Chapter IV deals with the main points of training and further training within companies, particularly the methods used and the competencies and skills they seek to develop. It contains three articles. The first deals with new trends within major European companies and attempts to classify the specific learning approaches created or designed to develop skill profiles. It describes the further training strategies implemented by companies to cope with the ongoing reorganisation of production and services, and illustrates how they are making better use of the potential skills of their employees and involving them more in the change process relating to work organisation. The second article deals with the competitiveness of small and medium-sized enterprises and their approaches towards providing technology and management training for their workforce. SMEs had to improve their chances of survival, particularly through the further training of managers and the entrepreneurs themselves. In view of the great pressures placed upon the latter, new paths would have to be taken and a system of comprehensive support, information, advice and continuous training set up between companies. The third article deals with similar issues relating to practical approaches and experiences. It shows that by establishing closer links between measures implemented by the public bodies of a sector or region and local companies a strengthening dynamic could be set in action that encouraged job creation, and promoted the competitiveness of the companies and region or sector concerned. Training and further training provided by VET colleges, technical colleges and universities in the region, training schemes set up in cooperation with companies and the adaptability to meet on-the-spot needs would play a crucial role in this process.

Barry Nyhan’s article describes trends in competence development, which was one of the strategic factors in ensuring companies’ survival and competitiveness. There was still much discussion going on concerning the nature of the competencies required, and how companies could become learning organisations and create an organisational learning climate which would support the development of these competencies, and there was no agreement on the matter. Using case studies, the author puts forward a taxonomy of methods and competencies for the very different teaching and learning situations, discusses the conditions and calls for efforts to be made by companies and industry-wide to improve the interaction between informal (on-the-job) teaching and learning and formal (classroom) teaching and learning. ‘Visionary’ companies had already started taking steps in this direction and were making great efforts, but many others had got no further than general considerations of the matter.

A number of general principles firstly had to be clarified, which were needed to underpin the ongoing change and adaptation process and its dynamic, namely visionary management and support given by managers of enterprises, their willingness to take risks, trust in the competencies of their workforce and wide understanding of the change process itself, etc. The competence profiles required were emerging along the following four axes – cognitive, technological, social (organisational) and business (entrepreneurial). Efforts had to be made to understand and master the general complexity of the situation behind each profile. This was no longer a management concern alone, but one which demanded the full participation of all the workers and experts in a company.

John Konrad underlines that the most crucial problem facing small and medium-sized enterprises and new enterprises was how to strengthen their chances of survival. A large number of new enterprises would not survive the difficult start-up period. Access to effective training that met their short and long-term needs had to be improved. This could increase employment and promote social integration, and also encourage a flexible, decentralised and adaptable economy. The author calls upon researchers to double their efforts to determine
the necessary support mechanisms that can be implemented at local and regional level, appeals for the recognition of training qualifications across Europe, and asks for greater commitment on the part of the EU in promoting local structures and actions, particularly in view of the Agenda 2000 programme for the accession of eastern European countries to the EU. New concepts, actions and practices needed to be developed and fostered through greater cooperation in the field of research.

Loek Nieuwenhuis’s article concentrates on the role of vocational education and training in facilitating innovation in small and medium-sized enterprises in the process of regional and sectoral development. Local industrial networks and their links with VET colleges and training centres in the region were becoming increasingly important for sustaining the dynamic of the training process. Common learning activities and continuous interaction between VET colleges and companies would take the place of traditional initial vocational training and further training, despite the fact that the role of VET colleges in these innovation processes was still rather marginal. To become ‘spiders’ in regional innovation networks, VET colleges had to develop towards becoming learning and networking organisations themselves. Using a number of concrete examples in the Netherlands, the author clearly shows how such networking and dynamics can make significant contributions to both local and regional economic development and to the renewal of sectors of the economy as a whole.
A. Trends in competence development in European companies

Barry Nyhan (*)

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Summary and outlook

Competence development is one of the critical strategic factors in ensuring companies’ survival and competitiveness. This has given rise to much discussion, firstly, on the nature of the competencies required, and secondly, on how companies can create an organisational learning climate which will support the development of these competencies.

This paper examines the experiences of a number of European companies, which appear on the surface to have similar views on the kinds of competencies required and to be using the same kinds of innovative competence development and learning organisation strategies in fostering these competencies. When analysed more closely, however, it emerges that these firms have different perspectives on the position competence development holds in the hierarchy of company values. Three distinctive strategies emerge – visionary (value-based), organisational/structural change focused, and problem-solving oriented.

The five central features which can be found in the vision-based companies (those which can be said to have implemented learning organisation strategies more fully) and to a lesser extent in the others are as follows:

• dynamic visionary leadership and support by senior management
• willingness to risk putting one’s faith in the competence of the workforce
• existence of an overall framework for the change process
• creation of a shared vision based on the implementation of a vertical organisational change programme
• commitment to and development of a practical programme.

The competence profiles emerging were along the following four axes – cognitive, technological, social (organisational), and business (entrepreneurial). An outstanding feature of the overall competence required by workers in the companies portrayed, is the capacity to understand and handle social/organisational and technological complexity. This kind of worker is able to relate the specific tasks which he/she is engaged in, at any moment in time, to the overall task being carried out by other members of the organisation. This person, therefore, needs to have a helicopter view of the organisation and feel in contact with the different parts of the system. These attributes were traditionally seen as ones which only management required.

In general terms most of the companies surveyed tended more towards what can be termed informal learning rather than formal training as a predominant approach. Informal learning refers to the learning effects of how work is organised. Formal training did play an important role, however, in particular to meet individual technological skill development needs.

1. Relationship between technological, organisational and competence development strategies in modern companies

In the course of the last 10 to 15 years, European companies have been subjected to similar challenges as other firms in the industrialised world. More specifically, they have had to deal with two major developments in the global business environment.

The first relates to the saturation in the demand for standardised mass-produced consumer goods. Markets changed from being primarily sellers’ markets to buyers’ markets with
a subsequent move away from price competition, towards one based on flexibility, quality and quick delivery – in other words meeting customers’ individualised needs.

The second challenge related to the advent of efficient and reasonably priced micro-electronic technologies, which were seen to have the potential to automate many aspects of manufacturing delivery systems (Naschold, 1993).

Company managers, who had been schooled in the Tayloristic tradition of scientific management, felt that the new technologies would give them the opportunity to automate their manufacturing systems in a way that products could be individually produced, with limited human intervention. In this regard, it should be remembered that the technical ‘rational–analytical’ paradigm had been the dominant one behind the concept of scientific management, according to which there is ‘one best way’ to organise work. According to this view, managers with the assistance of experts determine what this is, and the ‘non-expert’ employees follow their instructions exactly. The introduction of information technology in the 1980s reinforced this kind of thinking, leading to the notion of a factory where humans could be replaced by robots as manufacturing and administration operations are centrally controlled by management.

The findings of many European researchers, however, have shown that information technology cannot be implemented effectively without paying attention to the issue of human responsibility, initiative and skill (Docherty, 1991; Rauner and Ruth, 1989; Corbett, Rasmussen and Rauner, 1991). The success of the Japanese work organisation model, Toyotism, which respects the human (synthetic-intuitive) and the technological (analytical-rational) dimensions, made a major impact on the thinking of European companies just as it did in the rest of the industrial world.

1.1. A move away from the rational-technological model of the workplace

Today, therefore, we see many examples of companies which have introduced systems of management and organisation which differ radically from the centrally controlled, top-down models. The one best way or the grand design theory is not seen to have validity, because the action field of the environment is too complex. Unique decisions are called for in relation to the specialised needs of the customer. Studies in the automobile industry, in particular, have shown that it is the nature of the dynamic interactions between technology, social organisation of work and human competence that determines the success of a company.

The move from a mass production market towards a customised market based on quality, price and speed of delivery is forcing companies to disregard centralised autocratic command-type management and control practices, and embrace ones giving employees more discretion about how to undertake their work.

In this regard Handy (1994) makes an interesting historical analysis:

‘For a long time now, corporate chairmen have been saying that their real assets were their people, but few really meant it and none went so far as to put those assets on their balance sheet. That may change. Peter Drucker points out that the “means of production”, the traditional basis of capitalism, are now literally owned by the workers because those means are in their heads and at their fingertips. What Marx once dreamt of has become a reality, but in a way which he could never have imagined. Focused intelligence, the ability to acquire and apply knowledge and know-how, is the new source of wealth.’

The changes in workers’ functions, in line with the above, to be observed in a growing number of companies are as follows:

1.1.1. A move away from the vertical division of labour

This can be portrayed as the transfer of certain traditional management and control functions to workers on the shop-floor, where goods are actually being produced. In line with the principles of, for example, ‘lean production’, ‘the maximum number of tasks and responsibilities (are transferred) to those workers actually adding value to the (product being manufactured)’ (Womack et al., 1990). This entails the integration of many traditional direct supervi-
sory tasks (and other indirect tasks, such as production planning and process control) previously undertaken by specialised middle management staff, with those of the shop-floor production workers or teams of workers.

1.1.2. An integration of work functions at the horizontal level

This involves production workers being given responsibility for certain tasks such as quality control and machine maintenance, which traditionally belonged to specialised service staff from separate production-support departments. Workers are also expected in many cases, more particularly in a team-work context, to have a range of skills – to be multi-skilled – so as to be able to work on a variety of machines or to deputise for each other.

1.1.3. Teamwork is emerging as the most common form of organisational structure through which vertical and horizontal integration is being implemented

Teams can be accountable for carrying out all aspects of a job. Each team, or what is sometimes called a production island, can have responsibility for carrying out its operations in a more or less self-managing and self-controlling manner.

The above developments, in line with what some researchers refer to as flexible specialisation are having an influence on manufacturing trends in Europe. Production units (islands) utilising programmable technologies, and comprising skilled workers supported by knowledge-based management, can adapt to rapidly changing markets and deliver specialised and high value-added products (Wobbe, 1992 p. 143).

Overall coordination of the efforts of the different teams/units is established by a variety of means, such as the utilisation of matrix style management approaches, company-wide or inter-team project groups, and often technology-based information and communication systems and networks.

A comparison of the traditional and emerging work patterns with specific references to work organisation issues is presented below:

<table>
<thead>
<tr>
<th>Old Organisations</th>
<th>New Organisations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard product</td>
<td>Product variety</td>
</tr>
<tr>
<td>Assembly line</td>
<td>Module production</td>
</tr>
<tr>
<td>Single-purpose mechanisation</td>
<td>Flexible mechanisation</td>
</tr>
<tr>
<td>Unqualified workers</td>
<td>Qualified (skilled) workers</td>
</tr>
<tr>
<td>Low work motivation (indifference)</td>
<td>High work motivation (identification)</td>
</tr>
<tr>
<td>Confictual labour relations</td>
<td>Cooperative labour relations</td>
</tr>
<tr>
<td>Hierarchical management</td>
<td>Participatory management</td>
</tr>
<tr>
<td>Vertical division of labour (separation between planning and implementation)</td>
<td>Vertical job integration (enrichment)</td>
</tr>
<tr>
<td>External control, Internal self-regulation</td>
<td></td>
</tr>
<tr>
<td>Horizontal division of labour (extreme breakdown of tasks)</td>
<td>Horizontal job integration (enlargement)</td>
</tr>
<tr>
<td>Workers tied to workplace</td>
<td>Rotation</td>
</tr>
<tr>
<td>Machine paced</td>
<td>Independent from assembly line</td>
</tr>
<tr>
<td>Time standard</td>
<td>Time sovereignty</td>
</tr>
<tr>
<td>Individual work</td>
<td>Group work</td>
</tr>
</tbody>
</table>

1.2. New roles and competencies for line workers

The decentralised company which operates on the basis of delegating responsibility to teams and individuals at the operational (front-line) level has to think differently about the role and competencies of its workforce. These workers become central actors in the company, carrying out planning, execution and control functions.

In this regard they require core-competencies such as the ability to take initiatives, engage in abstract thinking, work in a team, ability to learn (self-learning competency) and so on. The people who possess these core-competencies have the ability to cope with changing business and technological climates. They can manage themselves in relation to economic and social change – they can learn to utilise new technologies as they come on stream.

The kind of knowledge required by people working in computer integrated manufacturing systems (CIM) according to Ebel (1989) is described as follows: ‘CIM requires... people who understand production methods and the system and are capable of handling a great deal of technical information, and of taking decisions on the spot, interpreting faults rapidly and correcting them. Judgement backed up by technical knowledge and experience, understanding of the system and common sense is a human quality that cannot be replaced by computers or artificial intelligence in the foreseeable future. In CIM systems, machines and computers may well take over most routine and physical tasks, but they do not relieve the people involved from thinking, critical decision-making and responsibility.’ (Ebel, p. 543).

This kind of knowledge can be defined as understanding what you are doing in dealing effectively with situations in a living system, which has interdependent, business social and technological elements.

It can be called holistic or integrated knowledge because it contains both formal/theoretical and practical knowledge.

Formal knowledge
- theoretical knowledge

Practical knowledge
- making a judgement about the situation in hand
- dealing with the situation
- knowing how to take up one’s role
- understanding the social context
- making technical decisions
- knowing in doing
- institutional knowledge
- knowledge based on experience

The above division of knowledge is similar to the one outlined by Goranzon and Josefson (1988). According to them, professional knowledge is divided into the three categories of propositional knowledge (similar to formal knowledge), practical knowledge and knowledge of familiarity. The latter is the knowledge gained from examining the experience of others.

In the above classification, the knowledge of familiarity is included under the heading of practical knowledge on the basis that practical knowledge comes about through reflecting on the experience of others as well as on one’s own experiences. (The Irish dramatist, George Bernard Shaw said that: ‘The fool is someone who learns through his own mistakes, while the wise man learns through the mistakes of others.’)

1.2.1. Personal effectiveness

Another term used to describe the profile of the modern worker is personal effectiveness. People who are personally effective in their working lives have the ability to organise themselves to respond to any task they are called upon to do. They bring all their skills and resources together and apply them to meet a specific situation. Personal effectiveness refers to attitude – the internal driving force in a person.

Two main characteristics, a sense of initiative and a sense of responsibility, mark an action by someone who is personally effective.
'Initiative’ refers to a person being enterprising or a ‘self-starter’. Pure initiative on its own, however, is not enough. It has to be balanced by ‘responsibility’. This means a person is not just ‘doing his/her own thing’, but is making the right choice implementing appropriate actions and taking other people into account. ‘‘Initiative” causes a person to act as an individual while “responsibility” relates him/her to others, to the group and the organisation.’ (AnCO, 1984). Drucker (1992) foresees a swing towards regarding ‘responsibility’ and not ‘power’ as the most important variable within modern organisations.

1.2.2. Managing oneself in role

The concept of managing yourself in role, developed by Reed (1985), is useful in understanding the situation faced by modern workers. Reed points out that social scientists normally use the term role as a way of describing a person’s expected behaviour. He refers to this as one’s sociological role – the role assigned to someone by means of a job description, job title, etc. This is the objective dimension of role. The counterpart to this – the subjective aspect of role – how I behave in practice, is determined by a person’s own judgement in a particular situation. This is one’s psychological role, which has to be managed by means of an individual’s internal control system. As circumstances are constantly changing, a role in this sense is never static. An analogy can be drawn with a yachtsman, who is order to follow a definite course, has to adjust constantly the steering to take advantage of the prevailing winds.

1.3. Competence development becomes a strategic issue for management – the learning organisation

As modern companies see higher levels of worker competence as a key to flexibility and competitive advantage, competence development becomes a strategic issue for management. Quinn (1991) and Prahalad (1990), who have developed the idea of competence/capability-based strategy, maintain that a company’s strategy should be based on competencies that are difficult for competitors to emulate. Prahalad (1993) uses the term core competencies in a different sense from the way it was used earlier, to mean the collective learning of an organisation, especially regarding the ability to coordinate and integrate different skills and technologies.

