Hans Borch, Hans Weißmann, Peter Wordelmann (Eds.)

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Federal Institute for Vocational Education and Training

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Preface

The Federal Institute for Vocational Education and Training has been commissioned by the Federal Ministry of Education and Research to monitor and evaluate the practical implementation of the IT continuing training system. One of the aims of the evaluation is for it to relate to the innovative educational policy elements within the system, such as the procedure for personal certification, the new didactic concept or permeability.

In addition to this, there were explicit attendant international objectives in the development of the IT continuing training system, including the following:

- the Operative and Strategic Professional qualifications should correspond to the internationally recognised qualifications of "Bachelor" and "Masters";
- the accreditation/certification procedure itself is international, the certificate being awarded pursuant to the international norm DIN EN ISO/IEC 17024 on successful completion of the examination;
- educational achievements are recognised within the system itself (from Specialist to Professional), the aim being for them to be internationally accreditable (credits);
- the system itself is in competition with the standard international manufacturer certificates.

Against this background, the BIBB project group has taken the decision to analyse the main focuses of the international dimension of the IT continuing training system. This collection provides documentation of the various studies commissioned, an introductory commentary on the system also being included. Responsibility for the individual articles remains with their respective authors.

Hans Borch Hans Weißmann Peter Wordelmann March 2006

The development of the IT continuing training system and its international dimension

HANS BORCH, HANS WEIßMANN, PETER WORDELMANN

2002 saw the enactment of the Advanced IT Training Ordinance, the first certifying body being accredited and the first examinations being held in 2003. The IT continuing training system has thus "gone to market". The IT continuing training system contains a whole series of innovative elements, ranging from the didactic concept of workplace related learning to certifying procedures, and extending to include the international dimension of the qualifications. The BIBB is monitoring the process of implementation of this system by means of an evaluation project. The aim of the following remarks is to provide an overview of the development, current status and international dimension of the system.

1. The requirement for skilled IT workers

Information technology (IT) has developed into a key technology over the course of recent decades. Without information and communication technology, operating processes across all areas of trade and industry and public administration would be unthinkable. IT enables

- new production concepts using flat hierarchies, process optimisation and acceleration of operating procedures;
- customer specific solutions, even in volume production;
- regional and global division of labour and added value networks.

Employment potential estimates for the year 2000[1] were based on around 12 million users and approximately 800,000 IT skilled workers, the latter being employed both in the ICT sector itself as well as in applications companies. This enables the communications sector to provide more jobs than individual traditional sectors of industry such as the automobile branch, which employs around 600,000 people. All this goes to make it even more astonishing that no attention was paid to the issue of regulated initial and advanced vocational education and training for the IT labour market until the middle of the nineteen-nineties. Up to this point, as many as 80% of skilled IT workers had been lateral entrants to the sector without relevant prior learning.

At the level of skilled worker, only the training occupations of Data Processing Management Assistant and Mathematical Technical Assistant had been available, these running alongside the original electrical occupation of Communications Electronics Technician, which was allocated to the telecommunications area.

Anyone wishing to undergo continuing training in the IT sector was confronted by a bewildering jungle of provision. More than 300 advanced qualifications were available on the market, ranging from Chat Room Manager to e-commerce Expert. The Chambers of Industry and Commerce and Chambers of Crafts and Trades alone recognised and examined 45 qualifications. Both those completing such qualifications and the companies themselves were faced with the problem that identical occupational designations could conceal a myriad of different profiles and examination content. Many course participants often found out too late that there was no labour market demand for many of the qualifications on offer. Manufacturers' certificates such as the "Microsoft Certified Systems Engineer" represented the standard in the IT sector.

It was not until 1997 that the four IT skilled worker occupations gained recognition, high training figures being achieved in these after a brief start-up period.

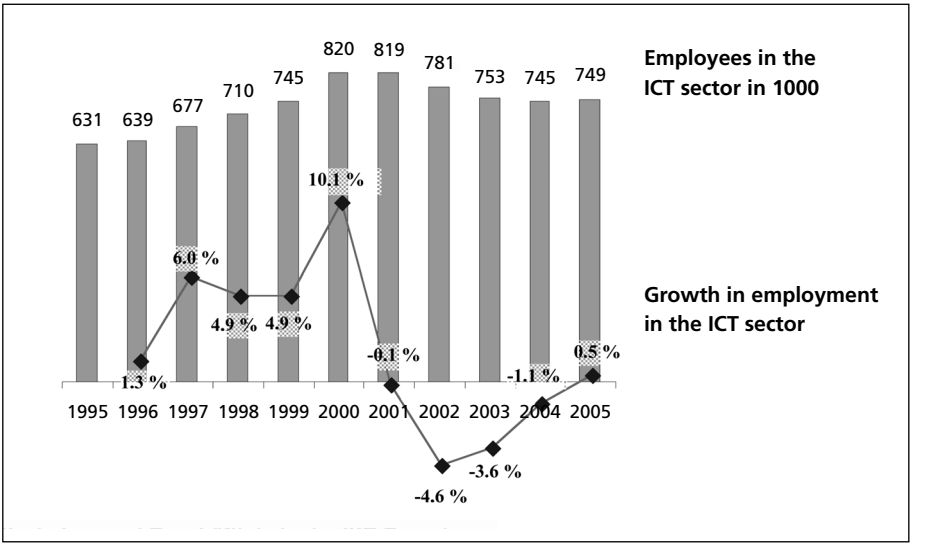
Since the mid-nineties, the Federal Government, employers' associations and trade unions have been wrestling with the issue of the "shortage of skilled IT wor-

1 PETERSEN/WEHMEYER: Die neuen IT-Berufe auf dem Prüfstand *("Putting the new IT occupations to the test")*, Flensburg 2001

kers". Much public attention has been afforded to the debate focusing on the "green card", a mechanism for recruiting foreign IT specialists to come and work in the Federal Republic of Germany.

Figure 1 shows a sharp growth in employment in the ICT sector in the years leading up to 2000. This period saw a specific form of economic development within the IT branch, many applications companies needing to replace or update their IT infrastructure in the light of the introduction of the euro and of the year 2000 problem.

Figure 1: **Growth and employees in the ICT sector**



After the collapse of the New Economy (2001), a shortage of skilled workers was no longer an issue. The economic situation led to job cuts on the part of ICT companies and an end to the additional demand for IT skilled workers.

At the same time, there was an increased influx of IT skilled workers onto the IT labour market comprising:

a) over 60,000 from IT training (1999 – 2004);
b) information technology higher education graduates, the annual number of those completing such courses doubling from around 6,000 to 12,000 (comparing 2005 with 2000);
c) approximately 17,000 via the green card (between 2000 and 2004);
d) workers who had undergone retraining.

There was a counter development in unemployment figures. Compared with only 26,242 persons unemployed in 2000, the figure has more than trebled and is estimated at around 75,000 for 2004.

Current expectations are that the ICT branch will return to stable growth in the coming years, once again achieving an increase in recruitment. According to the analyses carried out by the Adecco recruitment agency, job supply is once again beginning to rise, albeit from a low base (around 50% more jobs advertised in 2005 compared to 2003 according to a survey of 40 daily newspapers). This could lead to a return of the shortage of skilled IT workers.

In the light of the falling numbers of those commencing higher education courses in information technology, the German Association for Information Technology, Telecommunications and New Media (BITKOM) is predicting that there will once again be such a shortage by the year 2008.

There has been a decrease in the number of apprenticeship contracts. Companies such as IBM and Hewlett Packard have stopped offering training in IT occupations. A study commissioned by Cisco predicts that there will be a qualifications gap of around 100,000 persons in the networks sector by the year 2008.

Since an alternative strategy open to companies is to relocate provision of IT service provision abroad, it is questionable whether any such shortage of skilled IT workers will actually materialise.

2. The genesis of the IT continuing training system[2]

Agreement by the social partners

In 1999, within the scope of an "Offensive for the reduction in the shortage of skilled IT workers", the specialist information technology employers' association and the IG Metall trade union proposed the establishment of an IT specific continuing training system. The aim was to use this IT continuing training system in conjunction with other measures, such as an increase in IT training, to achieve total growth of around 250,000 qualified persons by the year 2005, thus eliminating the bottleneck prevailing at the time as well as securing the predicted additional requirement of approximately 150,000 skilled IT workers.

In May 1999, the social partners IG Metall, the German Postal Workers Union, the German Electrical and Electronic Manufacturers' Association and Deutsche Telekom AG (in their capacity as collective wage agreement partners) concluded an agreement on "Benchmarks for the realignment of continuing vocational education and training in the IT sector".

The benchmarks stipulated the following aims for the IT continuing training system:

- qualifications profiles which enjoy cross-branch recognition and are regulated in a uniform way on a nationwide basis, transparency on the German and international labour markets;

2 Cf. also: Hans BORCH and Hans WEIßMANN, IT-Weiterbildung hat Niveau(s) *("The level(s) of IT continuing training")*, Bertelsmann, Bielefeld, 2002

- advanced qualifications which enjoy equivalence with Bachelors and Masters qualifications in the way they are structured;
- continuing training which is independent both of current standardised provision and of manufacturers;
- the securing of the employability and career advancement opportunities for employees via ongoing competence development and the promotion of specialist and management careers;
- maintenance of the IT companies' ability to compete and innovate;
- paying due heed to the employment and organisational structures in the IT sector, particularly flat hierarchies;
- securing of permeability within the educational system, crediting of continuing training achievement as higher education achievement.

The benchmarks envisaged qualifications pursuant to § 46 para. 2 for the so-called "Professionals" qualifications (chamber examinations). The aim was for the new qualifications profiles (Specialists) to result in certification to be recognised via an accreditation procedure still to be agreed. The idea was for these certificates to be recognised as examination credits for the advanced training examinations.

Two aspects of the benchmarks impact upon further implementation.

- The partners will come to an agreement on appropriate instruments and projects for the provision of support to small and medium-sized IT companies in particular in respect of the implementation of the new continuing training system.
- There will be a process of cooperation with institutes of higher education with the aim of achieving an interlinking of advanced IT qualifications and higher education IT courses to enable fulfilment of relevant continuing training requirements to be recognised as higher education achievements via the use of credit points, even if such achievements are not completely identical with the fulfilment of higher education requirements.

Establishment of a BIBB development project

Between 1999 and 2000, working within the scope of a BIBB project, experts from in-company practice and IT qualification used the "benchmarks" as a basis for the development of the IT continuing training system.

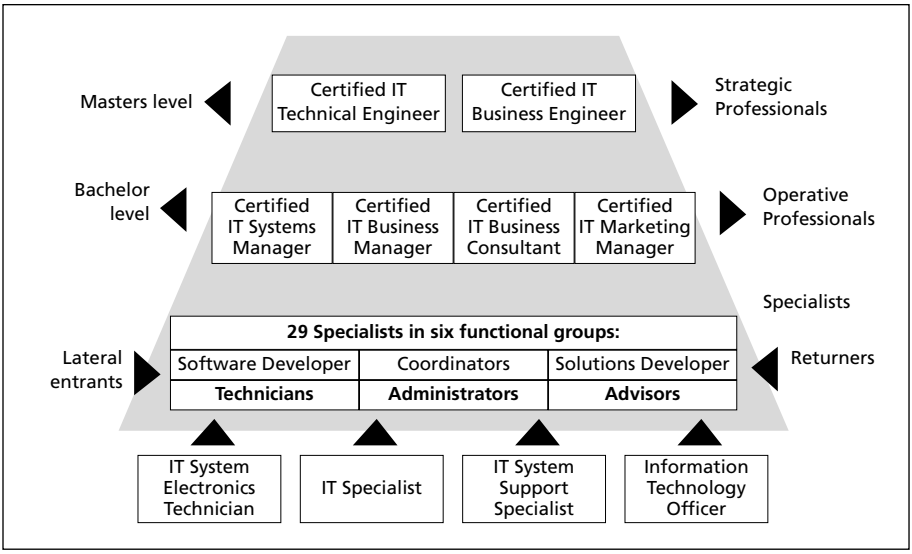
29 Specialist profiles were identified and described. These profiles cover the whole chain of business processes, extending to analysis, consulting, product development, sales, administration and support. The specialist profiles are "job roles" rather than structured and complete advanced training occupations. "Job roles" are bundled activities carried out by one person. There are companies which adopt an approach strongly based on the division of labour where the job roles are performed by a variety of persons. There are, however, also companies in which one person is able to take on different job roles, either simultaneously or in the course of the project.

Descriptors have also been drawn up for the Professional profiles stipulated within the benchmarks. An ordinance for the examination of the Professionals was developed within the scope of a further BIBB project and enacted on 3 May 2002. The ordinance constitutes the IT continuing training system on the basis of three levels which build upon one another (§1 article 1):

- vocational qualification as a Certified Specialist,
- upgrading training to Operative Professional (4 qualifications),
- upgrading training to Strategic Professional (2 qualifications).

This has resulted in a *continuing training system* which is structured in both horizontal and vertical terms (cf. Figure 2) and does not merely consist of individual qualifications which are interlinked to a greater or lesser extent.

Figure 2: **The IT continuing training system**



The Specialist profiles themselves are not named in the ordinance. They are constituted on the basis of the "Agreement in respect of the Specialist profiles within the scope of the procedure for the regulation of the IT continuing training system", concluded by the employers' associations and trade unions on 14 February 2002.

In the year 2000, the Federal Ministry of Education and Research commissioned the Fraunhofer Institute for Software und Systems Engineering (ISST) with the development project "Workplace oriented continuing training in the IT branch (APO)". The ISST worked together with IT companies and educational providers to draw up reference processes for the Specialist profiles identified by BIBB and produced detailed descriptions of these.

There was no further specification as such of the accreditation procedure relating to the Specialist profiles stipulated in the benchmarks. The organisations responsible for the benchmarks decided to have the certification carried out by bodies working in conformity with the requirements of DIN EN ISO/IEC 17024. The German Electrical and Electronic Manufacturers' Association (ZVEI) and the German Association for Information Technology, Telecommunications and New Media submitted an application to the company TGA (German Association for Accreditation – TGA GmbH) for the establishment of the "IT Specialist" field of reference and the setting up of an appropriate sector committee. The normative document regulates the requirements for:

- the certifying body and its examiners,
- "candidates" seeking to achieve the corresponding certification and
- "certified persons" seeking re-certification.

The main focus is, however, on describing the examination procedure the certifying bodies are required to conduct. The aim of the examination is for candidates to provide evidence of their qualification as an IT Specialist in accordance with one of the Specialist profiles based on the presentation of documentation monitoring the process.

Crediting the fulfilment of IT continuing training requirements towards higher education IT courses

In their paper setting out the benchmarks, the social partners had suggested the interlinking of in-company IT continuing training schemes with higher education courses in information technology. As far as an accreditation instrument for crediting learning and examination achievements acquired within in-company continuing training towards higher education courses was concerned, they had proposed the system of credit points in accordance with the European Credit Transfer System (ECTS) used in the higher education field.

When the Professional profiles were drawn up within the scope of the BIBB development project, due heed was paid to ensuring that the final level is comparable to the corresponding higher education qualifications (Bachelor and Masters). An additional BIBB development project was also launched together with institutes of higher education to represent exemplary reference and comparable achievements in accordance with the ECTS scheme.[3]

From 2005 onwards, two pilot projects, funded by the Federal Government and extending over several years, are being used to compare competences acquired through fulfilment of continuing training requirements with achievements in

3 Kerstin MUCKE, Stefan GRUNWALD: Hochschulkompatible Leistungspunkte; Grundsteinlegung in der IT-Weiterbildung *("Higher education compatible credit points; establishing a foundation in IT continuing training")*, Bertelsmann, Bielefeld 2005

higher education and to examine models and develop procedures for the crediting of these competences towards higher education courses.[4]

3. The implementation of the IT continuing training system

Accreditation of certifying bodies

The first certifying body, Cert:IT, was established in December 2002 and accredited in September 2003.

The second certifying body, IHK CERT GmbH, received its accreditation in April 2004. Operations were temporarily discontinued at the end of 2004. The TGA has suspended IHK CERT GmbH's accreditation for personal certification until further notice.

In October 2004, a third certifying body, the gps-cert in the Bavarian Trade and Industry Educational Association (bbw) gGmbH was accredited by TGA for "personal certification of IT Specialists in accordance with DIN/ISO 17024".

Participants are invoiced for certification costs. There is no significant difference in these costs at the individual certifying bodies. As of March 2006, the charge for initial certification is approximately € 1,000, the fee for initial re-certification after five years being around € 600 (each being subject to VAT).

Certification procedures carried out

Around 580 people have thus far registered for personal certification in respect of one of the 29 IT Specialists.[5] According to information provided by the certifying bodies Cert-IT und GPS-Cert, around 125 had successfully undergone the Specialist qualification by the end of 2005.

Provision of continuing training courses by the chambers

In 2005, 23 chambers of industry and commerce offered training courses in preparation for sitting the examination as Operative Professional. Just under 50 training courses are currently underway. Distribution of profiles in respect of current course provision is as follows:[6]

IT Systems Manager	16
IT Business Manager	20
IT Business Consultant	6
IT Marketing Manager	2

4 A support initiative by the Federal Ministry of Education and Research (BMBF): Crediting of occupational competences towards higher education courses, see www.bmbf.de

5 According to information provided on the telephone by Cert-IT on 14 February 2006; cf. also: information on the *"IT continuing training system"* from the consumer goods testing association "Stiftung Warentest online", Berlin 19 December 2005

6 Yorck Sievers/Association of German Chambers of Industry and Commerce (DIHK): paper given on 7 December 2005 in Frankfurt

Provision of continuing training examinations by the chambers

The enactment of the Advanced IT Training Ordinance involved the stipulation of 10 leading chambers to conduct the examinations. 33 chambers now offer examinations (cf. Table 1).

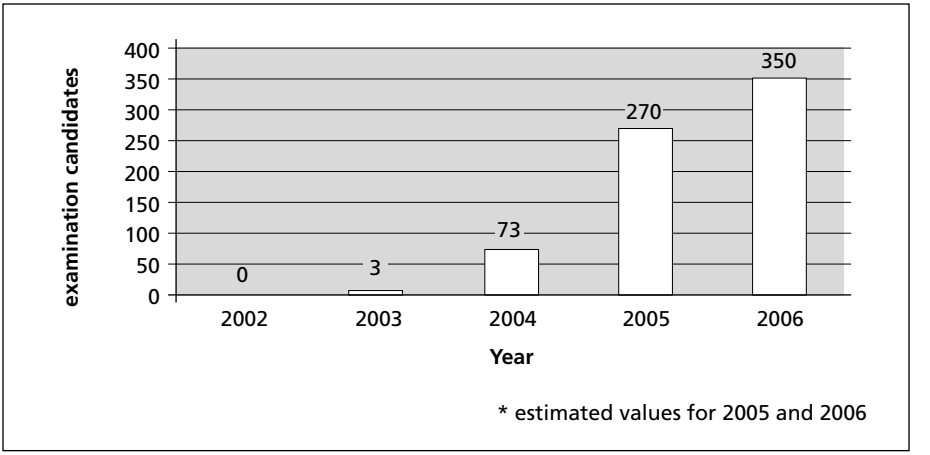
Table 1: **Chambers of industry and commerce offering examinations**[7]

Chamber of industry and comerce	IT System Manager	IT Business Manager	IT Business Consultant	IT Marketing Manager	Technical Engineer	Business Engineer
Aachen		X	X			
Augsburg	X	X				
Bayreuth		X				
Berlin	X	X	X	X	X	X
Bielefeld		X				
Bonn	X	X	X	X	X	X
Cologne	X	X	X	X		
Darmstadt	X	X				
Dortmund					X	X
Erfurt	X	X	X	X		
Essen	X	X	X	X		
Flensburg		X	X			
Frankfurt/M.		X	X			
Halle	X	X	X	X		X
Hamburg	X	X	X	X	X	X
Hanover	X	X	X	X		
Heidenheim	X	X				
Heilbronn	X	X	X	X		
Karlsruhe	X	X	X	X		
Kiel	X	X	X	X	X	
Koblenz	X			X	x	X
Leipzig	X	X	X			
Lübeck		X	X			
Magdeburg	X	X	X	X		
Mannheim		X		X		
Munich	X	X	X	X	X	
Münster		X	X			
Nuremberg	X	X				
Passau	X	X				
Regensburg	X					
Stuttgart	X	X	X		X	X
Ulm	X					
Würzburg		X				
33 chambers in total	23	29	20	15	8	7

7 Source: www.dihk.de

Examinations for IT Business Consultant and IT Business Manager were first conducted in the autumn of 2003, initial examinations for IT Marketing Manager and IT System Manager coming on stream in the spring of 2004. The following Figure 3 depicts the examination numbers.

Figure 3: **Number of professional examinations** [8]



In 2004, distribution of examinations in respect of the individual profiles was as follows:

IT Systems Manager	6
IT Business Manager	46
IT Business Consultant	2
IT Marketing Manager	19
IT Technical Engineer	
IT Business Engineer	

The average pass rate was 80%.

According to information provided by the DIHK, 300 persons had completed qualification in one of the four "Operative Professional" profiles by the end of 2005.[9]

As a comparison, 743 examinations were conducted in 2002 in the profiles replaced by the IT continuing training system: Operative IT Engineer, IT Assistant, IT Organiser and IT Business Technician.

8 Yorck Sievers/Association of German Chambers of Industry and Commerce (DIHK): paper given on 7 December 2005 in Frankfurt

9 Cf. also: information on the *"IT continuing training system"* from the consumer goods testing association "Stiftung Warentest online", Berlin 19 December 2005

4. The international dimension of the IT continuing training system

The development of the IT continuing training system had its origins in a time when the hype surrounding the Internet made it patently clear that there would be increasing networking of international markets, such a process seeming inexorable. IT opened the door to the virtual breaking down of borders. To this extent, the development of the IT continuing training system possessed an inherent international dimension, both in terms of content and as well as in respect of target groups and realisation. However, how can international workplace requirements actually be described? How international is the product or the products? How can they be classified in terms of endeavours to create transparency in terms of qualifications in Europe? And finally: what are our neighbours doing?

The closing part of this section will deal with the issue of the extent to which the IT continuing training system constitutes an international system and how it is moving, or has the potential to move, in this direction. The initial aim is to outline the international dimension of the system. A fundamental distinction needs to be drawn here between the contents of the qualifications process, which may be international in nature, and the structural features of the system which are, or may be, relevant in international terms. In order to be able to undertake appropriate classifications and draw pertinent comparisons, the significance of the system within the international environment also needs to be considered.

4.1 The international contents of the IT continuing training system

4.1.1 Workplace requirements: from international qualifications to network competence

Companies expect their skilled workers operating internationally to be in possession of knowledge of foreign languages, intercultural competence and outstanding specialist knowledge[10] and view these as constituting a holistic qualification, comprising economic and organisational competence alongside technically related qualifications. In addition to this, skilled workers also require a certain level of psychological and physical robustness when on foreign trips. Within the context of international development of competences, there is ultimately an inherent company related and socio-political mandate in the sense that it is possible to solve culturally based conflicts via intercultural learning both within and outside companies.

Both internationally and nationally structured companies need to function smoothly, even if employees originate from different cultural circles. The minimum requirement in terms of cooperation is respect for culturally or religiously based differences in behaviour, an attitude not established as a matter of course within

10 For the following, cf.: BORCH, H.; DIETTRICH, A.: FROMMBERGER, D.; REINISCH, H.: WORDELMANN, P.: Internationalisierung der Berufsbildung Strategien – Konzepte – Erfahrungen – Handlungsvorschläge *("Internationalisation of VET strategies – concepts – experiences – action proposals")*, Bundesinstitut für Berufsbildung, Bonn 2003

German society. Cultural differences can also provide the necessary impetus for company synergies.

Sales and service oriented companies or departments also have to deal with both the different culturally and religiously based behaviour of their customers as well as taking their cultural and legal business practices and product and service expectations on board.

International mobility can take place physically and, increasingly, virtually. The technical possibilities available (such as tele-maintenance) are bringing about a shift in relations. Technical and communicative competences are becoming intermingled. Although travelling abroad requires more in the way of justification, the fact that certain results can only be obtained via a face-to-face meeting means that it remains a necessary international activity.

The concept of international qualifications[11] is a useful one for many companies at the threshold of the process of internationalisation. It is also one which needs to be extended in future, building on dynamic development in the workplace and integrating the opportunities the Internet[12] is able to provide, to include a new concept, which could be termed "network competence".[13]

This competence is in no way solely restricted to technical competence relating to dealing with the Internet and intranets, i.e. working with networks. Its fundamental characteristic is one of illimitability, meaning it also requires the ability to work successfully in networks, with a particular focus on such aspects as "thinking and acting in a networked way". New requirements here are language and asynchronous communication, alongside the establishment of trust within a network. This once again includes, therefore, indirect dealings with people from other cultures. The characteristics of a new "digital" culture may superimpose themselves on ethnic features and may potentially open up new opportunities for trans-cultural communication. Such a concept could provide a useful approach for the structuring of the content of advanced training for the IT sector in particular.

In overall terms, it is important that all the dimensions described form an integral part of a comprehensive concept relating to qualification for international activities. The reduction of such requirements to mere competence in foreign languages must be avoided at all costs.

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11 A modified version of the concept is dealt with in: LENSKE, W.; WERNER, D.: Globalisierung und internationale Berufskompetenz, *("Globalisation and international occupational competence"),* Cologne 2000, particularly pp. 28 ff.

12 Cf. also: PFÖRTSCH, W.: Mit Strategie ins Internet. Qualifizierung als Chance für Unternehmen *("Approaching the Internet strategically. Qualification as an opportunity for companies")*, Nuremberg, 2000; see also Hering, E.; Pförtsch, W.; Wordelmann, P.: Internationalisierung des Mittelstandes. Strategien zur internationalen Qualifizierung in kleinen und mittleren Unternehmen, *("The internationalisation of SME's. Strategies for international qualification in small and medium-sized companies"),* Bundesinstitut für Berufsbildung (Ed.), Bielefeld, 2001

13 Cf. WORDELMANN, P.: Internetionalisierung und Netzkompetenz *("Internetionalisation and network competence")* in BWP, 4/2000, pp. 36 ff.

4.1.2 International aspects of organisational instruments for the IT sector

Although the system of dual vocational education and training is oriented to work processes, it has remained relatively resistant to the requirements of internationalisation and increasingly so in the face of economic globalisation. In technical commercial occupations, the international dimension has been accorded scant attention in the past.

The foreign language content of more recent training regulations has been limited to the reading and evaluation of English rules and regulations or handbooks, the use of specialist terminology in conversation or the imparting of simple information.

Only specifically customer-oriented occupations such as transport services clerk and tourism agent contain a more extensive level of communicative competences. Intercultural competences play virtually no part in the training regulations. Important aspects for IT training occupations are:

- the task oriented evaluation of sources of information, especially technical materials, documentation and handbooks, in both German and English;
- the use of German and English specialist terminology.

These training occupations also pay due regard to the fact that any extensive implementation of international competences within the scope of training regulations is currently scuppered by the facilities available in companies and at vocational schools. Cost and the competence of training staff play a role in both cases. Another argument ultimately put forward is that compulsory integration of international competences has an inhibiting effect on training in a time of shortage of apprenticeships.

As far as the IT continuing training system is concerned, the situation is somewhat different. During the development process, there was no disagreement that a modern, advanced vocational qualification with international ambitions within an internationalised sector must include international competences. Nevertheless, it is likely that considerations of practicability played a part.

As far as "IT Specialists" are concerned, international content is not included. For the "Operative Professionals" the following applies.

- Documentation needs to be preceded by an English language abstract covering the most important content of the project documentation.
- The examination contains a question in English.

In the case of the "Strategic Professionals" the applicant needs to demonstrate that he or she

1. can cope securely with occupationally relevant English language dialogue situations, is capable of taking the initiative in such dialogues and has the ability to lend appropriate consideration to typical national differences in the respective world of employment and work;
2. can react appropriately in a given situation to written English language information and has an adequate range of expression.

Evidence of knowledge of the English language is provided in the form of a report from an educational establishment, a report issued after a language test or provision of evidence of the relevance to the occupation in question of a period of time spent abroad.

In line with the defined strategic requirement profiles, intercultural aspects also play a part in the examinations. These include:

- consideration of culturally based emotional reactions;
- development of solution strategies for dealing with in-company or project related social and cultural conflicts;
- development of qualifications concepts for personnel development, including educational and staff transfer both domestically and abroad;
- development and promotion of sensitivity towards foreign cultures;
- development and maintenance of foreign language communication within a candidate's own company.

4.2 Equivalence of Professionals with Bachelor and Masters qualifications

The aim of equivalence of the Professionals qualifications with Bachelors and Masters qualifications was not included in the fundamental documentation of the development process. The benchmarks merely noted:

"As far as stipulating the levels of advanced vocational training is concerned, the current restructuring of higher education will be taken into consideration to the extent that advanced vocational qualifications will enjoy equivalence with Bachelor degrees and, where there is correlation, with Masters qualifications."

In practice, the impression has occasionally arisen that a higher education qualification can be achieved parallel to pursuing a vocational qualifications pathway. This is not possible within the educational system of the Federal Republic of Germany, only institutes of higher education being entitled to award such qualifications. Notwithstanding this, the aim of the IT continuing training system remains firmly on promoting permeability.

In March 2002, the German Employers Coordination Organisation for Vocational and Further Training, the German Confederation of Trade Unions, the Federal

Ministry of Economics and Technology and the Federal Ministry of Education and Research passed a declaration in which they called upon the Federal Government, the federal states and the social partners to issue a joint recommendation in respect of the crediting of the fulfilment of continuing training requirements towards higher education courses. The ECTS rules, according to which the institute of higher education accepting students monitors the equivalence of continuing training achievements, are proposed as an instrument for this process.

8 July 2003 saw the issue of a "Recommendation of the Federal Ministry of Education and Research (BMBF), the Standing Conference of the Ministers of Education and Cultural Affairs of the Länder in the Federal Republic of Germany (KMK) and the German Rectors' Conference (HRK) relating to the awarding of credit points in advanced vocational training and the crediting of these towards a higher education course of study". The fact that this is a recommendation reflects that a legally binding approach has not been adopted in respect of this issue. The core of the recommendation is that the KMK resolution of 28 June 2003 (crediting knowledge and skills acquired outside the higher education system towards a higher education course of study) should apply, although this resolution would have been valid in the absence of any recommendation.

According to the KMK resolution, knowledge and skills acquired in the course of occupational practice may replace a maximum of 50% of higher education requirements if the former are equivalent in terms of content and level to the part of the higher education course they are to replace and if this has been investigated within the scope of an accreditation procedure. Students also need to be in possession of a higher education entrance qualification or have a higher education entitlement for people in employment who have obtained specific qualifications. The latter is subject to varying regulations on an individual federal state basis. Whether these conditions can be fulfilled by a certificate which is not regulated by public law remains open.

A series of pilot projects is currently underway to investigate the extent to which IT continuing training system certificates can be recognised within the scope of a credit points system for higher education courses.

