicitly favour increasing individual attachment to the network.

Such a policy can also contain within it support for the development of more agile manufacturing environments allowing resources and people to be used, cost effectively, in changing, and often unanticipated, ways to produce products and services. These may be significantly easier for supported networks to achieve than individual companies. This does require that certain individuals within the networks identify their role with a mission rather than an occupation or a single organisation: they are change agents. Preparation for, and participation in 'network change agent' roles requires considerable learning and a sophisticated framework of learning support, as it bridges individual learning, changing work cultures and organisational change.

Another important development related to the development of supply chain networks, and with consequent effects upon work-related identities, is the focus upon improving the design capabilities of companies within the network. This is vital as product variety increases, time to market shrinks and total life-cycle durations become shorter. The above has two important consequences for initial skill development: greater attention has to be paid to product design capabilities and the linking of commercial considerations to technical skills development. Without the former companies in supply networks may not generate sufficient business opportunities and without the latter they may not take full advantage of those opportunities.

In the former respect it is important to try to ensure that there are sufficient practically-oriented initial higher education and continuing professional development programmes that give an adequate emphasis to the importance of design. However, it may be that the problem is less one of supply, rather one of insufficient demand - too few people choose to take such programmes. There may be limits to how far this number can be increased simply by exhortation and it may be that financial support targeted on individuals as well as institutions is required. Skill shortages seem to be particularly acute in the design area, because taken as a whole Europe seems capable of developing sufficient numbers of production engineers, able to take responsibility for the selection and installation of new

equipment and the transfer of new products to full production. Although the outlook in that respect is much healthier in France and Germany than in the UK, where the quality and quantity of engineering graduate output in Britain is in part constrained by the limited numbers of young people leaving school with qualifications in both maths and physics.

In the latter case, the need for commercial awareness, German companies seemed to be in a good position to devote time and resources to working with suppliers to improve their performance. This is partly because many of those working in purchasing and logistics in German plants had either been through commercial apprentice training or had formally qualified as 'business engineers'. Hence they already had the skills needed to manage and improve their supplier bases.

In the above there have been a number of cases where state support was recommended to support schemes that would be likely to promote the development of particular skill sets or progressive work-related identities. Examples of such support could include subsidies and tax incentives for employers and individuals as well as incentives to colleges, universities and other education and training providers to develop appropriate programmes.

One final comment is worth making in relation to the patterns of strategic action adopted by employees building work-related identities in engineering. The temptation in considering policy recommendations is to focus almost exclusively upon the requirements of organisations and the economy as a whole. However, the calls for employees to respond to demands for flexibility, mobility, and new patterns of working and learning present significant challenges for individuals. The relationship between individuals and their occupational roles could be represented in terms of their patterns of strategic action across a range of structural, cultural and social contexts. Individuals developed characteristic repertoires of strategic action and these included identification; long-term adjustment; short-term adjustment; adopting a strategic career perspective; and re-definition. What those making policy often assume is that identification and strategic career development are the states that can 'normally be expected' from those working in a particular sector. In practice, for a variety of reasons, many workers will see themselves as adjusting to work, over a shorter or longer time frame, rather than identifying with it. Any form of state-supported learning and development should therefore take cognisance of the need to give the individual a significant 'voice' in choosing the direction in which this should go, rather than assuming development should be aligned to their current work.

We should pay particular attention to individuals who are using re-defining strategies operating at the cutting edge of norms and expectations of employers, colleagues and others, typically leading their peers in some respect. We need to know more about the process of how work-related identities are transformed and such individuals could play a key role in helping us increase that understanding. Another form of re-definition occurred when an individual sought to change their occupation and/or employer, because they wanted (or saw themselves forced) to change direction. Much more could be done to support individuals in this process, rather than regarding this more or less as an aberration. Access to impartial advice and guidance could be critical in this respect.

This idea of support for the development of individuals on their own terms is valuable in its own right. However, in engineering it also offers the prospect of building on the very positive developments associated with employee development schemes, fairly common in the UK, open to all. In such cases workers at all levels are encouraged to study for further qualifications in their own time with employers offering some financial support. Encouragement should be given to extend support for employee development schemes more widely, because, for example, there are limited opportunities available for German workers to study for additional qualifications if they have not completed an apprenticeship. Policy-makers could look for further ways to build on the interest in 'second chance' education

among existing workers when considering proposals for workforce development and opportunities to undertake a personal skills audit may be one way forward.

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