Companies attempting to implement this competence-based strategy can be said to be aspiring to take on the features of what other authors refer to as a learning organisation.

There are many definitions of a learning organisation. Some stress the notion of an organisation as a cybernetic entity (a corporate body) which learns from its experiences through encoding the insights gained, into company routines. Other authors in the field,
pointing out the failures of many learning organisation notions to bridge the gap between theory and practice, prefer to focus on developing individual learning abilities in relation to specific company goals and change processes and so in turn having impact on the organisation as a whole (See discussion in Garvin, 1993 and Jones and Hendry, 1992).

The main focus in the learning organisation model presented by Stahl, Nyhan, and D’Aloja, (1993) is on all employees in a company learning in a systemic or global organisational context. Organisational effectiveness and individual learning are seen as interdependent factors. Organisational effectiveness provides an impetus for individual learning, while the latter in turn contributes to an increase in organisational effectiveness.

A learning organisation according to this model can be described as:

A company which involves all its members in increasing organisational and individual effectiveness, through continuously reflecting on how strategic and everyday tasks are handled.

The word ‘reflection’ in this description refers to thinking about and implementing new actions so as the company’s strategic operating processes and products can be improved.

If this model is implemented in an idealised situation, line workers are learning as a result of being assigned challenging tasks and through being assisted to reflect continuously on those tasks, so as to learn from them. The work content therefore becomes the learning content, as work and learning become part of a constant improvement spiral having an impact on the competence level of individual workers, the collective learning of work groups and the total organisation.

The key pieces of evidence, which show that a company relates to the above framework, are:

a) The line production employees have a high level of autonomy and control over the execution of their work tasks;

b) They are supported to use these work tasks as opportunities for continuous learning and competence development.

The manner in which work is organised ensures that all individuals are learning about their own role and responsibilities and how these relate to other roles within the overall system.

The real changes taking place at a grass roots level are a sign that a total organisational change has taken place. A management philosophy integrating working and learning has permeated the whole organisation. A management vision has become a vision in action. Many of the companies fulfilling the above criteria in adopting radical competence development strategies have not set out with the goal to become learning organisations. They may not even have heard the term. They had become learning organisations, however, even though they did not call themselves by that name.

In stressing that the evidence for a learning organisation vision being truly embedded in a company lies in the changed behaviour of all employees, one must relate this to the critical role of management. In fact management is the instigator of the whole change process. Without the understanding, leadership and continuous support of top management, any attempts to introduce wider roles for employees and linked work-based learning are doomed to failure.

Any lasting changes relating to the parts of an organisation have to be placed in the context of the whole system. The manager’s main responsibility is to ensure that the organisation as a whole is operating effectively internally and that it is interacting effectively with the outside environment in relation to customer needs and monitoring positive and negative influencing factors.

This means that the manager has to be a systems thinker promoting an understanding of the company in terms of causal interrelationships rather than linear cause-effect chains, and in terms of complex processes rather than static functions (See Senge, 1990).
2. Putting theory to the test – experiences of European companies

What would companies implementing radical competence development strategies, (along learning organisation lines, for example), or taking steps towards implementing them, look like? How would they conceptualise and formulate these strategies? What development steps would they go through? What would be the nature of the competencies cultivated in the workforce? What kinds of learning approaches would these organisations use?

A research project (2) set out to answer the above questions in relation to European manufacturing and process companies. Utilising European research and training networks a number of firms illustrating innovative competence development/human resource development policies, were identified.

Authors from different backgrounds – researchers, company managers, training and development consultants – provided case studies, analysing companies’ experiences against a common framework. Three seminars took place during which the cases were analysed and discussed. Of the 11 case studies presented, five represented large and medium-scale batch production mechanical and manufacturing industries and six were concerned with light and heavy process industries.

Cases from seven European countries were provided – Belgium, France (3), Germany (2), Ireland, the Netherlands, Sweden (2) and the United Kingdom.

The cases related experiences from the following companies:

1. Clark Hurth – the Belgian subsidiary of an American company, which manufactures heavy transmission units;
2. Aluminium Dunkerque – a new French aluminium plant which is part of the Pechiney group;
3. Autoplastique – a pseudonym for a French company manufacturing plastic components for the automobile industry;
4. Manducher – a progressive French plastics company supplying the automobile industry;
5. Audi/VW – the well-known German car manufacturing company;
6. Felten & Guilleaume – a German electrical engineering company, located in Bremen;
7. Bord na Mona – a semi-State peat production company in Ireland;
8. Sara Lee – a Dutch subsidiary of an American consumer products company;

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9. B&T (Byggtransportekonomi) – a Swedish mechanical engineering company; 
10. Volvo Auto (Uddevala) – a Swedish car manufacturing plant which has been the subject of much discussion; 

2.1. Common framework of analysis

The 11 companies were analysed in relation to a common framework which depicted different levels of progression in the adoption of competence-based strategies.

Level 1 – problem solving perspective

This represents a view of competence development as a means to introducing new problem solving processes in a company to meet its current needs. This could involve the introduction of new tools, equipment or operating systems. A radical evaluation and overhaul of current management and organisational strategies and models does not take place. The impact of competence development is mainly confined to the worker/shop-floor level.

Level 2 – organisational model perspective

This relates to the adoption of radical organisational models or management strategies such as TQM, world-class manufacturing systems which demand competence development on an organisational level, involving all managers and employees. The central feature of the change taking place is the adoption of an external organisational model.

Level 3 – visionary perspective

This entails a radical shift in the company’s values concerning the roles and responsibilities of all employees in the achievement of the company’s business goals. The implementation of the new company vision is based on the competence of the workforce. The chief executive of the company plays the key role in articulating and gaining company-wide acceptance of the new vision.

2.2. Where the 11 companies fitted in

Level 1

Three cases of the 11, Autoplastique, B&T and Clark Hurth, provide us with examples of companies which have incorporated innovations in their existing structures to respond to problems they are experiencing, without undergoing a radical structural or management transformation.

These companies adopted a contained competence development approach within more or less traditional management control frameworks.

Level 2

Three more cases, Audi-Volkswagen, Cadbury and Felten & Guilleaume illustrate the suc-
cessful importation of a state-of-the-art management or organisational model, entailing a company transformation with a major emphasis on competence development.

The change, which took place, was based on the successful adoption of an external model as distinct from being driven by an internal company-inspired innovation. For that reason therefore they are classified as secondary movers, their change process being based on the implementation of existing best practice management and learning systems and structures. The change in these companies is, therefore, fundamentally at a structural level.

Level 3

Five companies can be said to have adopted radical business policies based on a maximum development of the competencies of their front-line workers. These companies have adopted business strategies which enshrined competence development as a key value.

The change process in these companies started as a result of an internally generated company vision, giving rise to the adoption and application of competence-based values. These companies which can be termed prime movers in the change process are: Aluminium Dunkerque, Bord na Mona, Manducher, Sara Lee and Volvo.

2.3. The nature of the changes and the shape of the development processes

2.3.1. Visionary companies

The three companies Aluminium Dunkerque, Manducher and Volvo can be grouped together on the basis that the process started with a
new vision regarding the critical role to be played by line production workers in the achievement of business goals. This was step 1 – see diagram below. Steps 2 and 3 proceeded on from this. The competence of the workforce was seen as the key to getting things done. This entailed a reliance on human innovativeness.

Manducher for example changed on the basis of feedback from the workers who felt that they were not being given discretionary powers.

Volvo started with a vision of a factory in which workers’ creative craftsmanship skills (planning, controlling, sense of ownership of the product) were mobilised to make a maximum contribution in a modern technological-based production setting.

Aluminium Dunkerque started with the premise that unemployed people, in an economically depressed area, can be retrained to play a central role in ensuring efficiency in a process plant.

Sara Lee differs from the above three companies in that its initial focus was on the competencies of the business units (step 1) which would enable the company to innovate, to try new ways of doing things, thus ensuring continuous innovation. This was their fundamental value which was adopted as part of a value clarification exercise. A company-wide training programme was implemented (step 2) which had the business units at the centre, but was located in a total organisation context (looking up and outwards at the external business environment of the company) and linked to individual roles in the business unit in the form of per-
formance goals. This reinforced the vision (step 3).

Bord na Mona arrived at a similar value position as Sara Lee, but not on the basis of a proactive value clarification process. A company crisis forced them to take radical steps. They experimented with teams as autonomous business units (step 1) and discovered that they worked. They then ratified this system, putting the weight of the company behind it. This meant that a new value system was declared and implemented formally (step 2), but more importantly, became embedded in the shared informal value system of the company, which included management, workers and their trade union representatives.

2.3.2. Companies taking on new organisational models

The three companies, Audi/VW, Felten & Guilleaume and Cadbury can be termed secondary movers. The changes in Audi/VW and Felten & Guilleaume can be seen in the context of the new national policy guidelines emerging in Germany related to a national research and development programme. This work gave rise to new organisation models based on ‘production island’ manufacturing principles and new instruments for work-based learning with competence development seen as a central strategy (steps 1 and 2).

Audi/VW and Felten & Guilleaume, therefore, can be seen as an illustration of this new policy, which is sustained by a broad continuity with traditional German values regarding the central role of skilled workers in manufacturing companies. The beginning of a shift towards new values could be said to have taken place (step 3).

Cadbury illustrates the application of TQM principles which gave rise to the need for substantial competence development.

2.3.3. Problem solving oriented companies

The three companies Autoplastique, B&T and Clark Hurth illustrate how competence-based strategies were only partially implemented. Although radical changes were introduced at the work process and worker competence levels (step 1) the impact made on management structures and values was limited (step 2).

In the case of Autoplastique, even though the adoption of new management tools gave rise to dynamic learning patterns, management seemed incapable of changing its self-image as a centralised, rather autocratic controlling agency. They saw the changes as having to do with the implementation of new techniques without any corresponding significant changes in values.

The Clark Hurth case illustrated an extended change and learning process. The case depicts a rather tortuous piecemeal change process in which management gradually allowed more autonomy to be given to workers, with significant repercussions for their competence development. The overriding cautiousness of management, however, did not allow radical value changes to take place.

2.4. Features of competence-based strategies in the companies

This section is devoted to an analysis and discussion of the key features emerging in the companies which allows one to characterise them as competence-based companies.

The five central features which can be found in the vision-based companies and to a lesser extent in the others are as follows:

1. dynamic visionary leadership and support by senior management;
2. willingness to risk putting one’s faith in the competence of the workforce;
3. existence of an overall framework for the change process;
4. creation of a shared vision based on the implementation of a vertical organisational change programme;
5. commitment to and development of a practical programme.

These five characteristics, which illustrate different aspects of competence-based values,
can be seen as the pillars on which a company builds a competent workforce.

2.4.1. Dynamic visionary leadership and support by senior management

This first point reflects the degree to which the chief executive of the company has taken competence-based values on board and is prepared to embark on an organisational change process to transform the company in line with these values.

All of the five companies classified as prime movers – driven by competence-based values – had inspiring senior management who adopted a new mindset concerning the degrees of freedom and control to be exercised by employees. By the same token, the senior management of those companies who remained at the problem-centred solution level, such as Autoplastique, seemed reluctant or afraid to initiate a policy based on removing traditional management control systems.

The key driver in the change process is in the first place, the chief executive of the company. The head of the human resource development department can initiate real change only on condition that he/she receives total backing from the chief executive. The significant part played by the chairman and directors in initiating change is clearly illustrated in the case of Aluminium Dunkerque, in which the new plant was deliberately designed from the start to give prominent roles to front-line production workers.

Manduché illustrates how close cooperation and trust between the chief executive and the newly recruited personnel manager facilitated an effective change process. The senior management of Sara Lee reinforced their new company orientation through ensuring that an environment was fostered in which middle management (business units managers) felt fully involved in the company decision-making process. Thus they appeared to have avoided some of the problems which the middle management in Aluminium Dunkerque and Felten & Guilleaume had with their new roles vis-à-vis the line workers.

In the case of Sara Lee the corporate strategy focused on the concept of entrepreneurial management encouraging managers to feel and act like owners of the business unit for which they were responsible. A visionary image was utilised to communicate the new management philosophy and to inspire employees to adopt new ways of working. Similarly the new production process in Volvo was driven by a new vision, articulated by the company chairman, of the autoworker as someone who can build a complete car on his/her own. At the same time one can conclude that it was the failure of a significant group of senior management to take on board this new vision which caused the project to be terminated. The failure to achieve a consensus among senior management and the emergence of a more dominant divergent management school, eventually led to the demise of the chairman’s radical vision of ‘the new worker’.

The Autoplastique case illustrates a solution which many managers may be tempted to adopt – introducing new production and learning techniques within a traditional management framework – putting new wine into old bottles. The result in Autoplastique was an uneasy coexistence of prescriptive management strategies alongside open learning practices, not an ideal framework for sustainable development.

2.4.2. Willingness to risk putting one’s faith in the competence of the workforce

The willingness to risk depending on the competence of employees, as the key to ensure the future of the company, is a common feature which can also be found in the companies effecting real change.

‘Risk taking was a central feature of the new Bord na Mona, with a creative tension between the old control and the new autonomy of the teams’. It was the chief executive who took this risk in the interest of the survival of the company, a decision comprising elements of both inspired and pragmatic leadership. This meant ‘a total culture change for the company which involved setting up consensus within the group, carving out their own identity and direction and transferring leadership to teams’. Team-based activities were
not new to the company – ‘what was new, was the focus on, and centrality of teamwork. Even though this risk-taking resulted in a fragile consensus with the impact of the new values still reverberating within the company, the strong feeling of the workers after six years, was that there is no going back. The fragile consensus in Bord na Mona can be contrasted with the uneasy trade-off type of agreement in Autoplastique and the volatility of the consensus achieved in Volvo eventually resulting in a breakdown.

Felten & Guilleaume made a dramatic change from a reliance on a technology centred investment policy to a human resource one based on the unknown production island principle. This meant risking to place one’s confidence in people rather than in technology.

The low risk threshold of B&T (the fear of losing control), on the other hand, prevented them from learning from the insights gained concerning the human-technology interface in the temporary group established to set up the new technology system. One can also point out the fear of the unknown as one of the factors inhibiting Clark Hurth from embarking on a radical competence-based policy.

2.4.3. Existence of an overall framework (building on traditions and utilising new research)

The change process in most companies took up to three to four years from the start-up phase to the achievement of a significant objective. There are no examples of overnight re-engineering. The motto summing up the development process therefore is evolution not revolution.

In this long-term context a soundly based framework is required to keep the project on the right tracks. This was provided through broad conceptual organisational change models developed internally or mediated to the company by means of external consultant agencies or through participating in national development programmes. In this respect the two German cases Felten & Guilleaume and Audi/VW benefited from their participation in the national Arbeit und Technik-Programm which set out to re-search and develop new qualification models to respond to the introduction of new technology and new forms of work organisation.

Aluminium Dunkerque relied on sociotechnical design thinking and drew on the theoretical work on l’organisation qualificante (learning organisation) developed by French researchers such as Phillippe Zarifian (1993). The Cadbury company adopted a TQM framework within which the overall competence development programme took place. Manducher recruited an organisational development expert to design and orchestrate a total company change.

2.4.4. Creation of a shared vision based on the implementation of a vertical organisational change programme

The success of the change process in Bord na Mona can be attributed to the development of informal understanding and mutual respect between employees and management. This issue is at the heart of the notion of implementing a vertical organisational change – everybody in the company is involved in a significant way.