In principle, however, the IT continuing training system was established as an alternative to higher education. The jury is still out on whether equivalence has been achieved. Although it would be possible to conduct academic investigations as to the level of the professional examinations, there is no doubt that the ability of the new certificates to prove their value against higher education qualifications on the labour market, including in international terms, and maybe even surpass the latter, will be much more significant.

4.3 The certification procedure on the basis of an international norm

The Advanced IT Training Ordinance relates exclusively to the regulation of the Professional level, meaning that continuing training for Specialists had to be structured according to rules based on civil law. International standards law in the form of certification of persons formed the basis for this. The benchmarks themselves did not contain any specific definition of the accreditation procedure stipulated in respect of the specialist profiles. The organisations responsible for the benchmarks decided to have the certification carried out by bodies working in conformity with the requirements of DIN EN ISO/IEC 17024.

At the beginning of the nineteen-nineties, the European Commission called upon member states to establish national accreditation systems, introducing quality assurance systems in the form of European norms (EN) to apply throughout Europe. In 1991, the German Accreditation Council (DAR) was formed to act as a consortium under the control of German trade and industry, the Federal Government and the federal states. The DAR coordinates activities in the field of accreditation and recognition of test laboratories and certification and monitoring bodies in Germany. The TGA (German Association for Accreditation – TGA GmbH) is the accredited organisation for the accreditation of personal certification bodies. The German Electrical and Electronic Manufacturers' Association (ZVEI) and the German Association for Information Technology, Telecommunications and New Media (BITKOM) submitted an application to the TGA for the establishment of the "IT Specialist" field of reference and the setting up of an appropriate sector committee. At the TGA board meeting of 12 September 2001, the following resolution was formulated:

"The TGA resolves to establish the IT Specialist field of reference within the personal certification procedures of the TGA and to set up an appropriate sector committee. The pre-condition in respect of this is that the qualification of IT Specialist or its attendant profiles are not so named in the corresponding ordinance or its annex so as to constitute the allocation of this field to the statutorily regulated area..."

The sector committee was constituted on 13 February 2002. The "normative document" compiled was drawn up by the sector committee on 10 and 11 September 2002 and passed by the board on 8 October 2002. The reference processes drawn up by the Fraunhofer Institute for Software und Systems Engineering (ISST) formed the basis for the certification (Level 2). The normative document is currently available as version 2.0, as amended on 31 July 2003, thus integrating ISST Level 2 into the normative document.

The ISO norm uses internationally comparable procedures to regulate transparency, thus creating security and trust for the parties involved. Certification of persons based on the internationally applicable norm ISO/IEC 17024 thus secures qualification standards which enjoy Europe-wide recognition. Further market development

will undoubtedly be the determining factor in the extent to which progress can be made in terms of international recognition of the certificates themselves.

4.4 Alignment of the IT continuing training system within the development of a European Education Area

The Bruges Initiative of October 2001 constituted a resolution for a greater level of cooperation amongst EU member states in the field of vocational education and training. The aim was henceforth to have in place a process of cooperation similar to that established within the Bologna Process in respect of higher education. Cooperation was to be intensified, take place on a voluntary basis and be oriented towards actual requirements. One of the issues promoted was the adaptation and transfer of the successful European Credit Transfer System (ECTS) used in higher education to vocational education and training. This was followed by the "Copenhagen Declaration"[14] (November 2002). Four main focuses were set for vocational education and training cooperation until 2010, the following being important in terms of the international dimension of the IT continuing training system (cf. also the articles by Jäger/Reinisch/Volkert and Diettrich/Kohl in this volume):

- *European dimension:* The aim is to enhance the European dimension within vocational education and training. Mobility and the development of institutional cooperation, partnerships and other transnational initiatives are to be facilitated.
- *Recognition of competences and qualifications:* the aim is to develop the transparency, comparability, transferability and recognition of skills and/or qualifications between different countries at different levels by means of the development of reference levels, joint certification principles and joint measures, including a system for the crediting of the fulfilment of training requirements within the field of vocational education and training. The development of a set of joint principles for the recognition and validation of informal learning is being planned.

At the end of 2002, technical working groups were established to develop concepts for the **E**uropean **C**redit System for **V**ocational **E**ducation and **T**raining (**ECVET**), the **European Qualifications Framework** (EQF), the validation of informal learning and quality assurance, a task which is still ongoing and on which they report to the Commission.

The Copenhagen Declaration of 2002 was extended in Maastricht on 14 December 2004, being adopted as an agreement by the appropriate ministers from 32 European states, the European social partners and the Commission.[15] The

14 Declaration of the European Ministers of Vocational Education and Training, and the European Commission, convened in Copenhagen on 29 and 30 November 2002, on enhanced European cooperation in vocational education and training. "The Copenhagen Declaration".

15 Maastricht Communiqué on the Future Priorities of Enhanced European Cooperation in Vocational Education and Training, 14 December 2004.

Maastricht Communiqué also accords priority to the development and implementation of the European Credit System for Vocational Education and Training (ECVET).

European Qualifications Framework (EQF)
The establishment of an EQF formed the object of a resolution passed by EU heads of government at the meeting of the European Council in Brussels in March 2005. At the beginning of July 2005, the Commission published a consultation document containing important fundamental principles for a potential future EQF under the title "Towards a European Qualifications Framework for Lifelong Learning".[16]

Effects of European vocational education and training policy on the German VET system and potential implications for the IT continuing training system
The potential introduction of the EQF and ECVET is expected to bring about deep-seated systemic changes.[17] The fear is that the dual system will be gradually supplanted by the EQF/ECVET system. Companies may increasingly put their faith in the possibilities afforded by the modularisation of training:

- because they expect this will lead to a reduction in their investment costs;
- because demographic development, the competition provided by the higher education pathway and/or the individualisation of educational pathways mean that they are no longer able to obtain the high ability young people they are seeking for dual training;
- because they are deploying young workers with a Bachelors qualification and those who have discontinued higher education in more demanding blue and white collar positions;
- because they are increasing being afforded the opportunity of recruiting young foreigners who have obtained good qualifications in their home countries;
- and/or because they are putting their faith in a Taylorisation of work organisation, or a restructuring of complex, occupationally based jobs into simple activities which require only individual training modules.[18]

The European approaches could open up new perspectives for the recognition of workplace training, especially within the German educational system. The strictly formalised practice is Germany is unlikely to remain untouched by the extent of the intended recognition procedures across Europe. Further steps towards more permeability and equivalence of general and vocational education are conceivable. An additional factor above and beyond this could be the outcome oriented nature

16 EUROPEAN COMMISSION: Commission working document. Towards a European Qualifications Framework for Lifelong Learning, SEC (2005) 957, Brussels, 8 July 2005.
17 DREXEL: Das Duale System und Europa. Ein Gutachten im Auftrag von ver.di und IG Metall *("The dual system and Europe. An evaluation commissioned by the trade unions ver.di and IG Metall")*, September 2005.
18 Ibid., pp. 88 ff.

of the EQF in particular, its outcome orientation and the relatively high significance it accords to "learning competence" as well as "autonomy and responsibility" providing opportunities for a relatively high level of alignment in respect of the qualifications of the IT continuing training system. As far as the levels are concerned, however, attention needs to be paid to descriptive forms which are independent of traditional learning venues (in secondary and higher education). The extent to which "lifelong learning" is accorded significant value is also an issue which remains open.[19]

4.5 Positioning of the IT continuing training system within the European framework

This volume presents two detailed investigations compiled within the framework of an evaluation of the IT continuing training system.

Concepts for the linking of company oriented and higher education continuing training at an EU level

Armin JÄGER, Holger REINISCH, and Nadine VOLKERT describe and analyse "Concepts for the linking of company oriented and higher education continuing training at an EU level". Taking as their starting point the issue of which forms of linking, interlocking or networking of company oriented and higher education continuing training are conceivable in principle, they go on to develop eight models. These models then serve as a search grid for the identification of specific initiatives at an EU level. The most significant results are as follows.

- The EU level mandate does not encompass a remit for regulating legal stipulations for courses of study, the contents of such courses, forms of learning, access requirements or potential recognition for other educational courses.
- The contribution made by the EU concepts needs to be viewed in the light of the potential to develop and test such innovations by means of pilot projects in a range of countries and contexts, to identify these as best practice examples and establish them on the political agenda as an alternative solution to the shortcomings perceived by member states, ultimately resulting in general shared practice as they are deployed in the member states. Thus far, however, no regulation governing the linking of general and vocational education or integration of educational processes relating to lifelong learning and taking place outside the confines of such systems has been established.
- It is conceivable that instruments launched at a European level can originate from within regional or branch related practice and that broad based awareness for these can be achieved via specifically structured research projects or the political policy will of individual member states.

19 Cf. www.kaw.info.de; 1.12.2005

In the light of this, and in terms of the activities of the political committees of the EU thus far, the following points have been identified:

- requirements in respect of lifelong learning have been couched only in relatively open terms, and there is a lack of clarity as to how these are to be realised within institutes of higher education;
- no systematic conceptual development has been initiated at the interface between vocational and higher education;
- there is no discernable willingness to tackle the continuing training requirements of individual branches, and no investigations have been initiated to study the needs of the companies;
- although instruments have been designed with the primary purpose of promoting transnational mobility, there is an absence of instruments relating to supporting vertical permeability within national educational systems.

The study also shows that, at least as far as Germany is concerned, a high prevailing level of consensus on the part of the national associations of the social partners (the German Confederation of Trade Unions, DGB, the Confederation of German Employers' Associations, BDA) the chambers (the Association of German Chambers of Industry and Commerce, DIHK), the institutes of higher education (the German Rectors' Conference, HRK) and educational policy at federal state and Federal Government level (the Standing Conference of the Ministers of Education and Cultural Affairs of the Länder in the Federal Republic of Germany, KMK, the Bund-Länder Commission for Educational Planning and Research Promotion, BLK, the Federal Ministry of Education and Research, BMBF) in the sense that there is a strong desire for an improvement in the interlinking of vocationally oriented and higher education continuing training and a perception that this is an area worthy of promotion. Research into appropriate pilot projects has, however, shown that these still remain few and far between on the German continuing training and higher education landscape. The most successful project in our view is the pilot project depicted at the Stralsund University of Applied Sciences, which should be imitated as quickly as possible, especially in the context of the training of IT Professionals within the framework of the IT continuing training system.

The authors were not able to find a single reference project at EU level reflecting the intentions of the IT continuing training system. This could be interpreted as a lack of support at a European level, but may also represent an opportunity of establishing the system on a pan-European basis.

IT further training within the context of the European vocational education and training debate

In their study, Andreas DIETTRICH and Mathias KOHL describe the specific significance of IT continuing training within the context of the European vocational education and training debate. The German continuing training system is facing competition from continuing training and certification concepts from across Europe, some of

which are well established. The authors deal with the issue of whether and to which extent the European Union aim of establishing cross-national comparability and certifiableness of qualifications in IT occupations can be achieved. There are, for example, considerable differences between the German work process oriented continuing training system and the European Certification of Informatics Professionals (EUCIP) concept developed by the umbrella organisation CEPIS (Council of European Professional Informatics Societies). Work process oriented continuing training places the emphasis in-company, whereas EUCIP puts its faith in tried and tested educational providers. EUCIP also requires a defined body of basic knowledge. All this means the two qualification systems have widely differing starting points. This study lends transparency in terms of the approaches and varieties of IT qualification adopted in other European countries, specifically focussing on the EU level. The issue of mutual recognition and coordination between qualifications and forms of continuing training also forms an object of debate, extending to include the potential idea that individual national systems could be replaced by regulations applying across the EU.

4.6 Comparisons with other European continuing training systems

Within the scope of the BIBB evaluation, three country specific studies were undertaken, some of the issues addressed within the terms of reference being as follows:

- fundamental characteristics of initial and continuing vocational education and training,
- provision and structure of IT continuing training,
- linking of initial and continuing IT vocational education and training to upstream and downstream educational sectors.

The country specific studies focussed on the Netherlands, France and Denmark. The results of these are included in this volume. As far as an evaluation and the development of the German continuing training system are concerned, a number of interesting pieces of information/explanations emerge from the three studies according to the country in question.

In his study on **Denmark**, Sören KRISTENSEN focuses on highlighting the structural differences to the German system. Continuing training is established at institutes of higher education, considerably facilitating the awarding of appropriate qualifications (Bachelor/Masters). A wide range of organisational regulation is in place to provide for the delivery of in-service continuing training, meaning appropriate value is attached to this. The whole system is supported by a flexibilisation of systems and courses, which has been promoted in recent years and extends as far as modularisation. State regulations have been "deformalised" and educational institutions have been accorded a high level of autonomy. A point to be picked out as far as the IT sector is concerned is the foundation of a dedicated IT university.

In his study on the **Netherlands**, Dietmar FROMMBERGER concentrates on identifying the central difference between the German and Dutch models of vocational education and training and initial and continuing VET in the IT sector. The Dutch system of VET and initial and continuing vocational education and training in the IT sector displays similarities with the Danish system in the way it is integrated to a much greater extent into the educational and higher education system. It is also apparent that both the new "competence orientation", which has been a feature of the process of modernisation taking place within the Dutch vocational education and training system for some years, and the attendant changes it has brought about in curricular specifications for teaching and training has not led to any compartmentalisation of the higher education system. The fact that there is only provision of six central profiles in initial and continuing vocational education and training in the Netherlands constitutes a further major difference. Within the process of completing these profiles and acquiring the qualifications, there is a parallel opportunity of obtaining recognition of part competences and/or conducting "external examinations". The qualifications may be acquired regardless of employment status.

As far as initial and continuing VET in the IT sector is concerned, the emphasis in the Netherlands is on an occupation-based approach which aims to provide qualifications based only on a relatively broad set of competences, enabling these to be deployed in various branches, functional areas and sizes of company. The "added value" offered by these qualifications governed by public law, as opposed to the staple and heavily functionally and task oriented certificates provided by industry and manufacturers, is manifestly contained within this differentiated concept, which targets a wide range of future career and continuing training opportunities.

In her study on **France**, Jutta BREYER describes the educational policy endeavours to bring about formalisation of informal learning at the workplace via continuing training focussing on the recognition of experience gained in occupational practice. Whereas the German procedure involves a dedicated system which was drawn up to coordinate with the IT sector defining the Specialist and Professional profiles within the IT process, France has selected a procedure allowing for the use of all homologised diplomas, titles and qualifications via the RNCP National Register of Professional Certification.

As far as the target group is concerned, the French validation procedure VAE is also broadly structured independently from the branch. It is aimed at candidates who have occupational experience at the time of submitting an application for VAE, allowing its use by job seekers too. As well as the recognition of the partial fulfilment of study requirements, the French VAE procedure also allows, in extreme cases, for the whole of a course of study to be replaced by company oriented continuing training via informal learning at the workplace. There is no requirement for any preceding continuing training qualification per se, occupational experi-

ence alone being the decisive factor. If another form of documentary proof of previously acquired achievement of the competences defined as necessary for the qualification sought exists, this may be included in the VAE dossier to serve as supporting evidence.

The number of VAE's concluded thus far remains comparatively low in light of the fact that this procedure may be implemented in respect of all branches, all qualifications listed in the RNCP and at all educational institutions offering the respective qualifications.

There is still an absence of any evidence as to the actual value of the qualifications on the labour market. The jury is also still out on the international connectivity of the qualifications and the actual, specific bridging function they may provide to the institutes of higher education. In overall terms, the French vocational education and training and credit validation system is clearly highly regulated, representing, therefore, a correspondingly complex picture for the IT sector.

Models and concepts for the linking of company oriented and higher education continuing training

Armin Jäger, Holger Reinisch, Nadine Volkert

1. Object and aims of the study

The present study deals with the issue of the extent to which the German IT continuing training system is suitable for the facilitation of networking between continuing vocational training and higher education. To this end, a particular analysis was undertaken of concepts relating to the linking of company oriented and higher education continuing training launched at an EU level. Information was obtained via documentary analyses and by means of telephone interviews with selected educational experts. This places the study within the context of the didactic and structural aims of the new IT continuing training system in Germany, where an explicit linking with the higher education system is envisaged at the two Operative and Strategic professional levels, affording the opportunity of acquiring an academic degree in the form of a Bachelors or Masters qualification, whilst also incorporating a consideration of educational policy developments at a European level, which affect both the area of vocational education and training and higher education. These developments are mainly based on the decisions arrived at by the European Council in Lisbon in March 2000. The Council emphasised that there would need to be both" […] a radical transformation of the European economy" and a "challenging programme for (…) modernising social welfare and education systems". This was the first time that the European Council had recognised in such clear terms that general and vocational education systems were a critical factor in the economic and social development of the Union as well as in terms of its future.[1] In the interests of achieving these objectives, the European Council adopted a detailed work programme ("Education and Training 2010"), thus offering express support to the Education Ministers' aim "to make Europe's education and training systems a world quality reference by 2010".[2]

Parallel to this, at a meeting held in 1999 in Bologna, the ministers responsible for the higher education system in the EU states had already agreed on an ambitious programme for the creation of a uniform European Higher Education Area in Europe by the year 2010, whereas the Directors General for Vocational Training had already determined the core points for an enhanced level of future vocational education and training policy within the EU at a conference held in Bruges in 2001. This so-called Bruges Initiative (often referred to as the "Bologna of vocational education and training") also laid the foundations for the Copenhagen Declaration. At its summit in Copenhagen in November 2002, the Council passed a "Resolution on the promotion of enhanced European cooperation in vocational education and training", which was the precursor to the signing of the "Copenhagen Declaration" by the education ministers of the states, the European social

1 Cf. EUROPEAN COUNCIL (Ed.): Presidency conclusions Lisbon European Council 23 and 24 March 2000. Lisbon 2000 (Press release 24/3/2000; No. 100/1/00).

2 Cf. COUNCIL OF THE EUROPEAN UNION: Detailed programme on the follow-up of the objectives of education and training systems in Europe. Brussels 2002 (Outcome of the proceedings, No. prev. doc. 5828/02 EDUC 17).

partners and the Commission.[3] This declaration represents an agreement on the enhancement of European cooperation in respect of various aspects of initial and continuing vocational education and training.

Viewed against the background of these developments within the scope of a European higher education and VET policy, it is apparent that the question of the interlinking of company continuing vocational education and training (CVET) and higher education within a European framework forms the point of intersection between the "Bologna" and "Bruges-Copenhagen" Process. The authors' view is that development within the Higher Education Area, the so-called "Bologna Process", is of crucial significance here. The resolutions of the European Commission and Council have given rise to a wide range of impulses permeating back to a national level. The main focus is on the endeavours to open up existing study structures and adapt them to pan-European standards. Important instruments within this process are the categorisation of qualifications into Bachelors and Masters levels and the use of the ECTS (European Credit Transfer System) to provide transnational transferability of fulfilment of study requirements. Although the initial target of these reforms is first degree courses, there are already discernable implications for the classical areas of academically based continuing training (continuing courses of study) and for the creation of practically oriented Masters courses for skilled workers and management staff. In the light of the declared aim of allowing knowledge acquired in occupational practice in particular to be reflected via a full-time or in-service course of study and flow back into the company in the form of theoretically supported professional action, the fact that achievements are no longer exclusively acquired in a single place is leading to an increasing blurring of the classical differentiation between levels of qualification in Germany (company, trade and technical school, advanced training examinations held by the chambers, University of Cooperative Education, University of Applied Sciences, University). Although the implementation of the courses of study and new forms of continuing training is the responsibility of the individual countries within the European Union, it has been apparent that the main strings of the process are being pulled at a European level. This has led to the use of consultation papers, statements and personal lobbying on the part of the various social stakeholders, specialist associations and social partners involved as they seek to pursue their vested interests and make their arguments heard. This process has seen the establishment of a multitude of transnational associations in recent years, representing the interests of these bodies with the European institutions and, particularly leading up to the meeting of the European Council in Bergen (2005), integrating these interests into appropriate action networks and thus exerting significant influence on draft planning.

3 Declaration of 29 and 30 November 2002 made in Copenhagen by the ministers responsible for initial and continuing vocational education and training and the Commission in respect of enhanced European cooperation in vocational education and training (http://ec.europa.eu/education/copenhagen/index_en.html); cf. Council Resolution (Education) of 19 December 2002 (OJ C 13 of 18 January 2003).

The empirical and qualitative analyses of this dynamic area of European vocational education and training policy undertaken by the authors in preparation for this paper (for the methodological approach to the study see chapter 2) involved an initial logical and theoretical phase, the starting point for this being the issue of which forms of linking, interlocking or networking of company oriented and higher education continuing training are conceivable in principle, eight models being developed within this phase which in our view illustrate the scope of such a combination (see chapter 3). These models subsequently served as a search grid for the identification of specific initiatives at an EU level. At an initial level, this involved according particular reference both to the visions and strategic objectives at EU level in respect of the interlinking of academic and vocational continuing training and to the consensus hitherto achieved in this field, insofar as this is expressed in the form of resolutions passed by European institutions (see chapter 4). At a second level, where the main focus is on the development of specific models for the implementation of these ideas, there is, however, a plurality of positions and initiatives involving a wide range of stakeholders. Within the context of the subsidarity imperative, this process may be viewed in terms of a decentralised competition, sounding out in which form the overarching targets which have been set can be realised in a way which is actually acceptable to all parties. This also enables the expertise of various research and educational networks to be brought into play. At a third level, the paper finally describes and analyses individual examples of specific projects, which are already being used in an exemplary approach to piloting the concepts in practice. Germany represents a particular point of reference here as providing the best access to appropriate pilot projects and thus enabling an actual sounding to be taken of the extent to which the regulatory concepts are actually compatible with the traditional VET and higher education structures (for the second and third levels, see the fifth chapter of the paper).

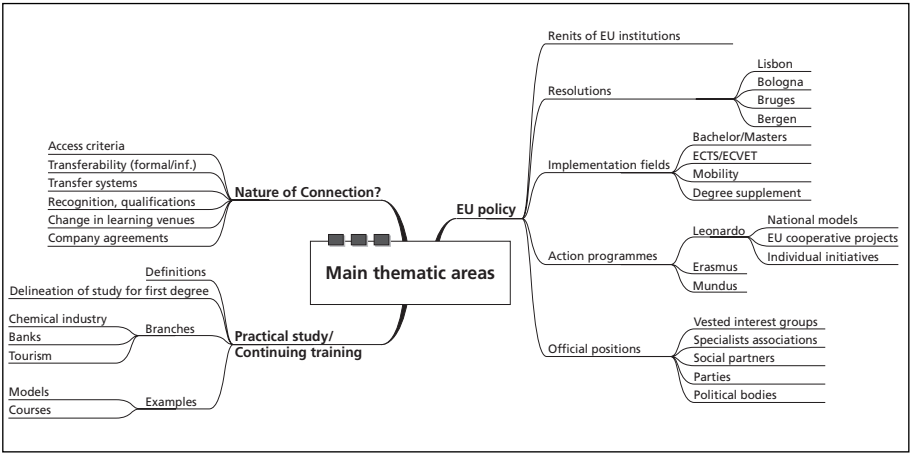
In the sixth and final chapter, we summarise the most significant results of our investigations, highlighting the action options we believe to offer the best prospects of success in terms of the intention we are pursuing within the scope of the IT continuing training system, which is the creation of an organisational and content related link between company oriented and higher education continuing training.

2. Methodological approach of the study

As indicated below, the present study is structured into three major areas of investigation, specific documentary research and supplementary data collection and surveys having been conducted in respect of each of these. The aim was both to establish a broadly based theoretical foundation for the examination of the issue and provide a platform for the debate of the effect of measures at a European level. In light of the fact that it was only possible to consider documents published or made available on the Internet by the end of 2004 and because the limited

amount of resources meant that we were unable to conduct detailed evaluations of all available documentation, restrictions need to be placed in particular on the period of time for which data has been gathered.

Figure 1: **Main thematic focuses of the study of European concepts** (own representation)



The first set of themes relates at a conceptual level to the terminological concretisation of the thematic focuses of the study and to the identification of models linking company and higher education based qualifications pathways. The initial review presents known models relating to the linking of the two levels and provides examples from individual European countries. It also builds on theoretically possible concepts hitherto accorded little significance in practice. It was not possible to conduct an empirical study of the "level of desirability" of the different models from the point of view of the stakeholders within vocational and academic education within the confines of the given project framework. In our view, however, the descriptive approach adopted allows a more systematic assessment of the initiatives being debated at a European level to be conducted, thus potentially paving the way for the promotion of new linking opportunities between vocational and academic qualifications areas.

The second set of themes presents the main initiatives and action fields at a European level, taking as its starting point the clarification of legal areas of responsibility in respect of vocational and academic education. Extensive Internet research was conducted in European Union databases and on the sites of the individual EU institutions to identify relevant documentation. This process is restricted to such institutions exerting significant influence on the structuring of European political fields by dint of their power of co-decision or initiative or on account of their budgetary powers. In specific terms, this relates to the European Council, the

Council of the European Union, the European Parliament and the European Commission. In addition to this, analyses were also undertaken of other project related material collated from other providers of information and, insofar as this proved necessary, of official statements from institutions of higher education and other associations. This is by way of addressing the issue of how the transition between vocational and higher education on the basis of competences acquired in-company can be assessed by various groups and how systematic support can be provided if necessary (such as by means of special regulations and examinations governing access to higher education).[4] It also proved possible to make reference to initial academic publications dealing with recent EU initiatives on general and vocational education.

The third part of the study deals finally with the presentation of model projects in selected sectors, with the aim of producing a better level of interlocking between higher education continuing training and in-company CVET. The basis of information here was once again provided by Internet research, coupled with supplementary surveys of associations in cases where no or too little information relating to planned activities in the areas specified could be identified from the other sources. A two-level procedure was adopted, involving initial written contact with the VET experts within the individual institutions and a series of follow-up telephone calls.

The concluding reflection on the results debates the repercussions of these developments at a European level in terms of the potential and necessary requirements for change within the German occupational/vocational education and training system. Our view is that the focus here always remains on normative evaluations, which are perfectly capable of being assessed in different ways by the respective stakeholders depending on their respective points of view, especially as in most cases, as opposed to other political fields, no direct national compulsion for identical structural implementation is in place. Notwithstanding this, the effects of the European programmes and initiatives must not be neglected in the long term, enabling the academic study of such processes to represent a major element in contributing to the objectification of the debate within a national context and to highlight new political options via these developments.

4 An overview of the key search words used and Internet sites visited during the course of the research is provided in Annex 2.

3. Models for the linking of company oriented and higher education continuing training

3.1 Terminological clarifications

The debate on the possibilities of the linking of company oriented and higher education continuing training has been one conducted with renewed intensity in Germany in recent years and is markedly multi-facetted in nature, encompassing such issues as access to higher education for occupationally qualified applicants without a school based general higher education entrance qualification[5], the putting into effect of academic continuing training provision by institutes of higher education[6] and the accreditation of knowledge and skills acquired outside the higher education system towards a higher education course of study.[7] The authors' view is, however, that this debate is characterised by the use of terminology lacking sufficient clarification in respect of the content of its meaning and its scope of application. This applies in particular to the terms "higher education continuing training" and "company oriented continuing training", which are central to the present purpose. It will therefore be necessary to proceed by specifying these terms in such as way so as to render them appropriate to the focus of the investigation within the context of the IT continuing training system. This will also provide an opportunity for defining the field of study in precise terms.

Higher education continuing training

An attempt is generally made to define the term "higher education continuing training" or similar terminology such as "academic continuing training" or "continuing training at institutes of higher education" by reference to the concept of "higher education", the latter being considered to be a sufficiently precise definition. The reasoning behind this is that the term "higher education" is associated across the world with an initial "academic course of vocational education and training" leading to a course of study extending over several years at a state or state

5 Cf. Secretariat of the Standing Conference of the Ministers of Education and Cultural Affairs of the Länder in the Federal Republic of Germany: *"Synoptic presentation of the existing opportunities within the federal states for access to higher education for occupationally qualified applicants without a school based general higher education entrance qualification on the basis of statutory higher education regulations"*. l.c., status March 2003.

6 Cf. Secretariat of the Standing Conference of the Ministers of Education and Cultural Affairs of the Länder in the Federal Republic of Germany: *Report on the current status of and problems relating to the "Perception of academic continuing training at institutes of higher education"*. Resolution of the Standing Conference of 21 September 2001.

7 Secretariat of the Standing Conference of the Ministers of Education and Cultural Affairs of the Länder in the Federal Republic of Germany: *"Accreditation of knowledge and skills acquired outside the higher education system towards a higher education course of study"*. Resolution of the Standing Conference of 28 June 2002 and the object of a recommendation of the Federal Ministry of Education and Research, the Standing Conference of the Ministers of Education and Cultural Affairs of the Länder and the German Rectors' Conference to institutes of higher education in respect of the issuing of credit points for advanced vocational training and the accreditation of these towards a higher education course of study. Bonn, 26 September 2003.

recognised institute of higher education, the so-called tertiary sector of the respective national educational system.[8] Successful conclusion of such a course of study results in a certificate which opens up access to one or several segments of the labour market for highly qualified skilled workers (professionals or semi-professionals). In Germany, such certificates traditionally take the form of Diplom degrees awarded by universities, Universities of Applied Sciences or equivalent institutes of higher education and the Magister degree qualifications which may be obtained at universities and equivalent institutes of higher education as well as certification of successful completion of initial state or church examinations. Examples of equivalents in the Anglo-Saxon language area are the academic degrees of Bachelor of Arts or Bachelor of Science and Master of Arts and Master of Science. It is now known that, by the year 2010, this Anglo-American system is to replace both the traditional qualifications in Germany and those which have hitherto been in use in other European countries as a means of creating a uniform European Education Area.

The authors' view is that the term "higher education continuing training" covers a range of possible interpretations, depending on whether the perspective adopted as a continuance of students' educational backgrounds is more institutional or more subject specific in nature. In the first of these cases, "higher education continuing training" encompasses all teaching provision an institute of higher education organises to run alongside its normal programmes of study. From an educational background point of view, normal programmes of study may also fall within the field of higher education continuing training, since the determining factor in this case is the order in which a period of study at an institute of higher education is classified within an individual educational pathway. The authors' view is that this involves essentially the following four cases:[9]

1. Persons who have already obtained an academic degree attend courses or a continuing training programme at an institute of higher education either as in-service training or in the form of an extended sabbatical from employment in order to acquire advanced training in their occupation or to obtain knowledge in a different academic discipline from the one they selected for their first degree course (model: academic continuing training for academics).

8 See here United Nations Educational, Scientific and Cultural Organization (UNESCO): International Standard Classification of Education ISCED 1997 (www.uis.unesco.org/TEMPLATE/pdf/isced/ISCED_A.pdf). The courses of study offered at German universities and Universities of Applied Sciences leading to an initial vocational qualification are to be categorised as Level 5, which is defined as the "first stage of tertiary education (not leading directly to an advanced research qualification)".