Shared visions

The notion of creating shared visions is important in this regard. Sara Lee focused initially on developing shared visions and values on a company-wide basis and within each business unit. This created a basis for setting performance standards for individual jobholders who then saw themselves as partners in business. The implementation of effective company-wide communication meetings was critical in this regard.

The extensive discussions, which took place between the trade unions and management in Bord na Mona, allowed the company to formulate a shared vision, which gave rise to the motto ‘Teams – partnership for progress’. The deep level of trust and understanding developed in the company meant that this phrase symbolised the common ground established and was not just a mere slogan.

Pilot projects

Another method used to ensure the commitment of everybody in the firm was the utilisa-
tion of pilot experimental projects in the start-
up phase. Felten & Guilleaume and Bord na
Mona pilot-tested their overall programme in
one department or with a number of employ-
ees within their companies. It was on the basis
of an evaluation of the results of the experi-
imental project by a group representing social
partners and different organisational-develop-
ment and technical specialists that the next
phase was designed and implemented.

In Sara Lee every stage of the development
programme was reviewed by all of the key
players involved – management, supervisors
and workers – so that the next phase was em-
barked on only after everyone expressed sat-
isfaction with the previous one.

Cross-functional teams

Another means to promote vertical company-
wide change, which can be observed in the
case studies, is the establishment of cross-
functional teams. The purpose of these teams,
which were composed of personnel from differ-
ent departments, representing different senior-
ity levels, was to facilitate vertical and horizon-
tal communication within the company. In
cadburys, for example, these teams which
were called ‘quality action teams’ and were
made up of people from different occupational
grades, met regularly to ensure that all of the
interested parties were au fait with current pro-
duction and maintenance problems.

Clark Hurth set up ad hoc project groups along
the same lines, but comprising training and
production personnel, with the aim of devising
relevant work-based competence development
systems. In the case of Aluminium Dunkerque,
planning and development responsibilities
such as human resources development were
handled by senior managers on a cross-
departmental basis, while line management
functions in the different departments were
handled by less senior staff. This is the reverse
of the position in most traditional companies.

Pragmatic cooperation

In Cadbury’s and Bord na Mona the notion of
pragmatic cooperation acted as a guiding prin-
ciple for management and trade unions. A col-
laborative style of industrial relations was to
the mutual interest of all concerned. For Bord
na Mona, in the final analysis, this meant that
workers could determine their own pay levels
in line with a gain-sharing principle.

Cadbury realised that higher levels of compe-
tence meant higher quality and more flexibility,
so employees were rewarded for learning. This
also entailed the introduction of new pay struc-
tures at operator level to promote the acquisi-
tion of new skills. Manducher introduced a
rather innovative scheme whereby workers
were paid on the basis of the skills they learnt,
while managers were rewarded on the basis of
their capacity to utilise workers’ existing and
new competencies.

2.4.5. Commitment to, and development of,
a practical programme

The attainment of long-term ambitious goals is
dependent on paying attention to the many de-
tailed steps which have to taken. This entails a
commitment to planning, to follow-through, im-
plementing and reviewing each of the stages
and allocating sufficient financial and human
resources to the overall project.

The human resource development depart-
ment in Sara Lee received a strong mandate
from senior management and was therefore
allocated sufficient resources to design and
implement a radical programme. Similarly in
Manducher a personnel director was appoint-
ed to draw up and supervise the implementa-
tion of a long-term programme. Felten & Guil-
leaume and Audi/VW anchored their internal
programme to a wider national programme
which provided them with practical instru-
ments and tools.

The manner in which companies implemented
their learning programmes in practice will be
covered in more detail later on.

2.4.6. Other factors having an impact
on the implementation of competence-
based strategies

External support

As already mentioned, the national develop-
ment programme in Germany had a very in-
fluential bearing on the progress of the Felten & Guilleaume and Audi/VW companies. It gave direction to the process and provided an essential research and consultancy service which allowed experimentation to take place. In France, Aluminium Dunkerque received backing from the French Ministry of Labour. This consisted of conceptual and financial support. Regional labour market and educational agencies also actively collaborated with the company, particularly at the initial stages. Manducher and Autoplastique also benefited to a certain extent from government inspired research and development initiatives.

The wider social context
From a social inclusion perspective Aluminium Dunkerque illustrates how unemployed people, in a region going through industrial decline, can be retrained and successfully integrated in a modern work environment, demanding advanced social and technical skills. Bord na Mona demonstrates how workers from a rural background who had become accustomed to Tayloristic work practices, including adversarial industrial relations, were able to cooperate actively with the company management in implementing radical changes. The management and workers in Cadbury also successfully negotiated a transition from a negative industrial relations culture to one built on pragmatic cooperation.

While Felten & Guilleaume showed how existing older workers could be retrained so as to adapt to modern practices, the picture of the flexible company emerging from Clark Hurth and Autoplastique is one in which younger workers/learners are displacing the older ones. In Clark Hurth, for example, the average age of the workers is 27 years.

Special issues
Bord na Mona was the only company in which change was clearly driven by an enormous crisis. Although Felten & Guilleaume, Manducher, Cadbury, Autoplastique and Clark Hurth were experiencing serious problems, they had not reached crisis proportions when they decided to take counter measures. All of the companies were on brown-field sites with the exception of Autoplastique.

3. New competence demands in European companies

An outstanding feature of the overall competence required by workers in the companies portrayed, is the capacity to understand and handle social/organisational and technological complexity. This kind of worker is able to relate the specific tasks which he/she is engaged in, at any moment in time, to the overall task being carried out by other members of the organisation. This person therefore needs to have a helicopter view of the organisation and feel in contact with the different parts of the system. These attributes were traditionally seen as ones which only management required.

This section firstly discusses some general frameworks, related to the above point, within which worker competence is portrayed by the companies, before going on to describe and analyse configurations of specific competencies and skills to be found in the different companies.

Three related frameworks within which one can describe the new competence and responsibilities of the workforce are as follows:

- capacity to relate to the total picture
- vertical role enhancement
- horizontal role enlargement: multi-skilling.

The latter two points, vertical role enhancement and horizontal role enhancement can in fact be seen as illustrations of the first point – the capacity to relate to the total picture.

3.1. Capacity to relate to the total picture

This refers to the capacity to carry out a complete job or long cycle work projects in a relatively autonomous manner, relating one’s role to the overall task to be performed by the group/organisation.

This holistic notion of competence was emphasised particularly in Volvo, Aluminium Dunkerque, Audi/VW, Felten & Guilleaume and from a unique perspective in Autoplastique. In Volvo one can note the emphasis which is placed on ‘being able to deal with the total assembly system – relating sub-systems to the
total system’. Long-cycle assembly work demands this type of competence.

In Aluminium Dunkerque, worker development was conceived in terms of progressively moving along different levels of complexity within ‘a field of related jobs’, instead of learning compartmentalised jobs related to discrete functions. One begins by carrying out normal operations regarding different stages of the work process from start to finish, while gradually improving the depth of one’s theoretical and practical knowledge, so learning to handle variance and thereby attaining complete mastery.

The notion of Handlungskompetenz (action-competence) which is a key attribute of workers in Audi/VW and Felten & Guilleaume, refers to the ability to conceptualise, plan and execute all aspects of a complex job in an independent manner.

The Autoplastique case-study highlights the need for employees to possess core competencies in order to contribute to, and participate in the collective intelligence of the organisation. Collective intelligence refers to the formal and tacit knowledge and expertise of the organisation as a whole. It is different from, and greater than, the sum total of indi-

**Worker Profile – an integration of different competencies**

![Worker Profile Diagram]

**Bord na Mona and Sara Lee**

![Bord na Mona and Sara Lee Diagram]
individuals’ knowledge, and has a quality of dynamic interconnectedness, which enables people to learn from each other about the whole system.

3.2. Vertical role enhancement

This entails workers taking on certain aspects of what were traditionally considered as management or supervisory functions. In the Bord na Mona autonomous teams, for example, everyone has certain team leadership responsibilities. In Audi/VW, the team, which is also expected to be self-directing, has a spokesman but not a supervisor. Operators also take on new roles in which they become like skilled workers. In Cadburys craft workers have responsibilities for tasks normally considered the preserve of technicians while operators have been trained to carry out certain craft-level functions. B&T showed how in the installation and running-in of new technologies, skilled workers had to assume (borrow) authority from management. When the new equipment was running smoothly, however, the company reverted back to the old boundaries between those having administration and management functions and those with operational functions.

3.3. Horizontal role enhancement: multi-skilling

Multi-skilling is very much in evidence in Cadburys where cross-trade flexibility exists for electrical and mechanical craft workers. Team workers at the operator level are also expected to be multi-skilled, able to carry out all of the functions of the team. The work processes in Aluminium Dunkerque were also based on the principles of multi-skilled teams.

3.4. Profiles of worker competencies

In line with the integrative frameworks within which workers’ roles and responsibilities have just been formulated, the profiles of specific competencies can best be understood along four interconnected axes. Overall competence therefore is an amalgam of four different kinds of competencies present to varying degrees.

3.4.1. Business and social-cognitive competencies

Bord na Mona and Sara Lee laid special emphasis on business and social competencies. For Bord na Mona this meant in particular financial management skills as an ‘understanding of basic finance was seen as central for the success of the team’. Broad business management skills, such as cost management, forecasting, planning and in particular risk taking, were also seen as essential.

In Sara Lee the emphasis was on employees developing an entrepreneurial spirit – a feeling of being a partner in the business – which is
manifested through qualities such as initiative and responsibility.

3.4.2. Cognitive-social-technological competencies: key qualifications

The concept of key qualifications was central to the notion of worker competence in the two German companies Audi/VW and Felten & Guilleaume.

Key qualifications are broken down under the following three headings:

- Cognitive skills include, among others:
  - observing
  - listening
  - reading and interpreting drawings and numeric data
  - knowledge of how PLC programmes are structured

- Communication and cooperation skills include, among others:
  - mutual information exchange
  - supporting maintenance actions
  - joint problem solving

- Technical skills include skills in the following areas:
  - electrical and electronic
  - hydraulic
  - pneumatic

Key qualifications have to be understood in relation to the notion of *Handlungskompetenz* (action-competence) which means bringing all these qualifications together in an integrated way to carry out a whole job. Aluminium Dunkerque, Manducher, Cadbury, B&T, Volvo and Clark Hurth also illustrate competence profiles highlighting cognitive-

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<td>2. Pilot development programmes</td>
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<td>Felten &amp; Guilleaume</td>
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<td>Sara Lee</td>
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<td></td>
<td>Volvo</td>
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<tr>
<td>3. Workplace learning</td>
<td>All companies</td>
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social-technological competencies, similar to key qualifications. The Manducher grid, which mapped the optimum worker competence profile, included — product, process, quality, planning, communication and social skills.

3.4.3. Social-cognitive competencies

In Autoplastique workers developed core competencies for collective intelligence.

The two types of core competencies needed to share and contribute to collective intelligence were of a social and cognitive nature:

- social competencies to share knowledge and know-how including tacit and formalised knowledge — communication and cooperation skills;

- cognitive competencies to create new know-how — ability to anticipate and react, e.g. formulating a problem, taking a decision.

3.5. Learning processes to develop new competencies

The implementation of a practical learning programme was identified earlier as one of the pillars of a competence-based company. This section spells out in detail what this means for the companies surveyed.

Firstly, the sequence of the competence development stages which the companies went through is discussed. This is followed by an analysis of the learning and development processes utilised, and finally the position adopted in relation to learning incentives is examined.

3.5.1. Competence development stages

The companies varied considerably in the ways in which they envisaged the steps in an overall development process. Six of the companies decided to implement extensive preliminary training or pilot development programmes. The purpose of a preliminary training programme was to bring people up to a basic level of technological or social skills, so that they could participate in a more specialised work-focused development programme. The emphasis in preliminary programmes was more on individual skills and learning, often following a formal pattern. Pilot programmes on the other hand had more of an organisational focus and gave companies the chance to try out and refine their proposal before implementing them on a wide scale.

Aluminium Dunkerque, Manducher and Bord na Mona carried out preliminary training.

Prospective employees in Aluminium Dunkerque underwent 1 100 hours of general training comprising scientific, technical and social topics and skills. This training was carried out in collaboration with the regional bodies before the start-up of the plant. Manducher likewise arranged a formal and general education courses for existing and newly recruited employees. Bord na Mona focused on equipping its existing workforce with cost-management skills which were essential for effective performance in the autonomous teams envisaged.

As regards pilot development programmes, Bord na Mona introduced its new forms of work on an experimental basis and subject to joint management—union monitoring. Felten & Guilleaume tried out and evaluated production islands and learning circles in one department of the company initially. Sara Lee also began its

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<td>Aluminium Dunkerque</td>
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<td>Financial rewards for learning</td>
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<tr>
<td>Recognition and portability</td>
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<td>Standard-based assessment</td>
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220
overall programme with a number of developmental projects, one of the most important being a training course for first line management.

3.5.2. Learning incentives

The standards-based assessment system utilised by Manducher, Aluminium Dunkerque and Cadbury was used as a basis for career progression within the firm. Aluminium Dunkerque went one step further in gaining recognition by external public training and professional bodies of company assessments, thereby assisting competence portability and job mobility. Cadbury was in the process of establishing links between its internal assessment procedures and the UK National Vocational Qualifications Awards standard-based system.

The same three companies also introduced a financial award system based on the development of new skills – a concrete expression of their belief in the value of competence development.

Before proceeding to provide illustrations of what the companies meant in practice by informal learning approaches, it is worthwhile examining the relationship between learning processes and work processes.

Informal learning implies that people learn as a result of being given, or taking opportunities to learn in the course of their work. This can be realised only if certain conditions are in place, the principal one being that workers can exercise a degree of control over how they plan, execute, evaluate and reflect on the work they have to do. The work environment on the shop-floor can promote or hinder learning therefore depending firstly, on the degree to which workers’ autonomy is fostered and secondly on the manner in which company management provides work-based learning frameworks such as learning circles (Felten & Guilleaume) and work-place pedagogics (Volvo).

As can be observed in the figure above, the workplace of many of the companies in this study tended to favour local control (and decision-making) by the workers. The related
Learning frameworks that were in place meant that the informal learning processes were supported by a high degree of planning and structuring. One of the exceptions was Bord na Mona for whom learning occurred in the teams principally as a result of being given full responsibility for how they undertook their work – ‘the learning environment, which emerged, was a very informal one’. It was a question of being thrown in at the deep end. Workers received a limited number of preliminary lessons, but in the context of the crisis, which the company was going through, they were forced to make it largely on their own.

The B&T group were also forced to learn, rather than assisted to learn, because they had to borrow management’s authority (decision-making) to resolve the problems they were faced with. The informal learning patterns in Autoplastique likewise were not complemented by the delegation of decision-making to the workers.

3.5.4. Specific informal learning approaches

The specific informal learning approaches implemented by at least eight companies cover a wide spectrum displaying rich diversity (see figure below). In the Audi/VW for example special ‘learning-oriented flexible manufacturing’ cells situated in the real work environment are used. Learning methods include the use of ‘cognitive learning strategies’ such as ‘heuristic rules’. In Volvo the term ‘workplace pedagogics’ refers to learning to understand and work in terms of cognitive wholes.

The informal learning strategy put into operation by Aluminium Dunkerque initially entailed ‘planned on-the-job learning’. Following on from this was a continuous learning programme based on the review of one’s performances in ‘real work situations’. Learning in teams was coordinated by middle management staff with the assistance of internal training facilitators and outside consultants.

In Felten & Guilleaume learning circles were the focal point within which individual and group learning needs were identified and training programmes agreed.

What were termed cooperative learning strategies were used by Autoplastique. This meant...
### COMPANY

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<tr>
<th>COMPANY</th>
<th>INFORMAL LEARNING APPROACHES</th>
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<tr>
<td>Audi/VW</td>
<td>‘Learning oriented flexible manufacturing cells’ ('decentralised work-based training')&lt;br&gt;‘Cognitive learning strategies’&lt;br&gt;('heuristic rules')&lt;br&gt;‘Leittextmethode’ ('guided discovery learning texts')</td>
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<tr>
<td>Volvo</td>
<td>‘Workplace pedagogics’ (learning to understand and work in terms of ‘cognitive wholes’)</td>
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<tr>
<td>Aluminium Dunkerque</td>
<td>Start-up phase: planned on-the-job learning according to eight stages in a job&lt;br&gt;Continuous learning programme based on a review of one’s performance in real work situations</td>
</tr>
<tr>
<td>Felten &amp; Guilleaume</td>
<td>‘Learning circles’ (work-based learning groups to identify needs and decide on programme to be followed)&lt;br&gt;Middle management changed from being knowledge holders to moderators and coaches</td>
</tr>
<tr>
<td>Autoplastique</td>
<td>‘Cooperative learning strategies’&lt;br&gt;Learning as a by-product of the work of the project team&lt;br&gt;One-to-one learning (based on a learning contract (contrat de qualification))&lt;br&gt;Coaching (tutorat)</td>
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<tr>
<td>Manducher</td>
<td>‘Close-to-the-job learning’&lt;br&gt;Experienced workers (multiplicateurs) and older retired workers acted as trainers’&lt;br&gt;‘Discussion circles’</td>
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Learning in one’s project team, where learning was seen as a by-product of teamwork. One-to-one learning approaches based on a ‘learning contract’ (contrat de qualification) and coaching (tutorat) were also used.

One of the terms used to describe informal learning in Manducher was ‘close-to-the-job learning’. Experienced workers who were called multiplicateurs were designated to carry out individualised training in special training rooms near the workplace. Older (retired) workers also acted as trainers on a part-time basis.

The trainer in Clark Hurth identified training needs by means of formal contacts with work groups and informal contact with individual operators and tuners. Technical work groups were set up under the supervision of the trainer to resolve special problems.

With regard to formal learning, Cadbury followed a modular training approach to assist the development of cross-trade technical skills at craft level. Self-instruction approaches were available in Cadbury and also in Aluminium Dunkerque.

The assistance of external consultants and training bodies was central to Cadbury’s strategy as well as a number of other companies. The modular programme in Cadbury’s and the initial first-line management programme were...
designed by external agencies. As already described, local public training authorities played a very important role in Felten & Guilleaume and Aluminium Dunkerque programmes.

In the latter company also, as well as in Manducher and Cadbury, progress in learning was carried out on a joint basis. This meant that competence was assessed jointly by the frontline supervisor, the employee and the external consultant. To facilitate this process Manducher utilised a competence grid covering technological, production and social skills.

4. Conclusion

4.1. Detecting the difference between ‘espoused theory’ and ‘theory in action’

Chris Argyris (1978) coined the terms ‘espoused theory’ and ‘theory in action’ to make the distinction between what people say they are doing and what they really do in practice. Reality often does not match the rhetoric. This study affirms this hypothesis. While most of the companies examined described their behaviour as being in line with forms of management giving greater autonomy to employees and supporting learning organisation principles and actions, the reality for three of these companies (displaying an unwillingness to let go of traditional ‘tight control’ management and organisational models) was very different. This was true of many other companies which identified themselves at the beginning of this project as innovative, competence development oriented companies, but on examination did not bear up to the way they described themselves. The framework for evaluating the three different levels of implementation of innovatory practices, developed in the course of the project, could be a useful research instrument in evaluating the experiences of companies in general.

4.2. Variety of pathways to achieve the same goal

Another interesting conclusion to this study is the variety of pathways which the featured companies took in achieving similar goals. Successful innovation can originate from many different starting points and follow a variety of pathways, that is, providing all of the necessary stages are gone through. This is illustrated by the fact that while three of the companies, Aluminium Dunkerque, Manducher and Volvo introduced new organisational and learning models in a very logical manner, beginning with the adoption of new values and the drawing-up of an overall long-term plan, other companies (in particular Bord na Mona) displaying a responsiveness to events occurring within the company – learning from them – went on to implement radical solutions entailing major changes in management’s attitude towards the position of employees as stakeholders in the company.

4.3. The fragility of social (human resource) innovation

Another concluding reflection on the cases examined in this study, which is linked to the last point above, is the fragility of social or human resource innovation. In the first place, opportunities to implement the innovation process can so easily be lost. This study has shown how opportunities for radical innovation to respond to modern business needs, which were grasped by some companies, were allowed to slip away by others. An interesting example in this regard, not outlined in the study, relates to the Cadbury case-study. A different Cadbury factory in the same location as the one featured in this study was also the subject of an innovation exercise around the same time. However, the renewal process did not take off there due to a combination of factors, one of them being the inability of that company to move away from its traditional adversarial industrial relations practices. While one company took the opportunity to move forward, its sister company did not. Secondly, the study also shows that social innovations that have taken ages to build up can be destroyed very quickly. The Volvo case, and to a much lesser degree the other Swedish case, B&T, demonstrated how easily achievements based on enormous commitments and a great deal of work were lost overnight.

4.4. Innovation a highly complex process

The experiences of those companies, which embraced radical ‘worker centred’ competence strategies, show it to be a very complex
process demanding vision, risk-taking and a long-term commitment.

As outlined in this paper the companies which made the change had the following five characteristics.

- senior management had visionary and leadership qualities characterised by a capacity to see work activities, business development and organisational and individual learning goals in a systemic context;
- both management and workers (and their unions) displayed an ability and a willingness to take risks in moving beyond existing mind-sets and begin to shape a new reality for the company;
- soundly-based and well-researched frameworks were used by the companies in effecting the change process;
- all of the stakeholders in the companies (management and workers at all of the different levels and trade unions) were involved in the ‘whole-system’ change process (not top-down) which was characterised by pragmatic cooperation;
- all partners in the change process were committed to the implementation of detailed, time-consuming and sometimes very difficult steps required in the change process – very different from the ‘re-engineering’ philosophy.

4.5. Competence profiles

The competence profiles of the employees of the companies featured in this study must be understood primarily in relation to the context of the particular enterprise they were working in, and only secondarily in relation to formal public qualification profiles. Employees were at the same time being shaped by, and shaping, this context. In the first place, the demands on the company to establish working patterns to enable them to respond to competition in a globalised market-place determined the kind of competencies required of the workforce. Secondly, the need for the company to devise effective ‘long-term’ strategies to respond to, and indeed have an impact on the environment (or anticipate changes in the environment) required individuals to play a part in building the ‘collective knowledge’ or competence of the company and at the same time reshaping/enhancing their own competence profiles. (See Nonaka and Takeuchi, 1995).

The knowledge required by employees in the study was, to use the terms of Erault (1997), ‘personal’ as distinct from ‘prepositional’ knowledge. According to Erault, prepositional knowledge is codified knowledge which is given foundational status by incorporation into publicly recognised qualifications. Personal knowledge on the other hand ‘is acquired not only through the use of public knowledge but is also constructed from personal experience and reflection. It includes propositional knowledge along with procedural and process knowledge, tacit knowledge, and experiential knowledge in episodic memory. This allows for representations of competence, capability or experience in which the use of skills and propositional knowledge are closely integrated.’ (Erault, 1997, p. 552). This distinguishes an experienced-worker (an expert with personal knowledge) from the beginner-worker (a novice possessing in the main propositional knowledge). (See Dreyfus and Dreyfus, 1986.)

4.6. How learning took place

In the light of the last point above, it is not surprising that the predominant learning approach used within the companies was situation-based learning. Although all of this learning is grouped together under the heading of informal learning in this paper, it would be a mistake to see this as haphazard or unplanned learning, (although there is a certain truth in the statement that the best way to improve learning in a company might be to change the organisational culture and then the learning would look after itself).

The key feature of the learning approaches of the visionary companies studied, was the planned provision of opportunities for collective and individual reflection on ways in which the company could improve its performance, benefiting in the long run both the company and the individuals working there. In many cases these reflections led to focused on-the-job learning solutions based on ‘the reflection-based learning cycle’ with, for example, an expert teaching a less experienced
person, but it also included the introduction of formal learning (training) programmes where appropriate. The reason why the predominant learning approach in the companies is called ‘informal learning’ is to highlight the importance placed on ‘contextual learning’, that is learning embedded in the working process of the company as distinct from formal context-free knowledge. (While on the one hand much of this knowledge could be seen as what is referred to as company-specific knowledge, not having any benefit to the individuals in a personal career development sense, it is also true that this learning did provide individuals with personal knowledge in the sense in which Erault uses it (or core/key competencies) which built up their specific occupational and general competencies and promoted their employability in modern labour markets.

4.7. European values and traditions

While the companies examined illustrated the changing but continuing influence of European industrial and human resource values and policies in the business world to-day, there are also clear signs that globalisation trends are challenging these values. Sparrow and Hiltrop (1994) identified six features of continental European human resource management traditions which distinguish Europe from the USA. In Europe, according to these authors, there tends to be (a) more restricted employer autonomy; (b) less stress on free-market processes; (c) less emphasis on the individual with more on the group; (d) greater focus on workers rather than management; (e) increased role of ‘social partners’ in the employment relationship; (f) higher levels of government intervention or support in many areas of human resource management.

Most of the above features can be found to a greater or lesser extent in the companies examined which placed a strong emphasis on highly skilled workers as the backbone of the enterprise. An important role was also assigned to collective trade union representation and the influence of national government support frameworks, be they financial and/or advisory, could be seen in many cases. Although the European emphasis on creating macro-societal frameworks to promote social cohesion by means of government industrial and social regulations, including the importance of social partnership and the protection of individuals’ rights, was not explicitly discussed in any level of detail in the study, but underlies the daily life of most of the companies examined.

Nevertheless, it is also clear that global free market competition is strongly challenging European (more specifically continental and Nordic) work-related values. In this regard, globalisation is pressuring all companies, that wish to compete in world markets – and all markets are becoming global more and more – to devise similar state-of-the-art organisational structures based on the concepts of efficiency and flexibility, for example world class manufacturing. The development of flexible workers is, in many cases, a direct challenge to the notion of profession or occupation (giving people an identity or role and characterised by traditions, standards, values and membership of a professional group) which is broader and different from the company role. A short-term and too lopsided view of the business dimension noticeable in the competence profile of workers can have a negative impact on overall professionalism in the above sense.

In terms of competence profiles, the European way (professional/occupational identity approach), can be seen as situated midway between the individualistic job orientation of the USA (project-based and in line with a flexible unregulated labour market) and the corporatist/company (job for life) perspective of Japan (in line with the notion of the clan, family or cohesive group and based on the internal flexibility of the company). The challenge for European players (social partners, enterprises and government) in the industrial, business and vocational education and training areas is to find a way to modernise companies so that they can compete in the global market while at the same time not lose sight of local, national and European societal values and goals which provide continuity and stability.

Some specific issues facing human compe-
tence and business development in Europe and deserving of further study are as follows:

1. the creation of frameworks bringing together the human resource development (HRD) business orientation (in particular the humanistic HRD schools) with the vocational education and training (VET) professional identity and personal development perspective;

2. building coherent ‘holistic’ professional/occupational profiles (new professions/occupations) – including business and societal perspectives – which are flexible (broad enough and deep enough) to deal with globalisation and which have an in-built predisposition towards lifelong learning (employability);

3. designing learning strategies and curricula which can address the above;

4. designing accreditation systems which provide frameworks for interpreting the above competence profiles, incorporating the ‘personal knowledge’ (Erault) or ‘core/key competencies’ acquired and so allowing for transferability to other contexts.

5. development of training professionals who can carry out their new roles as facilitators of learning within the context of learning organisations where the line management has responsibility for ensuring that learning takes place;

6. examining ways in which trade unions find their role in the new modernised organisation finding a balance between individual and collective representation methods.

Bibliography


JÜRGENS, U. et al., Moderne Zeiten in der Automobilfabrik. Strategien der Produktionsmodernisierung im Länder- und Konzernvergleich (Modern times in the automobile factory. Strategies of production – A comparison be-


B. Skill and competence needs of small and medium-sized enterprises (SMEs) and for the creation of new companies

John Konrad (1)

Summary and outlook

The most important issue in this field is to increase the survival rate of SMEs through access to effective training and development processes that meet their short and longer-term needs. This would increase employment, encourage a flexible, decentralised economy, and with flexible procedures and flatter organisational structures typically found in SMEs, would promote social inclusion.

The promotion of suitable education for both new and existing entrepreneurs is a worldwide issue, which is given added urgency with the continuing internationalisation of the labour markets. The broadening of the knowledge base of entrepreneurs is an issue where different countries and regions are developing examples of good practice in common.

One of the most effective strategies is to develop the competence of professional workers at all levels as reflective practitioners through a progressive ladder of rigorous qualifications. This approach appears likely to meet identified SME needs when linked to a broad competency model that promotes both individual and organisational development and avoids simplistic mechanistic prescriptions.

Structural measures to promote SME survival and growth as high performance enterprises include business incubators, research and development or technology centres or parks and apprenticeship promoting programmes. The development of links between such measures

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and SME education and training is quite often inhibited by market failure in labour and human resource development.

The following recommendations are being made:

1. Further research should be undertaken to identify significant aspects of institutional structures at local, regional and sector levels, which contribute to improving the effectiveness and efficiency of the labour and human resources at the respective level.

2. The development and proper implementation of parameters for high quality education and training based on the reflective practitioner model should be subject to pilot project developments and linked to use and possible refinement of the European credit transfer system (ECTS) in ways that meets the needs of prospective and current employees of SMEs.

3. The European Commission should use the opportunity presented by the new programme structures associated with its Agenda 2000 to promote effective locally coordinated action that provides a high-quality work force.

4. Collaborative conceptual, action, and applied research on the development of comprehensive competencies and qualifications for owner-managers should be a high priority for all actors, policy makers, social partners, and practitioners.

I. Context

1. European Union

The European Commission's enterprise policy was presented to the Madrid European Council of 1995 (2). The Commission then prepared the integrated programme in favour of smes and the craft sector (3). This paper has been elaborated for the European Centre for the Development of Vocational Training (Cedefop) and more especially for its handbook 'European trends in occupations and qualifications'. It ought to be located within the priority and objective designed to 'strengthen the competitiveness of SMEs and improve their access to research, innovation and information technologies and to training'. Objective D of the enterprise policy objectives refers to a particular focus to 'stimulate management training' (4).

The Commission has adopted a recommendation (5) concerning the definition of SMEs, which applies to all European Union programmes and is as shown in the table on p. 231.

In addition to meeting the criterion for number of employees, an enterprise must meet one of the financial criteria, and it must be independent in that less than 25% is owned by one or more enterprises falling outside the above definition.

The 1993 European Commission's White Paper Growth, competitiveness and employment: The challenges and ways forward into the 21st century outlined the EU's approach to increase employment and to combat social exclusion, while also encouraging a flexible, decentralised economy.

More recently, the Commission has sent to the Council of Ministers a set of priorities on fostering entrepreneurship in Europe. These proposed priorities include the promotion of specialised training in enterprise management and the development of synergy between universities and enterprises (6).

The role of SMEs in the EU economy

SMEs employed two-thirds of the EU workforce in 1995, and in 1996, 19 million SMEs were set up with 110 million employees. However, current Commission figures indicate that

(3) COM(94) 207 final, 3.6.1994.
only half of SMEs survive after the first five years of operation (7).