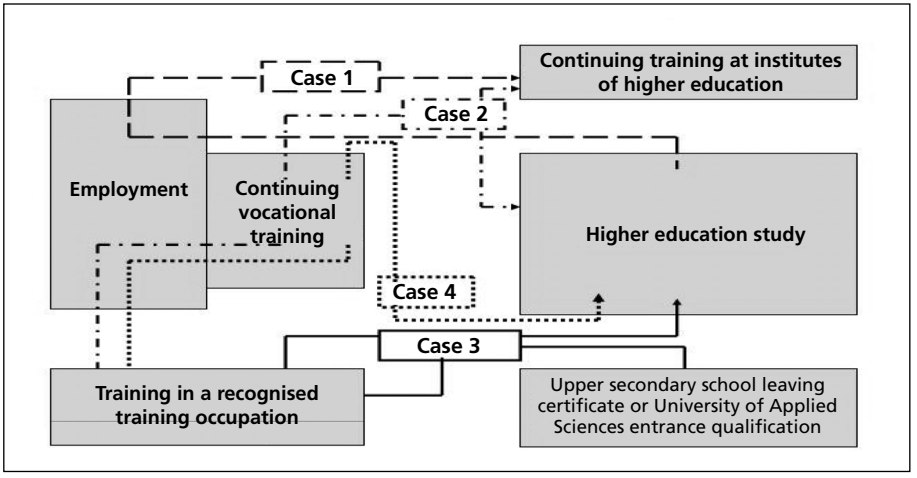
9 It needs to be borne in mind that a course of study at an institute of higher education which concludes with an academic degree may, depending on the respective subjective educational background, constitute either academic vocational education and training or higher education continuing training. It is also conceivable that there may be other combinations of cases than those given here, both in terms of dependence on a specific vocational/educational system or in terms of an individual educational pathway.

2. Persons who have completed a non-academic course of initial vocational education and training or, as the case may be, a non-academic course of continuing vocational training, attend courses or a continuing training programme at an institute of higher education either as in-service training or in the form of an extended sabbatical from employment in order to acquire advanced training in their occupation and/or to obtain academic knowledge. They usually receive a certificate from the institute of higher education which is not connected to the conferment of an academic degree (model: "guest students").

3. Persons who despite being in possession of a general higher education entrance qualification initially completed a non-academic course of vocational education and training and attend an institute of higher education as full-time or part-time students to complete an additional, academic course of vocational education and training in order to acquire the academic degree associated with this (model: double qualification).

4. Persons who have completed a non-academic course of vocational education and training and have already taken part in non-academic continuing vocational training schemes attend an institute of higher education as full-time students or on a part-time basis as in-service training in order to complete an additional, academic course of vocational education and training and acquire the academic degree associated with this (model: academic study for those who have obtained vocational qualifications).

Figure 2: **Models of higher education continuing training linked with continuing vocational training** (own representation)



In cases one and two, although those completing the courses receive certificates at the end of their programme of study (a programme which is sometimes very individually structured) in respect of the courses or the academic continuing training programme they have attended, these certificates are not equivalent to an academic degree. The context of the study (the IT continuing training system) leads the authors to conclude that case one is of no particular interest to the present investigation. This case will, therefore, not be considered further. The same applies in respect of the third case, a perfectly common occurrence in Germany. The persons involved here are pursuing initial academic vocational education and training, and this consequently constitutes higher education rather than higher education continuing training. Further consideration will, therefore, focus on cases two and four.

Company oriented continuing training

In view of the level of differentiation, heterogeneity and complexity prevailing within in-company continuing training, a situation not confined to Germany, there are great difficulties[10] in delineating the segment of continuing vocational training[11] constituting "company oriented" in precise terms. We can, however, start by excluding all forms of continuing vocational training which take place within the context of vocational schools, whether these be attended full-time, part-time as in-service training or as part of a distance learning course. There is a particular emphasis here on state or state recognised trade and technical schools[12] providing such training as state accredited technician or degree level qualifications in business management, Germany being a case in point. The second stage is to clarify exactly what could be meant by "company oriented continuing training". Again taking Germany as an example, we can see that this term may be interpreted in a variety of ways:

1. Interpretation model with reference to the learning venue of the continuing training. From this point of view, continuing vocational training would be defined as "company oriented" if it takes place within a firm or company, in other words directly within the work process or at least in relative proximity to the workplace (in company training rooms or workshops).

10 Delineation of continuing vocational training from other areas of a national education system also presents difficulties within the scope of international classifications of education systems. UNESCO generally allocates continuing training, insofar as this constitutes upgrading training within the meaning of German terminology, to level 4 of ISCED 97 (post-secondary non tertiary education). This system differentiates two types of programme (level 4A and level 4B), type 4A programmes leading to direct access to higher education (level 5), whereas type 4B programmes do not connect directly with the higher education sector. Within the scope of this classification, vocational upgrading training in Germany would be classified as level 4A, although in actual fact it corresponds more to level 4B (see note 17). For information on ISCED 97, see the source reference in note 8.

11 The German view of continuing vocational training is that it extends to include retraining and advanced vocational training. In the following, the authors exclude retraining from consideration, and the terms continuing vocational training and advanced vocational training are used synonymously.

12 A further example are the Academies of Business and Public Sector Management which offer opportunities for in-service continuing vocational training to non-technically oriented public sector employees in particular.

2. Interpretation model with reference to the initiators, providers and funding body of the continuing vocational training. From this point of view, continuing vocational training would be defined as "company oriented" if it were to be arranged and funded by a company for its own employees regardless of the fact whether the continuing training courses then take place within the company itself (in-house) or externally, such as by using an educational service provider.

3. Interpretation model with reference to the contents and objectives of the continuing vocational training. From this point of view, all measures relating to continuing vocational training would actually be defined as "company oriented", the assumption being that the focus of the contents and aims of continuing vocational training courses is the later deployment of the knowledge, skills and attitudes acquired within a company context.[13]

4. Interpretation model with reference to the legal status of the certificate to be acquired. In Germany, several institutions are empowered to award certificates within the scope of continuing vocational training. These are trade and technical schools commissioned by federal state ministries and state recognised continuing training academies, the chambers in their capacity as bodies under civil law within the scope of the autonomy accorded to them by relevant provisions of the Vocational Training Act, non-state organisations, particularly private commercial companies, branch associations or non-profit making educational service providers and, recently, state recognised accreditation agencies. From this point of view, a strict interpretation of the criterion would only involve consideration being accorded to certificates awarded by companies or branch associations.

Taking the explanations of these four interpretation models as a basis, it is apparent that the "company oriented" area of investigation is only capable of sufficiently precise delineation if more than one of the interpretation models stated are deployed.[14] If, for example, the authors were to make sole reference to the first interpretation model, all forms of updating training taking place within the work process or in a workplace related way would also be included. This, however, represents a contradiction of the overall approach of the study, since a link between company oriented and higher education continuing training can only relate

13 If this interpretation model were to be used as the sole model, the exclusion of school-based continuing vocational education and training already undertaken could not hold water, since this is also the ultimate purpose of the latter.

14 This applies particularly if the structure and configuration of continuing vocational training in other states are to be accorded consideration, rather than merely focussing on Germany. For an example of this, see the individual country studies on England and Wales, France, Italy, the Czech Republic, Hungary and Switzerland compiled in the Leonardo-da-Vinci Pilot project "The role of social partners and local authorities in managing VET systems". For information on the situation in Germany, see the related study: JÄGER, A.; REINISCH, H., VOLKERT, N.: The Continuing Vocational Training System in Germany. Jena 2004 (Jenaer Arbeiten zur Wirtschaftspädagogik, Series A: Kleine Schriften, Vol. 29).

to forms of upgrading training.[15] By the same token, sole consideration of the second interpretation model would exclude all forms of training involving a personal contribution on the part of employees towards the funding of a continuing training course, examples of this being participation in the costs of continuing training by means of a monetary contribution or by taking part in a continuing training scheme outside paid working hours. Furthermore, strict interpretation of the fourth model would lead to the exclusion of the very certificates which enjoy a particularly high level of acceptance from both employers and employees, these certificates carrying the entitlement to hold a protected designation of occupation.

In the light of these considerations, the main emphasis should be placed on the second and fourth interpretation models and the object of study of "company oriented" continuing training should be delineated as follows.

We can speak of company oriented continuing training if:

- the learning venue for at least the majority of the continuing training measure is the company, meaning it takes place either within the work process or in a workplace related way;
- successful conclusion of the course results in a certificate awarded by a company or branch association, an accreditation body or a chamber in its capacity as a body under civil law on the basis of the relevant provisions of the Vocational Training Act or the Crafts and Trades Regulation Code.

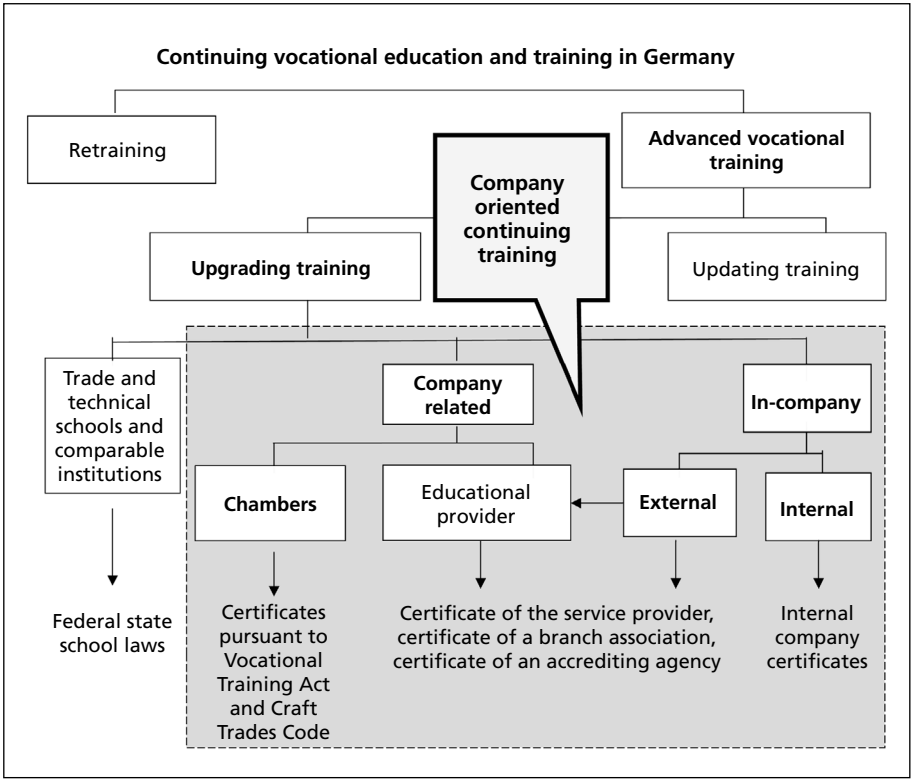
The authors assume that both of these aspects need to be fulfilled and consider this combination as a sufficient prerequisite for constituting company oriented continuing training. A further necessary prerequisite is that participants must be persons who are in an employment relationship and either have concluded a course of non-academic vocational education and training or else have accumulated occupational experience to the extent that they are able to take part in an appropriate continuing training scheme without the need for a formal vocational qualification.

Within the scope of the area of delineation which has been defined, the problematic issue nevertheless remains of whether the typical advanced training examinations administered by the chambers pursuant to § 54 of the Vocational Training Act (BBiG) 2005 and the upgrading training regulated by the Federal Government in accordance with § 53, para. 1 BBiG 2005 are excluded. In such cases, participants

15 As will be explained in section 3.2, the criterion of occupational experience will be applied in some cases involving the issue of admission to higher education in respect of persons not in possession of the general or subject related higher education entrance qualification or entrance qualification to a University of Applied Sciences. Within this context, occupational experience also extends to include such aspects as experience in the area of updating training. Since such cases are formally based on the duration of occupational activity rather than on the type of occupational experience in terms of content, the authors consider it appropriate to exclude updating training from any further scope of consideration.

generally prepare for the appropriate examinations by attending courses. Such courses display characteristics of school-based learning. Participation in such preparatory courses does not, however, constitute a compulsory stipulation within the relevant examination regulations. It is, therefore, perfectly possible for a participant to prepare for these examinations in-company or privately. Since no empirically significant information in respect of the actual preparatory behaviour of candidates is available to the authors, we consider it appropriate to include these forms of upgrading training within our considerations (see Figure 3).

Figure 3: **Continuing vocational education and training in Germany** (own representation)



3.2 Possibilities for the linking of company oriented and higher education continuing training: eight models

3.2.1 Preliminary remarks

Before moving to a more detailed consideration of actually realised or planned forms of the linking of company oriented and higher education continuing training in chapters four and five (insofar as these have already been launched at an EU level), the aim of the following remarks is to undertake an initial attempt to depict in broad terms the scope of the opportunities provided by such a networking.

The authors view this as necessary, since it represents the only way of drawing a comparison between what is possible in principle and what has already been realised or planned. Determining the scope of opportunities also provides the basis for targeted research into measures relating to the linking of company oriented and higher education continuing training which have already been realised, planned (or even only promoted) at a multinational level.

Our view is that a total of eight models can be identified, some of these in turn being capable of assuming a variety of specific forms. The individual models, arranged in ascending order of intensity of linkage, are as follows.

1. A successfully completed course of company oriented continuing training within the scope of the definition provided above is accorded equivalence with the criteria for admission to a higher education course of study otherwise applying within a country *(admission model)*.
2. The duration of a successfully completed course of company oriented continuing training within the scope of the definition provided above is accredited in whole or in part towards the (standard) duration of study, making it possible to shorten the period of study *(recognition model I)*.
3. Individual fulfilment of requirements acquired and confirmed within a successfully completed course of company oriented continuing training within the scope of the definition provided above are recognised as fulfilment of higher education study requirements *(recognition model II)*.
4. The successful completion of a course of company oriented continuing training within the scope of the definition provided above is recognised in whole as the equivalent of a higher education examination (as an interim examination, although recognition as a final examination is also conceivable). *(recognition model III).*
5. Company oriented and higher education continuing training are interlocked in terms of study organisation and higher education didactics, enabling training to take place both in-company and at an institute of higher education on an alternating basis *(alternation model I)*.

6. Company oriented and higher education continuing training are interlinked in terms of content, enabling some study modules to take place in-company and others at an institute of higher education *(alternation model II).*

7. A joint examination is conducted by an external examining board for both company oriented and higher education continuing training, enabling the same academic degree to be obtained via both forms of continuing training *(qualification model).*

8. On the basis of an agreement concluded between the participating institutions, teaching staff and, where appropriate, candidates are active in the two areas of company oriented and higher education continuing training, enabling a controlled exchange of information and competences to take place via the teaching staff *(exchange model).*

The following will explain these models in more detail and provide illustrative examples where available, although the examples given do not relate to in-company continuing training in every case.

3.2.2 Admission model

In most European countries, completion of initial vocational educational and training at a level comparable with skilled worker, skilled employee or journeyman examinations in Germany pursuant to the Vocational Training Act (BBiG) and the Crafts and Trades Regulation Code (HWO) does not automatically confer the right to study at an institute of higher education. Persons possessing initial vocational education and training of this type may gain access to higher education. In Germany, for example, as far as the state (or institutes of higher education) are concerned, a qualification in a recognised training occupation in accordance with the BBiG and HWO or in a "school occupation" pursuant to the school laws of the federal states is not recognised as constituting sufficient previous learning for a higher education course of study. In respect of "opening up higher education" for those not in possession of the higher secondary school leaving certificate (or entrance qualification to a University of Applied Sciences), the following models are currently specified by the higher education laws of the federal states:[16]

1. Vocational education and training and occupational experience

In this model, the prerequisites for commencement of a course of study are successful completion of vocational education and training and several years of occupational experience within the profession which has been learned. The required dura-

16 Cf. here FROMMBERGER, D.: Zur Anbindung beruflicher Weiterbildung an den tertiären Bereich des nationalen Bildungswesens. Ein Beitrag zur Berufsbildungsforschung in deutsch-niederländischer Perspektive. (*"On the linking of continuing vocational training to the tertiary sector of the national education system. A contribution to vocational education and training research from a German-Dutch perspective"*): Markt Schwaben: Eusl 1999, pp. 286 ff. as well as the synopsis of the Standing Conference of the Ministers of Education and Cultural Affairs already listed (see note 57).

tion of the employment activity prescribed by the higher education laws of the individual states varies between two and five years. In some states, occupational experience extending over several years (at least five) or heading a household comprising at least one person in respect of which there is a duty of upbringing or care may be used in lieu of a completed course of vocational education and training. Model one only leads to a subject specific higher education entrance qualification, in other words to matriculate for a field of study closely related to the occupation which has been learned.

2. *Vocational education and training, occupational experience and higher education access examination*

In addition to the requirements stated in model one, this model requires a higher education access examination generally consisting of both written and oral components and which should also include consideration of a candidate's occupational experience. In some federal states (such as Lower Saxony), a general higher education entrance qualification can be obtained via this route.

3. *Vocational education and training, continuing vocational upgrading training and advisory or aptitude interview*

This regulation applies in cases where a study applicant not in possession of a "normal" general higher education entrance qualification wishes to pursue his or her studies in a field of study not related to the occupation which has been learned.

4. *Vocational education and training, occupational experience and/or continuing vocational upgrading training and test period of study*

In the federal states of Berlin, Bremen, Lower Saxony and Rhineland Palatinate, study applicants in possession of completed vocational education and training, several years' occupational experience and/or continuing vocational upgrading training may be admitted to a test period of study in a field of study related to the occupation they have learned. There is considerable variation both in the duration of the period of test study (between one and four semesters) and in the study achievements required during this time between the individual institutes of higher education (even within the same federal state).

5. *Vocational education and training, occupational experience and contact studies*

The required admission criteria in this model are completed vocational education and training, several years' occupational experience and extend to include other criteria (such as the "residence" clause in Bremen, whereby applicants have to have been mainly resident in Bremen for a period of at least three years prior to the commencement of their studies). If these criteria are fulfilled, applicants may be admitted to a period of contact studies in a field of study related to the occupation they have learned. The difference between this and the period of test study in model four is that the contact studies do not differ from "normal" studies in terms of content, organisationally or with regard to the required achievements.

6. Continuing vocational upgrading training

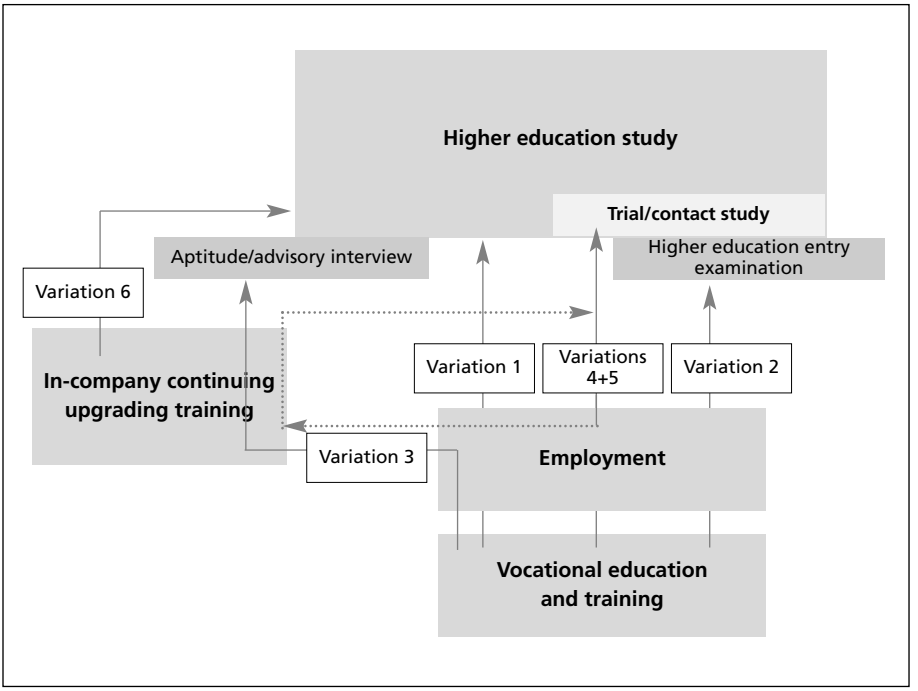
This model opens up direct access to a course of study at an institute of higher education in a field related to occupational experience acquired to persons who have completed a course of continuing vocational upgrading training pursuant to § 53 para. 1 or § 54 BBiG 2005 or in accordance with the relevant provisions of the HWO.

Within the scope of the field of our study, model six is of particular interest since, within the context of the new IT further training system, it would open up higher education access to both specialists and professionals who had not acquired a higher education entrance qualification within their previous educational background.

In overall terms, however, it needs to be emphasised that the admission model represents an extremely loose form of coupling between company oriented and higher education continuing training. The models described have not thus far made any great impact in terms of achieving the political aim of "opening up higher education" for those in employment. The number of matriculating students not in possession of an upper secondary school leaving certificate remains extremely low. The admission model also offers, at best, the opportunity of achieving an academic vocational qualification within the respective standard duration of study. All this suggests it is unlikely that this model has created sufficient incentive for those in employment to commence higher education studies.[17]

17 This route, often referred to as the "third educational pathway" currently provides a conduit to higher education for less than one percent of all students. Cf. HANNKEN-ILLJES, K.; LISCHKA, I.: Ansätze zur Systematisierung von Lernleistungen im Rahmen eines Leistungspunktsystems und Lebenslangen Lernens (LLL), unter Berücksichtigung der europäischen Perspektive – Einordnung und Zusammenfassung wesentlicher Rechercheergebnisse. *("Approaches for the systematisation of fulfilment of learning requirements within the framework of a credit points system and lifelong learning (LLL). On the linking of academic and vocational education").* In: STAMM-RIEMER, I. (Ed.): Lebenslanges Lernen. Zur Verknüpfung akademischer und beruflicher Bildung. *("Lifelong learning. On the linking of academic and vocational education"),* Berlin: Berliner Wissenschafts-Verlag 2004, pp. 23 – 52, see also Confederation of German Employers' Associations (BDA, Ed.): Weiterbildung durch Hochschulen – Gemeinsame Empfehlungen des DIHK, BDA, HRK. *("Continuing training via institutes of higher education – joint recommendations of the DIHK, BDA and HRK"),* Berlin 2003, pp. 7 and 10.

Figure 4: **Variations of the admission model** (own representation)



Outside the Federal Republic of Germany, concepts along the same lines exist which are based on a configuration of upper secondary education which differs from that which is usual in Germany. Whereas in Germany a continuing separation of vocational educational courses and general educational courses at grammar schools is the rule, the latter leading to higher education, Sweden, for example, has an integrated form of upper secondary education in which successful students studying subjects which are predominantly vocationally related also acquire a higher education entrance qualification. Normal upper secondary practice in Austria includes dual qualifying courses at the commercial academies and higher secondary technical schools conferring both a higher education entrance and a vocational qualification.[18] The Netherlands has a non-tiered educational system, which enables seamless transitions to be made between the various educational courses with the upper secondary area, advanced vocational training (post secondary) and higher education.[19] For a policy of "opening up higher education" for those in employment genuinely worthy of such a designation, Germany would need to pilot such approaches in a broadly based way with the aim of achieving appropriate and wide-ranging reform of the upper secondary area.

18 Such approaches have been tested in Germany via various pilot projects without yet having been adopted in normal practice.

19 Cf. here FROMMBERGER (1999), pp. 189–248.

The broad debate centring on the assessment of prior and experiential learning (APEL) which is currently ongoing within the European Education Area could continue to be of benefit in terms of a reform of access to higher education in Germany, a further aspect of the debate being access to higher education (APEL for access). A study recently carried out at the Institute for Higher Education Research at the Martin Luther University in Halle-Wittenberg, however, concluded that requirements fulfilled outside the higher education system currently do not play any part in the issue of regulating access to higher education in Germany.[20]

3.2.3 Recognition models

The recognition of previous achievement or periods of training and awarding credit for these in respect of the study or examination requirements in a subsequent course of study already constitutes a normal procedure at German and foreign institutes of higher education at the present day. However, at least as far as Germany is concerned, such recognition practice predominantly relates to cases where second courses of study are undertaken (such as a continuation of studies at a university after successful completion of an interim or final examination at a University of Applied Sciences) or when a change of course of study takes place. This very frequently involves the consideration of individual cases by the subject representatives at the respective institute of higher education or on the part of examination boards, both of these enjoying a wide range of discretion. Such a practice applies despite the generous nature of the scope accorded to recognition practice and the clear standardisation codified within both the higher education laws of the federal states and the Framework Act for Higher Education.

As far as recognition of periods of training and fulfilment of training and examination requirements achieved in the course of initial or continuing vocational education and training are concerned, the current situation in Germany is much bleaker. Recognition practice is generally restricted to the fulfilment of individual examination requirements. At the vast majority of universities, there is thus no longer any requirement for students taking economically based courses of study to provide evidence that they have fulfilled the requirements of a basic examination in bookkeeping, as long as they have successfully completed the subject of accountancy with a mark of "good" or better in a previous course of commercially based initial or continuing vocational education and training. This only applies, however, if the examination certificate contains a specialist mark relating to accountancy, the restructuring of the curricula to learning fields meaning that this may no longer necessarily be the case. A further example here is the recognition of the trainer aptitude examination as an equivalent fulfilment of requirements for certain basic study elements in the areas of occupational and economic education. The general rule seems to be that practical work experience is not required if a student has completed initial and/or continuing vocational education and training,

20 Cf. here ILLJES; LISCHKA (2004), pp. 32 ff.

as long as the vocational qualifications obtained and the field of study selected are related.

A linking of company oriented and higher education continuing training to be based on an instrument recognising time and fulfilment of requirements would be reliant on a considerably more generous scope of recognition than is the case in current practice and on defined regulations rather than examination of individual cases. The aim of the following is to outline the opportunities for achieving this, treating the aspects of duration of study, study requirements and examination requirements separately.

VARIATION 1: Recognition of periods of training towards duration of study
This variation of the recognition model generally involves the accreditation of periods of time spent within the scope of initial or continuing vocational education and training towards the usual subsequent standard period of study. The consequence of this is that, upon matriculating, a student fulfilling the stated requirements is placed in a more advanced subject and higher education semester of study than the first semester of the course. Further to this, students in this case is not obliged to provide (further) evidence of the fact that they have fulfilled the study requirements prescribed for the "normal" students in the study regulations. As already mentioned, this is certainly common practice when transferring from a University of Applied Sciences to a university, insofar as students have successfully completed their course at the University of Applied Sciences or at least passed the interim examination. When commencing studies at a university, students further need to intend to study a subject related to their studies at the University of Applied Sciences. At present, the individual universities are free to decide how many semesters credit they will grant in individual cases. Similar regulations relate to the rarer instance of transferring from a university to a University of Applied Sciences and to the more frequent case of changing courses of study within the university or University of Applied Sciences.

Compared to this, recognition of periods of training spent in initial and/or continuing vocational education and training is in its infancy in Germany (and in Europe too, according to the latest information available to us[21]). Nevertheless, attention may be drawn at this point to two examples:

1. The Thüringia Higher Education Law of 1992 makes provision for admission to a higher subject semester within a course of study without having previously studied at an institute of higher education. Accessing this right, however, depends upon two prerequisites. Firstly, evidence needs to be provided of

21 See here also SCHMIDT, R.; SCHERMUTZKI, M.: The European project "Developing European Work Based Learning Approaches and Methods" (DEWBLAM). Europäische Ansätze und Modelle zur Anerkennung von Work Based Learning durch die Hochschulen *("European approaches and models for the recognition of work based learning by institutes of higher education").* In: Stamm-Riemer (Ed.): l.c. pp. 87–95.

fulfilment of learning requirements relevant to the intended course of higher education study, and secondly a classification examination needs to be successfully completed. In respect of the latter condition, the institutes of higher education in the state are obliged to enact classification examination regulations in the event they wish to avail themselves of this opportunity.[22]

2. At Emden, part of the Ostfriesland, Oldenburg and Wilhelmshaven University of Applied Sciences, two three-year Bachelors courses of study are on offer in the subject areas of Speech Therapy and Physiotherapy. In order to matriculate for these courses of study, applicants need to have previously completed vocational education and training as a state recognised speech therapist or physiotherapist (albeit predominantly school-based) and successfully take a classification examination. Three semesters are then credited to the duration of study in respect of the completed vocational education and training, meaning the period of study before a Bachelor degree is obtained extends over a further three semesters only.[23]

Despite the requirement for a classification examination in both cases, these two models offer points of contact for the establishment of a link between company oriented and higher education continuing training. There is, however, a pressing need to pilot both models further, varying them in such a way so as to enable the weaknesses which have been identified to be eliminated (equivalence of requirements fulfilled via a non-academic route, the restriction to "school occupations" and the classification examination).

VARIATION 2: Recognition of individual requirements fulfilled in training or continuing training

The fact that the accreditation of periods of training towards the duration of a subsequent course of study always involves the recognition of individual requirements fulfilled means that variation 1 of the recognition model outlined above

22 To our knowledge, only the Bauhaus University in Weimar has taken advantage of this opportunity thus far. As reported in BENDL, J.: Erfahrungen mit der Anerkennung nicht-akademischer Lernleistungen im Hochschulsystem – Die Einstufungsprüfungsordnung der Bauhaus-Universität Weimar *("Experiences with the recognition of non-academic fulfilment of learning requirements in the higher education system – the classification examination regulations of the Bauhaus University in Weimar").* In: STAMM-RIEMER (Ed.): l.c. pp. 53– 57, this decision on the part of the Bauhaus University in Weimar is based on the fact that its predecessor institution, the Weimar University of Architecture and Construction, already had in place "external regulations" whereby *"those in employment who have acquired knowledge and ability appropriate to higher and specialist education by means of continuing training measures and by autodidactic methods"* (ibidem, p. 53) may be admitted to a course of study in a higher subject semester. According to Bendl, however, this is an exceedingly rare occurrence within engineering based courses of study, the applicants mostly failing to meet the first condition. It is generally the case that the university fails to recognise the achievements of the applicant to be equivalent to the requirements to be fulfilled in the course of study, the consequence of this being that applicants are not even admitted to the classification examination. Bendl takes a somewhat more favourable of the situation prevailing in the artistic subjects.

23 For further information, see the Internet presence of the University of Applied Sciences (www.fh-oow.de/studium/studiengaenge).

encompasses variation 2, which will now form the object of our attention. Such a statement, however, does not apply the other way around. The recognition of equivalence of individual requirements fulfilled during the course of initial or continuing vocational education and training does not automatically result in allocation to a higher subject semester. To this extent, it is legitimate to view this form of recognition as an independent variation of the model.

The clearly prevailing principle of investigation on a case-by-case basis must be viewed as constituting the major problem of this variation in recognition practice. In the interests of linking company oriented and higher education continuing training and establishing a route for the recognition of previous achievement, a move away from the consideration of individual cases, a process which accords too great a scope of autonomy to the respective subject representatives of the institutes of higher education, and towards a regulated and standardised recognition procedure would be of crucial significance. Signs that this issue is being tackled are in evidence within the context of the wide-ranging European Education Area debate on the assessment of prior and experiential learning (APEL) already alluded to. This involves establishing lines of debate in respect of the area of higher education itself and with reference to the discussions relating to the "making visible" of competences acquired via informal learning.[24] In short, the line of debate relating to the institutes of higher education centres on the award of transferable credit points (APEL for credits),[25] whereas the line of debate containing a particular relevance to continuing vocational training focusses on the creation of internationally recognised portfolios or continuing training passports.