‘Net job creation in SMEs has more than compensated for job losses in large enterprises during the period 1988 to 1995. Enterprises with fewer than 100 employees have been responsible for almost all the job creation at a rate of 259 000 net jobs per year.’ (European Commission 1995: 3) (8)

The same report identified SME training as a case of market failure in labour and human resources.

‘Although qualifications are a key to competitiveness, training in SMEs is undertaken significantly less often than in large companies, partly because the training does not meet SMEs’ needs. Initial training programmes do not always provide for the necessary multi-disciplinary skills and core competences they need. Traditional away-from-the-job training is often unsuitable for SMEs and the training infrastructure is notoriously weak in sectors dominated by SMEs. … However, there is still insufficient creation of business and jobs in this sector (craft industry and small enterprises), due to a still inadequate level of vocational and management training for apprentices and potential new entrepreneurs. … In the medium and long term, education and training should aim to encourage an entrepreneurial culture which will lead to business start-ups and job creation …’ (European Commission 1995: 6, 12).

Overall, the picture of apparent stability in the proportion of workers in SMEs masks not only high turnover due to business failure, but also the swing away from manufacturing to service employment, especially in sectors such as tourism which in 1996 made up 6% of total employment (European Commission 1997: 3). The existing ‘dual system’ of vocational education and training (VET) in Germany and some other EU Member States developed in the 1950s. At this time large manufacturing employers needed a rational, planned and systematically trained workforce. With the collapse of the centrally controlled command economies in eastern Europe and the shift towards the open, customer-focused variable production characteristic of SMEs, future patterns of training and education are likely to require open, learner-centred pedagogy. This entrepreneurship-orientated training is more likely to be provided away from the employers’ premises in order to meet the wide range of needs and situations (9) (McFarland 1997: Chapter 11).

A recent research study on training provision for SMEs commissioned by the UK Department for Education and Employment (DFEE) which reviewed a wide range of research in the UK, North America and Australia confirmed many of the above findings. In particular, the research concluded that:

- a manager or an employee of an SME is less likely than one who works for a large firm to receive training, particularly job related or leading to an accredited qualification;
- there is no obvious reason or conclusive evidence that the quality of training provided in small firms is worse than that provided in large firms;

(8) However, over the same period (1988–95) enterprises employing 100+ employees lost an average of 222 250 jobs per year (Graph 5).
(9) There are some examples of innovative apprenticeship placement schemes for new graduates, for example the Companies Assisted Partnership Scheme (CAPS) in West Yorkshire (UK).
the ‘market forces’ explanation for the lower level of training in SMEs is more plausible than the ‘ignorance’ explanation in that:

– owners of SMEs are mainly concerned with short-term survival while many of the benefits of training, especially those leading to accredited awards, are longer term and represent significant returns to the individual and the economy rather than the employer;
– employers believe that trainees in small firms will be poached by other (and larger) employers (10);
– there are less market forces and, for managers, less promotion opportunities, within an SME;
– the wide range of needs exhibited by SMEs leads to diseconomies of scale for training providers (11).

A local study confirms that there appears to be a mismatch between government policy stressing qualification achievement, and employers’ priority for high quality, flexible, customised and company-specific training (Konrad et al. 1998).

2. Asia–Pacific Region

Outside Europe, the most active area for development in supporting SMEs has been the Asia Pacific Economic Co-operation (APEC) group. Following the establishment of the Ad Hoc Policy Level Group on SMEs (PLGSMEs) in February 1995, a number of projects and workshops were established. Projects for 1998 include the creation of a distance learning training programme and the establishment of certification standards for small business counsellors (12).

The report of the second joint US–EU conference ‘Education and Training for an Innovative Work Force’ held in San Diego in November 1994, has recently been published by the National Centre for Research in Vocational Education at the University of California at Berkeley (13) (McFarland 1997).

The common challenge faced by both the US and the EU is that under global pressure, businesses have to become much more responsive and demand flexible production, high skills, and innovative workers. One of the US responses to this challenge has been the establishment of ‘incubators’ which link SMEs and colleges more closely (14).

The ‘business incubator’

A US survey of entrepreneurs and business incubator managers was published in 1996. This identified the following entrepreneurial characteristics:

• business skills;
• entrepreneurial skills;
• technological skills;
• motivational skills;
• interpersonal and communications skills.

About one-third of the respondents felt they had no need of training and development services, with a similar proportion valuing individual on-site training and consultancy, and another quarter using periodic seminars. The largest group of the entrepreneurs (40 %) had learnt their business and technical skills by ‘working for a company’ with ‘undergraduate/graduate coursework’ accounting for 18 % and 33 % respectively. The three main skill areas where further education and training was required were business (29 %), entrepreneurial (18 %), and technological (17 %).

These results confirm the view that specific skills complement the personal qualities of the entrepreneur. The study also indicated that universities were more appropriate sources of this education and training than two-year colleges (Hernades-Gantes et al. 1996).

(10) However, this view has been refuted by other UK research (which argued that training led to lower labour turnover) supporting ‘the notion that employers train workers they wish to retain so that they can benefit from any skill upgrading that results from training.’ (Dearden et al. 1997: 1).

(11) This is another reason why training providers should receive encouragement and incentives to develop open and flexible approaches to education and training.


(13) Obtainable at http://vocserve.berkeley.edu/MDS-1073/

(14) Business incubation is defined as a strategy to foster local economic development (Hernades-Gantes et al. 1996).
Local research and development institutes in Japan

The Japanese government has been continuously carrying out support measures for the technological upgrading of small and medium-sized enterprises (SMEs). These measures have used the unique scheme of ‘kosetsushi’ or public research and development institutes which aim to remove obstructions to technological development and actively challenge SMEs to develop their own technologies to meet economic change. This approach is based on the result of government research that found that 70% of the SME sector lacked support in the development of new products. The local (prefecture) government manages the kosetsushi with central government providing financial support. There are currently 200 kosetsushi in the 47 prefectures with a total budget of USD 1 000 million. The largest institute has more than 200 engineers, while 14 have more than a hundred. In aggregate, they deal with some 450 000 technological issues and questions annually.

Technological training to meet local needs is provided at cost for local SMEs, with support and consultancy in the use of the latest processing and measuring technologies provided free. This approach has the benefits of promoting networking and communications which often enables SMEs to support and supplement each other’s needs, thus achieving a broader take-up of new technologies than would normally occur with individual firms (Nakazawa 1996).

Overview

A common response to these issues has been to stress the importance of locally coordinated action where leadership emerges from local government, schools and colleges, business and community-based organisations (in the UK, the Training and Enterprise Councils/Local Employment Companies performed a crucial role in the first half of the 1990s). The Japanese approach is highly pragmatic, emphasising promotion of cooperation and networking between SMEs with central financial support provided through local government.

The influences on local action depend on a variety of factors. In times of prosperity when skill shortages become a major issue, employers are likely to be interested in participating in programmes linking education and business and training initiatives directed at improving the supply of higher level skills. In general, the research indicates that the main concern of low level operative and technology training is to help SMEs deal with practical problems that threaten their survival. As SMEs become more mature and stable, they become more interested and disposed to becoming involved in longer-term issues such as raising the level of formal competencies through formal accreditation (15).

If this essential provision of individualised support achieves a significant improvement in the survival rate of SMEs, workplace learning will also provide a basis for medium term developments of accredited competencies leading to vocational, undergraduate and postgraduate qualifications. The provision identified in the next section is an example of the type of provision that achieves this goal.

In addition, central government or EU initiatives, such as the New Deal or ADAPT programmes create quality frameworks and incentives for local programmes. The major incentive at a local level is the possibility of inward investment, which often depends on the availability of appropriately skilled workers and which can exert a major influence on the development of the SME sector as part of the supply-chain.

II. Review of current provision of qualifications for SMEs

1. Development of university qualifications

The last decade has seen a number of innovative developments of qualifications at undergraduate and postgraduate levels in which the

(15) Hardill and Wynarczyk (1996) identified that textile SMEs who used information technology successfully and achieved higher levels of growth had directors who were more likely to have a formal qualification and to have established a formal management team.
The curriculum is defined by the work of the individual undertaking the qualification. The United Kingdom has provided a number of examples of such innovations.

1.1. Three case studies from the United Kingdom

- The University of Stirling has developed the Learning in Small Companies (LISC) which works in partnership with local colleges to create a number of work-based learning schemes leading to awards at pre-university level (16) as well as a Certificate in Small and Medium Enterprise Management (CSMEM). A total of 28 companies, mainly within the geographical area covered by the Central Scotland Local Enterprise Company (Forth Valley Enterprise), participated in the project. The companies came from a range of industrial and commercial sectors and ranged in size from the micro level to the upper limit for SMEs. Although some company managers were less interested than employees in qualifications, those based in the workplace were more likely to gain the support of employers. The project tapped a reservoir of latent demand from those groups of employees who did not traditionally participate in continuing professional development (CPD). The attraction of the CSMEM was as a custom-designed qualification in general management for SMEs (17). In line with the European Commission’s 1995 White Paper on Education and Training (18) recommendation for ‘reintroducing the merits of a broad base of knowledge’, the CSMEM is being developed through Leonardo da Vinci development funding as a transnational distance learning programme (19).

- The National Centre for Work-based Learning Partnerships at Middlesex University (20) enables people to use learning from work to gain credit for academic programmes from a single module, to whole awards at certificate, diploma, degree, and postgraduate levels. Specific modules are provided which enable participants to plan their own programme of learning using a mixture of planning, knowledge and skill development, and project modules (21). This uniquely flexible approach enables individuals to meet the needs and aspirations of their organisations and themselves. One of over 50 partnerships developed is the formation of a B.Eng. degree with Anglia Polytechnic University for suppliers to the Ford Motor Company (22).

- In the School of Professional Education and Development at Leeds Metropolitan University, the Short Course Accreditation Scheme (SCAS) provides a framework that enables employers to accredit internal staff training and development against academic credits both UK CATS and European CATS. Progression is provided by a linked undergraduate/postgraduate award scheme where work-based learning programmes can be accredited up to a maximum of 50% of the credits for a particular year. The remaining credits are earned through further modules, which mix taught modules (through direct teaching or distance learning), independent study modules, and projects (23). The University is building on its existing transnational European partnerships to plan the development of an accredited undergraduate programme for workplace trainers and mentors using the Socrates institutional contract and the mechanism provided by Action 6 of the Erasmus programme.

These examples of programmes that meet the needs of full-time employees are particularly appropriate to the situation of SMEs where

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(16) Scottish Vocational Qualifications (SVQs); Scottish Vocational Education Council (SCOTVEC) National Certificate modules and Higher National qualifications; and a University Access Course.

(17) The executive summary of the project report, University of Stirling, 1996 is available on http://www.stir.ac.uk/epd/lisc/exect.html


(19) Details are provided on: http://alpha2.mdx.ac.uk/www/ncwblp/wblprogrammes/hndbk_tit.html

(20) Further details on: http://alpha2.mdx.ac.uk/www/ncwblp/welcome.html

(21) Details are provided on: http://alpha2.mdx.ac.uk/www/ncwblp/wblprogrammes/hndbk_tit.html

(22) For details and students’ views, see: http://alpha2.mdx.ac.uk/www/ncwblp/GeneralInfo/partnership.html

(23) For details see http://www.lmu.ac.uk/ces/ped/
there is a wide diversity of need, coupled with a lack of sufficient numbers to make conventional courses viable. In the examples of good practice referred to in this section, care has been taken to ensure that the staff involved in the management and delivery of this type of programme are fully supported by the policy and infrastructure of the University. In two of these examples, EU research and development programmes have provided the means of adapting the innovation to the differing systems of Member States.

These developments are not confined to the UK and there are many parallel developments in Australia where an important study identified the characteristics of the learning methods used by successful work-based learning programmes (Candy et al. 1994):

- peer-assisted and self-directed learning;
- experiential and real-world learning;
- resource-based and problem-based teaching;
- reflective practice and critical self-awareness;
- flexible and open learning delivery.

The Australian experience of learning from reflection has been very influential, especially the concepts of preparation and reflection-in-action (Boud and Walker 1991).

1.2. The Australian experience

Southern Cross University is located on the coast in northern New South Wales. Through the Graduate College of Management, the Master of Business Administration (MBA) offers a range of electives through distance learning, including the use of teleconferencing; with opportunities for face-to-face contact at weekend workshops on and off-campus. The programme operates a trimester calendar year that ensures that staff are available for 44 weeks in the year. The full MBA is awarded on completion of 12 units, with a Graduate Diploma awarded for 8 units and a Graduate Certificate after 4 units. Entrepreneurship and small enterprise is one of the specialist streams, which introduces a primary unit on ‘concepts of entrepreneurship’ (25). This unit is a coherent part of a formal academic ‘focus on management of the major business functions and business strategy. … Study materials are designed to emphasis the link between the conceptual knowledge gainer and ‘real world’ practice.’ (26)

This example indicates the limited extent to which the traditional MBA model can be adapted to SME needs.

1.3. North America

The W. Maurice Young Entrepreneurship and Venture Capital (EVC) Centre, University of British Columbia, Canada was founded in 1992 as a research centre, which supports degree programmes especially the MBA in Entrepreneurship and undergraduate coursework. The Centre also runs workshop for local SMEs, principally in the area of business planning.

The MBA is designed for students who will initiate their own venture or join emerging new enterprises (27). The structure of the programme is conventional, with a specialist core module in Entrepreneurship and New Venture Creation and option modules in Corporate Entrepreneurship, Technology Entrepreneurship, and Managing the Privately-Held Business. Although this MBA programme is more specialised towards the high technology start-up companies than the previous example, it is mainly concerned with the education of new entrepreneurs.

The School of Business and Economics at California State University, Los Angeles follows a similar approach (28). The School offers an undergraduate option in Entrepreneurship and a Certificate programme in Entrepreneurship and Small Business (29).

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(26) The prospectus may be viewed on http://www.scu.edu.au/schools/gcm/mba/prospect.htm
(27) MBA outline is available at http://pacific.commerce.ubc.ca/evec/mba.html
(28) School prospectus is available at http://www.calstatela.edu/academic/business/mktg/entrepre.htm
(29) Details are available at http://www.calstatela.edu/academic/business/mktg/entcert.htm
The Donald H. Jones Centre for Entrepreneurship in the Graduate School of Industrial Administration at Carnegie Mellon University conducts research and provides an entrepreneurial management programme for chief executives and founders of small and mid-sized companies (30). Participation is targeted at companies who employ 20 or more people with annual earnings of over USD 1 million. The 20-week three-hour seminars are based on the graduate programme in entrepreneurship. The School also offers specialist undergraduate and graduate programmes where ‘students learn the methods and philosophy of the entrepreneur and begin to view business from the entrepreneur’s perspective.’ (31) In addition to courses in Entrepreneurship and Entrepreneurial Management, opportunities are provided to gain credits through management projects, collaboration in the development of new products and independent studies. These involve students working as consultants with owners of small businesses in the local Pittsburgh area.

It is worth recalling Robert Reich’s discussion on the role of symbolic analysts who ‘simplify reality into abstract images that can be rearranged, juggled, experimented with, communicated to other specialists, and then, eventually transformed back into reality.’ (Reich 1993: 178)

The effect of major universities and research centres, particularly when combined with good international communications is to act as a magnet for the most able and entrepreneurial.

‘America’s symbolic-analytic zones remain, for the most part, wondrously resilient. Within them, America’s symbolic analysts continue to improve their abilities to solve, identify, and broker ever more challenging conceptual problems.’ (Reich 1993: 240)

Overview

These innovative university-level qualifications have met the need of SMEs for flexible and individualised programmes of accredited learning which educate and train working professionals as ‘reflective practitioners’ (32).

2. Sub-university (further education) level

2.1. United Kingdom

Four National Vocational Qualifications (NVQs) for owners of small businesses were approved in June 1996 (33). Of these, only one has attracted significant numbers of candidates. The two owner-manager qualifications are summarised below, together with the number of certificates awarded as at 30 September 1997.

This approach to the training and education of SME managers is still at an early stage, with only about 18 months since these qualifications were approved (34). At the same time, the mainstream management standards were revised in 1997 for the first time since 1990. In this context, the achievement of almost 1 000 awards at level 3 in the first year would seem to be quite significant. With the improvements currently under way in the quality and reliability of NVQ assessment, the relevance and impact of this qualification is worthy of further research (35).

2.2. Australia

Open Learning Australia coordinates a small business management training programme that covers:

- individual modules/groups of modules such as negotiation, communication, management and leadership, and interpersonal skills;

- the Certificate in Small Business Management (150 hours minimum) a nationally

(30) Details available on http://www.gsia.cmu.edu/afs/andrew/gsia/EntC/management-programs/no-js-index.html
(32) This concept is normally associated with Kolb’s (1976) experiential learning model; Donald Schön’s influential books on the topic of reflection – The reflective practitioner (1983), Educating the reflective practitioner (1987) and The reflective turn (1990); and Revans’ (1983) Action learning model.
(33) These qualifications were developed by the Small Firms Lead Body, approved in 1996 and are awarded by The Institute of Management Foundation.
(34) When these qualifications were launched, they were criticised as failing to recognise the holistic approach needed to meet client needs. (Banfield et al., 1996)
(35) Some indications of the approaches required may be found in Jennings et al., 1996.
recognised and accredited programme delivered through self-paced distance learning by Institutes of Technical and Further Education (TAFE);

- a Graduate Certificate of Small and medium Enterprise Management is provided by one University on a 26 weeks/620 hours taught/distance mode. It is designed for both those entering SME management and those wishing to advance and gain recognition for their existing knowledge and experience.

An interesting example of a TAFE programmes is described below (36).

<table>
<thead>
<tr>
<th>Qualification</th>
<th>Level</th>
<th>No awarded</th>
</tr>
</thead>
<tbody>
<tr>
<td>OWNER MANAGEMENT – Business management and development</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>• Mandatory units (5)</td>
<td></td>
<td></td>
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<tr>
<td>• Develop the business plan</td>
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<tr>
<td>• Implement the business plan</td>
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<tr>
<td>• Improve own management of the business</td>
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<tr>
<td>• Manage the finances of the business</td>
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<tr>
<td>• Review the performance of the business</td>
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<tr>
<td>Optional units (3 out of 9)</td>
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<tr>
<td>• Develop a credit control policy</td>
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<tr>
<td>• Develop and implement the marketing plan</td>
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<tr>
<td>• Develop and implement the sales plan</td>
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<tr>
<td>• Develop the contribution of people to the business</td>
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<tr>
<td>• Export products and services</td>
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<tr>
<td>• Obtain finance for the business</td>
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<td>• Obtain and manage business premises</td>
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<tr>
<td>• Plan the finances of the business</td>
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<tr>
<td>• Purchase products and services</td>
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<tr>
<td>OWNER MANAGEMENT – Business planning</td>
<td>3</td>
<td>998</td>
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<tr>
<td>Mandatory units (3)</td>
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<tr>
<td>• Determine the legal and financial requirements for setting up and operating the business</td>
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<tr>
<td>• Generate the business proposal</td>
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<td></td>
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<tr>
<td>• Plan the business operation</td>
<td></td>
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<tr>
<td>Options (3 out of 4)</td>
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<tr>
<td>• Determine the requirements for monitoring and controlling business operations and quality</td>
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<tr>
<td>• Evaluate and develop own practice</td>
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<tr>
<td>• Plan the human resource development within the business</td>
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<tr>
<td>• Plan the marketing strategy for the business</td>
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Certificate III in Small Business Management (Transport and Distribution Industry)

Aim of course
This course is for people entering small business management or who are currently working within the transport and distribution industry and would like to update or increase their skills.

This is an accredited course, involving a nominal 200 hours of study.

Entry requirements
None.

Context
The course was customised for the transport and distribution industry – especially for

(36) Information supplied by Claire Brooks, Course Tutor Wodonga Institute of TAFE, Victoria (personal communication).
women whose partners were truck drivers, couriers or taxi drivers. This course has been very successful and has been recognised as a great equity (i.e. contributing to equal opportunities) programme. This was partly because we included a comprehensive recognition of prior learning program as well so the women did not have to do things where they could demonstrate competence (e.g. time management). The groups who complete the course are people who are new to a small business or thinking of setting one up.

**Duration**

Students can complete modules at their own pace. However, it would be possible to complete all the modules in 12 months.

<table>
<thead>
<tr>
<th>Module</th>
<th>Cost (AUD)</th>
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<tbody>
<tr>
<td>OL670 Introduction to small business (compulsory core)</td>
<td>56.00</td>
</tr>
<tr>
<td>OL552 Financial record keeping for small business</td>
<td>56.00</td>
</tr>
<tr>
<td>OL671 Marketing and sales promotions</td>
<td>28.00</td>
</tr>
<tr>
<td>OL672 Customer relations for small business</td>
<td>28.00</td>
</tr>
<tr>
<td>OL673 Time management</td>
<td>14.00</td>
</tr>
<tr>
<td>OL551 The business plan</td>
<td>28.00</td>
</tr>
<tr>
<td>OL674 Monitoring business performance</td>
<td>42.00</td>
</tr>
<tr>
<td>OL675 Customer-driven business strategies</td>
<td>21.00</td>
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</tbody>
</table>

**Module descriptions**

**Introduction to small business**

This core module introduces the concepts and factors required to start or run a successful business within the transport industry. It examines the legal, marketing and financial implications of setting up a small transport business.

**Financial record keeping for small business**

Enables the potential small business transport operator to set up and use an effective financial recording system, including cash journals, debtors, creditors, and petty cash and bank reconciliation.

Marketing and sales promotion

Covers the concept of marketing, market size, share, research, and marketing mix as well as pricing, distribution, promotional and competitive strategies.

Customer relations for small business

Covers effective customer service, increasing the total number of customers, providing quality goods and services, identification of customer needs, staff training in customer service, handling customer concerns and complaints, self-presentation, strategies to increase average sales per customer and quality standards.

Time management

Covers time/task relationships, effective time management practices, including common time wasters and ways to avoid them, a time management plan, changing behaviour and the use of time management tools.

The business plan

Covers the format and purpose of the business plan, processes for successful planning, the marketing plan, the operational plan, and the financial plan.

Monitoring business performance

Covers establishing and using measures of day-to-day profitability and financial stability including, cash budgets and effective stock control systems relevant to the transport industry. Examines target setting and performance evaluation against set targets.

Customer-driven business strategies

Introduces the strategies that disclose customer perceptions and reactions to the transport and distribution industry products. Develops a quality plan that will remedy short-term deficiencies and produce long-term acknowledgement of a consistent quality product.

As against this, the following view was expressed on the generality of these courses.
‘Normally small businessmen like us do not do the courses available at the TAFE colleges in Australia. Maybe that’s why so many fail in the first 12 months of operation. The people that usually go to these courses are young people that have just left school and before getting a job or maybe get a job and one of the requirements is that they must go to this type of course. The other advantage with this course is if you are planning to enter into the corporate world then it’s a good springboard to that.’ (37)

2.3. Canada

There are occupational guidelines for small business owner-operators produced by the Sector Councils Steering Committee Secretariat at the Canadian Labour Force Development Board (38).

III. The nature of competence, using competencies at work – the UK experience

Definitions

The early 1990s saw a growing debate on the nature and definition of competencies that focused on the chosen approach to competency. ‘These competency frameworks are based, to a lesser or greater extent, on the following (alternatives):

- A competency model which relates to ‘an underlying characteristic of an individual which is causally related to effective or superior performance in a job’ (Boyzatis 1982). Competencies are expressed as the behaviours that an individual needs to demonstrate.
- A competency model which relates to ‘the ability to perform activities within an occupation to a prescribed standard’ (Fletcher 1991). Competencies are expressed as minimum standards of competent performance.’ (Strebler et al. 1997: 3)

These distinctions are extended by a critical appraisal of the methodology of functional analysis used to develop the National Vocational Qualifications (NVQs).

‘The notion of competence applied here has two characteristics. First, that competence consists of specific behaviours on the part of individuals and that certain behaviours lead to superior performance. Second, that these behaviours are associated with personal qualities which are capable of being learned and developed. Boyzatis proposes that effective performance will occur when three components are consistent with each other. They are:

- the individual’s competences;
- the job’s demands; and
- the organisational environment.

This would suggest that competence is situation specific. (Stewart and Sambrook 1995: 97).

In practice, the theoretical distinction between the behavioural and competence models is often blurred in practice. The most important issue is that employers and employees should be clear about the focus (individual or job) and standard of performance (non-competent or competent or effective or superior).

The starting point for the development of competence-based qualifications has been the analysis of occupational functions. This involves a group of experts in the methodology of functional analysis, rather than the particular area of occupational competence, carrying out a top-down analysis of an occupational area using a model of competence-based on ‘the whole work role’ (39).

In the behavioural model, competencies help to define the values of the enterprise as being concerned both with individual and business development. A typical example is the use of

(38) No details were available at the time of writing, despite an e-mail request to info@councils.org
the Investors in People UK National Standard \(^{(40)}\).

The ‘minimum standards’ approach to competency is increasingly associated with the introduction of performance management and competency-based pay. (Industrial Society 1996) The newly privatised UK sectors, such as telecommunications, water, electricity and gas (the ‘utilities’ sector) have made particular use of this approach. Standards-based qualifications (in the UK, S/NVQs) have been associated with the early 1990s, rise in unemployment, lack of job security and growth of multi-skilled rather than mono-skilled employment. The contributory impact of financial institutions seeking to maximise shareholder value to the neglect of other stakeholders, especially the workforce, has recently been highlighted as a problem against the background of high rates of job creation in the US economy (Reich 1998).

The fundamental weakness of the UK approach to competence-based qualifications is related to the functional analysis approach referred to above.

‘It is clear from the critical appraisal presented here that functional analysis has arguable weaknesses at a number of levels...its philosophical and conceptual base is problematic, and empirical assessment of its application suggests failure to achieve claimed and expected benefits.... There are two major implications …

First, … the result of this conception of competence and functional analysis is a concentration on a narrow range of technical skills. Therefore, enhanced skill levels are unlikely to be developed.

Second, purposes and values other than those associated with employment, which are traditionally pursued through education, are likely to be marginalised. …

It is clearly our view that the method cannot be accepted as a valid and reliable tool for constructing a national system of vocational qualifications.’ (Stewart and Sambrook 1995: 104–105)

This view is supported by a study of ‘expert workers’ which showed that ‘expertise’, unlike ‘competence’, depended on both the amount of specific skills possessed and the ways that the workers organised their knowledge. (Cornford and Athanasou 1995). In addition, there is some evidence from the UK engineering industry to support the EU ‘social partnership’ approach in that trade unions, workers’ expectations, and past history will have an important impact on training decisions (Heyes 1993). Distinctive management styles and business cultures, especially related to new technology and management development also limit the usefulness of the narrow, mechanistic approach of the current NVQ standards (Fletcher and Hardill 1995).

The above analysis indicates that the original NVQ model of competence-based qualifications was flawed. The small group of enthusiasts in control of development did not consider the fundamental methodological and ideological critiques of the approach. This UK approach to workplace learning relied on a narrow, mechanistic, and somewhat incoherent framework of professional levels. The current reforms of the NVQ system, which are due for completion by September 1999, will need to be firmly rooted on rational, coherent procedures based on a modern, constructivist, cognitive framework, as well as being closely linked to the emerging needs of the enlarged EU. Further research is required to monitor the impact of the NVQ model and other competence-based qualifications on the needs of SMEs for accreditation of work-based learning.

**Overview**

This study suggests that the behaviours where development and assessment are easiest are those that employers regard as the least important for the medium and long-term growth.
Ease of assessment and development of competencies: users’ views

<table>
<thead>
<tr>
<th>Easy to assess</th>
<th>Hard to assess</th>
<th>Easy to develop</th>
<th>Hard to develop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication</td>
<td>Vision</td>
<td>Technical skills</td>
<td>Interpersonal skills</td>
</tr>
<tr>
<td>Technical skills</td>
<td>Interpersonal skills</td>
<td>Planning and organising</td>
<td>Problem solving and decision making</td>
</tr>
<tr>
<td>Planning and organising</td>
<td>Soft and behavioural competencies</td>
<td>Communication</td>
<td>Soft and behavioural competencies</td>
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<tr>
<td>Measurable outputs</td>
<td>Problem solving and decision making</td>
<td>Knowledge</td>
<td>Leadership and motivation</td>
</tr>
<tr>
<td>Team work</td>
<td>Financial and commercial awareness</td>
<td>Customer awareness</td>
<td>Vision</td>
</tr>
<tr>
<td>Analytical skills</td>
<td>Analytical skills</td>
<td>Measurable outputs</td>
<td>Analytical skills</td>
</tr>
</tbody>
</table>

The softer skill areas are difficult to assess because of the way they are defined, overlap with each other, are relative to particular situations, and are difficult to change (Strebler et al. 1997: 48–59).

The flexible, individualistic and reflective strategies developed at university level do not fit the narrow, standardised and mechanistic approach used by the original competence-based qualifications. As the range and level of competitive pressures on SMEs intensifies, high performance enterprises are those characterised by sound management development strategies (Quale 1994, Smallbone et al. 1995).

This study has identified a consistent pattern in the needs of SMEs for qualifications that accredit the competencies, knowledge, and insights that promote survival and growth. Whilst the qualification frameworks will vary according to the particular structures of qualifications in Member States, the relevant common principles are relevance, flexibility, accreditation of workplace learning and the development of the reflective professional.

Bibliography


FLETCHER, D. and HARDILL, I., ‘Value-added competitive strategies: a comparison of cloth-


Summary and outlook

This contribution is targeted at the role of vocational education and training in facilitating innovation in small and medium enterprises. Companies’ innovation is seen as an embedded process within regional, sectoral and chain-bound networks. The role of VET is shifting from delivering initial education for youth and adult training towards facilitating interaction and common learning activities in local industrial networks.

Several case-studies have been presented to understand industrial innovation processes and linked actions within various networks. The role of VET colleges in these innovation processes is still rather marginal. To become ‘spiders’ in regional innovation networks, VET colleges have to develop towards learning and networking organisations themselves.

Introduction

Innovation and its speed of implementation are crucial factors for the competitiveness of enterprises and industrial sectors, regions and local agglomerations. Innovation is a complex process based on interactive network learning and includes trial and processes on the shop floor on the one hand, and research and technology development on the other hand. For small and medium-sized enterprises, this innovative process should be facilitated by out-of-
company institutes. Both sectoral and regional organisations for supporting innovation and transfer of new knowledge and technology should play a role.

This contribution is targeted at the role of vocational education and training (VET) in the innovative process of early- and late-adopting enterprises. A major prerequisite for this role is that the VET-system is able to cope effectively with the challenge of responsiveness: flexible responses to new skill requirements, both in initial education of young people and in the continuing training supply for the older labour force. Responsive VET can be an important instrument in the dissemination of R & D results addressed at SMEs. VET training centres and colleges ought to function as pivotal actors within regional and local innovative learning networks of enterprises.