As far as "APEL for credits" is concerned, we have seen the purely quantitative European Credit Transfer System (ECTS) become established right across Europe, awarding credit points on the basis of the workload deemed necessary for the fulfilment of a study requirement, this workload being measured in hours. Study modules, which usually consist of several courses or teaching cycles at institutes of higher education, are accorded a points score, the student receiving this amount of points credited upon successful completion of the module. Since one course of study comprises several modules, an overall points score is assigned computed from the sum of the points allocated to the individual modules. When students have successfully completed all modules and achieved the total number of points stipulated, they have achieved the study aim without the need for a further final examination.

It is of crucial significance that this procedure promotes three aspects relating to the mobility of students, at least in theory. According to the basic principles behind the ECTS, it is of no importance:

24 BJÖRNAVOLD, J.: Making Learning Visible: Identification, Assessment and Recognition of Non-formal Learning. Luxembourg: Office for Official Publications of the European Communities 2000 (CEDEFOP).

25 See also the sources provided under note 7.

- at which institute of higher education students have completed a module and accumulated credit points. In the event of a change of study location, they take their credit points with them, the institute of higher education admitting them being obliged to recognise the requirements they have fulfilled at another institution of higher education. The particular aim here is to promote studying abroad, as well as supporting changes of study location within a country.
- in which course of study students completed a module and accumulated credit points. If students change their course of study (possibly even changing their study location at the same time), they take their credit points with them and receive credit towards the requirements to be fulfilled within their new course of study, providing the module in question also constitutes a component of the curriculum of the new course of study. This will particularly tend to be the case with instrumentally oriented modules (such as modules relating to social science research methods, statistics, mathematics and scientific theory). The aim here is to enable students to change their course of study without wasting too much time.
- in which order students complete the modules and the total period they take to complete the whole of the curriculum of a course of study. The aim here is to prevent permanent cessation of studies and enable students to interrupt a course – to commence employment, for example – and resume their studies in later years, the principle being that, once acquired, credit points never lose their validity.

Disregarding the weakness of the ECTS for a moment, which consists in the fact that credit points are calculated purely on a quantitative basis (work load), this system represents significant progress in comparison to the regulations for the recognition of fulfilment of study requirements appertaining hitherto and based on the examination of individual cases. Our own experiences and sources within the relevant literature have, however, revealed that there are still currently frequent breaches of the intentions of the ECTS within the German higher education system. This involves non-compliance with the system by waiting for a positive outcome of investigations on a case-by-case basis carried out by an appropriate subject inspector rather than automatically recognising credit points from other institutes of higher education (in particular from abroad). Here it is obvious that the reputation of the institute of higher education issuing the credit points plays a prominent part in arriving at a positive decision.[26] To this extent, the central task within the higher education sector consists of unifying and objectifying recognition practice in respect of competences acquired within the ECTS. The issue of whether the ECTS can also be transferred to vocational training courses would be a matter for a second stage of discussion. This debate has, however, already been ongoing in Germany for a number of years, centring on the aim of creating a system for

26 See here HANNKEN-ILLJES; LISCHKA: l.c., p. 40.

vocational education and training comparable to the ECTS. The way for this was paved politically and the initial basic legal principles put in place for the recognition of such a system on the part of the institutes of higher education by the 4th amendment of the Framework Act for Higher Education (HRG) of 20 August 1998 (§ 15 para. 3 HRG), as well as the resolutions of the Standing Conference of the Ministers of Education and Cultural Affairs of the Länder in the Federal Republic of Germany of 28 June 2002 and the German Rector's Conference (HRK) of 8 July 2003.[27] These resolutions stipulate, however, that knowledge and skills acquired outside the higher education sector can replace a maximum of 50 percent of study requirements within the context of a course of study at an institute of higher education and specify that the autonomy of institutes of higher education should remain intact, especially with regard to any examination of equivalence they deem necessary.[28] The extent to which the appropriate cornerstone for the introduction of a pan-European credit point system has been laid remains to be seen. A point which still needs to be borne in mind is that the framework of European vocational education and training debate is more closely focussed on portfolios than it is on credit point systems.

The debate centring on the creation of portfolios enjoying pan-European validity and recognition in initial and continuing vocational education and training has been ongoing for several years, largely decoupled from the issue as to whether achievements recorded in the portfolios should be recognised towards a higher education course of study. Many countries, including Germany, can now look back on experience with such portfolios, essentially the collection of (various kinds of) written evidence of fulfilment of learning requirements and competences within the context of an evaluation procedure related to the learning process (formative evaluation). This area involves a multitude of education and training passports claiming regional, sectoral, national or European validity. The intention here is to restrict consideration to the specific set of problems this instrument poses in terms of the recognition of equivalence to higher education requirements, a detailed treatment of the individual education and training passports being beyond the scope of this study.[29] As far as the authors are aware, there are not currently any initiatives – at least not in Germany[30] – whereby such portfolios enjoy complete

27 Cf. the sources provided under note 7.

28 The resolution passed by the plenary assembly of the HRK (see previous note) lists in particular the requirements of the new IT advanced training occupations and qualifications and the qualifications available within continuing vocational training at technical schools which enable institutes of higher education to accord equality of recognition.

29 Cf. here the relevant articles in STRAKA, G. A. (Ed.): Zertifizierung non-formell und informell erworbener beruflicher Kompetenzen. *("Certification of non-formally and informally acquired vocational competences.")* MÜNSTER et. al.: WAXMANN 2003 and COLLINGRO, P.; et alii.: Identifizierung, Bewertung und Anerkennung von früher und informell erworbenen Kenntnissen – Deutschland. Luxemburg (*"Identification, evaluation and recognition of previously and informally acquired knowledge – Germany, Luxembourg"*): CEDEFOP panorama – country report.

30 It was not possible to conduct research across Europe. To this extent, reference can only be made to the articles by BREYER, FROMMBERGER and KRISTENSEN included in this volume. Cf. further the relevant articles in STRAKA (Ed.), 2003 and FRANZ, H.-W.: Berufsbildungsreform für Lebenslanges Lernen

and overall recognition within the framework of higher education study. To this extent, the inclusion of portfolios when considering cases on an individual basis would lead to the problems described above. In the light of the current situation prevailing at institutes of higher education, the authors do not believe that they will be willing to go down this path. The assumption is, therefore, that for the foreseeable future competences acquired in the course of continuing vocational training will only be recognised as being equivalent by institutes of higher education if said competences have been ascertained by means of summative evaluation.

VARIATION 3: Recognition of successful completion of a final examination within vocational education courses as the equivalent of a higher education examination

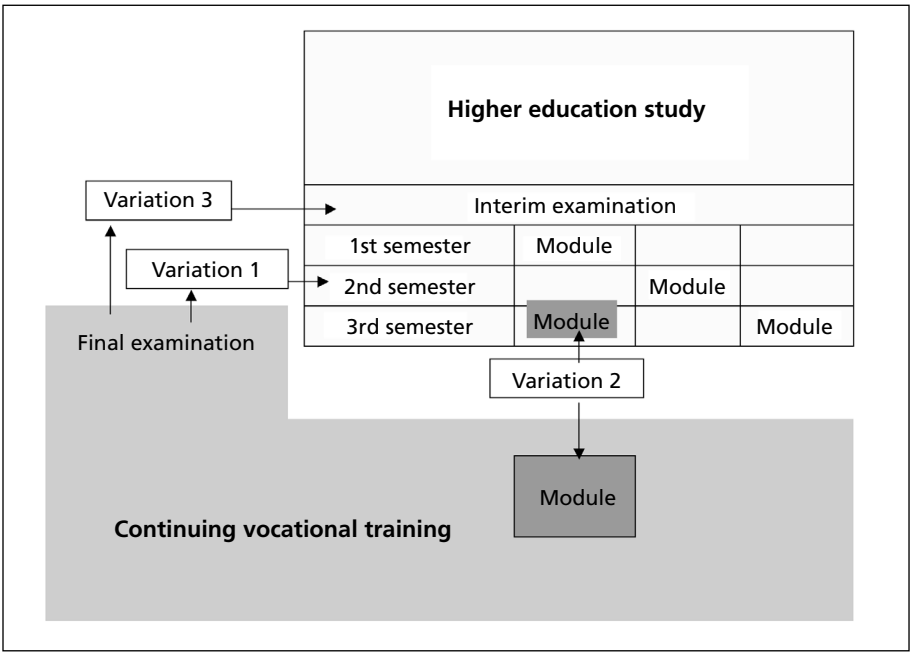
Variation 3 would include variations 1 and 2. The recognition of a final examination within the framework of initial and continuing vocational education and training as possessing equivalence with a higher education examination would necessarily entail the recognition of the equivalence of training periods and requirements fulfilled. One conceivable approach, for example, would be to credit successful completion of the chamber examination as bookkeeper as the equivalent of passing the interim examination in "accounting and auditing" within a Bachelor course of study, leaving the qualified bookkeeper only needing to complete the modules within the main programme of this Bachelor course of study to obtain the appropriate academic degree. Similar regulations would be conceivable for the Specialist level within the IT continuing training system, but would also be possible at the level of a Masters course for Operative and Strategic Professionals.

However, in light of the well-known propensity of institutes of higher education to insist on their autonomy in matters relating to the academic examinations system, the authors cannot imagine that institutes of higher education will be willing to adopt such a wide-ranging form of recognition practice within the foreseeable future. In this respect, the chances of any piloting or implementation of this form of recognition must be viewed as remote, although the authors' opinion remains that its impact on raising the attraction of the vocational educational pathway could be considerable, and that this would result in a significant reduction in training and study times leading to academic qualifications.

continuation of 30

in Spanien, Frankreich und Dänemark. *("VET reform for lifelong learning in Spain, France and Denmark")* In: DOBISCHAT, R.; SEIFERT, H. (Hrsg.) Lernzeiten neu organisieren: Lebenslanges Lernen durch Integration von Bildung und Arbeit. *("Reorganising learning times: lifelong learning through the integration of education and work"),* Berlin: Edition Sigma 2001.

Figure 5: **Recognition models** (own representation)



3.2.4 Alternation models

Alternation models offer an interesting range of pedagogical and didactic opportunities for the networking of company oriented and higher education continuing training from both a vocational education and training and higher education point of view. The difference between the two variations of the model to be presented here is that the first case involves alternate learning in the two learning venues, the company and the institute of higher education, although no overall curriculum agreed in terms of content exists for the two institutions. Persons undergoing learning within this variation of the model are both registered students and participants in a continuing vocational training course, the two programmes being concluded separately. In the second case, however, there is an overall curriculum relating to the two courses which may stipulate an integrative examination for the two courses, although this is not compulsory.

VARIATION 1: Organisational linking and double qualification[31]

The first of these cases will be sufficiently familiar from the area of combining vocational education and training with a course of higher education study. This type of configuration is the crucial structural feature of the German Universities of Cooperative Education, which lead to a vocational qualification in a recognised training occupation pursuant to BBiG or HWO, a further period of learning at the Univer-

sity of Cooperative Education and in-company culminating in a degree level qualification in Business Administration or as an Engineer, both with the appendage "BA" (for "Berufsakademie", or University of Cooperative Education). Certain University of Cooperative Education models in Germany enjoy equivalence with qualifications awarded by Universities of Applied Sciences.[32] The features described are also to be found in the majority of "dual courses of study" now established at Universities of Applied Sciences, these also involving the alternation of in-company learning phases and periods of study spent at the institute of higher education. Although the aim is to create a link between the two learning phases in terms of content, there is a frequent lack of didactic preparations in this regard and no overall curriculum.

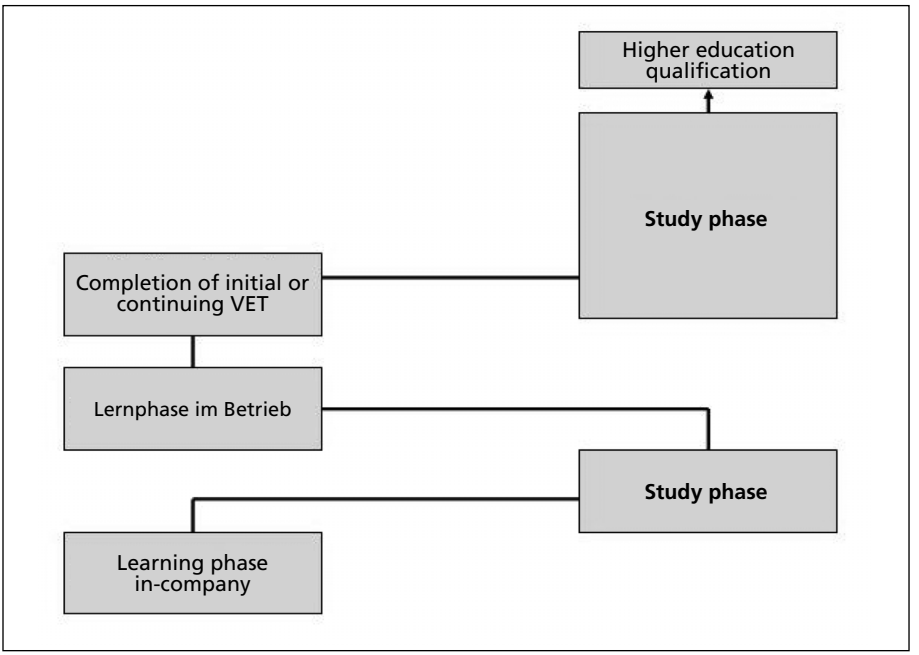
However, according to the information available to us, such models are a rarity within the field of continuing vocational training. One example would be the "Health Insurance" course of study offered by the economics faculty at the Hildesheim University of Applied Sciences, although the course has since been discontinued. This course, which led to the awarding of the academic degree of Diploma in Business Studies (appended by "FH" to indicate University of Applied Sciences) was jointly developed with the in the 1990's with the Lower Saxony Federation of Statutory Public Health Insurance Funds (AOK). The aim of the Lower Saxony AOK was to replace the hitherto internally administered advanced vocational training examination (the so-called B-examination) for its employees already in possession of a vocational qualification as social insurance clerk (the so-called A-examination) by a higher education qualification conferring an associated academic degree. The course of study developed stipulated alternating phases of learning to take place in-company, in the Lower Saxony AOK training centre and at the institute of higher education. It is, however, generally true to say that this model constituted the replacement of a company oriented continuing training qualification by an academic qualification, the AOK then recognising this academic qualification as being equivalent to the previous B-examination (necessary for advancement within the company). This model thus spelled the end for independent company oriented continuing training.[33]

31 The authors do not apportion the practical placement semesters stipulated in courses of study at Universities of Applied Sciences either to the alternation models in general or specifically to this variation, practical placement seminars being purely an instrument deployed by institutes of higher education to increase "practical reference". The same applies to so-called "occupational practice study phases" at universities, which we also therefore exclude from consideration.

32 For further information on Universities of Cooperative education, see the extensive evaluation study based on the original model of the University of Cooperative Education in the federal state of Baden-Württemberg conducted by ZABECK, J.; ZIMMERMANN, M. (Ed.): Anspruch und Wirklichkeit der Berufsakademie Baden-Württemberg. Eine Evaluationsstudie. *("Objectives and reality of the Baden-Württemberg University of Cooperative Education. An evaluation study"),* Weinheim: Deutscher Studien-Verlag 1995.

33 For further information on this model, see the Internet presence of the University of Applied Sciences at (www.fh-hildesheim.de/hawk/fk_wirtschaft).

Figure 6: **Variation 1 of the alternation model** (own representation)



VARIATION 2: Interlinking of company oriented and higher education continuing training organisationally and in terms of content

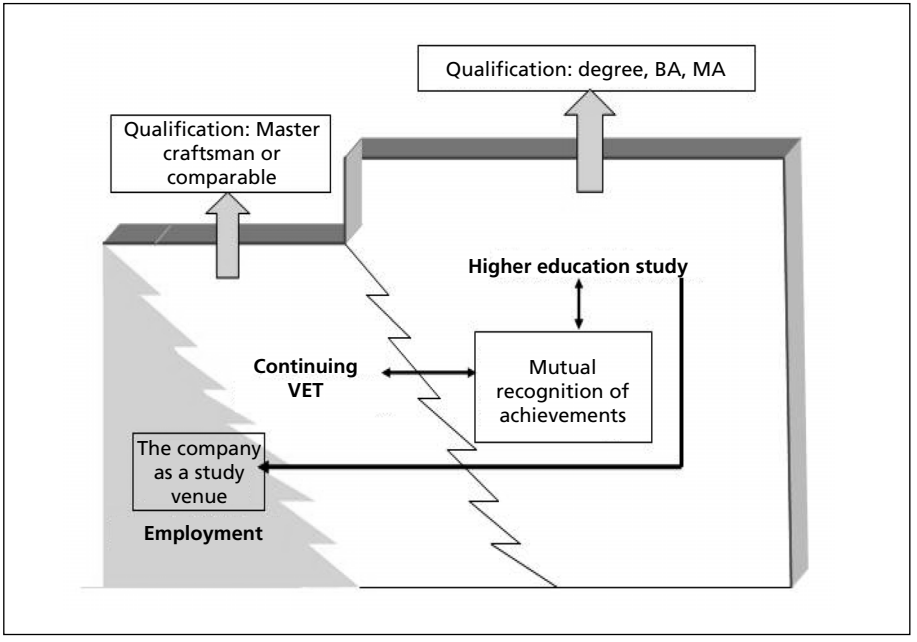
In the authors' view, this variation of the alternation model is the one which would provide the highest conceivable extent of networking of company oriented and higher education continuing training. It comprises an overall curriculum for the in-company component and the element based at an institute of higher education, stipulates alternating learning at both learning venues (possibly also extending to include learning via a continuing training provider) and leads to both an academic degree and a recognised certificate of continuing vocational training. In didactic terms, this involves the allocation of certain functions to the participating learning venues, the learning process within one venue making reference to the learning in the other respective venue in terms of content. The recognised certificate of continuing vocational training and the academic degree may be obtained simultaneously or successively, the latter being the more likely.

This variation requires, therefore, a close degree of cooperation between the companies and institutes of higher education in order to ensure coordination of the teaching provision in terms of content and the necessary organisational conditions. The functionality of this variation is also linked to the fact that companies view this form of cooperation as a central instrument within their personnel development, since the learners need to be employees of the company in question.

In the view of the authors, the most extensive example realised thus far in Germany is the dual course of study in Business Administration and Engineering at the University of Applied Sciences in Stralsund.[34] This enables both a company oriented continuing training qualification (master craftsman in industrial or crafts trades) and an academic degree in Business Engineering (University of Applied Sciences) to be acquired. Employment activity, participation in continuing vocational training and higher education studies run parallel to one another, these phases being interlocked both organisationally and in terms of content. It thus displays the features of version 2 of the alternation model as described above, these also being depicted in the following schematic representation (see Figure 7).

In our view, this is a convincing model, which it should be possible to transfer to the level of operative professional within the IT continuing training system as long as it is possible to identify Universities of Applied Sciences and companies willing to accept the greater level of expenditure associated with this variation.

Figure 7: **Variation 2 of the alternation model** (own representation)



34 See here LAST, B.: Dualer Studiengang Wirtschaftsingenieurwesen an der Fachhochschule Stralsund – Der Betrieb als Studienort. *("Dual course of study in Business Administration and Engineering at the University of Applied Sciences in Stralsund")* In: STAMM-RIEMER, I. (Ed.): l.c., pp. 59-69 and the detailed presentation and appraisal of the approach in the fifth chapter of this report.

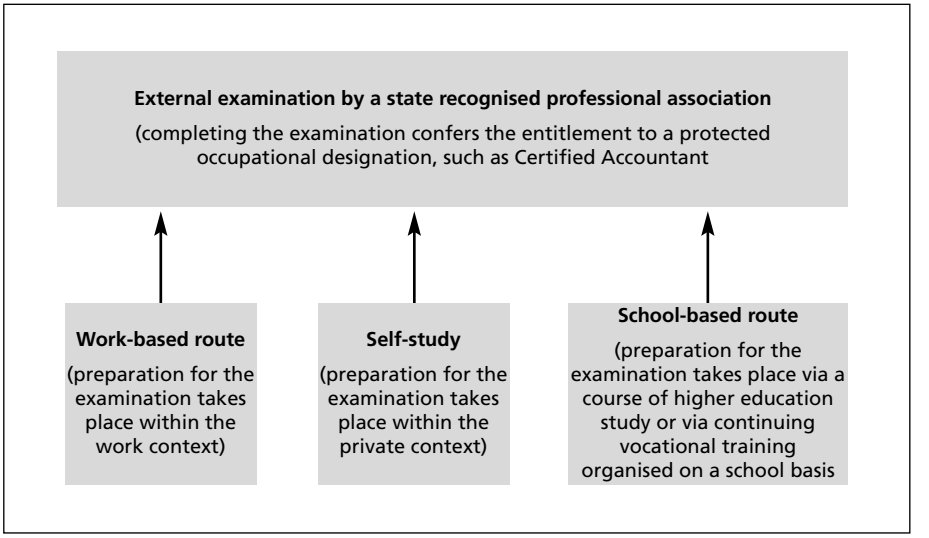
3.2.5 Qualification model

The principle behind the qualification model is that vocational and higher education continuing training run in parallel, the same (academic) degree, however, being awarded on the basis of an external examination. The central feature of this model is that although the examination requirements are stipulated in terms of content, no regulations exist as to which type of training is to be undergone and via which training route candidates are to acquire the necessary knowledge and skills. This purely summative, learning outcome geared idea has been common practice in some parts of the Anglo-American area for many years, the primary example of its application at present being within the terminology of competence-based approaches as a focus of the debate surrounding the National Vocational Qualifications in England.[35] There are, however, further examples of this approach which have been in use for 100 years and more. Reference can be made here to the examinations for accountancy specialists in the United Kingdom and the USA, for instance (Certified Accountants), which are administered by state authorised professional associations (such as the Royal Society of Certified Accountants of England and Wales), success in which is a prerequisite for working as a public accountant or auditor. In the USA, colleges and universities provide appropriate preparation courses for these examinations within the framework of a normal Bachelor course of study, the degree obtained being of lesser significance to career advancement. The central issue is the passing of the professional entrance examination of the respective professional association. These are, however, also open to persons who have not completed a higher education course of study on the basis of competences acquired within the workplace. The configuration of vocational education and training in the Netherlands is also of interest in this regard, permitting two routes to vocationally related qualifications, a school-based-route and a work-based-route.

Leaving aside for the moment the fact that attendance of a preparation course for participation in the examination is also not mandatory in the case of chamber examinations in the area of advanced training occupations (notwithstanding this, there is, generally a more or less detailed curriculum covering this preparation courses), this leads to the conclusion that the qualification model in the form described here does not fit in with the German curricular traditions of an input oriented and standardising teaching and learning process. In this regard, it is fair to assume, at least for the present, that such a model, based as is on the parallelism of different access routes to a final examination, will not have any great part to play in Germany.

35 See here FROMMBERGER, D.: Zauberformel "competence-based-approach"? Ein Beitrag zur Einordnung einer internationalen Strategie der Modernisierung der Berufsbildung aus Sicht der Berufs- und Wirtschaftspädagogik. *("Competence-based approach a magic formula? A contribution to the classification of an international strategy for the modernisation of VET from the point of view of occupational and economic pedagogy")* In: Zeitschrift für Berufs- und Wirtschaftspädagogik ("The periodical of occupational and economic pedagogy") 100 (2004), p. 413.

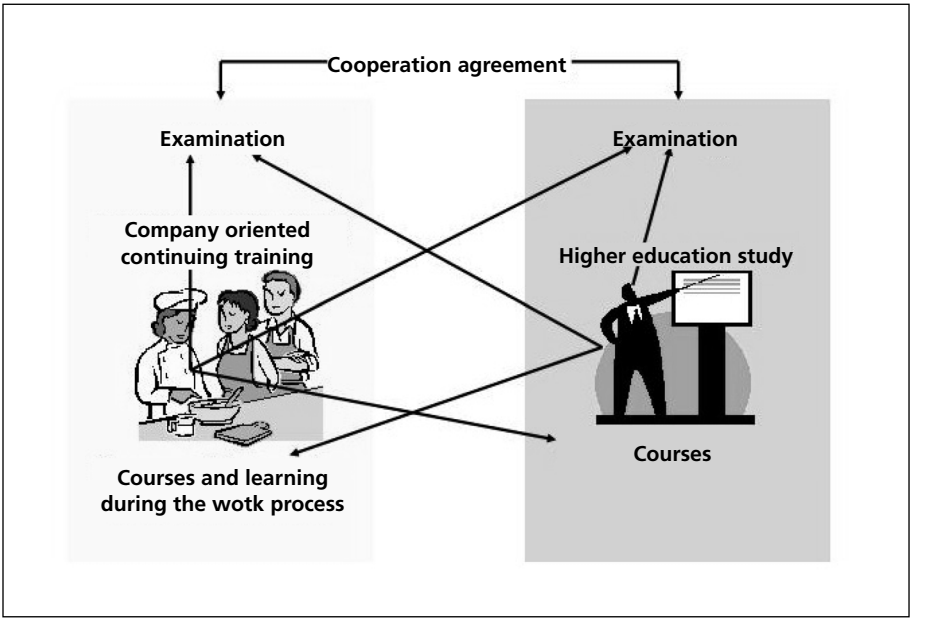
Figure 8: **Qualification model** (own representation)



3.2.6 Exchange model

University teachers who work part time in continuing vocational training and the opposite process whereby lecturers at continuing training institutions teach at institutions of higher education on an individual course basis is just as well-known and widespread a practice in Germany as it is elsewhere. It is, however, a practice which in itself is by no means sufficient for the establishment of a stable and institutionally secure networking of company oriented and higher education continuing training. Nevertheless, the authors believe it to be a model worthy of mention and, within the context of alternation model 2, urgently necessary and capable of development. As will be shown in chapter five, which deals with the example of the University of Applied Sciences in Stralsund, it is perfectly possible to make compulsory stipulation within the curriculum of a course of study for a process whereby company employees participate in education at an institute of higher education as teachers and examiners. This is the key element in imbuing an appropriate cooperation agreement with "life". To this extent, the authors work on the assumption that a legally binding exchange of staff is one of the basic prerequisites for the functioning of version 2 of the alternation model in higher education and company practice.

Figure 9: **Exchange model** (own representation)



3.3 Summary

The depiction thus far shows a linking of company oriented and higher education continuing training markedly extensive in its scope. This scope stretches from access to institutes of higher education on an individual basis for those in possession of vocational qualifications all the way to the interlocking of content of in-company and study phases in alternation model 2, which receives decisive support in the form of the deployment of professional practitioners from the participating companies in the teaching and examination system of the institute of higher education. In our view, the networking displayed in the example of the University of Applied Sciences in Stralsund represents the optimum form of linking of company oriented and higher education continuing training in terms of vocational pedagogy and higher education didactics. The following chapters will firstly depict whether conceptual and political starting points are in evidence at an EU level to be able to provide support for such approaches in the form of a top-down strategy (see chapter 4) and secondly examine if specific examples of the models can be identified which are capable of development into joint European practice via a bottom-up strategy (see chapter 5).

4. Contributions of EU policy towards the linking of company oriented and higher education continuing training?

4.1 Legal and political mandate of the European institutions

In order to evaluate the role which can be played and impact which can be made at a European level with reference to issues of higher education and in-company continuing training it is first necessary to clarify the extent of decision-making powers which exist in this area. The role of the institutions is defined in general terms by the treaties of Maastricht (1992), Amsterdam (1997) and Nice (2001).[36] Articles 149 and 150 stipulate strict limitations to the activity of the institutions both formally and in terms of content. From a formal point of view, such activities are to be restricted to promoting cooperation, support and extending the number of member states. Even if this constellation were to leave areas with discernable scope for the standardisation of educational issues, such leeway is, in turn, negated by the emphasis on strict responsibility of the member states for the structuring of their vocational/educational systems and by the confinement of legislative authority to "recommendations", which are not binding in form pursuant to article 249 and which furthermore must not have as their object the harmonisation of statutory regulations. The general thrust of competences accorded at an EU level can essentially be subsumed into the headings of 'mobility', 'languages' and 'exchange of experiences'. The nearest references to the thematic area of this study were identified in the aim to "stimulate cooperation on training between educational or training establishments and firms".[37]

These regulations may be interpreted as constituting a thoroughly sceptical attitude towards the EU, an aspect which has been fed in the past by the federal structure of individual member states. Education was virtually viewed as part of national tradition and therefore as something which should be excluded form investigation at an interstate level. Furthermore, Article 5 of the treaty stipulates a so-called "subsidiarity" principle, meaning that the division of responsibility determines that action is only possible at an EU level in the event tasks have not been sufficiently achieved at a national state level. Although no legal appraisal of this stipulation can be provided here, it is fair to assume that it fundamentally acts as a brake on the activities of EU institutions.[38] The main consequence was the putting into effect of Commission action programmes under secondary Community law centring on increasing the mobility of learners, teachers and young people. Over

36 Cf. Treaty establishing the European Community - (Consolidated version) (http://europa.eu.int/eur-lex/lex/en/treaties/dat/12002E/htm/C_2002325EN.003301.html).

37 Treaty establishing the European Community, Article 150 para. 2.

38 For a detailed legal and economic appraisal, cf.: MOERSCH, W.: Leistungsfähigkeit und Grenzen des Subsidiaritätsprinzips: eine rechtsdogmatische und rechtspolitische Studie. *("Efficiency and limitations of the principle of subsidiarity: a study of legal dogma and legal policy"),* Berlin: Duncker & Humblot 2001; Ischia, H.: Zentralisierung und Subsidiarität: eine politökonomische Analyse dieses Spannungsfeldes in der Europäischen Union. *("Centralisation and subsidiarity: a political and economic analysis of this area of conflict within the European Union"),* Frankfurt am Main et al.: Lang 2004.

the course of time, this process has led to a considerable expansion in the promotion of innovation and cooperation between the members states both in terms of volume and quality, also resulting in the emergence of a European debate on general and vocational education.[39] The European nature of the research activities being undertaken by CEDEFOP, EURYDICE or the ETF and the increasingly transnational organisation of the interests of social partners and academic associations when dealing with the EU institutions may also be viewed as further indicators of the increasing significance of the EU level.[40] Through the publication of white papers, the Commission has also been able to exert an influence at a conceptual level on the debate surrounding international qualifications, transparency of vocational education and training systems, quality assurance and lifelong learning, the last of these becoming virtually a common denominator determining the structure of the educational field as a whole and where references to the labour market and competition policy have also been emphasised.[41]

In strategic terms and in its capacity as a potential driving force behind Community initiatives, the Commission certainly possesses instruments to help push through a broader level of implementation of individual objectives contained within the treaties of the EU via the structuring of action programmes and the awarding of funding associated with these. On the other hand, when dealing with new thematic areas which are not clearly covered within the terms of reference of the treaty and which are aimed at the further expansion of national practice, it is dependent on the cooperation of the Council of the European Union and the Parliament. Recent years have seen a clear increase in the amount of interest shown by member states in this voluntary cooperation at a European level, thus representing confirmation of the thesis that there is a dynamic and self-strengthening process of integration ongoing within the Community, driven by the limited nature of the European mandate for issues relating to education. This development is also the expression of a change in the perception of the problem and a stronger level of interest on the part of member states in driving forward the creation of excellent educational opportunities for their citizens.