1. Understanding innovation

Innovation is important for the competitiveness of companies and industrial sectors, regions and local communities. The main line of thought stems from evolutionary economics, in which the dynamic aspects of economic development are central (see Dosi and Nelson, 1994). Schumpeter (in Kleinknecht, 1994) between the wars formulates the process of creative destruction, in which enterprises with old-fashioned products are expelled by enterprises with new products (competition on substitution and not on prices: see Jacobs, 1996). Innovation and technology development is the main tool to survive this dynamic process. Protection of ‘old’ enterprises hinders the process of creative destruction, which should lead to under-investment in innovation. According to Kleinknecht, investments in R & D lead to increasing export and job growth on enterprise level. Innovative enterprises are more resistant to economic crises.

National and European policy-makers believe in massive investments in technical-oriented research programmes as a major impulse for innovation. The production of new knowledge and technology is the prime target of these programmes, which are built on a firm trust in the usefulness of research efforts for compa-
• purchasing knowledge through machinery and tools.

Innovation is, according to Dosi, problem-solving: ill-defined technical problems have to be solved through creative ‘learning’, based on formal and tacit knowledge. Tacit knowledge is important in relation to the appropriateness of innovations: the comparative advantage is depending on it. Innovations are cumulative; they are built on former activities and in-company knowledge, what hinders the imitation of innovation by competitors.

Innovation is not a random process, but based on historically rooted main roads depending on technological paradigms: innovative products are built on older technologies and products (a main reason for that is linked to consumers’ demands). Innovation is (partly) predictable via zones of near development; the technological state-of-the-art defines the next problems which have to be solved with new inventions. Technological paradigms are characterised by specific learning strategies, which leads to reduction of uncertainty.

Company internal knowledge and routines lead to a prevalence for the company’s internal innovation. Even in the case of purchasing new tools, internal capacity is needed to implement the new knowledge. Innovative companies are built on their own core-competence (Hamel and Prahalad, 1992). The embedment of innovations within this core-competence and internal learning processes is the best protection against imitation.

Competitiveness, innovativeness and internal craftmanship are fundamental elements of a healthy company. Maintenance of these important elements asks for a specific knowledge management. Detecting and using external knowledge sources and the organisation of internal learning processes are central aspects of modern management. Oerlemans (1997) regards innovation as an embedded process within a broader knowledge context in which the exchange of learning and technical sources is elementary, especially for SMEs. Economic networks are crucial to transform heterogeneous knowledge sources into useful new combinations.

Innovation leads to company-specific knowledge (tacit knowledge; see Dosi 1998, Nonaka and Takeuchi 1994, Attwell and Brown in this publication), which strengthens the ‘forward’ position of innovative enterprises. Tacit knowledge is dependent on people: it is important to have long-lasting contracts with the core of the employees. Hartog (1996) states that the new economic order asks for an increased flexibility of workers on the one hand (higher skills, life long learning), but on the other hand for job security. Flexibility should be translated into trainability and learning skills and not into external flexibility.

Problem-solving and innovation through trial-and-error processes are part of informal learning processes, in which social networks play an important role. Workers learn by sharing knowledge in the working team and employers learn by creating networks of colleagues and advisers. However, the relation between innovation and competencies is not unequivocal. A reciprocal relationship seems to exist: the skill level within enterprises is a prerequisite for innovative activities; on the other hand innovation may also lead to a certain obsolescence of skills, which underlines the need for re-skilling and further training.

2. Knowledge context and knowledge sources

A company’s innovation is an embedded process. Companies are not solo players in the knowledge and technology field. According to Oerlemans (1997), companies are embedded in various knowledge spaces. Innovation is an embedded process; knowledge and technology are exchanged within networks of collaborative companies and institutions. The innovative process can be characterised as a combination of existing knowledge with new combinatory knowledge. To organise this combinatory process, companies need to collaborate with other companies and knowledge institutes. This is especially the case for small and medium-sized companies, because they do not possess large internal knowledge sources and research potential. For effective innovation, small and medium-sized companies have
thus to use external knowledge sources. Non-profit or public agencies and innovation centres on the sectoral and regional level, technical colleges and universities may play this important role of back-up service for SMEs. In addition industrial local and regional networks are necessary for the transformation of knowledge into new innovative combinations and products.

The external knowledge context is complex for SMEs. The figure on page 246 gives an overview.

The entrepreneur or the employer, with his/her skilled employees, is continuously involved in problem-solving and innovative processes. In the first instance, he looks for internal solutions. But very soon the use of external sources will become a necessity. Professional journals, financial advisers, suppliers and customers will bring in new knowledge deliberately or accidentally. So an interactive exchange of knowledge will develop around internal company processes and their external relations. The enterprise is embedded within an expanding knowledge space. The knowledge space surrounding companies is multidimensional; at least three dimensions can be discerned: the product chain, the professional sector and the socioeconomic region.

With the product chain dimension the relevance of user-producer and producer–customer relations is pointed at. Learning and innovation are taking place through the exchange of product requirements and quality information systems.

With the professional dimension the exchange of knowledge between professionals within competing companies is indicated. In many cases common interests exist, pushing competitors into collaborative innovative activities.

On the third dimension, knowledge exchange is seen as a process between companies in the same (sometimes virtual) region. Direct contact via observation, discussion and mutual shop floor visits is an important feature of knowledge exchange. Also the supply of skilled labour is spatially bound.

Depending on socioeconomic preconditions, strategic decisions have to be taken on all three dimensions; the balance between common interests and competitive advantages is depending on many variables.

2.1. Chain knowledge or knowledge chains?

Enterprises exist within product chains. They need raw materials, tools and machinery to be able to produce their products and services, which in turn should be tuned to specific needs and requirements of their customers. Chain management is an important new field of business management, targeted at inter-company relations: product-accountability, quality information exchange, logistics for transportation and stock-keeping are major subjects in this field.

Knowledge development and collaborative innovation should be part of the chain management, however, the sources for innovative activities are not always located within the producing enterprise: according to Von Hippel (1988), the source of innovation is located within the supplier–producer–user chain, depending on the expected benefits and production, chains are important units for analysing innovation processes.

Caused by the tacit aspects of innovation, by the partial appropriateness of new technologies and the cumulative character of innovation, enterprises are developing differently or in different directions. If the introduction of new products has been successful, innovative companies are often able to define economic rules for their competitors. Innovation leads to comparative advantages. Imitation and diffusion lead to convergency. Depending on market figures, enterprises are increasingly pleading for a kind of ‘collaborative innovation’. Within supplier-dominated chains, collaboration is easier to realise.

2.2. The sectoral dimension

Industrial sectors have their own possibilities to scaffold innovative activities within SMEs. According to Finegold (1991) industrial sectors should look for ways to facilitate cooperation
between enterprises and common activities to enhance investments in training and innovation. They tend to set up low-skill traps: individual enterprises will decrease their investments in human resources if they are endangered by poaching behaviour of their competitors. So, industrial sectors have to look for policies which will scaffold cooperative behaviour in training and innovation; trade unions can play a facilitating role.

Based on cooperation between companies, sectors should be able to build sector-bound infrastructures for technology transfer and training policies. In order to scaffold these sectoral policies, systems are needed for the monitoring of future technology developments; the results of monitoring activities can be translated into transfer supporting measures and skill requirement forecasts.

Sectoral challenges to facilitate innovation and learning processes are: establishing preconditions for collaboration between competitive enterprises in the field of training and innovation; building future-oriented monitoring systems for technology development; building support systems for company bound innovation and training; defining of key competencies for skilled workers and entrepreneurs; creating sectoral ownership for vocational education and training systems.

2.3. The regional dimension

Morgan (1997) stresses the importance of the network paradigm in understanding regional development strategies. He emphasises the importance of creating learning regions, analogous to the concept of learning organisations, as building up collective learning capacities between geographically related enterprises and regional infrastructural provisions/opportunities. Strong industrial districts seem to be characterised by learning interrelationships between enterprises. Italian industrial regions and districts are characterised by their monostructures in terms of products and services: each district is famous for a single set of products. Learning and exchange of expertise is essential to keep the quality of this set at a guaranteed level. Other emerging regions are characterised by chain relations: exchange of innovation and information is related to purchasing and selling activities. These kinds of learning networks are strong because of their promotional impact on economic activities.

In less developed regions these kinds of learning networks are non-existent, because of a lack of economic activities and an inadequate infrastructure. The challenge for regional and local authorities is to establish education, training and labour market policies which lead to a high level of learning potential and an emergence of networks for the support of SMEs and starting entrepreneurs as a part of their economic policy. Innovative VET-provisions could even more substantially lead to an improvement of the innovative capacity within regional economies (see Morgan, 1997) and give decisive impulses for regional and local economic development, so one of the challenges is to improve these provisions.

To reach that target, regional VET providers should act in a proactive way and in strong alliances with other knowledge providers such as innovation centres and sectoral knowledge centres. This is one of the targets of the regional development programme of the European Union’s Regional Funds policies, for example the European business and innovation centres, targeted on the interrelation between SMEs and higher education, can scaffold these developmental programmes.

Regional policies which serve to enhance industrial innovation and learning processes are in the main: learning networks of enterprises; facilitating infrastructures for technology transfer; educating and training a highly skilled labour force. Meeting these challenges is one major condition for stimulating regional economic development. Regional and national governments, however, have restricted options to facilitate knowledge networks: establishing intermediate organisations, enhancing fundamental research and development and maintaining vocational education and training are mentioned as the main governmental instruments in this respect (see OECD, 1997).

2.4. VET as part of the knowledge context

For building competitive regional economies, VET is a major player as has been shown by
IV. Inter-enterprise and in-company developments and local/regional competition

Rosenfeld (1998) at a recent OECD conference. Next to the supply and maintenance of a skilled labour force, a new task is indicated for technical colleges: the brokering of (new) knowledge towards the local economy. This implies regional strategies for economic development, of which VET should increasingly be an integral part.

VET on the sectoral level is also present as an important actor. The promotion and accompanying of the ongoing process of building and rebuilding a rapidly changing occupational identity is an important instrument to promoting economic activities. The vocational courses and qualifications play an important role in this promotional process (see De Bruijn and Nieuwenhuis, 1994). At the same time, however, the foundation, implementation and development of technical and vocational courses and curricula are often based on skill definitions from a specific professional/occupational group, both on its skills and competencies and its professional/occupational interests, which, however, sometimes do or do not coincide with larger socioeconomic needs. Trade unions and employer organisations play their roles in the defining of vocational courses in German and Dutch apprenticeship systems and in the formulation of national vocational qualification standards in the UK system. VET is delivering and developing occupational standards, interacting with the professional sectors. Employers and skilled workers use their professional institutions for maintaining and upgrading their skills. Innovative shifts in occupational requirements often stem from developments within the educational system. So, on the sectoral dimension VET has powerful potentials for facilitating innovation within SMEs.

3. On the delivery of skills and competencies

3.1. Delivering work process knowledge

In the theory on human capital, knowledge and skills are mainly identified on the individual level. Hommen (1997) argues that this approach denies the social dimension of knowledge and skills. Knowledge is a collective good within communities of economic and social practices. Knowledge is developed within the complexity of work environments, which are not bound to individuals or jobs, but dispersed within a group of workers. This view is compatible with the evolutionary vision on innovation: economic organisations (institutional communities) form the core units to understand innovative practice. Innovation is the common, active reconstruction of work and processes: proactive instead of reactive.

Companies should develop towards reflective communities based on high skilled work. Berryman and Bailey (1992) develop a comparable argument for the US economic development. Companies should develop towards learning organisations and will need highly-skilled workers.

The traditional design of vocational education and training shows strong parallels with the design of traditional workplaces: traditional education is built on simple learning patterns compatible with the traditional workplace. This traditional workplace is not well suited for innovation and knowledge creation: companies have to change and so has vocational education and training.

Berryman and Bailey suggest the model of cognitive apprenticeships as an alternative, with a strong research tradition (cf. Raizen, 1989; Nieuwenhuis and Mulder, 1998). Learning of symbolic and abstract concepts should be replaced by learning in functional contexts. An elaboration of this model is proposed in four blocks (see Collins et al., 1989): content, methods, sequencing and sociology of learning.

Content: target knowledge for an ideal learning environment includes domain-specific conceptual, factual and procedural knowledge and
three types of strategic knowledge (tricks of the trade; cognitive strategies; learning strategies). Schools usually focus on domain-specific knowledge. Strategic content is needed to operate effectively with domain-specific knowledge.

Methods: teaching methods should be designed to give students the chance to observe, engage in, invent or discover expert strategies in context.

Sequencing: learning should be staged so that the learner builds the multiple skills required in expert performance and discovers the conditions in which they can be generalised.

Sociology of learning: the learning environment should reproduce the technological, chronological and motivational characteristics of the real-world situations in which what is being learned will be used.

This type of situated learning does not automatically imply on-the-job learning: traditional workplaces do not have much learning potential. Prerequisites for lifelong learning and innovations are situated learning in vocational courses combined with newly designed workplaces within ‘learning work organisations’.

3.2. Three roles for vocational education and training

In order to enhance knowledge transfer processes vocational education, training and further or continuing education and training should play three important roles (see also Rosenfeld, 1998):

- education and training of new employees and employers to structure the knowledge base in companies;
- the supply of up-to-date information and training facilities to update the knowledge and skills of the workforce;
- the organisation of active networks of enterprises to facilitate interactive learning processes.

Technical colleges and training institutes should accept the challenge of improving within their own efforts the knowledge transfer process by ensuring a high degree of responsiveness to the results of research/science and (technology) development. Regional training
IV. Inter-enterprise and in-company developments and local/regional competition

colleges, supported by sectoral innovation centres, have the opportunity to become a pivotal pole in the learning networks of small and medium-sized enterprises, by implementing innovative knowledge from the R & D infrastructure into their course supply and linking more closely to local networks and companies. Central in the model are intermediate structures established by economic and industrial sectors to enhance communication between R & D and VET systems. These intermediate structures are depending on features of both, the sectoral training system and the innovation.

VET is standing at the crossroads of regional and sectoral policies: labour markets are regionally defined; the supply and demand of employment is spatially bound because of mobility limits. Craftsmanship on the other hand is highly sectoral bound, because of the intertwining between occupational domains and economic activities. Educational policies in VET are more or less connected to sectoral policies, depending on national VET-systems and socioeconomic constraints. VET-institutions have to build on both sectoral and regional networks to operate effectively in supplying a well qualified labour force, prepared for lifelong learning within an innovative socioeconomic and employment situation.

4. Case studies on new qualifying strategies

The empirical base for this contribution has been established in former case studies; they have been undertaken in several Dutch industrial sectors representing a large proportion of SMEs (Grooters and Nieuwenhuis, 1996; Lokman and Nieuwenhuis, 1998; Gießen and Nieuwenhuis, 1998). The intermediate knowledge infrastructure in several industrial sectors was studied and comparative analyses were made of the role of vocational education and training in facilitating innovations in enterprises.

Based on these cases a sectoral/regional innovation model has been built, in which four actors play a major role: SMEs, R & D-infrastructure, sectoral innovation agencies and VET institutes. SMEs have to be innovative to improve their competitiveness; they use knowledge from different sources but they also produce new knowledge as a result of their innovative activities. Institutes for research and development produce a lot of new knowledge, but they meet problems in disseminating and, even more so, in implementing that knowledge towards SMEs. In several industrial sectors innovation centres have been established and were targeted on the translation of innovative knowledge towards the sector-bound enterprises. Not only were public funds made available, but also the social partners play an important role in the funding of these centres.

Regional innovation centres play a facilitating role in disseminating innovative knowledge. VET provisions have the opportunity to contribute in regional networks through educating young people, training of adult workers and organising learning networks of enterprises.

In the following six cases these aspects of regional/sectoral knowledge contexts are illustrated from different angles. These cases are taken from a Dutch context: in the next two years a European perspective will be added through a Leonardo survey and analysis project called Spidervet: VET colleges as ‘spiders’ in regional knowledge networks.

4.1. Sectoral delimitation in installation engineering

The installation engineering sector deals with plumbing, fitting, air conditioning and central heating installations. In the last two decades, the sector has defended its economic market share very effectively. The sector is highly dependent on the developments in the building sector: in the design of houses and utility buildings the mechanical installations (lifts, air-conditioning, heating systems and water supply) form a substantial part. Emphasising its professionalism, the installation engineering sector succeeded in keeping its market share. Both employers and workers agree on the basis of their interest in craftsmanship and in the investment in training. For that purpose, each year 1.15 % of the total wages in the sector are saved for training and innovation activities, as laid down in a special collective agreement.
Installation engineering is an innovation following sector: the sources of innovation (Von Hippel, 1988) are located outside the sector. Innovations are designed during integral design processes for utility building or via research and development activities in the supplying industry (e.g., new heating technology). Innovations are disseminated in the installation sector following the linear model. To facilitate innovation processes, the social partners in the sector founded the agency ‘Intechnium’ (2), the sectoral innovation and training centre.

Intechnium gained, in a period of five years, an important role in monitoring technology developments and translating them into training, adult training, and other disseminating activities. For the monitoring purpose, a targeted instrument is designed, whereas for the knowledge transfer towards the regions a directive script is written. In the installation engineering model, vocational education and training have a rather reactive role. Intechnium formulates the training requirements, based on information from its regional member organisations, and is designing the training materials. Vocational colleges are asked to supply the respective courses. In addition, the maintenance of the qualification structure for initial courses is directed within the same monitoring structure.

This model fits well for the linear way of innovative processes in the sector, but it does not necessarily enhance regional learning networks of companies and colleges. The VET colleges are now challenged to initiate such a network, within the sectoral structure from Intechnium.

4.2. Chain relations in the bakery sector

In the bakery sector craftsman-like production has for a long time kept its ground against industrial bakeries. Each represented about half of the Dutch bread market. Today a special threat is the shift in selling points: supermarkets sold 60% of the bread in 1994. The traditional bakery is thus confronted with a struggle for life. In the Dutch market it is expected that a substantial proportion of the consumers, however, will keep buying their loaves in the small bakery shops. Good craftsmanship of the baker and of his personnel is crucially important in keeping that market share.

Self-employed bakers in the Netherlands are educated at the bakery school in Wageningen, whereas the employees are trained in apprenticeship courses. The selling personnel is educated within the general school system. Employers’ organisations and trade unions in the bakery sector are agreed on the importance of training, however, a strong training tradition has not existed.

The bakery sector is rather traditional: large innovations do not occur. Small bakeries did not change dramatically, whereas the industrial bakeries were confronted with process automation, however, at a rather slow pace. Innovation takes place in the form of new equipment, e.g., computer-steered ovens and dough mixers and, on the other hand, via new raw materials and recipes. The supply industry is the motor behind those innovations. The innovative process within the bakery sector can be described as rather slow and linear.

Recently, the National Bakery Centre was founded, in which several sectoral organisations were merged. This new centre has the chance to grow into an innovative focus of the bakery sector. However, the bakery college is at present not involved in this centre. The intermediate knowledge infrastructure in the bakery sector is thus still in a developing stage. Communication and information lines are not clear yet. The weak training and innovation tradition, combined with some aversion against centralism, could be an explanation for a comparatively slow development.

4.3. Knowledge systems for greenhouse farmers

Greenhouse farming is a rather prosperous sector of Dutch agriculture. Vegetables, flowers, and plants are exported all over the world. Today, however, greenhouse farming is confronted with large shifts in its economic basis. The Dutch government is stepping aside from its leading role in agricultural policy. Economic

(2) Intechnium, Korenmolenlaan 4, Postbus 484, 3440 AL Woerden, The Netherlands, Tel. (31-348) 43 74 37, fax (31-348) 43 20 13.
developments, both positive and negative, on the global food market will be steering impulses for the agricultural sector. Competition will increase.

This shift is supported by a new policy of the European Union. A major economic tendency is the shift of power in the different food chains. Supported by the European policy, the suppliers in the food chain had for several decades the major say. In the last decade, however, the balance of power has changed in favour of the other side of the chain, i.e. the consumers, represented in the main by the supermarkets. Because of this shift, traditional cooperative structures are breaking down and will be replaced by structures which are better prepared for competition on the international scale.

The structural changes have their impact on the agricultural knowledge system. The knowledge system for greenhouse farming is oriented traditionally on the farmer. Employees in the sector are usually of a low level of education and training. Greenhouse farmers are at the front of interactive innovative processes. Individual farmers or networks of farmers have direct influence on research and development programmes of the institutes for applied agricultural research, whereas the results of research are directly available for the farmers through evening courses and extension programmes.

The economic shifts also affect the way the knowledge system operates. Recently groups of farmers formed competitive promotional activities and consequently the cooperation in the knowledge system is basically affected. At present, agricultural organisations are mainly looking for new ways of promoting the knowledge transfer between research institutes, intermediate organisations and farmers/enterprises. Within the agricultural knowledge system, the role of agricultural education and training has been in danger of a certain marginalisation. Vocational education is still seen as the major supplier of future farmers; however, the role of education/training within the innovation processes in the sector is decreasing. Agricultural education has difficulties especially on the national level in obtaining the necessary information to respond adequately to innovation, and on the regional level the education institutes do not play an important role in the knowledge network around the greenhouse farms. The commitment of the sector to education and training is declining and, therefore, the responsiveness of the whole agricultural education and training provision to the highly changing and open-minded sector seems to be decreasing.

4.4. A linear approach in environmental technology

The Dutch public-private enterprise for the development of energy saving and environmental care technology (NOVEM (3)) aims to facilitate the introduction and spreading of a sustainable and ecological technology by enterprises and entrepreneurs. NOVEM is interested in knowledge and technology diffusion techniques to reach this target. New technology, which is in stock at NOVEM, is not automatically used by companies. Based on the notion of the ‘knowledge context of companies’ an investigation of knowledge transmission processes within some agricultural sectors (greenhouse farming and bulb breeding) was undertaken. A description of the actual knowledge context has been made and, via interviewing of entrepreneurs and intermediate institutes, the process of knowledge transfer has been analysed.

Within the knowledge transfer and technology diffusion process two major stages can be discerned. In the stage of information diffusion, a linear approach can be used: entrepreneurs learn from reading their economic and professional periodicals or journals and talk with their colleagues and advisers. Information on new technologies ought be channelled through these kinds of informal and formal transfer mechanisms. At this stage a rather broad focus of the information is important: it is not only technical information which should be made available; more integrated information on, for instance, the impact of new technologies on the turnover and benefits of the enterprise is more important.

Entrepreneurs are interested in new technology if, by introducing new tools and techniques,
the cost-benefit ratio of their enterprise will improve. A highly effective method for knowledge transmission is the use of information on good practices from innovative enterprises themselves: shop floor visits are most persuasive didactical tools.

The second stage in the technology diffusion process is the moment of problem-solving or investment decisions, to be decided by the entrepreneur. Advisers and regional knowledge organisations should have up-to-date information on their shelves to facilitate the problemsolving process of SMEs. Technology supplying companies should focus less directly on the entrepreneurs, but should target their information, marketing and diffusion activities in the main at the relevant intermediate organisations. For the individual SME-entrepreneur it is impossible to grasp all the available knowledge (energy-saving technology is not the only parameter for his decision processes!); therefore it is important that the regional and sectoral knowledge context offers integral and easy entrance to relevant information combined with the possibility of participating in interactive learning and decisions processes.

This ought to be also the departure point for institutes for vocational education and training. They can claim a role as regional innovation and knowledge centres. Responsive vocational education and training implies a cohabitation of regional and sectoral impulses, in which colleges are increasingly a focal point for collecting, treating and disseminating innovative knowledge in their region. They can strongly support innovations especially in late adopting companies within their region. They can be ‘spiders’ within regional and sectoral innovation networks.

4.5. Regional networking of Dutch engineering and tool-making industry

The regional economy around Eindhoven, in the southern part of the Netherlands, is strongly based on the engineering industry. Eleven hundred of the 8 000 Dutch enterprises in this sector are located in the region of Eindhoven, including large ones, e.g. Philips (electronics), DAF (trucks) and Océ (copying machinery). Most of these engineering enterprises, however, are small sized: 75 % have 10 or fewer employees. The small enterprises play a role as suppliers to the larger ones. The Eindhoven region is known as a highly innovative one: 50 % of the national R & D budget is spent in this region, notably by larger companies, and about 11 % of the employees in the Eindhoven region are involved in R & D activities.

In the late 1980s, the Eindhoven region was confronted with an economic crisis, but with the help of European and national funds the region recovered and built a strong regional infrastructure of networks and chains of enterprises. Regional intermediary organisations such as the innovation centre and a regional promotion institute play an important role in this structure, as do sectoral organisations of the engineering industry sector organised at national level.

In the Eindhoven region there are a number of large institutes in which knowledge is created, handled and disseminated, amongst them are the Technical University of Eindhoven, TNO-industry (one of the largest private-public R & D organisations), the Technical College (for level 5: professional courses) Fontys, and two regional colleges for vocational education and training (level 2-4). The metal industry has its own institute for adult technical courses and Fontys houses the microcentre (a laboratory for microtechnology). The large companies have their own R & D labs (like the famous Natlab of Philips).

In the 1990s engineering in the region became very prosperous, but a shortage of skilled workers is nowadays an ever greater threat: skill shortages will be the problem for the next decade because of a lack of interest amongst young people in technical and engineering occupations and professions. Therefore employers in the region increasingly cooperate in promoting activities jointly with technical colleges in order to attract new students for technical courses, the natural sciences and engineering disciplines.

Within this dynamic region, the regional college Eindhoven (ROC-Eindhoven (4)) was es-

(4) ROC Eindhoven, PO Box 6101, 5600 HC Eindhoven, The Netherlands. Tel.: (31-40) 291 86 86.
tablished in 1996, based on a merger of several vocational and technical institutes (both apprenticeship courses and full-time vocational education). This ROC has 16,000 younger or primary students, 8,000 adult students, 1,400 employees and around 20 buildings in the region. About 10% of the turnover is generated by specific contractual courses and activities. The innovative mission of the ROC is based on a network strategy: partnerships, collaboration with other regional knowledge institutes, cooperative courses in joint ventures with enterprises.

ICT (5)-based courses and individual trajectories are the main characteristics of the course supply of ROC-Eindhoven. The ROC aims to be an open institute with a regional function. The core competence is restricted to the delivery and maintenance of skilled and highly skilled craftsmanship in the region. Facilitating innovation is not a part of the core activities of the ROC: networking and connecting enterprises and knowledge institutions, however, is the strategy for scaffolding innovation. Delivering skill and qualifications in terms of craftsmanship involves all kinds of regular courses and takes into account individual trajectories in cooperation with enterprises or the regional labour supply offices.

The ROC-Eindhoven made a clear choice only to play a restricted role within the region. Within these restrictions, its core competence is elaborated in an excellent manner.

4.6. School management strategies within regional networks

During a short survey schools for agricultural education were investigated about their management strategies as regional innovation centres. All 18 Dutch agricultural VET institutions have been involved in this survey. The most striking result of this survey is that all schools agreed on the necessity of developing a new regional networking strategy, but only one of these schools is in fact involved in regional innovation networks. Regional networking is ranked very high on the priority list for school management, but the operational tools have to be developed yet.

Reasons mentioned for underlining the needs for new strategic developments are linked to their own needs, namely to develop an innovative course supply: fall of demand within traditional occupations, the rise of new ones, and the declining demand from agricultural enterprises for support of innovative processes by the agricultural colleges. A general cause for these processes is the pace of technological development in which the obsolescence of technical knowledge is rapidly spreading and accelerating. The traditionally slow development process for new courses for VET should be replaced by a flexible and responsive course supply. In order to improve the responsiveness of schools, colleges and training centres it is crucial to play a central role within such innovative networks. Colleges are aware of the danger of not being involved in such a network building process, they are conscious that they may leave the risk of losing their supplying role for skilled craftsmanship and of being increasingly limited to the delivery of courses for the low-skilled, for disadvantaged young people and unemployed adults to be retrained.

With this background the agricultural schools and colleges are nowadays starting to develop new strategic options for regional networking and course supply. A major obstacle is linked to staff development problems. Teachers for vocational education and training are educated themselves rather as generalists, whereas operating in innovative networks asks for specialist competencies too. The new networking needs and strategies imply double qualifications for teachers, trainers, tutors and supervisors: both general didactics and specific technologies/competencies should be part of their qualification. Wanting to transform VET institutions into network players demands major investments in the further education and training of the teaching and training staff itself. This is an urgent need anyway.

5. Summarising conclusions

This contribution is targeted at skill and competence needs and the role of vocational education and training (VET) within the innovative
European trends in the development of occupations and qualifications

European trends in the development of occupations and qualifications

processes of early and late adopting, especially the rather small, enterprises. The increasingly high pace of innovations urges VET to develop new strategies to deliver and to maintain skilled craftsmanship for the local, regional and sectoral labour market. The traditional target for initial and regular course delivery should be combined with new targets, tasks and strategies for adult courses and activities, which aim at accompanying and facilitating innovations. Organisations for VET cannot act any more as stand alone institutions, but should develop network-oriented strategies. VET colleges should define their own specific role within ‘learning SME networks’ and should look for strategic alliances with other knowledge institutions within their regional context.

Understanding innovative processes within regional economies should be part of the core competence of VET institutions. Enterprises innovate, embedded within regional, sectoral and chain-bound networks. Enterprise innovation is an interactive process of problem-solving and combining pieces of knowledge and technology into new processes and products. To facilitate these company-specific innovative activities, knowledge creating and disseminating institutions, like VET colleges, should be able to deliver information on new techniques, methods and technologies on time and efficiently. These institutions should organise their own knowledge networks to be able responding to the increasingly chaotic knowledge demand. To develop these organisational and innovative skills, VET colleges and other knowledge creating and disseminating institutes, should become learning organisations with an open mind towards the local economic community and sectoral technology development processes.

Several case studies have been presented to understand industrial innovation processes and linked actions within various network types. Depending on regional and sectoral characteristics, industrial branches organise knowledge and technology networks in order to promote, implement and accompany the innovation process. Local, regional and national governments can smooth innovative processes by certain infrastructural measures, but in most cases the social and economic players and actors are themselves the most important facilitators of their own innovation processes within the respective regions and sector or technical/professional field.

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In developing and emerging nations especially, infrastructure can be a boon for both, opening access to both markets and resources and reducing the frictions within economies. For construction, investment in infrastructure delivers immediate workloads. In a cold market there is typically intense competition among contractors for very little work, reducing cost pressures. Markets are considered warmer as competition decreases and prices begin to rise, as demand increases in relation to supply. International real estate investors are re-emerging, and local development firms are pushing forward with plans. The oil sector, finally, seems set to blossom with exports slated for 2019. Developmental processes ask for a combined role of the activities of the central, regional and local level, enterprises, business associations and investors. After all, local development does not imply a "de-activation" of the higher government levels, nor a simplification of decentralisation by way of replacing management and organisation on the central level with the local one, but rather the development of such a local policy which would be complementary to the central government's policy, and which would be a part of a coordinated... In this paper, LED strategies in South Africa are investigated in order to examine the emergence, contemporary directions and problems of entrepreneurial LED strategies across urban South Africa reconstruction.