39 HUISMAN & VAN DER WENDE also view this as a significant signpost for the breaking down of national resistance to an expansion of European activities in this area and for a change in the way member states perceive the problem, the consequence of which has been an assimilation of points of view at both levels. For more details, cf. Huisman, J.; van der Wende, M.: The EU and Bologna: are supra- and international initiatives threatening domestic agendas? In: European Journal of Education, 39 (2004) 3, pp. 350 ff.

40 Cf. the organisations and consultative bodies listed in the Commission's CONECCS database (http://ec.europa.eu/civil_society/coneccs/index_en.htm).

41 For information on the developments within the political field as a whole, cf. MÜNK, D.: Perspektiven und Perspektivität der europäischen Berufsbildungspolitik aus bundesdeutscher Sicht. (*"Perspectives and perspectivity of European VET policy from a German point of view"*) In: REINISCH, H. et al. (Ed.): Studien zur Dynamik des Berufsbildungssystems. (*"Studies on the dynamics of the VET system"*), Wiesbaden 2004, pp. 50-52.

4.2 EU decisions and objectives in the field of education

4.2.1 General strategic objectives of Lisbon and subsequent conferences

In March 2000 at a special conference in Lisbon, the European Council stated: "The European Union is confronted with a quantum shift resulting from globalisation and the challenges of a new knowledge-driven economy."[42] It was against this background that the European Council formulated its much quoted aim to make the European Union the most competitive and most dynamic knowledge-based economic area in the world by the year 2010, whilst also emphasising that such changes would necessitate both "[…] a radical transformation of the European economy" and a "challenging programme for (…) modernising social welfare and education systems […]".[43] As far as education is concerned, this represents a clear expression that the main focus of interest of the heads of government in member states is on the expansion of advantages related to location and the accumulation of human capital as a way of achieving the overarching economic goal and being in a position to react to the challenges of globalisation. The Lisbon mission statement, however, is more than just a yardstick for educational issues. It defines itself as a joint mandate extending into virtually all political areas and can only be realised via an intensification of political cooperation. Although at the European level there remains the inherent contradiction that the legal stipulations in place render joint policy in educational matters an impossibility within the EU, members states are in future seeking to put in place a coherent strategy enabling the objectives formulated by the European Council to be realised.

This led to talk of political change amongst some authors, involving the replacement of the principle of subsidiarity as it relates to the field of education and vocational training systems by the quest to achieve convergence and comparability.[44] The legal construct to achieve this is the "open method of coordination" agreed in Lisbon. This is a "[…] coordinated strategy in which the member states set common objectives and instruments."[45] In formal terms, therefore, the main focuses, work programmes and benchmarks drawn up by the Council and the Commission always need to be adopted by the European Council in its capacity as the coordinating instrument of the member states. In this regard, the Commission acts "on behalf of" the members states in respect of its involvement in the operationalisation of objectives, the evaluation of progress and the formulation of adaptation requirements, thus also being in a good position to feed results from other initiatives and draft decisions into the debate.

42 Cf. EUROPEAN COUNCIL (Ed.): Presidency conclusions (Lisbon) European Council 23 and 24 March 2000. Lisbon 2000 (Press release 24/3/2000; Nr. 100/1/00).

43 Cf. ibidem.

44 Cf. WÄCHTER, B.: The Bologna process: developments and prospects. In: European Journal of Education, 39 (2004) 3, p. 268; Münk, 2004.

45 SCADPLUS: Concrete future objectives of education systems (http://europa.eu.int/scadplus/leg/en/cha/c11049.htm).

It is, however, extremely difficult to clarify the extent to which such draft measures will become established, in other words whether this constitutes an irreversible process which will lead to the permanent alignment of regulations within the individual countries. A continuing lack of clarity with regard to the Commission's mandate within this political field and a further augmentation in the number of member states[46] are particular factors which could easily see a return to stronger emphasis being placed on national distinctive features of vocational/educational systems at the expense of an expansion in European interfaces and a commitment to joint standards.

In March 2001, the meeting of the European Council in Stockholm defined three strategic goals in respect of the concrete future objectives formulated in Lisbon, which were divided into a total of 13 partial objectives with a target achievement date of 2010.[47] The most important of these are:

- Increasing the quality and effectiveness of the systems of general and vocational training within the EU
- Improving the general and vocational education and training of teachers and trainers
- Promoting the basic skills required for the knowledge society
- Access to information and communication technology for all
- Easier access to general and vocational education and training for all
- Creating open learning fields
- Increasing the attractiveness of learning
- Opening up the systems of general and vocational education and training to the world
- Closer contacts with the world of work, research and society in the broadest sense
- Development of the entrepreneurial spirit
- Promotion of the acquisition of foreign languages
- Intensification of mobility and exchange

The aim is to pursue the further development of systems of general and vocational education and training in such a way "[…] so as to deliver the basic skills and competences everyone needs in the knowledge society; to make lifelong learning attractive and rewarding; and to reach out to everyone in society, however far from education and training they may consider themselves, with ways of develop-

46 The work of the European Training Foundation (www.etf.eu.int/WebSite.nsf), which takes place in the forefront of the accession of a country and covers a wide range of measures relating to the alignment of an educational system to the European "standards", is, however, one of the factors making an impact in this area. It is, therefore, fair to assume that these states will continue to make a particularly significant contribution to the ongoing coordination of systems in future.

47 Cf. Report from the (Education) Council to the European Council: "The concrete future objectives of education and training systems" (5980/01 EDUC 23); Council conclusions of 13 July 2001 on the follow-up of the report on concrete future objectives of education and training systems (2001/C 204/03).

ing their skills and making the best use of them".[48] The core approach is, therefore, to tackle areas where the EU and the member states are already active and where appropriate activities are ongoing. A new aspect of the initiative is that the individual measures are being refocused within the overall context of lifelong learning, and there is a willingness on the part of the member states to use progress and development as a learning vehicle to realise a joint strategy. A further aim is to achieve synergies with other action fields and forms of European cooperation.

In the interests of achieving this aim, the European Council meeting in **Barcelona** in March 2002 adopted a detailed work programme ("Education and Training 2010"), thus offering express support to the Education Ministers' aim "to make Europe's education and training systems a world quality reference by 2010".[49] In addition to the formulation of the objectives in concrete form, as already mentioned, the work programme contains a detailed schedule for the implementation of the individual fields covered by the measures and a description of the "core points" to be achieved with reference to the individual partial objectives. Potential evaluation instruments are presented to enable success to be more precisely recorded within the individual areas. These include indicators allowing progress to be quantified, prescribe qualitative evaluations in the form of peer reviews and provide a list of areas for the exchange of good practice examples from member states. As examples of the indicators, the following should be mentioned:[50]

- Shortage/over-supply of qualified teachers and trainers on the labour market
- The number of those completing secondary education
- The percentage of those aged between 25 and 64 participating in educational and training courses
- The percentage of students and trainees undergoing initial training who take advantage of alternating training or educational provision
- The proportion of teachers, academics and researchers from other EU member states employed at various levels within the educational system

The joint interim report by the Commission and the Council, which formed the object of debate at the meeting of the European Council in Brussels in March 2004, shows significant deficits in the achievement of the stated objectives. By the year 2010, there is very little prospect of fulfilling five of the benchmarks[51] stipulated by the Council in 2003, for example, and "[...] the reforms undertaken are not up

48 Report from the Commission on the concrete future objectives of education systems (COM (2001) 59 final), p. 15.

49 Cf. COUNCIL OF THE EUROPEAN UNION: Detailed programme on the follow-up of the objectives of education and training systems in Europe. Brussels 2002 (Outcome of the proceedings, No. prev. doc. 5828/02 EDUC 17).

50 Cf. ibidem.

51 Max. ten percent of school dropouts; 15 percent increase in higher education graduates in mathematics, science and technology; 85 percent of 22-year olds with an upper secondary education qualification; reduction of the proportion of school pupils with reading difficulties to 13.7 percent; 12.5 percent participation of those capable of gainful employment in lifelong learning.

to the challenges and their current pace will not enable the Union to attain the objectives set."[52] The overall economic evaluation of competitiveness in the EU reaches a similar conclusion within its terms of reference, this being in contrast to the status of development in the USA as assessed by the World Economic Forum.[53] Although the nature of the reforms adopted make it likely that far-reaching effects will only be achieved in the medium to long term, the status hitherto suggests that those responsible perceive the necessity for a "focussing" of activities, something which can certainly be viewed as a departure from the original breadth of the thematic areas. The following issues in particular are to be addressed:[54]

- increasing private and public investment in human capital, concentrating this on the most important areas and deploying it more efficiently;
- working with participants to develop a national strategy for lifelong learning by 2006, taking due account of formal/informal learning opportunities and the principles of lifelong learning established at an EU level;
- creating a Europe of education by uniform recognition of qualifications, a joint quality framework and the removal of barriers to mobility;
- better coordination of project structures, more precise evaluation of progress and a strengthening of the external effect of activities.

In overall terms, there is a discernable and increasing attempt at integrating these themes with other educational issues[55], something which must be regarded as an extremely ambitious objective given the problems currently existing in terms of implementation. There is an inherent danger that this may easily lead to the blurring of areas of responsibility, resulting in a negative impact on the level of stringency with which activities are pursued. The Kok report once again emphasises that the educational issues raised in Lisbon are critical to further strengthening of the common market and competitiveness.[56] Notwithstanding the "open coordination procedure", this may lead to a temptation on the part of the Commission increasingly to take the lead in setting the agenda and aim to expand it as a vehicle for the implementation of its own recommendations in order to move towards convergence within the member states. Individual members states are already

52 EUROPEAN COMMISSION: Education and training 2010. The success of the Lisbon strategy hinges on urgent reforms. Brussels 2003 (Communication from the Commission, COM (2003) 685), p. 3.

53 Cf. here World Economic Forum: The Lisbon Review An Assessment of Policies and Reforms in Europe. Geneva 2004. Looking at the countries on an individual basis shows that northern countries are significantly ahead of southern countries in terms of development. Compared to the EU 15 average, the USA displays much better results in 7 of 8 areas. This indicates that the EU deficit has structural causes, rather than being solely due to the proportion of GDP spent on educational investment.

54 Cf. Joint interim report of the Council and the Commission on the implementation of the detailed work programme on the follow-up of the objectives of education and training systems in Europe (6905/04 EDUC 43).

55 A summary of the reports submitted to the Commission by the member states on mobility, lifelong learning, the Bologna Process and the Copenhagen Process leads to the same conclusion.

56 Cf. KOK, W. et al.: Facing the challenge. The Lisbon strategy for growth and employment. Nov. 2004 (http://europa.eu.int/comm/councils/bx20041105/kok_report_en.pdf).

being exhorted that "Education and Training 2010' should be duly taken into account in the formulation of national policies"[57] and are thus coming under an increasing amount of pressure to explain themselves if they fail to do this or if the desired level of progress and success is not forthcoming.[58] In rejecting certain decisions, they are thus possibly leaving themselves open to the suspicion not only of preventing the mobility of their citizens but also of torpedoing the way in which the market functions as a whole. Viewed from a purely utilitarian point of view, such a truncated view of education in instrumental terms very much runs the risk of thwarting the idea of lifelong learning and endangering the "voluntary" co-operation in this area.

4.2.2 "Bologna to Bergen" – the creation of a European Higher Education Area

As already indicated in the preceding section, it has only been since 2004 at the latest since the Council and Commission have viewed the Bologna Process, which has been in development since 1999, as a part of the overall strategy relating to "Education and Training 2010". This "[…] integrates all actions in the fields of education and training at European level, including vocational education and training (the "Copenhagen process"). As well, the Bologna process, initiated in 1999 is crucial."[59] Notwithstanding this, analytical reasons, the specific framework conditions applying in the higher education sector, the differentiated way in which the objectives and measures are formulated and, not least, the actual division of tasks which has applied at EU level thus far all conspire to necessitate separate consideration of this structural element of European educational policy.

The main objectives of the process were formulated in Bologna at a meeting of 29 education ministers, not all of whom were from EU countries, and may be interpreted as the logical consequence of EU endeavours thus far in the area of mobility and reciprocal recognition of fulfilment of study requirements. The very fact that over one million students were spending periods of study abroad as part of the Erasmus Programme served both to create a stronger perception of the differences between the national systems and to make the transferability of achievements a practical concern and a necessary prerequisite for the attractiveness of the programme, meaning that coordinated instruments needed to be developed. The aim henceforth is for Bologna to provide a qualitative boost to development, leading to the establishment of a "European Higher Education Area" by 2010, creating mobility of people, transparency and recognition of qualifications and a high level of attractiveness, all enabling success to be achieved in the "talent competition" with third countries. These objectives are not achievable by a broad-

57 Joint interim report of the Council and the Commission (6905/04 EDUC 43), p. 31.

58 Commissioner Verheugen, for example, has already announced a complete "realignment" of the Lisbon strategy for the spring conference of 2005 in respect of issues relating to competition and employment, which will also bring about changes to the educational issues discussed in this context.

59 EUROPEAN COMMISSION: Policy areas Education and Training 2010 (http://ec.europa.eu/education/policies/2010/et_2010_en.html).

based introduction of the ECTS and the expansion of mobility programmes alone, supplementary action being required in the forms of the following measures in particular:[60]

- the creation of a system of comparable, two-tier higher education qualifications,
- the elimination of further barriers to mobility and
- the establishment of quality assurance procedures.

In the wake of the conference, the introduction of Bachelors/Masters qualifications attracted the greatest degree of attention, the whole process predominantly being interpreted as an initiative for structural assimilation. Some of the points on the agenda which had been agreed upon, such as with reference to lifelong learning as an element of the European Higher Education Area or to extending Ph. D. qualifications to from a third structural level within the system, were expanded at the subsequent conferences in Prague and Berlin.[61] In addition to this, a "social dimension" was now stressed, rather than focussing exclusively on the idea of the competitiveness of higher education, as had been the case at the beginning of the process. This is documented via academic values, the access "for all" to higher education, the reduction of social inequalities and the integration of student representatives. WÄCHTER views these expansions as possibly placing excessive demands on the convergence efforts, if not even representing a return to "pre-Bologna approaches".[62] The fact that, prior to 1999, the most important preparatory work in respect of the recognition of degrees in EU countries, the development of degree supplements and quality assurance in higher education was carried out at an EU level means that the strengthening of the role of member states within the process at the expense of the EU institutions could also prove to be a disadvantage.

In principle, a favourable assessment can be made of the area of implementation of measures. A comparison of the positions of 17 European associations in the area of higher education, for example, revealed that seven welcome the process in its entirety and that nine have reservations in some points only. Only one association virtually rejected the process completely. A breakdown of the various areas of measures showed that there is evidence of a critical, albeit constructive, position particularly with regard to the introduction of tiered study structures, the comparability of qualifications and issues of quality assurance.[63]

60 The Bologna Declaration of 19 June 1999: Joint declaration of the European Ministers of Education (www.europa.eu.int/comm/education/policies/educ/bologna/bologna.pdf).

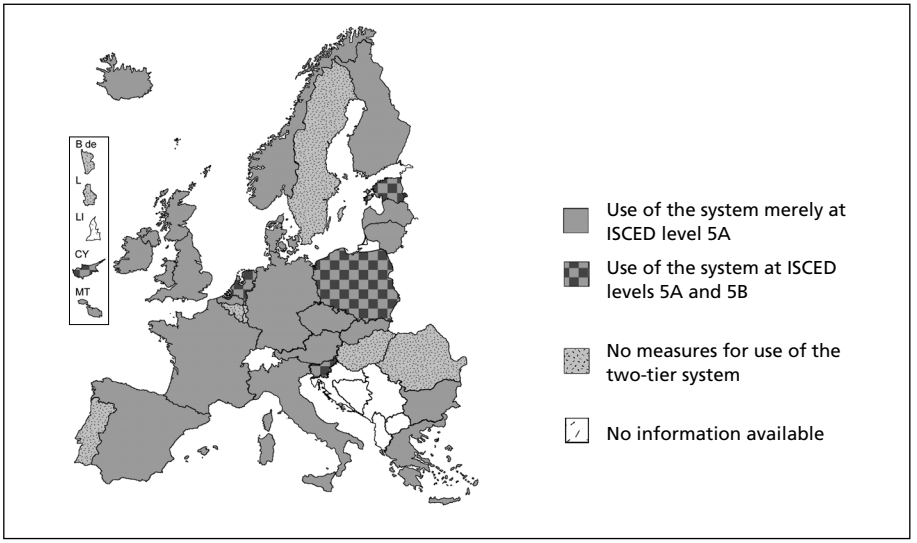
61 For information on the extensive work programme, the integration of a wide variety of stakeholders, specialist workshops and seminars within the framework of the Bologna Process cf. www.bologna-bergen2005.no/.

62 Cf. WÄCHTER, 2004, pp. 272 f.

63 Cf. TAUCH, C.; WUTTIG, S.: Comparative analysis of selected statements on the European Higher Education Area, based on the Bologna Declaration and the Prague Communiqué (www.bologna-berlin2003.de/en/ main_documents/docu/comparative.htm).

The first two studies on the level of progress towards a European Higher Education Area, based on information provided by countries and higher education associations themselves, either revealed a high level of willingness to introduce tiered courses of study in the wake of the Bologna Process (cf. Abb. 10) or else showed that existing study structures were already organised in this way (40 percent of countries).[64] The detailed "Trends 2003" analysis, however, shows that, notwithstanding the basic level of consensus as to the general direction, a large number of issues remain to be addressed in the area of methodological approach, leading to divergence in the introduction of Bachelors and Masters courses of study at a national level.[65] Furthermore, the development process is predominantly being driven by higher education management without sufficient involvement on the part of employees, students or professional associations and companies, a necessary element especially with regard to the level of employability afforded by the Bachelor qualifications.

Figure 10: **Application of the two-tier study system in the Bologna countries 2003/04**[66]



64 Cf. TAUCH, C.: Almost Half-time in the Bologna Process - Where do we stand? In: European Journal of Education, 39 (2004) 3, pp. 275-288.

65 Cf. Trends 2003. Focus on the Structure of Higher Education in Europe (www.eua.be/eua/jsp/en/upload/Trends2003final.1065011164859.pdf); Wächter, 2004, pp. 269f assesses the debate on "qualifications frameworks" as a further indicator that comparability is scarcely achievable, leading to an agreement to develop a further transparency instrument.

66 EURYDICE: Focus on the structure of higher education in Europe 2003/04. Brussels 2004, p. 11. (www.eurydice.org/Documents/FocHE/en/FrameSet.htm, p.13)

A counter-example is provided by the Tuning Project, initiated as part of Socrates, in which 78 institutes of higher education aim to develop a joint implementation framework for five different subject areas to extend as far as the curricular level.[67] The possibilities of establishing joint, rather than double, qualifications between institutes of higher education in different countries is an area which has hardly been exploited in terms of achieving internationalisation of higher education, although draft plans have been drawn up and it is fair to expect that such an approach would result in crucial benefits, both for students and in terms of the realisation of a European Higher Education Area.[68] Although the further expansion of cooperation at a European level on issues relating to quality assurance is proceeding with a relatively high level of consensus and comparatively smoothly[69], deficits remain apparent in other areas. Notwithstanding the appropriate European convention, for example, recognition of a period of study spent abroad still mostly takes place on a case-by-case basis; there is very little awareness of the degree supplement on the part of employers; the accumulation of fulfilment of study requirements via the ECTS, which two thirds of institutes of higher education state that they use, is applied very differently by these same institutes.[70]

The way the Bologna Process has proceeded hitherto provides a stronger indication than ever that the development process will be both continuous and painstaking and has little to offer in the way of genuine innovation and milestones. Added value thus consists in an intensification of the level of debate at a European level, a process of raising awareness of the potential benefits of convergent higher education regulations and a dissemination of the instruments that have been developed in member states. The limits of the top-down strategy being pursued, which are reflected in a tense relationship with broad-based local acceptance of changes within institutes of higher education and the adaptation to locally specific conditions, are, however, becoming apparent.

67 Cf. general description (http://europa.eu.int/comm/education/policies/educ/tuning/tuning_en.html); Project report Phase I (www.relint.deusto.es/TUNINGProject/doc_tuning_phase1.asp).

68 Cf. Council of Europe: Recommendation on the recognition of joint degrees. 9 June 2004 (www.bologna-bergen2005.no/EN/Other/Lisbon_Rec-doc/040609_Recommendation_joint_ degrees.pdf); EUA: Developing Joint Master Programmes for Europe. Brussels 2004.

69 Commission: Proposal for a recommendation of the Council and of the European Parliament on further European cooperation in quality assurance in higher education (COM (2004) 642).

70 Cf. Trends 2003, 2003, pp. 10 f.

4.2.3 "Bruges to Copenhagen" – Transparency in vocational education and training

Parallel to the initiatives within the Lisbon Process, the European Commission Directorate General responsible for vocational education and training reached agreement at a conference held in **Bruges** in October 2001 on the core points for future enhanced cooperation in VET policy cooperation in the EU.[71] This so-called Bruges Initiative also laid the foundations for the "Copenhagen Declaration" by national ministers of education, the European social partners and the Commission, also being confirmed by the Council.[72] This declaration is an agreement on the intensification of European cooperation with regard to various aspects of initial and continuing vocational education and training:

- promotion of the European dimension, particularly through mobility, intercultural competences, cooperation and an opening up of curricula and training regulations at a European level;
- promotion of the transparency of qualifications and competences by combining the instruments of the European Curriculum Vitae, the Degree Supplement and the Europass and by the extension and further development of training and careers guidance;
- creation of a European framework for the recognition of competences and qualifications acquired on the basis of jointly agreed principles, also to be used for purposes of cross border recognition (such as on the basis of a credit points system or credit transfer system);
- accreditation and transfer of achievements, joint principles for the evaluation of non-formal and informal learning and lifelong advice and guidance;
- quality assurance of vocational education and training: promotion of cooperation in quality assurance with a particular emphasis on the exchange of models and methods and on joint quality criteria and principles for vocational education and training.[73]

There are clear parallels to the strategy adopted in the higher education sector in the breadth of the topics agreed (transparency, recognition, quality), and this may be viewed as a necessary addition to implementing the Lisbon strategy as a whole.[74] The higher education level is, however, clearly dominating the European debate, despite the fact that vocational qualification and the connectivity of com-

71 A clear difference is apparent here compared with the approach adopted in other fields. Firstly, this initiative emanated from an EU organ itself, and secondly consideration was accorded from the very outset to the interests of the social partners and the ideas of the other specialist associations within a bottom-up process.

72 Cf. Declaration of 29 and 30 November 2002 made in Copenhagen (http://ec.europa.eu/education/copenhagen/index_en.html); Council Resolution (Education) of 19 December 2002 (OJ C 13 of 18 January 2003).

73 Cf. EUROPEAN COMMISSION, Directorate General for Education and Culture: Enhanced Cooperation in Vocational Education and Training. Stocktaking Report of the Copenhagen Coordination Group October 2003 (EAC-2003-00738-02-00-DE-TRA-00).

74 The benchmark selected (12.5% participation in lifelong learning) does not, however, appear to be particularly helpful in evaluating progress in this area. No differentiations are made in respect of initial, adult or continuing VET or with regard to the duration of the measures.

petences acquired within this area are likely to be of greater relevance to the majority of the population in terms of further learning and the securing of employment. In contrast to Bologna, approaches to the structural assimilation of diverging statuses of development and traditions in initial and continuing VET are absent from the work programme, which restricts itself to those models displaying the greatest level of compatibility with existing systems of vocational education and training. It can, of course, be the case that the long-term effect of the European Credit Transfer System for Vocational Education and Training (ECVET) being pursued also will be to blur existing occupational structures within VET or to create new transitional routes to other occupational fields. How and where this will happen remains to be seen.[75] As the bottom-up strategy continues, this needs to be determined in line with actual requirements and with the involvement of the relevant stakeholders. The value judgements contained within the "Guidelines for the recognition of vocational qualifications" have, however, led critics to fear that a levelling out of initial and continuing vocational education and training will ensue within the EU member states, resulting in pressure being exerted on the respective VET structures.[76] Within a national framework, the programmatic unanimity prevailing at a European level in respect of instruments enabling mobility and the applicability of competences often gives way to disenchantment or harsh criticism on the part of individual groups, something which is becoming all too apparent in the wake of the reform of the Vocational Training Act in Germany.

The progress made thus far by the "Credit Transfer" Working Group documents the main features of the models discussed up until now, the exchange of information regarding alternative concepts and jointly agreed definitions. Implementation of the ECVET is viewed as a medium term prospect and is seen as being dependent on the further development of a qualifications framework to serve as the basis for the evaluation and recognition of learning achievements acquired across national and sector related borders.[77] How a link could be created with the ECTS established within the academic sector, or how separation between the two areas of education in issues relating to the accreditation of learning achievement will continue to be provided are as yet unresolved.[78] As far as quality assurance is concerned, more clearly defined contours for the implementation of voluntary controls are already in evidence, these already having been adopted into Council

75 For potential effects in individual countries which have formed the object of a study cf. SELLIN, B.: Internationalisierung der Berufsbildung. Neue Ansätze zur Zertifizierung und Akkreditierung von beruflichen Qualifikationen in der EU. *("Internationalisation of VET. New approaches to certification and accreditation within the EU")* In: Pruschansky, S. et al. (Ed.): LebensLangesLernen. *("Lifelong learning"),* Berlin: BBJ Verlag 2001, pp. 295-307.

76 Cf. SEHRBROCK, I.: Qualität sichern - Transparenz herstellen - Mobilität fördern. *("Assuring quality – creating transparency - promoting mobility")* In: Gewerkschaftliche Bildungspolitik *("Trade union educational policy")* (2003) 5/6, pp. 4 ff.

77 Cf. First Report of the Technical Working Group on Credit Transfer in VET. October 2003 (http://cedefop.communityzero.com/credittransfer).

78 If lifelong learning is to be taken seriously, non-formal and informally acquired learning achievements ultimately need to be integrated into an overall system of recognition of achievement, the transferability of such learning to formal learning processes requiring investigation.

conclusions with reference to the individual components of the model.[79] Statements of acceptance have, however, not been forthcoming from member countries thus far.

4.3 Contributions towards the linking of company oriented and higher education continuing training phases

As set out in section 4.1, the mandate at EU level does not extend to include a remit to regulate legal provisions relating to courses of study or their contents, forms of learning, conditions of access or possibility of recognition of other educational measures. The same also applies to the vocational sector. Such issues are primarily determined at national level or even via regional bodies. For this reason, the "Concepts for the linking of higher education and company oriented continuing training at EU level" mainly represent the provision of a secure basis and support for "instruments" focussed on openness of access, recognition regulations, transfer possibilities and forms of interconnection rather than constituting specific study and continuing training models as such.

The contribution made by concepts determined at an EU level comprises the possibility of the development and testing of innovation within pilot projects in various countries and contexts, the identification of these as best practice examples, their introduction into the political process as alternative solutions to the deficit perceived by member states and their application within the states - ultimately leading to their establishment as shared practice. A reverse case scenario, whereby instruments launched at a European level have their origins in regional or branch related practice and are accorded a wide level of public attention by means of specifically designed research projects or simply via the political will of individual member states, is also conceivable. Both cases will be described in more detail by means of selected examples and their effects investigated in Chapter 5 of the study which follows. There is, however, no assurance that the two processes described lead to success, nor any certain indication which process is more effective and delivers the better results. Both development paths have the potential to highlight new routes within the educational sector, leading to an enhanced level of uniform trans/national practice and allowing a new form of permeability between phases of education in a form either not planned within existing regulations and ordinances or simply not stipulated at all. This would also provide an opportunity to establish a greater level of plurality within learning and educational pathways. It has not proved possible thus far to use "shared practice" at EU level to establish an integrated regulation covering all areas of education. Linking both general and vocational education and the educational processes taking place outside these systems continues to present difficulties, as is evidenced by the separate instruments represented by the ECTS, the ECVET and the Europass.

79 COUNCIL OF THE EUROPEAN UNION: Draft Council Conclusions on Quality Assurance in Vocational Education and Training (9599/04 EDUC 117 SOC 252).

In general terms, there is an expectation that the various educational initiatives at a European level will primarily result in economic effects and bring about enhanced social integration. The first of these is mainly associated with a quantitative expansion of and a qualitative improvement in education, training and continuing training. There is, however, an absence of systematic surveys looking at gaps in existing educational structures, these also being capable of interpretation as economic inefficiencies. Furthermore, no orientation on the part of the EU institutions towards the continuing training requirements of individual branches or the needs of companies is discernable. The second dimension – social cohesion – is always linked to the demand for programmes to promote lifelong learning, despite the fact that this does not form a part of the specific characteristics dictating thinking at a European level. Particularly with regard to institutes of higher education, the requirement to balance "education for all" against academic excellence seems to represent an insurmountable double challenge. In our view, both of these elements would be a necessary requirement of the process of establishing the desired links within the cross-sectional area of company oriented continuing training and higher education in a systematic way. For this reason, judging the impact of European education policy in terms of the three "linking models" described in Chapter 3 is relatively difficult. Although a variety of instruments aimed at increasing the level of mobility within the vocational/educational system are available, these almost exclusively relate to the promotion of transnational mobility or mobility within a given training area (such as higher education).

Any intersection at all between the concepts at EU level and the present object of investigation within this study is mostly to be found within the context of the *admission and recognition models* previously discussed (models 1-4). In this area, however, further promotion of approaches relating to the transfer of learning achievements between the various institutes of learning is required, and there is a need for the establishment of reliable regulations which are decoupled from formal qualifications for the admission of those in employment. Measures which could be of assistance in the implementation of alternation models, as previously defined, have not formed the object of consultations on the part of EU institutions or bodies. A more fruitful approach here might be the evaluation of practical projects in individual EU countries which may have involved the piloting of such models. There are also no indications of appropriate concepts for the promotion of a joint *qualification model* between institutes of higher education and VET. The forms of cooperation in place in the field of initial and continuing vocational education and training in Germany, for example, also always result in a doubling up rather than leading to any genuine integration of qualifications. The extremely hesitant attempts hitherto undertaken to establish joint qualifications at a number of institutes of higher education certainly do not point to any short-term change of policy in this field. The same applies to the exchange of teaching staff between educational institutes. Both this area and the area of student exchange are dominated by transnational exchanges between educational institutes of the

same type. Nevertheless, this would appear to offer the prospect of establishing an *exchange model*, even in the short term, if there is recognition of the fact that the exchange enriches both the teaching provision and the quality of the teaching and learning process.

None of the concepts debated at an EU level is to be viewed in wholly negative terms or as completely incapable of implementation. The general expectancy is that some instruments could bring significant benefit if realised at a national level. As far as the development of new EU concepts in future is concerned, a closer alignment to the context of the issues addressed here would be a welcome step.

4.4 Conclusion on the significance of the EU level within the national context

The developments which have been outlined make it clear that increasing attention is being accorded to in-company qualification in Europe and within the European countries, especially in respect of the securing of competitiveness and the innovative ability of trade and industry. Within the whole context of the "European Education Area 2010", only partial references can be identified as relating to the issue of the linking of company oriented and higher education continuing training addressed here. The promotion of participation in and of access to continuing vocational training or the improvement in opportunities for the recognition of informally acquired competences represent areas where the two areas intersect. The extensive nature of the overarching objectives defined within this field allow, however, for the inclusion of many activities already debated or implemented at a national level prior to Lisbon. Problems arise when these local approaches are displaced by pan-European initiatives or become ignored because of the dominance of the member states and individual associations writing crucial "political consultation" studies.[80] A sense of proportion should therefore prevail when adopting European recommendations, or when finding a good reason for expressing a preference for the local approaches should the latter appear to be more sustainable, although the instruments developed at an EU level could, in the long term, contribute towards a further opening up of institutes of higher education and of vocational education and training. As shown in the previous section, these instruments are, however, in many respects still in the infancy of the development process. The interim reports submitted within the various areas where measures are being developed certainly do not give rise to any kind of euphoria. The European Qualifications Framework or the guidelines on the recognition of vocational qualifications represent other areas where future effects are difficult to assess in terms of the extent to which these support the processes already initiated for the

80 A more precise consideration of supporting structures reveals that associations and experts who have a vested interest in the thematic areas they are evaluating are mostly charged with the task of drawing up progress reports and feasibility studies. By selecting "willing" partners, the Commission is also afforded the opportunity of exerting direct influence on the direction of recommendations, such studies mostly being operated via the action programmes administered by the Commission.

creation of a European Education Area and an increase in transparency in vocational education and training. Whether this will be the case or whether the reservations of the member states will hold sway cannot currently be foreseen.

Contrasting the German system of initial and continuing vocational education and training with the concepts and considerations being debated across Europe shows that the separation between vocational training and higher education is relatively distinct and firmly established in Germany. European concepts of lifelong learning, viewed as a continuous and uniform process, come up against traditional structures. A continuation of the exogenous nature of the pressure to innovate and the abundance of concepts developed both at a European level and within national frameworks will see a significant reduction in this discrepancy.

5. Linking of company oriented and higher education - an exemplary consideration of models and concepts

5.1 Ideas and concepts within the context of European educational policy

5.1.1 Stakeholders and activities within academic continuing training in the European Union

Taking as a starting point the preceding detailed analysis of educational policy within a European context – the positions and perspectives adopted by the bodies and associations of the European Union – the aim is now to proceed to a consideration both of stakeholder groups from various sectors as representing the company position and representatives of the institutes of higher education.

The authors have placed the main focus of the analysis on the bank, metal, chemistry and tourism branches, since these sectors are already displaying clear signs of the changing situation and the ensuing consequences for vocational education and training. The opening of markets as a result of globalisation and internationalisation implies pressure of competition for all branches, a process in which human capital has a major part to play in terms of providing a competitive advantage. The trend towards occupational mobility is thus not only discernable within the tourism branch, being equally a requisite for manufacturing engineers, financial services providers and employees in the chemical sector. The decrease in the number of jobs where physical labour is required and the accompanying increase in the proportion of workplaces where a high level of vocational qualification is in demand means that highly qualified employees are viewed as an essential competitive advantage. The necessity for academic continuing training is inherent within these processes of change and should therefore form an object of public political interest rather than purely being left in the hands of companies and individual economic interests.

Taking these assumptions as our starting point, we have carried out a survey at a national (German) and international level of both the supply and demand side of

vocational qualifications – represented by the social partners – on the theme of "Linking company continuing training and higher education".[81] The action fields in which these stakeholders are involved are broadly based and manifest at international, national, regional and local level, reflecting the fact that continuing vocational training should be structured at all levels and rolled into integrated concepts related to technical, qualificationary and economic developments.

The European representatives of the social partners were the "European Banking Federation" (EBF), the "European Trade Union Confederation" (ETUC) and the "Union of Industrial and Employers' Confederations of Europe" (UNICE) and were surveyed in writing as to the prevailing state of awareness of ideas, concepts and models. Representatives from the tourism branch in the form of the "Association for Tourism and Leisure Education" (ATLAS) were also questioned on the theme. At the time of going to press, however, it has not thus far proved possible to include any of these answers or statements in our study. There are also no statements in respect of the object of our research on the respective websites of the above organisations. So as to extend investigation of the issues beyond a mere company perspective, the survey was expanded intersectorally to include various European higher education associations.

A selection of four examples for further study was made from the wide variety of associations and groupings active within this context and the networks arising from their activities.[82]

A particularly high level of interest on the issues being investigated was expected from the European University Association (EUA) in its capacity as an association representing European universities. The EUA is representing the universities in the official follow-up work within the Bologna Process and has made a contribution to all major events staged as part of the Bologna work programme.[83] The object of the survey here was once again to discover with which concepts, projects or even specific ongoing examples in the field of "dual academic continuing training" those responsible were familiar with at a European level. A telephone interview was conducted with the senior programme manager in the quality assurance area, who displayed a considerable level of interest in the issues. Although our interview partner informed us that the EUA itself had no projects or concepts specifically related to this theme, she emphasised the urgency of such a debate, even if it is only possible to establish a framework for educational policy at a European level. This could have an impact on promoting projects and conceptual ideas in this field on the part of educational policy institutions at a European level.

81 Results of the survey of the German stakeholders are provided in section 5.1.2.

82 An overview of various European higher education institutions, their tasks and the networks arising from their work is available in WÄCHTER, B.: Handbook of European Associations in Higher Education. A Practical Guide to Academic Networks in Europe and Beyond. Bonn 2000.

83 Further information on the European University Association can be found on the organisation's homepage (www.eua.be).

Written questionnaires were also conducted with the "European Association of Distance Teaching Universities" (EADTU), which has its headquarters in the Netherlands, the "European Association for the Education of Adults" (EAEA) and the "Academic Cooperation Association" (ACA). At the time of going to press, however, no responses had been recorded. An analysis of the homepages, documents and press releases of the above organisations resulted in the conclusion that no official position has been taken and no projects launched on the part of these associations which are specifically related to the issues forming the object of study.

In conclusion, it only remains to record that, despite indications of interest in the issue, no models, projects or concepts attracting public attention have apparently been launched at a European level either on the part of company stakeholders (employers'/employees' representative bodies) or by the higher education associations. Our view is that the reason for this could be related to the predominantly national nature of the relevance of the issues or else lie in deficiencies within previous investigations of the theme. The European higher education associations do not seem to have identified any necessity to take action within this research field thus far. Although the stakeholders are also pursuing the objectives stated at a European level in principle, namely mobility, permeability and transparency in vocational education and training, such activities are confined to their own action fields (higher education and in-company (vocational) training respectively). The transparency between the educational systems required for our research approach, meaning permeability of educational systems in the sense of recognition of learning achievements from everyday working life by the higher education system (and not merely within the higher education system itself) has not hitherto been accorded attention by the stakeholders interviewed.

More research, in the form of detailed, qualitative research case studies, will be required if the above suppositions are to be confirmed or refuted, however.

Taking the investigation of the position of various European stakeholders as a starting point, the aim in the following is to study two central European action programmes in the areas of education and vocational education and training respectively as to their thematic relevance.

5.1.2 Model projects of the European Union

The organisation of education in general and higher education in particular both in terms of content and organisationally lies predominantly within the area of responsibility of the member states of the European Union. As already indicated at a number of points, the EU bodies make an important contribution to the stipulation of long-term, integrating EU educational policy objectives and action frameworks which then need to be achieved and filled out at a national level. There is a range of European Union action programmes to promote cooperation between member states both in the general educational as well as the VET field. The Socrates Programme is most predominant in the area of general education,

whereas the LEONARDO da Vinci programmes are used in the field of vocational education and training.

In the light of the thematic area of the linking of company continuing training and higher education and the problems arising in this field forming the focus of study, the authors would like to make specific reference in this section to two European projects which partly address the issues inherent to our present thematic focus.

The central theme of the European project *"Developing European Work Based Learning Approaches and Methods"(DEWBLAM)*, which has been running since October 2003, focuses on approaches and models for the recognition of "work based learning" (WBL) by institutes of higher education.[84] This project is based on the EU Socrates Project and interacts specifically with the Grundtvig Action.[85]

The aim of the project is the development of a European approach and framework for the development of higher education courses of study integrating learning imparted via occupational experience.[86] The principle of WBL is particularly applied in the Anglo-Saxon world to summarise attempts, concepts and ideas focussing on the fact that work processes also represent learning processes, whilst also paying due heed to the idea that, in terms of knowledge acquired, such learning is comparable with knowledge obtained within traditional, formal learning processes and, as a consequence, must be transferable to a higher education qualification to a measurable extent.

84 The Project initiator is the E-Form Consortium, an association of 12 universities from the South of Italy formed by the University of Florence. The homepage of this organisation provides further information on the DEWBLAM Project (www.eform.it/dewblam/dewblam.php).

85 The activity being promoted within the scope of this project characterises itself as a transnational cooperation network with the objective of exchanging tried and tested practices, experiences and analyses within the content of educational policy. Within this process, the Grundtvig action specifically relates to adult education with the programme aims of promoting the European dimension of lifelong learning through enhanced transnational cooperation, supporting the debate surrounding lifelong learning and contributing to the dissemination of tried and tested implementation projects. Cf. here German language website (www.sokrates-leonardo.de/programme/sokrates).

86 Further partial objectives have been defined under the heading of this primary objective. For a more detailed portrayal, see SCHMIDT, Reinhard; SCHERMUTZKI, Margret: The European project "Developing European Work Based Learning Approaches and Methods" (DEWBLAM). Europäische Ansätze und Modelle zur Anerkennung von Work Based Learning durch die Hochschulen *("European approaches and models for the recognition of work based learning by institutes of higher education")* In: STAMMRIEMER, I. (Ed.): Lebenslanges Lernen. Zur Verknüpfung akademischer und beruflicher Bildung. *("Lifelong learning. On the linking of academic and vocational education")*/(Workshop on the topic of "Ansätze zur Anerkennung von außerhalb der Hochschule erbrachten Leistungen im Rahmen eines Konzeptes Leistungspunktesystem und Lebenslanges Lernen" *("Approaches to the recognition of achievements acquired outside higher education within the scope of concept comprising a credit points system and lifelong learning")*, organised by the Bund-Länder Commission (BLK) cooperative project "Entwicklung eines Leistungspunktesystems an einer Hochschule in allen Fachbereichen" *("Development of a credit point system in all subject areas of an institute of higher education")* on 9/10 October 2003 in Berlin. Institute for Higher Education Research (HoF) at the Martin Luther University of Halle-Wittenberg), Berlin 2004, p. 90.

Justification is provided on a number of levels for such an accreditation of learning achievements acquired in the course of employment towards higher education qualifications. In accordance with the objective of establishing a European Education Area and within the context of lifelong learning, there is in Europe a requirement for educational pathways offering extensive levels of transparency and permeability in order to be able to maintain a position within, or even drive forward, ongoing global change. From an adult education point of view and from the perspective of lifelong learning, such study structures are needed to increase levels of acceptance and tolerance. As a consequence, both those participating in education and the companies and institutes of higher education themselves will be the beneficiaries, the latter being able to exploit the advantages ensuing from joint cooperation projects and make use of the added value arising from synergies.

The project partners comprise institutes of higher education from various European countries, addressing such issues as in-company continuing training for adults at higher education level and the further development of the ESCT, partners with specific expertise in adult education and social partners also being involved, the latter representing the interest of the world of work.

The project may be divided into three main operational phases:

- **Phase 1:** development of a European framework for WBL,
- **Phase 2:** using the framework thus drawn up for the development and implementation of locally based WBL courses of study in various disciplines (paying due heed to national and local conditions),
- **Phase 3:** establishment of the WBL approach within a local, institutional context, development of a multicultural WBL model.

When the project concludes, the aim is for a European model framework to have been established which can be used to consolidate modularised WBL courses of study defined in terms of competences and credits (ECTS). A central focus of this work will be to deploy appropriate methods and measures to adapt ECTS to the requirements of lifelong learning.

In terms of results, the work of this project will stand or fall by the acceptance and credibility it requires from the participating stakeholders from the worlds of theory and practice that the awareness gained in the course of occupational activity at the workplace is implicitly equivalent to the acquisition of knowledge at a higher education level.

As an adjunct to the remarks in respect of the Socrates Project, the main features of another project going on at a European Union level should be outlined. This is the project *"ECTS – Certification of online and conventional training in the initial and continuing vocational education and training of workers in the chemical indu-*

stry"[87], ongoing within the context of the Leonardo da Vinci Programme.[88] The aim of this project is to make a contribution to improving mobility, health and safety at work and safe use of equipment in the chemical industry.

This project is regarded as a European reference model in the initial, advanced and continuing training of operators in automated chemical plants. The main focus of the project work is the compilation, application and piloting of evidencing/certification of training results. The project objectives may be described as follows:

- compilation and description of important necessary competencies of operators in the oil-processing, the chemical and the pharmaceutical industry,
- compilation and description of requirements for the training of operators resulting from the required competencies,
- identification and evaluation of available training modules for the acquisition, consolidation and maintenance of the necessary occupational competences.[89]

The way in which these objectives are formulated does not immediately necessarily suggest a link to the to the themes which are the object of our analysis. Notwithstanding this, we have selected this project, a closer look certainly revealing important statements and starting points relating to the main thrust of our research.

Taking the Socrates Programme as described above into the argument, recognition and accreditation of achievements obtained in the course of occupational activity to subsequent phases of education was identified as an important aspect. A crucial prerequisite here, however, is the transparency and description of such competences as arise in everyday working life. This is the starting point for the idea behind the "ECTS – Certification of online and conventional training in the initial and continuing vocational education and training of workers in the chemical industry", which further seeks to establish a reference to theoretical training by questioning its requirements in terms of the necessary competences. In this example, however, theoretical training is not then related to higher education continuing training, which certainly would be feasible in our opinion.

87 Detailed information as to the project objective, duration and partners are available at (www.ects-chemie.de/english/leonardo.htm).

88 The European Union Leonardo da Vinci Programme is aimed at vocational training. It supports and supplements the VET policy of member states with strict regard to the responsibility accorded to member states for the contents and organisation of vocational education and training. It represents both an increase in quality and innovation and an extension of the European dimension of VET systems. Cf. here German language website (www.sokrates-leonardo.de/programme/sokrates).

89 The objectives listed here are only selected examples. The complete catalogue of objectives may be consulted at (www.ects-chemie.de/english/leonardo.htm).

In our view, both projects offer starting points for the problem forming the object of analysis. The "DEWBLAM" project especially adopts an approach towards a particular set of problems relating to this issue which have not yet been debated at a European level in the form presented.

5.2 Ideas and concepts from Germany - a consideration of the national situation

5.2.1 Continuing vocational training and institutes of higher education – positions and perspectives from Germany

Having undertaken a thematically related analysis of European educational policy, the study will now be extended and expanded using Germany as a specific example. The insufficient current use of a top-down policy approach to this issue, and indeed the fact that this form of policy cannot be practised as such, necessitates a consideration of the national situation. In addition to this, a focussing of national positions, pilot projects and concepts affords the opportunity of shedding extensive light on the issues, widening the angle of approach and adopting a more critical stance in terms of questioning of our own positions.

The debate on the necessity and significance of study concepts integrating practice and theory has been ongoing in Germany since the start of the nineties. A series of discussion papers, joint declarations, publications and joint conferences have continued to give expression to a positive evaluation of "dual education at the tertiary stage".[90] The "dual courses of study" discussed here, however, should not be viewed as academic vocational education and training which can be undertaken in universities, Universities of Applied Sciences or in Universities of Cooperative Education in combination with companies. The prevailing view here is that dual courses of study are considered to be "[...] the necessity to learn actions in practice during a course of study in an environment not capable of exhaustive recreation or simulation by an institute of higher education."[91]

As laid out in the terminological pre-definitions, the analysis carried out principally relates to higher education continuing training, and specifically to the group of people which has completed a non-academic course of vocational education and training and has to some extent participated in non-academic continuing training measures. The intention of the course of study is to obtain an academic degree or be awarded a certificate. The aim of the following is to highlight the main accentuations within the German educational debate by focussing on these two groups of people with regard to the issue of the linking of vocational and continuing training.

90 Descriptions of the various positions adopted by public education policymakers since 1993 in the area of dual courses of study are available in BLK (Ed.): Perspektiven für die duale Bildung im tertiären Bereich *("Perspectives for dual education at the tertiary stage")* – Bericht der BLK *("BLK report")*, Vol. 110, Bonn 2003, pp. 54ff.

91 KONEGEN-GRENIER, C.: Hochschulen und Unternehmen im Ausbildungsverbund *("Institutes of higher education and companies in training networks")*, Cologne 1994, p. 14.

Nowadays, education and the acquisition of knowledge are lifelong processes. Within the context of a "European Area of Lifelong Learning", continuing vocational training is assuming a particular significance in respect of academic continuing training. Scientific and technological progress is constantly accelerating the trend towards higher and academic qualification. This is accompanied by a growth in the number of jobs requiring training and continuing training qualifications at an academic level. This is currently forming the background for the development of a national debate on the part of those involved in public education policy, the employers' associations and the chambers. Trade and industry in particular will display an increased level of interest in the area of joining forces with institutes of higher education to develop academic continuing training provision in the interests of remaining competitive in the long term.[92]

The Confederation of German Employers' Associations (BDA), the German Rectors' conference (HRK) and the Association of German Chambers of Industry and Commerce (DIHT) have developed a 10-point programme setting out the general conditions for successful cooperation between companies and institutes of higher education.[93]

Academic continuing training in the sense defined here comprises such higher education provision as is conducted subsequent to an initial completion of a vocational qualification and/or a phase of occupational activity and which, in addition, has been drawn up in a way appropriate to a higher education level both in terms of content and didactically and methodologically and which pays due heed to the specific time budget of those in employment.[94] With due regard to the mutual expectations of the potential cooperation partners and in line with the objective of convergence, mutual understanding ("speaking the same language") and ultimately of achieving active cooperation on the part of both partners, a programme was generated to eliminate the prevailing problems and barriers within the context of academic continuing training. Some of the main starting points stated in this respect are the elimination of service, remuneration and budgetary restraints, the liberalisation of access to higher education, the attractiveness of continuing academic training for higher education lecturers, network structures between institutes of higher education and trade and industry and curricular cooperation.[95] These should be interpreted as an exhortation to the world of politics, institutions of higher education and trade and industry.

92 Current practical examples of cooperation between trade and industry and institutes of higher education can be found in section 5.2.2 of this study.

93 Cf. here BDA (Hrsg.) Weiterbildung durch Hochschulen – Gemeinsame Empfehlungen des DIHK, BDA, HRK. *("Continuing training via institutes of higher education – joint recommendations of the DIHK, BDA and HRK")*, Berlin 2003.

94 According to §12 Framework Act for Higher Education (HRG), cf. ibidem p. 6.

95 Detailed information on the individual points can be found in BDA, 2003, pp. 9-13, KÜPPER, S.: Weiterbildung durch Hochschulen, Vortrag auf der FiBS-Konferenz in Köln 2003 *("Continuing training via institutes of higher education, presentation at the FiBS Conference in Cologne, 2003")* pp. 10-20. (www.fibis-koeln.de/kueppers.pdf) - German language resource.

The objective of making the European Union the most competitive and most dynamic knowledge-based economic area in the world by the year 2010 is throwing up new challenges across various areas of vocational education and training. The concept of lifelong learning has been allocated a crucial role. The prerequisites needing to be put in place in this context determine in particular regulations governing the positioning and further development of individual education and training systems at a national level as well as relating to the requirements of the educational systems of the European Union.

In light of these educational policy points of view, the Bund-Länder Commission for Educational Planning and Research Promotion (BLK) is planning a programme to address the theme of "Further development of provision of dual courses of study at the tertiary stage". The interim report "Perspectives for dual education at the tertiary stage" presents initial results, showing both deficits and problem areas relating to dual education at the tertiary stage as well as providing action recommendations for an enhanced level of commitment in the cooperation between trade and industry and higher education.[96] As far as the typologisation of dual courses of study is concerned, *occupationally integrative*[97] dual courses of study in particular are to be allocated to the category of academic continuing vocational training. Differentiated integration of occupational practice into the dual course of study is possible. One conceivable approach would be recognition of the general higher education entrance qualification based on several years of vocational qualifications in respect of credit towards a higher education course of study.[98]

According to the BLK, the main area of focus should be placed on the following areas of measures within the context of the development of academic continuing vocational training with reference to the Bologna Declaration (1999):

- incorporation of provision for dual courses of study into the system offering Bachelors and Masters qualifications,
- incorporation of a credit points system - similar to the ECTS - with regard to crediting VET qualifications (accreditation of prior certificated learning - APCL) and/or occupational experience (accreditation of prior experiential learning - APEL) in the interests of enhancing the level of permeability within the educational system (according to the Bologna Declaration, it should also be

96 Cf. BLK, 2003.

97 Occupationally integrative dual courses of study are aimed at those interested in pursuing a course of higher education study with or without a general higher education entrance qualification, who have already concluded a course of VET which they can use as a basis of reference for their studies and who are in employment. Cf. here MUCKE, K.; SCHWIEDRZIK, B.: Duale berufliche Bildungsgänge im tertiären Bereich – Möglichkeiten und Grenzen einer fachlichen Kooperation von Betrieben mit Fachhochschulen und Berufsakademien. *("Dual vocational courses of study at the tertiary stage – opportunities and limitations for specialist cooperation between companies and Universities of Applied Sciences and Universities of Cooperative Education"),* Final report of BIBB project 2.1003 – status July 2000.

98 For information on the integration of practice and study with regard to recognition, transfer and permeability of the educational systems cf. BLK, 2003, pp. 24 ff. and pp. 42 ff.

possible to acquire credit points outside higher education (such as in the course of everyday work),
- development of a national qualifications framework[99] including recognition, accreditation and permeability of educational systems – in this case between vocational training and (continuing) tertiary training.[100]

A specialist conference staged by the German Coordination Office of Further Training and Employment (KWB) in conjunction with the rail company Deutsche Bahn AG in June 2004 "More attractiveness through permeability – new forms of cooperation between vocational and academic education" once again provided a platform for controversial debate of the thematic area of the future linking of vocational and academic education.[101] Representatives from trade and industry, institutes of higher education and politics gave papers on a range of themes:

- the Bologna Process and vocational education and training,
- successful cooperation between companies and institutes of higher education,
- structuring lifelong learning with institutes of higher education,
- recognition of achievement between vocational and academic education.

The intention was to drive forward the debate on permeability of educational systems by setting new educational policy priorities. The practice of separation of initial and continuing vocational education and training on the one hand and academic higher education training on the other has given rise to the levelling of a considerable amount of criticism at current educational policy for no longer corresponding to the requirements of modern labour markets. Within this context, the action frameworks put in place at a European level, in the so-called Bologna Process, are viewed as offering an impetus. For the purpose of an international positioning and recognition of the German educational system and, ultimately for the development of a "European Education Area", the focus now also needs to be placed on loosening the traditional structures within the area of higher education and developing them further. Within this context, the speakers from the area of public education policy presented a differentiated range of concepts aimed at opening up educational pathways and thus lending a structure to lifelong learning.

99 The development of a national qualifications framework as constituting a further objective of the ongoing Bologna Process was formally stated at the follow- up conference to Bologna (1999) held in Berlin (2003).

100 Further information and detailed remarks on the areas of measures relating both to the development of dual courses of study and working and study fields within this thematic area are available in the programme outline of the BLK (www.blk-bonn.de/modellversuche/studienangebote_tertiaerer_bereich.htm). German language resource.

101 The papers given at the conference were complied in a conference documentation volume. (www.kwb-berufsbildung.de/pdf/2004_Dokumentation_Durchlaessigkeit.pdf). German language resource.

The recommendations of the BDA, HRK and DIHT, the remarks of the BLK and the results of the specialist conference staged by the KWB on the topic of academic continuing vocational training indicate that the basic idea of linking practical learning venues (companies) with the teaching of theory (institute of higher education) is evaluated in an extremely positive light by those involved and forms an object of future expectation. Such a positive assessment may have its origins in previous experience of the dual system of vocational education and training in Germany. All those supporting duality in higher education continuing training associate this particular form of continuing training with practical relevance, applicability, high learning motivation, more effective deployment in practice, extended specialist competence and social competence due to in-company activity.[102]

On the other hand, however, there are problem areas requiring certain action and development. These are to be found in the "duality problem" and in the necessity to take action at a national level ensuing from the educational policy objectives of the European Union (ECTS, mobility, tiered courses of study etc.). Analysis of the debate surrounding dual academic continuing training in Germany tended to lead to an investigation of the branches stated running parallel to the analysis taking place at both European and national levels rather than being merely restricted to the actions above. The branch related social partners in Germany were surveyed by telephone and e-mail on their awareness of concepts and models relating to this thematic area.

A representative of the German Employers' Association for Private Banking (AGV) presumed that there would be ongoing models addressing this theme at the Business School of Finance and Management in Frankfurt. No official statement as to the current state of debate was available from the representatives of the banking sector, however.[103] As far as the tourism branch was concerned, the tour operator Deutsches Reisebüro and the German Association of Tour Operators (DRV) both referred the authors to the Willy Scharnow Institute at the Free University of Berlin, which offers a Masters course in tourism management which is delivered in a closely practice related way.[104] In addition, interviews were also sought with the German Employers' Association for the Metal Industry (AGV-Gesamtmetall), the Confederation of German Employers' Associations (BDA), the Association of German Chambers of Industry and Commerce (DIHT), the German Chemical Industry Association (VCI), the service industry trade union ver.di, the industrial trade union IG-Metall and the German Confederation of Trade Unions (DGB). At the time of going to press, however, no responses had been recorded.

102 Cf. BLK, 2003, p. 8.

103 There will be more detailed treatment of an example from the University of Banking and Finance in Frankfurt in section 5.2.2.

104 Investigation of this course of study revealed, however, that is not of relevance to the main focus of our research.

The enactment of academic continuing training in both the Framework Act for Higher Education and all the higher education laws of the federal states as a further core task of institutes of higher education and a recommendation of the Standing Conference of the Ministers of Education and Cultural Affairs of the Länder in the Federal Republic of Germany (KMK) in 2001[105] relating to the implementation of this function created the necessary respective preconditions for the initiation of cooperative continuing training programmes.

5.2.2 Selected examples of dual courses of study in continuing vocational training in Germany

Higher education continuing training in Germany is, as such, nothing new. A more precise typologisation, however, reveals that the variations of academic continuing training which have predominated hitherto should be defined as very much as in the nature of in-service training rather than as occupationally integrative. The central criteria of dual courses of study – such as coordination of content between occupational activity and higher education study – are not fulfilled by in-service academic continuing training. The established distance courses of study in particular operate according to the principle of in-service continuing training and are mainly private matters for those studying them.

Continuing training programmes involving cooperation between companies and institutes of higher education in terms of their implementation have, however, have made only a sporadic appearance in Germany up until now.

An ongoing discussion on the permeability of educational systems is accompanying the debate on lifelong learning. "In an optimised educational system, "straggling", elaborate detours and repetitions for formal reasons should be avoided wherever possible."[106] The recognition and accreditation of previously acquired qualifications and practical experiences play a particularly significant role in allowing smooth re-entry to later phases of learning and lend continuing training a much more attractive structure for those interested.

An example which has been highlighted in literature on the subject, and which can be allocated to the category of occupationally integrative course of study fulfilling the criteria relating to permeability is the *dual course of study in Business Administration and Engineering at the University of Applied Sciences in Stralsund*.[107] In accordance with the model constructs developed in Chapter three, this course of study should be allocated to *variation 2 of the alternation model*. This

105 Cf. here the remarks of the KMK in respect of academic continuing training of 21 September 2001. (www.kmk.org/doc/beschl/wisswei.pdf.). German language resource.

106 BLK, 2003, p 42.

107 Vgl. LAST, B.: Dualer Studiengang Wirtschaftsingenieurwesen an der Fachhochschule Stralsund – der Betrieb als Studienort. *("Dual course of study in Business Administration and Engineering at the University of Applied Sciences in Stralsund – The company as a learning venue")* In: Stamm-Riemer, I. (Ed.): Lebenslanges Lernen: zur Verknüpfung akademischer und beruflicher Bildung *("Lifelong learning. On the linking of academic and vocational education"),* Berlin 2004, pp. 59-70 and BLK, 2003, p. 43.

means that the example subsequently described represents an interlinking of company oriented and higher education continuing training in terms of content and organisation.

The initiative behind this dual course of study emanated from trade and industry, specifically from engineering and metal working companies in the federal state of Mecklenburg-Vorpommern which viewed such a study model as a human resources development scheme. A right to co-determination in respect of the content of the qualification provides the opportunity of qualifying staff in a target-oriented way, in line with company specific needs.

This study provision is primarily aimed at those interested in studying who are in possession of an initial VET qualification and wish to study in a practice related way.[108] Admission requirements are: completed vocational education and training, a general higher education entrance qualification, entrance examination based on completed VET in conjunction with at least three subsequent years of occupational activity and proof of employment.

The plan behind the study concept is for a young person beginning commercial and technical training with a company participating in the programme to achieve, over a period of seven and a half years, a vocational qualification, master craftsman status in industry or craft trades and a degree in Business Engineering (FH). The model for this dual course of study thus comprises three progressive phases of study with various entry and exit opportunities (cf. Figure 11).

- Phase 1: A phase of vocational education and training preceding studies enabling the parallel acquisition of an entrance qualification to a University of Applied Sciences in only three years.
- Phase 2: Basic study period at the University of Applied Sciences and parallel master craftsman continuing training.
- Phase 3: Main study period and acquisition of the degree.[109]

The intended duality of the course of study is based on the joint pillars of a co-operation agreement between the University of Applied Sciences, the companies and a designated coordinating firm and a curriculum integrating theory and practice. This purely organisational interlinking is then extended into a linking of content by the relocation of learning content to the company.[110] The model is structured in such a way that of the 6 semesters comprising the basic study period,

108 Cf. here course information of the University of Applied Sciences in Stralsund. (www.fh-stralsund.de/lehrangebot).

109 For a detailed overview of the structure of the course in terms of basic study period and main study period, see the website of the University of Applied Sciences in Stralsund (www.fh-stralsund.de/lehrangebot/lehrebaum/powerslave,id,16,nodeid,.html).

110 For remarks on the in-company learning phases, which are specifically defined as project phases, see LAST, 2004, pp. 61, 64.

three (plus semester holidays) are spent working in-company and participating in master craftsman continuing training, these internships occupying the first, third and fifth semesters. The second, fourth and sixth semesters are accordingly set aside for study, the aim being for the acquisition of part one of the degree and master craftsman qualification in the sixth semester. These are followed by two study semesters (7th and 8th semesters) and work periods in the holidays. The degree examination is taken and the dissertation written in the ninth semester. This linking of content and organisation is further extended to include personnel. The in-company projects are assessed by teachers at the university and recognised as fulfilment of examination requirements. The mentors in the companies are also involved in the presentation of project results and in the evaluation of project implementation and documentation.

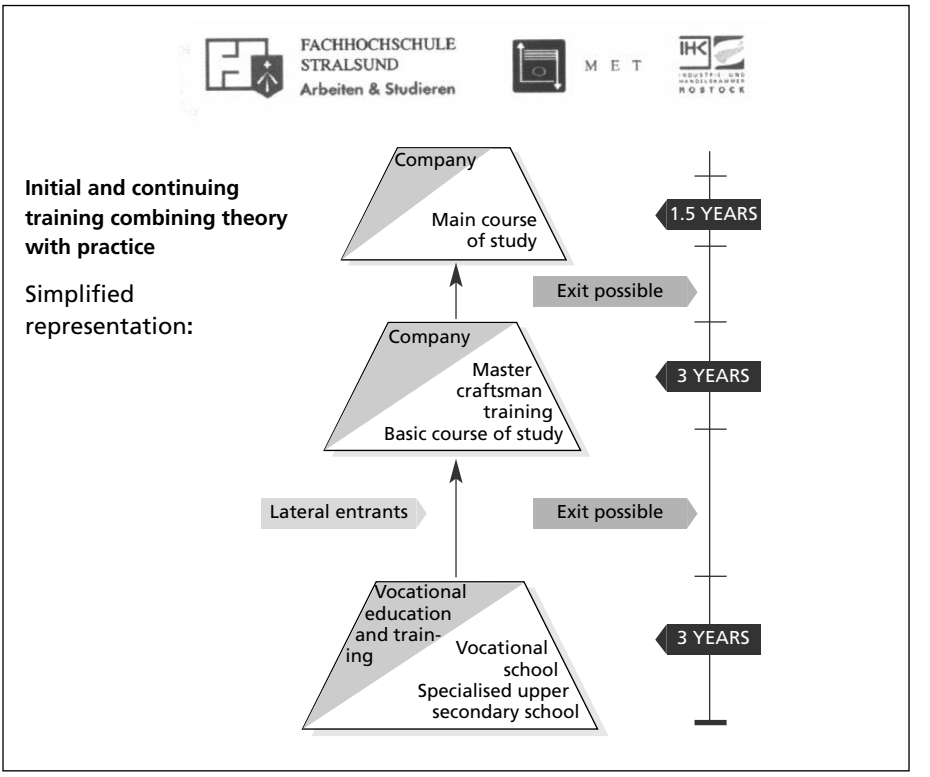
In the light of the "tiered courses of study" approach, initial consideration was given to consecutive Bachelors and Masters courses. The issue of conversion has, however, yet to be clarified, "[…] (the university) quite rightly being dissuaded from this course (…) the main idea being to retain the achievements of the dual degree study programme."[111]

Within the context of recognition and accreditation of previous achievements, it remains to comment that various forms of recognition and accreditation are deployed, higher education achievements being credited towards the master craftsman examination, for example. However, there are also learning achievements acquired outside the institute of higher education which are not credited towards the degree qualification either formally or informally. Introductory qualifications (requirements fulfilled in vocational education and training or additional qualifications) are only accredited insofar as they "[…] facilitate understanding of certain subjects and reflect to some extent better marks than achieved in the regular course of study."[112] The study concept has not hitherto accorded consideration to the fact that companies wish to use this course of study to provide master craftsmen and women with many years of occupational experience with continuing training and has not formulated a procedure for the accreditation of previous achievements in this case as this would apply in accordance with the concept of APCL or APEL.

111 Ibidem, p. 69. At this point, attention should be drawn to the transparency creating function of the degree supplement which can be added to a degree qualification.

112 Ibidem, p. 66.

Figure 11: **Structure of the dual course of study in Business Administration and Engineering at the University of Applied Sciences in Stralsund**[113]



A further example of academic continuing training is the model of *Bachelor of Engineering at the Technical University of Applied Sciences in Berlin*. This course of study was developed by the Technical University of Applied Sciences in Berlin in conjunction with Siemens AG.[114] This model may be given as an example of the accreditation of non-higher education based achievements. Interested students who have completed training as an industrial technologist at the Siemens Technical Academy may be placed in a higher semester contingent on passing a classification examination. According to the model constructs drawn up in Chapter 3, this form of higher education continuing training can be allocated to recognition model I.

113 LAST, 2004., S. 60.

114 Further information on this course of study is available at (www.asiin.de/deutsch/1_akkred/ausfuerlich.ph?id=28). German language resource.

115 Further information on the structure and contents of the CCT VDT qualification are available at (www.vdtev.de/public/qualifizierung.shtml) and (http://hfb.de/Templates/simple/Certified_Corporate). German language resource.

At the Business School of Finance and Management (HfB) in Frankfurt, the academic continuing training course of study of *Certified Corporate Treasurer (Association of German Treasurers, VDT*) is offered. This model is primarily aimed at treasury workers with several years of occupational experience seeking to deepen and complement their knowledge. The duality of this form of continuing training is primarily to be found in the organisational area. In conjunction with the Association of German Treasurers (VDT), the HfB has developed the in-service qualification of Certified Corporate Treasurer VDT (CCT VDT). The intention of this form of cooperation is the linking of "applied theory and actual practice in the treasury"[115] and the course is not capable of definition as occupationally integrative.

The examples presented here demonstrate both that a linking of in-company continuing training with higher education is a topic forming the object of political discussion and that attempts are underway within the German educational landscape to implement various pilot projects. The authors' view is that the networking displayed in the example of the University of Applied Sciences in Stralsund represents the optimum form of linking of company oriented and higher education continuing training in terms of vocational pedagogy and higher education didactics. With reference to the IT continuing training system, this is certainly a model which should be transferable to the level of Operative Professional, as long as it is possible to identify Universities of Applied Sciences and companies willing to accept the greater level of expenditure associated with this.

Within this process, however, European Union concepts are accorded only cursory, and to some extent, insufficient consideration. It is thus apparent that a top-down educational policy will be difficult to implement within this context and that national differentiations and specifications will be of critical significance.

115 Further information on the structure and contents of the CCT VDT qualification are available at (www.vdtev.de/public/qualifizierung.shtml) and (http://hfb.de/Templates/simple/Certified_Corporate). German language resource.

6. Summary

The present study has dealt with the issue of the extent to which an interlocking of company oriented and higher education continuing training is feasible in principle in terms of the objectives aspired to within the German IT continuing training system, for example. The authors decided on a three-step approach. In the first step, the starting point being the issue of which forms of linking, interlocking or networking of company oriented and higher education continuing training are conceivable in principle, eight models[116] were developed which in our view illustrate the scope of such a combination.[117] These models subsequently served as a search grid for the identification of specific initiatives at an EU level.

The second step according presenting the visions and strategic objectives at EU level in respect of the interlinking of academic and vocational continuing training and of the consensus hitherto achieved in this field, insofar as this is expressed in the form of resolutions, work programmes and interim reports produced by European institutions. The third step then firstly dealt in detail with the development of concrete models for the implementation of these ideas, insofar as these represented concepts and implementation approaches promoted by the wide variety of stakeholders involved within a context of transnational cooperation, before concluding with a description and analysis of individual examples of specific projects which are already being used in an exemplary approach to piloting concepts relating to the linking of the two levels in practice. Germany represented the reference point selected here, as providing the best access to appropriate pilot projects and thus enabling a sounding to be taken of the extent to which the regulatory concepts at a European level are actually compatible with the traditional and higher education structures.

The core results of our investigations in the second step were as follows.

1. The EU level mandate does *not* encompass a remit for the *direct* regulation of the legal stipulations for courses of study (contents, forms of learning, access requirements, potential recognition) or for vocational courses of study. Such issues are primarily the decision-making responsibility of national or even regional bodies. For this reason, concepts aimed at the linking of higher education and company oriented continuing training at an EU level represent the provision of a secure basis and support for "instruments" focussed on open-

116 In individual terms, the eight models comprise the following: the admission model, the recognition of training requirements fulfilled, the recognition of individual achievements outside the higher education system, the recognition of (interim) examination achievements outside the higher education system, the organisational linking of higher education studies and company oriented continuing training, the linking of higher education studies and company oriented continuing training in didactic and curricular terms, higher education studies and in-company continuing training as an option for the preparation for a final examination and the statutorily assured exchange of teaching staff from institutes of higher education and company oriented continuing training.

117 Cf. Chapter 3 for detailed information on this.

ness of access, recognition regulations, transfer possibilities and forms of interconnection rather than constituting specific study and continuing training models as such.

2. The contribution made by the EU concepts needs to be viewed in the light of the potential to develop and test such innovations by means of pilot projects in a range of countries and contexts, to identify these as best practice examples, establish them on the political agenda as an alternative solution to the shortcomings perceived by member states, ultimately resulting in general shared practice as they are deployed in the member states. There is, however, no assurance that this process will result in success and integrated regulation for all educational areas.

3. On the other hand, instruments launched at a European level can have their origins in regional or branch related practice and are capable of being established as joint reference models at a European level only by means of specifically designed research projects or simply via the political will of individual member states.

It was further established that the political bodies of the EU have hitherto

- couched requirements in respect of lifelong learning in relatively general terms, there being a lack of clarity as to how these are to be realised within institutes of higher education or adapted to continuing training practice;
- not initiated any systematic conceptual development at the interface between vocational and higher education;
- not clearly identified the continuing training requirements of individual branches nor initiated any investigations to study the needs of the companies;
- primarily drawn up instruments for the purposes of promoting transnational mobility, whilst there is an absence of instruments relating to supporting vertical permeability within national educational systems.

Although the political bodies of the EU are yet to reach any final resolutions, the main thrust of educational policy and the way it is being implemented are providing support for appropriate approaches at a national state level, particularly with regard to the admission and recognition models. By way of contrast, alternation models as defined here have not as yet formed an object of consultation on the part of the EU institutions or bodies,[118] the qualifications and exchange models having fared similarly. Although there is evidence of hesitant initiatives in this direction in the form of the awarding of a joint qualification on the part of several institutes of higher education (including from different countries) and although there are programmes to promote the mobility of learners, the latter relate exclusively to the exchange of teaching staff between educational institutions of the same type.

118 There is however, at least one current practical project aimed in this direction and with the support of EU funding in the form of the DEWBLAM Project.

In overall terms, it may be stated that the problematic areas relating to interfaces addressed within the study have not yet found their way onto the discussion agenda of EU bodies, meaning it was only possible to identify a few points of contact with the object of the study within the overall context of the issues discussed in connection with the "European Education Area 2010" (such as the promotion of participation and of access to continuing vocational training or the improvement in instruments for the recognition and accreditation of achievements). The reason for this may lie in the fact that the separation between vocational education and raining and higher education in Germany is relatively marked and well established compared to other European countries, with the effect that this issue, which is of such relevance in Germany, does not hold the same significance for partner countries. Establishing this theme on the European agenda is one of the tasks faced by German educational policy. To put a positive spin on the situation, the low level of interest this issue has attracted at the level of EU political bodies thus far has the effect that national state initiatives to promote the linking of company oriented and higher education continuing training are allowed to go unhindered by EU initiatives and have the potential to enrich the debate at EU level.

Investigations in respect of the third step led to results very similar to those obtained in step two, albeit without the same exhibition of piecemeal tendencies on the part of transnational coalitions of the social partners and institutes of higher education as is the case at EU bodies level. Although no resolutions in respect of the issue forming the object of study have yet been arrived at on the part of those organisations surveyed (EGB, UNICE, EBF, ATLAS, EUA, EADTU, EAEA und ACA), all the above indicated a high level of interest, the representative interviewed at the EUA even considering detailed examination of the issue to be a priority. German representatives within these organisations are thus afforded an opportunity to exert a decisive influence on the process of opinion formation by submitting appropriate pilot schemes. Our study has ultimately demonstrated that, at least on the part of the national associations of the social partners (the German Confederation of Trade Unions DGB, the Confederation of German Employers' Associations BDA), the chambers (Association of German Chambers of Industry and Commerce DIHT), the institutes of higher education (the German Rectors' conference HRK) and educational policymakers at both federal state and national level (Standing Conference of the Ministers of Education and Cultural Affairs of the Länder in the Federal Republic of Germany KMK, the Bund-Länder Commission for Educational Planning and Research Promotion BLK, the Federal Ministry of Education and Research BMBF) there is a high prevailing level of consensus in Germany that an improvement in the linking of company oriented and higher education continuing training is highly desirable and worthy of support. All this makes the expected results from the two current EU funded projects DEWBLAM (Socrates-Grundtvig) and "ECTS for workers in the chemical industry" (Leonard da Vinci) highly interesting from a German point of view. The European framework for work-based learning in particular, which forms one of the objectives of the DEWBLAM Project,

could have an impact on support accorded to German ideas at a European level, although research into corresponding pilot projects in Germany has revealed that these still remain a rare phenomenon on the German continuing training and higher education landscape. In the view of the authors, the most successful example is the model depicted at the University of Applied Sciences in Stralsund, which should be imitated as quickly as possible, especially in the context of the continuing training of IT Professionals within the framework of the IT continuing training system.

The authors were not able to identify a reference project at a European level reflecting the intentions of the IT continuing training system. Although the consequence of this may well be a problem in terms of a lack of support at a European level, this unique feature could also represent an opportunity of establishing the system on a pan-European basis.

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Annex 1:
Further Internet research links (German and English language)

ACA: Academic Cooperation Association
www.aca-secretariat.be/index.htm

ASIIN: Akkreditierung von Bachelor- und Masterstudiengängen/Fachakkreditierungsagentur für Studiengänge der Ingenieurwissenschaften, der Informatik, der Naturwissenschaften und der Mathematik e.V. *("German accreditation agency specialised in accrediting degree programs from the fields of engineering, informatics/computer science, the natural sciences and mathematics")*
www.asiin.de/english/newdesign/index_ex5.html

Bildung für Europa: Nationale Agentur beim Bundesinstitut für Berufsbildung BIBB *("National Agency Education for Europe at BIBB")*
www.na-bibb.de/home/index.php

Bildung und Kultur: Leonardo da Vinci/ECTS – Zertifizierung von Online- und Präsenztraining in der Aus- und Weiterbildung von Chemiearbeitern *("ECTS certification of online and conventional training in initial and continuing training for workers in the chemical industry")*
www.ects-chemie.de/english/leonardo.htm

BiTZ Die Unternehmer-Hochschule *("The Entrepreneurial University")*
www.bits-iserlohn.de/content.php?lang=de&folder=51

Bologna to Bergen Summit 2005
www.bologna-bergen2005.no/

CEDEFOP
http://libserver.cedefop.eu.int:80/F/2DL9GUIXHVRUDKR175GINLTNRCCIA5IN2K2YDB37SFAYGVK6LF-00691?func=file&file_name=find-d

CEDEFOP: European Centre for the Development of Vocational Training
www.cedefop.gr/index.asp

Centrum für Hochschulentwicklung *("Centre for Higher Education Development")*
www.che.de/

Council of Europe
www.coe.int/T/E/Cultural_Co-operation/education/Higher_education/General/default.asp

Deutscher Bildungsserver: Internationale Weiterbildung *("German Eduserver: International continuing training")* German language resource
www.bildungsserver.de/zeigen.html?seite=201

Deutscher Bildungsserver: Onlineressource *("German Eduserver: online resource") German language resource*
www.bildungsserver.de/db/mlesen.html?Id=23509

Documents of the European Union
http://europa.eu.int/documents/index_en.htm

ESIB: The National Unions of Students in Europe
www.esib.org/

EUA: European University Association
www.eua.be/eua/

EU training programmes in Germany
www.sokrates-leonardo.de/programme/sokrates German language resource

EurActiv: EU News, Policy Positions & EU Actors online
www.euractiv.com/Article?tcmuri=tcm:31-103609-16&type=LinksDossier

EurLEx - Portal to European Law
http://europa.eu.int/eur-lex/en/index.html

European Commission
http://europa.eu.int/comm/index_en.htm

European Commission CONECCS Database
http://europa.eu.int/comm/civil_society/coneccs/organe_consultatif/liste_index_cb.cfm?CL=en

European Commission: Education and Training 2010
http://europa.eu.int/comm/education/policies/2010/et_2010_en.html

European Commission: Secretariat General of the Commission
http://europa.eu.int/prelex/detail_dossier_real.cfm?CL=en&DosId=172279

European Commission: Secretariat General
http://europa.eu.int/comm/secretariat_general/index_en.htm

European Commission: Education and Training Policy Area
http://europa.eu.int/comm/education/index_en.html

European Commission: Tuning Project
http://europa.eu.int/comm/education/policies/educ/tuning/tuning_en.html

European Commission: The Lisbon Strategy
http://europa.eu.int/comm/lisbon_strategy/index_en.html

European Parliament
www.europarl.eu.int/home/default_en.htm

European Training Foundation: SHARING EXPERTISE IN TRAINING
www.etf.eu.int/WebSite.nsf

EURYDICE – The Information network on Education in Europe
www.eurydice.org

Fachhochschule Stralsund *("Stralsund University of Applied Sciences")*
www.fh-stralsund.de

FIDB: Fachinformations-Datenbanken, E-Learning (Distance Learning), Fernuniversitäten und Internetstudiengänge **("Specialist information databases, e-learning-distance learning, tele-universities and Internet courses of study")**
www.fh-augsburg.de/informatik/projekte/mebib/fidb/ausbildung/elearning/fernuni_nat.html German language resource

Hamburger Fern-Hochschule *("Hamburg Tele-University")*
www.fern-fh.de/studiengange/betriebswirtschaft.html German language resource

Hochschulrektorenkonferenz: ECTS als System zur Anrechung, Übertragung und Akkumulierung von Studienleistungen *("German Rectors' Conference: ECTS as a system for the accreditation, transfer, and accumulation of study achievements")*
www.hrk.de/de/beschluesse/109_276.php?datum=98 German language resource

Hochschulrektorenkonferenz: Ergebnisse des HRK-Plenums in Saarbrücken (*"German Rectors' Conference: Results of the HRK plenary session in Saarbrücken")*
www.hrk.de/de/home/index.php German language resource

ILS online: Institut für Lernsysteme GmbH *("Institute for Learning Systems")*
www.ils.de/google.php?o=00001_00010_C005B_fernuniversit%C3%A4t German language resource

Informationsdienst Wissenschaft *("Academic Information Service")*
http://idw-online.de German language resource

KWB Kuratorium der deutschen Wirtschaft für Berufsbildung: Neue Formen der Kooperation zwischen beruflicher und akademischer Bildung/Tagungsbeiträge *("Coordination Office of Further Training and Employment: New forms of cooperation between vocational and academic education/conference contributions")*
www.kwb-berufsbildung.de/pdf/2004_Dokumentation_Durchlaessigkeit.pdf German language resource

Online-Welt der Bankakademie-Gruppe *("Online world of the Business Schools of Finance and Management")*
http://hfb.de/Templates/simple/Certified_Corporate German language resource

PreLex – Database Monitoring of the decision-making process between institutions
http://europa.eu.int/prelex/apcnet.cfm?CL=en

ReferNET UK
www.refernet.org.uk/index.asp

Register of Commission Documents
http://europa.eu.int/comm/secretariat_general/regdoc/recherche.cfm?CL=en

The Berlin Communiqué: A substantial document with concrete priorities for 2005
www.bologna-berlin2003.de/en/aktuell/index.htm

The European Gateway to Recognition
www.enic-naric.net/

Tuning Education Structures in Europe/ Final Report/ Pilot Project - Phase 1
www.relint.deusto.es/TUNINGProject/doc_tuning_phase1.asp

University of Kassel: Informationsorganisation Teilnehmerstruktur WS 2000/01 (III)
("Information organisation on structure of participants")
www.uni-kassel.de/inforg/studierende2001/sld003.htm German language resource
Verband Deutscher Treasurer ("Association of German Treasurers")
www.vdtev.de/public/qualifizierung.shtml German language resource

Annex 2:
Key search words

Academic continuing training	Access to higher education
Alternation	BIBB
Bologna Process	Bruges-Copenhagen Process
CEDEFOP	Competence development
Continuing training studies	Corporate University
ECTS	Employability
EU Commission	EU Council
EU Parliament	European Higher Education Area
Eurydice	International qualifications
Ministries	Modularisation
Occupational mobility	Part-time studies, in-service
Social partners	Specialist associations (branch, institutes of higher education, …)
Workplace oriented learning	

Supranational activities in IT continuing training on the part of the EU, the specialist associations and industry

ANDREAS DIETTRICH, MATTHIAS KOHL

1. Introduction – object, aim and design of the study

The implementation of the IT continuing training system within the German "continuing training landscape" forms the thematic basis for this paper. The IT continuing training system represents an innovative approach with the aim of organising continuing vocational training and qualifications within a dedicated system extending far beyond the creation of new, partial qualifications or designations of occupations. The basic principles of the IT continuing training system (work process orientation, modularisation, accumulation of achievements and transnational recognition, permeability) are considered as setting the trend for reform of the vocational education and training system in Germany. The IT continuing training system has been accorded considerable significance in terms of VET policy, and its introduction is accompanied by a high level of expectation.[1]

National VET and qualifications structures and the German IT continuing training system in particular operate within the context of European endeavours aimed at integration. The basic principles of the IT continuing training system stated above display a close correlation with pan-European programme objectives for a modern concept of vocational training and qualification. There are, however, only a few studies available relating to the expressed European Union aim of achieving cross border comparability and certifiability of qualifications in IT occupations in future. A pan-European, comparative analysis of the various continuing training systems in general, of institutional link-ups in particular and of existing certification concepts is required in this area. In order to enable subsequent investigation to be undertaken into the extent to which mutual recognition and coordination of divergent qualifications and continuing training pathways is achievable and to identify the available opportunities for a transnational transfer of best practice, the first stage is to establish transparency with regard to which other approaches and variations are in existence elsewhere in Europe in "competition" with the German IT continuing training system. With regard to any future guarantee of the connectivity of the German concept and for the purpose of promoting cross border educational and employment mobility for employees, an overview of the analogous (or divergent) concepts and strategies at EU level is indispensable. This issue is of particular importance in the light of the fact that the IT branch is a highly internationalised sector, whilst also displaying a considerable level of divergence in terms of the qualifications structures for employees and the respective national and product or industry related continuing training and certification concepts.[2]

This means that any analysis needs to be extended to include consideration of standards and design intentions which are conceived and motivated in a "European"

1 As formulated by BIBB, for example, in: "Flexibles Weiterbildungssystem einer Branche macht (hoffentlich) Karriere" *("Flexible continuing training system (hopefully) developing a successful career")*, cf. BORCH/HECKER/WEIßMANN 2000, p. 16.

2 Cf. the aspects indicated in Chapter 2.

way on the part of the social and political stakeholders rather than simply being restricted to selected country examples (Denmark, France, the Netherlands). In accordance with this, the present study will discuss which concepts are being proposed in respect of occupational structures, career levels and educational pathways (company oriented and higher education IT continuing training) within the IT sector at an EU level on the part of the EU as well as by associations and educational and other organisations operating at an EU level. The aim of the study is to obtain an overview of the status of IT continuing training at an EU level and of the relevant stakeholders operating across the EU. Activities on the part of individual institutions or countries which have been hitherto essentially national in nature are not portrayed.

Following this introduction on the object, aim and design of the study, Chapter 2 will briefly outline the starting position with regard to occupational structures, career levels and educational pathways in the German IT sector. Chapter 3 will then provide an overview of the main associations and educational and VET organisations within the IT sector operating at a pan-European level and of the relevant EU organs exerting an effect on the sector. Chapter 4 will subsequently focus on activities and programmes relating to the IT sector. Chapter 5 will present the specific proposals, concepts and projects for IT continuing training, providing comprehensive explanations of these. Specific details will be given on the "Informatics Curriculum Framework 2000", the initiatives of the "ECDL-Foundation", "Career Space" and "EUCIP". These remarks will be supplemented by the results of a survey of selected VET experts in the IT sector, which will be presented in Chapter 6. Finally, in order to enable an initial positioning of the IT continuing training concept in terms of the competing qualification concepts within an EU context to be undertaken, Chapter 7 will offer an assessment and interpretation of the developments at a European level from a German perspective and against the background of the German IT continuing training system.

The results presented are mainly based on Internet research and documentary analysis. The current nature of the issue and the central significance of digitalised information, particularly within the IT branch, both mean that many documents are not, or not yet, available in a printed version.[3] Furthermore, as already indicated by preliminary studies conducted by the authors, the number of concepts launched at a Europe-wide level is relatively small, the German IT continuing training system, for example, currently being embroiled in an implementation process which is certainly difficult and involves the commitment of resources, only therefore being in a position to participate to a limited extent in the competition of continuing training systems in Europe. The materials which have been evaluated also frequently

3 Consequently, no claims can be made in respect of the completeness of the presentation of concepts and initiatives. Although the most significant or publicised relevant concepts have been included, the existence of endeavours, some of which may be informal in nature, on the part of individual countries or persons to disseminate branch related or national concepts across the EU cannot be precluded. Individual country studies may be able to shed more light on this.

have their origins within the sphere of operation of the stakeholders in question rather than coming from an academic or neutral context and certainly either reflect (vested) political interests or need to be interpreted as a depiction of a desired agenda or political philosophy, meaning that a certain bias of this nature cannot be excluded, especially in respect of the description of these instruments. Given both this and the current nature of the problem mentioned above, a further face-to-face, e-mail or telephone survey of individual experts in respect of detailed issues was undertaken as an adjunct to the Internet research and documentary analysis. These interviews were, however, merely supplementary in nature, the limited resources available not always meaning that they could be conducted in situ with the relevant persons.[4]

Against the background of both this empirical design and the restrictions indicated, the following study will present its most significant results, commencing with the starting position, viz. an outlining of the status of IT continuing training in Germany, thus mapping the reference system for the evaluation of the research results in Chapter 7 of the present paper.

2. Starting position

2.1 Starting position in the IT sector

The ongoing changeover to a knowledge society, the constituent elements of which include both the dynamic development of knowledge and communication as well as the accordance of a greater significance to lifelong learning, harbours considerable pressures at both individual and organisational level to adapt and develop further, although, viewed positively, also represents a high level of innovative potential.[5] In global terms, the IT branch (both developers and manufacturers) is also particularly affected by this development, the technical progress of which being also largely co-responsible for the societal changes indicated. The effect on this branch of the economy, however, is to create an extremely short half-life in respect of certain elements of specialist knowledge. This especially applies to product and performance specific knowledge which, due to the brief product cycles involved, is subject to becoming obsolete in a particularly short space of time. 50 percent of the knowledge that a technical employee in this area will require in three years' time is not yet available today (cf. Severing 2003, 16). This means that demands are placed on individuals in terms of continuous learning and the competence to overcome rapid change if they wish to retain their own employability and labour market mobility with a view to promoting their career development.

4 Further interviews making use of diversified empirical social research instruments would certainly be appropriate here and, if conducted on a regular basis, could comprehensively map the process of "Europeanisation" of IT continuing training in terms of a long-term based, process related monitoring procedure.

5 Parts of the following Chapter 2 are based on JÄGER/REINISCH/VOLKERT 2004, pp. 28 ff.

Furthermore, in Germany as in many other countries, the 1990's saw a considerable economic boom triggered by an increasing digitalisation of company economic and business processes and by the rapid further development of appropriate hardware and software systems. The consequence of this was a development and differentiation of the business fields covered by IT providers, such as in the areas of mobile computer applications, network architecture, e-business systems and so forth. The branch was mainly characterised by a large number of start-up companies and small firms, employees finding work in the IT sector as lateral entrants and little trade union representation of any significance compared with other areas. Although the formation of the sector's own specialist association (BITKOM) and the investigation of new opportunities for better initial and continuing vocational education and training can be viewed as a sign of an increasing level of professionalism, satisfactory solutions have not been identified for major structural problems on the IT labour market:

- 80 percent of employees are "lateral entrants" without specialist training;
- only 6,000 IT higher education graduates per year despite an estimated requirement of 30,000;
- a lack of connecting routes for those who have completed training in an IT occupation;
- difficulties in integrating into work the 50,000 people currently undergoing IT qualification schemes due to a lack of standards.[6]

The obsolete occupational profiles to be found in initial vocational education and training in the 1990's, coupled with the manufacturer and the product related certificate based continuing training which had represented the norm in the branch up until that point and did not feature any binding standards, meant the possibilities of acquiring the competences necessary within the employment system were extremely limited (cf. BOSCH 2000, p. 260). Although this problem remained below the surface for certain periods, labour shortages meaning that the recruitment and employment chances for skilled workers in the IT sector were very high, this situation changed after a fall in employment in the branch in 2002 and 2003. This has formed the background for considerable change in the VET situation since the introduction of new IT training occupations in 1997 and the ongoing endeavours since 2000 to implement the IT continuing training system.

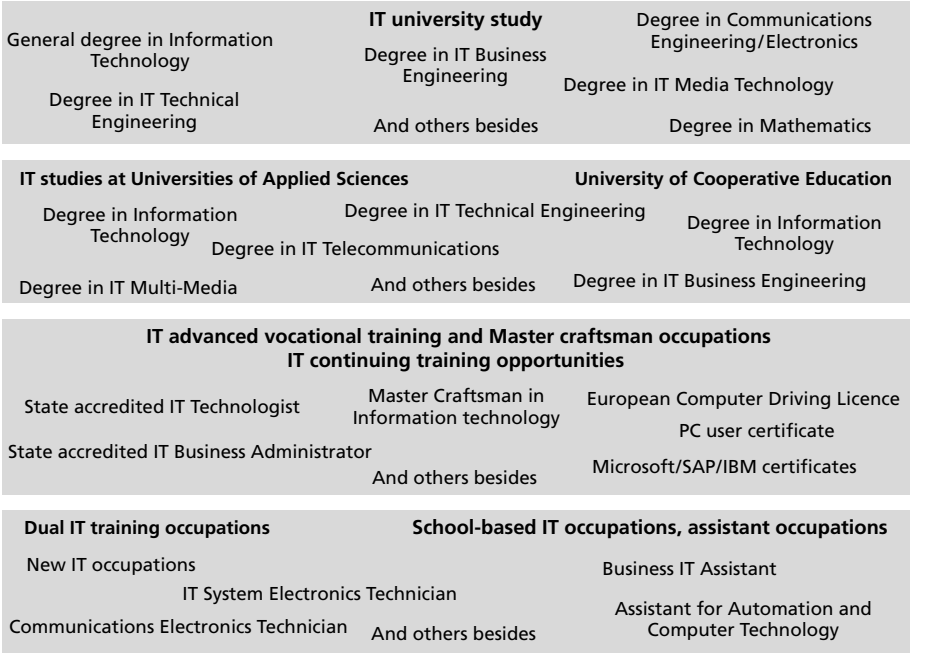
2.2 Occupational structures, career levels and educational pathways in the German IT sector

The occupational structures and corresponding educational pathways within the German IT sector are capable of very differentiated assessment. In line with company skills profiles, occupational and qualifications profiles exist at four levels. Within the IT sector, it is possible to complete a course of studies at university, such

6 For more information on these problems, cf. EHRKE/HESSE 2002, S. 32.

as a general degree in Information Technology or in various specialist fields (e.g. as a degree in Business Administration and Information Technology). There is also a range of higher education courses available at Universities of Applied Sciences (such as a degree in Information Technology and Telecommunication) and at Universities of Cooperative Education (e.g. a degree in Technical Engineering and Information Technology). In the continuing training area, there are IT advanced training occupations and master craftsman occupations (such as State Certified Information Systems Specialist) and a series of other continuing training possibilities which enjoy a high level of acceptance and are accorded significance. These include the European Computer Driving Licence, although this encompasses basic rather than continuing training, PC user certification and product and industry based certificates. As far as initial vocational education and training is concerned, a differentiation needs to be drawn between IT occupations involving dual training (e.g. Information Technology Specialist) and school-based training courses such as Information Technology Assistant (cf. in detail the work carried out by the Vocational Education and Training Institute for Work and Technology (Biat) at the University of Flensburg, e.g. PETERSEN 2000).

Figure 1: **Initial and continuing training in the IT employment sector** (PETERSEN/WEHMEYER 2001, p. 2)



Notwithstanding this extensive range of formal qualifications routes, attention once again needs to be drawn to the fact that a high proportion of employees in the IT branch does not possess an appropriate qualification, meaning that no more or less formal career routes run alongside the formalised qualifications tiers. Required competences were, and still are, therefore frequently acquired via more informal learning processes which take place within the context of specific work activity or privately.

Two main "milestones" have brought about change in the initial and continuing training system within the IT branch in recent years: the introduction of the IT training occupations and the IT continuing training system. Since 1997, it has been possible to embark upon a three-year course in vocational education and training in one of the four newly created occupations within the IT sector (IT Systems Electronic Technician, IT Specialist in the two fields of Systems Integration or Application Development, IT System Support Specialist and Information Technology Officer). This enhances greatly the opportunities for commencing vocational education and training within IT, also providing dual courses of training, and represents a breakthrough against the hegemony of institutes of higher education and Universities of Applied Sciences with regard to training. These new occupations both open up a new vocational perspective for motivated and qualified young people, whilst also providing those completing training with a broad-based, interdisciplinary and application oriented qualifications profile enabling them to take up employment duties in a wide range of task areas within IT companies or, in principle, the information technology departments of any company. The concept behind the new occupations is entwined around aspects of customer and business process orientation, links with technical and business administration qualifications, the delivery of core qualifications and specific, occupationally related specialist qualifications, training regulations providing future flexibility and application oriented examinations (cf. Bundesinstitut für Berufsbildung 2000a, Bundesinstitut für Berufsbildung 2000b). After some initial difficulties in such areas as the examinations system, these innovative elements have been largely integrated into training, although further action is needed to some extent at the education policy and curricular didactic level (c.f. e.g. DIETTRICH 2003, STEINDAMM 2000). The rapidly rising training numbers in the occupations involving dual training also provide evidence for the considerable backlog of demand in this area, although one of the reasons behind this rise is that the new IT occupations are increasingly replacing training in the "old" occupations (such as Data Processing Officer), meaning that there is an ongoing displacement process. According to surveys in respect of evaluation of the new IT occupations, conducted by Biat and commissioned by BIBB, approximately one third of jobs in IT occupations are in reality newly created jobs (PETERSEN/ WEHMEYER 2001, pp. 9 ff.).

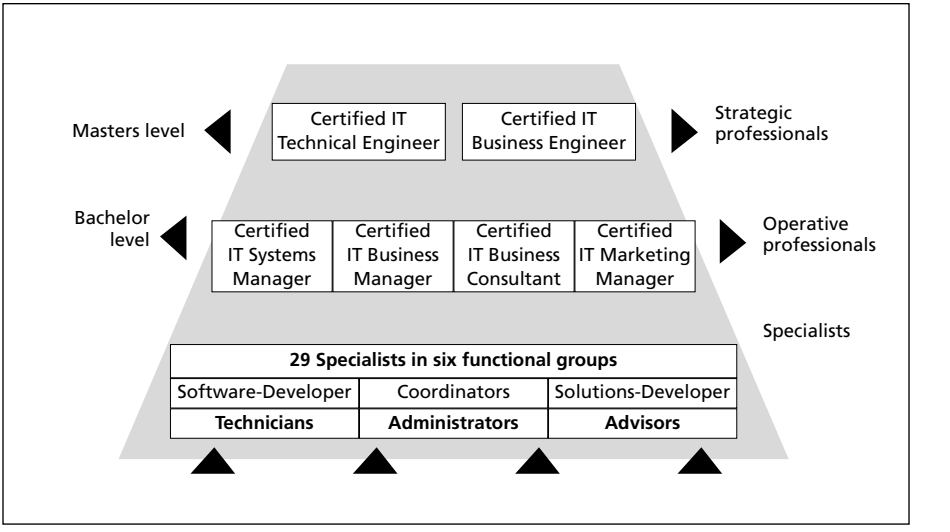
The second "milestone" comes in the form of the innovative model of the IT continuing training system, introduced in 2002 and which represents a fundamental reform approach in vocational education and training in Germany with the objec-

tives of overcoming the opposing poles of company and vocational continuing training and formal, qualifications related learning and informal learning, linking (via certification) regulated (pursuant to the Vocational Training Act, BBiG) and unregulated continuing training, developing a quality management system for continuing training, viewing examinations as providing evidence of competence rather than as the regular testing of "inactive knowledge", providing permeability between continuing training and higher education and guaranteeing a high level of applicability via connection with international standards (cf. EHRKE/HESSE 2002, pp. 6 ff.). Since the German approach represents, so to speak, the reference model for a consideration of the concepts of IT continuing training at an EU level and on the part of the EU, the intention is to provide a brief description of this approach in the following.

2.3 The German IT continuing training system

The IT continuing training system is, strictly speaking, a legal ordinance from the Federal State defining on three functional levels a total of 29 IT Specialists and 6 IT Professionals and providing differentiated activity and competence profiles (cf. Bundesministerium für Bildung und Forschung 2002a, b, BORCH/WEIßMANN/BUNDESINSTITUT für Berufsbildung 2002).

Figure 2: **Structure of the German IT continuing training system** (BORCH 2003, p. 3)



The development process was led by the Fraunhofer Institute for Software and Systems Engineering (FHG-ISST), and involved the participation of the umbrella bodies within the branch, the Federal Institute for Vocational Education and Training (BIBB) and the social partners. A point to be emphasised here is that, in contrast to the classical method of tailoring occupations, the initiative for the development of this continuing training structure emanated from the branch. There was a recognition of the fact that the situation which has prevailed hitherto, the existence side-by-side of unregulated, formal continuing training courses and non-documented in-company learning on the part of the employees, represented a barrier to the further development of the branch. Although employer and employee representatives were very much pursuing different objectives, it proved possible to arrive at a satisfactory solution for both sides, a demonstration of the fact that the political and administrative level and the VET regulations relating to the balancing of vested interests are perfectly capable of exerting a conciliatory effect and are viewed by the private economy as an important adjunct to market competition.

The main target groups of the IT continuing training system are considered to be those who have completed a course of IT training and the large group of lateral entrants to the occupation already employed in IT companies. For the latter group in particular, the IT continuing training system represents an opportunity to acquire recognition for competences acquired within the working process, the prerequisite for this form of qualification being defined simply as the exercising of a relevant activity which can, in principle, act as a vehicle for the acquisition of the appropriate competences. The fact that the work process orientation of IT continuing training does not generally prescribe the pre-existence of specific employment tasks or content represents a fundamental problem within the current economic situation, which features a high level of unemployment, even for IT experts. This means that the way in which the IT continuing training system is constructed tends to exclude qualifications for the unemployed, this being an area where appropriate reinterpretations or concepts relating to the organisation of training need to be developed and piloted.

Alongside the issue of methodologically secure and comprehensive recording and certification of the competences to be acquired by employees in IT manufacturing and applications companies in a predominantly informal way and within an occupational context, something which continues to be an object of controversial debate within the field of German VET research, there are further critical factors relating to the successful, long-term, overall establishment of the tiered continuing training system within the branch. These particularly include both the practical implementation of the concept and the acceptance of the existing regulations. In addition to the barriers to implementation which have emerged from other areas (cf. FAULSTICH 2000), the German IT continuing training system needs to consider two further problem areas in particular. Firstly, the newly created qualifications, notwithstanding the undoubted added value they represent for both companies

and individuals, need to establish themselves on a market where a wide range of product and manufacturer related certificates hold sway and prove that they are structured in a company and practice related way as well as displaying sufficient flexibility to cope with the rapid rate of development within the IT sector (cf. ZEDLER 2003, p. 12). Another recurring issue is the positioning of the competent bodies (Chambers of Industry and Commerce) towards the IT continuing training system, whereas the economic "blip" of recent years, the effects of which have included cuts in IT budgets, weakening demand and a fall in employment in the IT branch, has also both led to savings in continuing training budgets and caused a decrease in the continuing training willingness and requirements of companies due to the surplus of skilled staff created by redundancies. There can thus be no question at present of the shortage of skilled workers which existed at the time the system was introduced as well as being forecast for the future.

Alongside the recording and testing of the implementation, realisation and recognition of the IT continuing training system in practice, the ambitious objectives relating to the guarantee of permeability between continuing training and higher education and the high level of applicability via connection to international standards in particular require further research work. Up to now, these objectives have merely been accorded the status of declarations of intent (cf. No author 2002a, pp. 142 ff.). No agreement has therefore thus far been reached between the Federal Ministry of Education and Research and the Standing Conference of the Ministers of Education and Cultural Affairs of the Länder in the Federal Republic of Germany (KMK), which is responsible for institutes of higher education, or with the German Rectors' Conference (HRK) in respect of the recognition of qualifications acquired in the course of continuing vocational education and training by institutes of higher education (cf. ROGALLA/WITT-SCHLEUER 2004, pp. 165 ff.).

The innovative character of the IT continuing training system lies in the fact that an opportunity for the further qualification of employees recognised by both the social partners and the branch can take place during the working process, resulting in a relocation of the learning process to the company and thus avoiding the usual problem of the transfer of knowledge into individual company action processes from such learning provision as seminars. In this context, BIBB refers to a change of paradigm which takes into account that 90 percent of knowledge is acquired in informal contexts. The present case involves an extensive interlocking of phases of informal learning, documentation and reflection. A second, major innovation is the fact that the curriculum is output oriented, defining the activities to be mastered by participants in terms of reference processes rather than taking a prescriptive approach to learning content. Individual employees can stipulate their own routes, matching these with the specific company circumstances and with the projects falling due within this context. Learners receive specialist support from a consultant and methodological support from a learning process monitor, as well as enjoying the backup of their respective team and social environment. The involvement of training service providers able to provide appropriate cross-company and

coaching sessions may also be a possibility in respect of the second function. This form of continuing training engages them in closer monitoring of the self-organised learners rather than assuming their previous role of mediator of knowledge, thus broadly ensuring that even people who are not familiar with this form of continuing qualification or who resume continuing training after an extended break receive an intensity and flexibility of support which frequently cannot be delivered at such a level by the companies themselves. One final, major innovation is the fact that successful certification is also being used as a vehicle to seek to link the qualifications to the higher education level, thus avoiding the "dead ends" present within the vocational qualifications in other branches and also providing high ability school leavers with good career opportunities without the need for an academic qualification. Nevertheless, there is presently a considerable lack of clarity with regard to how accreditation of certificates from the IT continuing training system can and should take place within the area of higher education.[7]

As already indicated, an appropriate and extensive in-company project needs to be conducted in a firm to obtain accreditation in accordance with a certain Specialist profile of the IT continuing training system. The certification process follows on from this, mainly being based on supporting documentation completed by the employee. The whole project can be designed to take place over a maximum period of 24 months, enabling the suitability of more extensive and complex tasks. Private sector, accredited providers, such as cert-IT, are responsible for the certification process and operate in compliance with the international norm DIN EN ISO/IEC 17024.

At the beginning of the process, these institutions check that the participant is exercising an occupational activity which is appropriate to the Specialist profile and is planning a suitable project covering all of the major reference processes in terms of specialism as well as with regard to the scope and quality of the project. Once the certifying body has issued its approval, the employees are free to carry out their projects in an autonomous way taking advantage of the support mechanisms described. The aim of this process is to ensure that, alongside the actual conducting of the project, it is also possible to prepare the necessary documentation for certification. This involves the specialist presentation, justification and monitoring of effectiveness of the various stages of planning, implementation and evaluation of the success of the project and amendment in the form of alternative solutions, should this prove necessary. In this way, the learners provide evidence of mastery of the respective technologies in their areas, as well as demonstrating

7 The "ProIT Professionals" project is currently addressing this problem. The aim of the project is to provide initial practical implementation of the identified area of equivalence in respect of learning achievements at the Operative and Strategic Professional levels in accordance with the new IT advanced training ordinance. By its own account, ProIT Professionals conducts the necessary analyses for this, develops appropriate procedures and tests the feasibility of these. Project partners are the Technical University of Darmstadt, Darmstadt University of Applied Sciences, the Darmstadt Chamber of Industry and Commerce and the Confederation of Employers' Associations of the State of Hessen, cf. ProIT Professionals 2004.

that they possess a certain ability to take a general view of the project and a capacity for reflection.

Upon completion of the project and submission of the documentation, the final phase is the actual certification procedure. The documentation is reviewed by a specialist examiner, also working in the field in question, from both a specialist and general point of view. If this assessment is positive, the employee attends the certifying body for an interview and to give a project presentation, followed by a specialist discussion in which the employee is questioned on any unresolved issues and further specialist problems within the specialist field. If the employee is successful in this part of the process, the specialist examiner issues a recommendation to the certifying body to award the certificate. The latter then makes the final decision and awards the certificate for a period of three years (an extension without further provision of evidence is possible). After this period has elapsed, a re-certification procedure takes place to ensure that the employee is taking part in in-service continuing training and continues to be up to date in terms of performing the respective activity. The fact that all continuing vocational training certificates issued in Germany up until now have been issued with no limitation in terms of validity has frequently led to criticism of this practice. In addition to this, the documentation and interview procedures used in the certification process tend to be summative in nature, recording competences in an indirect way via the quality of the way in which the project was conducted and presented. Although procedures involving a greater level of validation are conceivable, the present process nevertheless seems practical and appropriate for the branch.

A point to be borne in mind, however, is that the attractiveness of the certification depends on externally defined influencing factors, such as the presumed economic value of the certificate, as well as on the credibility and professionalism of the certifying body.[8] This could certainly lead to a heterogeneous consideration of the costs and benefits on the part of the participating stakeholders, the consequence of which could be a failure to participate in the procedure as a whole. A trend is discernable within IT continuing training practice for many interested IT employees to forgo certification as a Specialist because of the high fees and move directly to the Professional level. Perspectively, this seems to necessitate a stakeholder centric consideration in order to gain an insight into the conditions on which participation or non-participation in the IT continuing training system and its examination system are considered contingent and which appraisals are made in this context by the various groups.

Examination regulations for IT Professionals were commissioned by the Federal Ministry of Education and Research (BMBF) and drawn up under the auspices of the Federal Institute for Vocational Education and Training. This "IT Advanced Training Ordinance" is a legal ordinance pursuant to the Vocational Training Act § 46

8 For further advantages of certification systems, cf. GRUNWALD/ROHS 2003, p. 209.

(2) and regulates the admission conditions and final examinations across the whole country for the six advanced training occupations (four profiles for Operative Professionals, two profiles for Strategic Professionals) at the IT Professional level and was published in the Federal Law Gazette on 17 May 2002. The IT Professionals' qualification also takes place via the work process orientation method, the main focus being the preparation of a project which needs to contain certain reference projects stated in the examination regulations. The examination itself consists of the areas of "Company IT processes", "Profile specific IT specialist tasks" and "Employee leadership and staff management" (Operative Professionals). In the "Company IT processes" component of the examination, the candidate prepares documentation relating to a practically relevant project or tasks arising from company IT processes. The examination elements for the Strategic Professionals are "Strategic processes", "Project and business relations" and "Strategic personnel management".

In overall terms, an examination platform has thus been created within the IT continuing training system which takes into consideration the learning potential provided by jobs in the IT branch to the greatest extent possible and not only pays due heed to competence development processes within the work process but, in some circumstances, promotes these. Consideration has also been accorded to the fact that IT working tasks are subject to such rapid change, "[…] that preparing them didactically for inclusion in curricula, integrating them into the training system and the period of time available for learning inevitably must lag behind the reality of IT work systems (working processes)" (Schweres, 2000, p. 268). It may therefore be attested that the IT continuing training system tackles the complex requirements made of continuing training from an innovative and dynamically developing branch. Nevertheless, the issue remains as to whether and to which extent this form of IT continuing training is able to correspond to European requirements.

2.4 IT continuing training within the context of the European VET debate

Within the context of European or international educational debate, the German IT continuing training system is, however, in competition with other continuing training and certification concepts operating within Europe, some of which are well established. A particular issue which needs to be addressed is whether and the extent to which the objective of the European Union to achieve cross border comparability and certifiability of qualifications within IT occupations can be met. As described in detail below, there are, for example, clear differences between the German work process oriented continuing training system and the EUCIP concept developed by the umbrella organisation of the Council of European Professional Informatics Societies (CEPIS): "The first difference is the qualifications procedure preceding the awarding of the certificate and the second difference is its location. Work process oriented continuing training places continuing training within the company, whereas EUCIP puts its faith in tried and tested educational providers.

EUCIP also requires a defined body of basic knowledge as a precondition, only those able to demonstrate possession of this basic qualification in the first stage of the process being able to receive a certificate in respect of any specialist knowledge which builds on this." (CEPIS 2003a). The basic starting positions of the two qualifications systems are thus very different. The aim of the present considerations is to make approaches to and variations of IT qualifications in other European countries or at an EU level more transparent. A particular issue here is the problem of mutual recognition and coordination between qualifications and forms of continuing training.

Further debates, oriented for example towards concepts relating to the "knowledge society", "lifelong learning", "informal learning" or the definition of competence, are, however, especially superimposing themselves on the debate centring on appropriate IT continuing training systems at an EU level.[9] Alongside the European initiatives, there have been decisions made by a number of organisations within the national context, such as the "Alliance for Jobs", the "Educational Forum" and the "Bund-Länder Commission for Educational Planning and Research Promotion", which have had an impact on the dynamic progress of the German debate process relating to the structuring of lifelong learning and the informal learning associated with this, particularly in terms of documentation (cf. here Deutsches Institut für Erwachsenenbildung/Deutsches Institut für Internationale Pädagogische Forschung/Institut für Entwicklungsplanung und Strukturforschung an der Universität Hannover 2004 (German Institute for Adult Education/German Institute for International Pedagogical Research/Institute for Development Planning and Structural Research at the University of Hanover 2004, p. 4). One of the consequences of these extensive discourses, which have extended over a number of years and had both a national and international focus, is the diversity of terminology, which has been influenced by the wide range of educational policy backgrounds, the various theoretical approaches and the specific cultural and educational policy characteristics within the different countries.

These varying educational policy "currents" also affect the continuing training situation in the IT sector, which also requires the documentation and certification of informal learning processes during work, as does the issue of horizontal and vertical mobility within the IT branch. Although it is not possible within the following remarks to provide more details of the various strands of discussion relating to this and ongoing at an EU level, as far as the IT sector is concerned the following major issues emerge for the investigation of existing qualifications systems against the background of the European debate.

- An object of investigation needs to be which **concepts** exist at an **EU level** with regard to career stages, educational pathways or vocational structures in the IT branch. Apart from the branch associations already mentioned, EU posi-

9 Cf. Chapter 3 for more detail.

tions and corresponding European educational organisations are of interest here.

- Issues of **right of access**, the **recognition** of achievements within informal learning processes or within the context of qualifications at lower levels of training and the validity of qualifications and certificates form the main focuses. This particularly also applies to potential accreditation within the higher education system.
- A further issue is the **organisational structure** of IT continuing training, such as in respect of the criteria full time/part time, time volume (workload), modularisation etc.
- This is closely related to the question of the **didactic concept**, in other words whether the learning processes are predominantly formal or informal, how the learning units are structured, whether self-organised learning takes place, how the selection of content, sequencing and reduction is made, the form of examination, and so on.

Leaving the IT sector aside for a moment, one of the most fundamental issues requiring clarification is the extent to which European concepts relating to the linking of company oriented and higher education continuing training are in place. Both the existing EU positions (the Bruges and Copenhagen Processes) and routes being pursued in other EU states need to be examined in this regard. Country specific higher education access and permeability regulations are also of particular relevance within this context. Country studies (cf. for example the investigations of the developments in Denmark, France and the Netherlands contained within this volume) are also required for deeper and more complete clarification of whether and how IT continuing training is structured and regulated in other EU countries. Identification of the specific certification regulations is also required.

3. Stakeholders within European IT training

The following overview provides an indication of the multitude of stakeholders and institutions active within the IT sector at a European level. Section 3.1 outlines selected EU stakeholders and institutions, section 3.2 providing a brief presentation of the associations and organisations in the IT branch in terms of their function and remits, investigating the extent of their activities in the field of vocational training up until now and thus ascertaining their degree of relevance to the object of this study. A detailed presentation of important proposals, concepts and projects of the institutions named will then follow in Chapters 4 and 5, the former dealing with the activities of the EU as such and the latter focussing on the IT sector.

3.1 EU stakeholders and institutions

The European Union is characterised by a wide range of different institutions, the roles and functions of which are determined by the treaties of Maastricht, Amsterdam and Nice.[10] Alongside the central institutions (European Parliament, Council of the European Union, European Commission, Court of Justice of the European Communities, European Court of Auditors, European Ombudsman, European Data Protection Supervisor), there are a range of financial and funding institutions, advisory bodies, interinstitutional bodies and decentralised bodies of the European Union (agencies). The **European Parliament** shares legislative power with the Council, exercises democratic supervision of all EU bodies and also shares budgetary powers with the Council. The **Council of the European Union** has six key responsibilities: the passing of European laws, the coordination of economic policy in broad terms, the conclusion of international agreements, the co-approval of the budget, the development of guidelines for foreign and security policy and the coordination of national courts and police forces. The **European Commission** is the executive organ of the EU and the originator of legislative initiatives. Alongside the development of legislative proposals, its responsibilities include the implementation of EU policy, the management of the budget, the monitoring of compliance with European law and the representation of the EU at an international level.

As far as the present focus of study is concerned, the EU is active in many areas. Its activities in the field of **vocational education and training** have their roots in Article 127 of the Treaty of Rome (Article 150 of the Treaty Establishing the European Community): "The Community shall implement a vocational training policy which shall support and supplement the action of the Member States, while fully respecting the responsibility of the Member States for the content and organisation of vocational training."

In its own words, the Lisbon European Council of March 2000 set itself "[…] the strategic goal of becoming the most competitive and dynamic knowledge-based society in the world. The development of vocational training is a crucial and integral part of this strategy. The Barcelona European Council in March 2002 reaffirmed this important role and gave a mandate to make European education and training a world reference by 2010, and to develop closer co-operation in vocational training (in parallel to the Bologna process in higher education)." (European Commission 2003d). The individual instruments and content milestones for this are:

- Foundation of CEDEFOP – European Centre for the Development of Vocational Training (1975)
- Leonardo da Vinci Programme for the implementation of an EU VET policy (1994)
- European Training Foundation for the support of countries in the reform and modernisation of their vocational education and training systems (1995). The

10 Cf. here and in the following (insofar as no indication to the contrary is provided) the European Un-ion Internet presence [http://europa.eu/index_en.htm, 18.11.2004].

ETF operates as a centre of specialist knowledge with the aim of promoting sustained socio-economic development in partner countries and enabling these states to reform their VET systems via the EU programmes Phare, CARDS, Tacis and MEDA (cf. European Training Foundation 2004).
- EUROPASS-Training (since 2000; documentation of competences acquired abroad)
- New European CV (since March 2002, Lisbon European Council; consideration of informal learning)
- The Copenhagen Declaration on enhanced European cooperation in vocational education and training and the promotion of specific measures for the improvement of transparency, mutual recognition and quality in vocational education and training (30 November 2002)

Further relevant main areas of focus of the EU are the accentuation of lifelong learning (cf. EUROPEAN COMMISSION 2004a), the deployment and the effects of new technologies (cf. EUROPEAN COMMISSION 2003c), the recognition and transparency of qualifications (cf. EUROPEAN COMMISSION 2003b) and, finally, issues relating to general and higher education (cf. EUROPEAN COMMISSION 2003a). The overarching aim is the enabling of mobility, via such projects as EuroCert (1998-2001) (cf. No author 2001), rather than the implementation of a uniform educational system. EuroCert is an addendum to a certificate, a one-sided document issued on a voluntary basis by an "issuing body", awarded as a certificate supplement and/or accessible via the Internet. Representatives of EU/EEA member states, the social partners, the European Commission, the European Training Foundation and CEDEFOP have been working for two years with the support of a technical working group to draw up proposals for practical measures to create transparency of vocational qualifications. The recommendations of the European Forum extend to cover that each member state should

- institute a system whereby the award of each official national qualifications certificate is accompanied by a certificate supplement which is translated into at least one other EU language;
- nominate a national contact body to be responsible for the provision of information about national vocational qualifications, including certificate supplements, and information on national educational systems and training pathways.

The European Forum ultimately drew up a catalogue of success criteria, aimed at supporting member states in the implementation of the proposed measures between 2001 and 2003 (cf. Bundesministerium für Bildung und Forschung 2001 (FEDERAL MINISTRY OF EDUCATION AND RESEARCH), pp. 244 ff.). Although this instance provides exemplary documentation of the activities of the EU in terms of ensuring a certain level of uniformity and transparency of VET qualifications, it also illustrates the gradualist approach adopted within the underlying political and

administrative process. Appropriate projects need to be developed for the IT sector where casting the focus on a single branch might tend to raise expectations of an agreement on the harmonisation of different training pathways and vocational qualifications.

Notwithstanding the high level of commitment to a European VET policy, we must not lose sight of the fact that the EU treaties "[…] stipulate strict limitations to the activity of the institutions both formally and in terms of content. From a formal point of view, such activities are to be restricted to promoting cooperation, support and extending the number of member states." (JÄGER/REINISCH/VOLKERT from this volume, section 4.1, where further details may be found on this). This means that the structuring of national educational systems and occupational structures remains within the responsibility of the individual members states, EU communiqués tending to be of an advisory nature. Nevertheless, recent years have seen a considerable increase in the level of interest in a European VET policy on the part of the member states, this being reflected both in statements of political will, such as the new draft guidelines relating to the recognition of vocational qualifications (cf. EUROPEAN COMMISSION 2004), whereas the multitude of initiatives, programmes and projects which have been launched provide a firm indication of a growing level of awareness within member states of a joint European vocational education and training policy. Chapter 4 will look in detail at the implications of this for the IT sector.

3.2 Associations and organisations

European Information & Communications Technology Industry Association (EICTA)
The European Information, Communications and Consumer Electronics Industry Technology Association was founded in 1999 from the industrial associations of the information and telecommunications industry, ECTEL and eurobit, merging with EACEM, der European Association of Consumer Electronics Manufacturers, in 2001.[11] The association is currently a federation of 32 national IT or consumer goods associations in 24 European countries (including the German Electrical and Electronic Manufacturers' Association, ZVEI and the German Association for Information Technology, Telecommunications and New Media, BITKOM from Germany) and 48 direct company members (including Accenture, Alcatel, Apple, Cisco Systems, Dell, HP, IBM, Intel, Microsoft, Motorola, Nokia, Philips, SAP, Siemens, Sony, Sun Microsystems) and represents more than 10,000 European companies with a total workforce in excess of two million.

Alongside the widely known aims of industrial policy associations (securing growth within the branch, lobbying, providing members with information about developments at EU level etc.), EICTA also concerns itself with the significance of the factor of human capital for future growth and with the "eEurope 2005" Programme.

11 Cf. here and for the following the Internet presence of EICTA [www.eicta.org; 18.11.2004].

It has, however, no specific recommendations, concepts or initiatives relating to vocational education and training.

European Telecommunications Platform (ETP)

The European Telecommunications Platform was established in 1998 as an amalgamated group formed from the Open Network Provision Co-ordination and Consultation Platform (ONP-CCP) and the European Interconnect Forum (EIF) and represents the interests of the telecommunication industry in its dealings with such bodies as the EU Commission and Parliament, the European regulatory authorities and the European Telecommunications Standards Institute (ETSI).[12] The ETP seeks in particular to achieve self-regulation of the industry and further development of competition and clarify both the operative and strategic goals of this branch of industry. As far as our research has revealed, the ETP is yet to adopt an official position in the area of "vocational education and training in the telecommunications industry".

European Internet Foundation (EIF)

The aim of the European Internet Foundation, which was established by Members of the European Parliament (MEP's) and is supported by the European Commission, is to provide support for policy structure within this sector.[13] The Foundation is managed by MEP's, operates independently and on cross-party lines and is funded via the contributions of its member companies (such as Amazon, Deutsche Telekom, Ericsson, France Telecom, HP, Intel, Microsoft Oracle, SAP, Siemens) and of its associate members (including CEPIS, the ECDL Foundation and EICTA). Its primary tasks include the promotion of online democracy, the guarantee of privacy and the guaranteeing of secure communication via the Internet. The overall objectives focus particularly on enhancing the rights of Internet users. Although the EIF deals with social, economic and political aims within the context of the development of a European network and information society, it has yet to provide any statements relating to the area of vocational education and training.

European Competitive Telecommunications Association (ECTA)

The European Competitive Telecommunications Association represents the interests of the telecommunications industry in its dealings with government authorities and pursues objectives relating to deregulation, market liberalisation and the promotion of competition. As far as we are aware, however, the ECTA has not yet become involved in educational policy.[14]

12 Cf. here and for the following the Internet presence of ETP [www.etp-online.org; 14.11.2004].
13 Cf. here and for the following the Internet presence of EIF [www.eifonline.org; 16.11.2004].
14 Cf. here the Internet presence of ECTA [www.ectaportal.com; 15.11.2004].

European Information Technology Observatory (EITO)

The EITO is an initiative supported by the EU Commission and the OECD (members and sponsors include BITKOM, CeBIT, Deutsche Telekom, AMD, Sony) and has published the Year Book of the European IT industry since 1993.[15] This contains both a detailed market overview and specialist studies and analyses covering various themes. Although there are no detailed statements on vocational education and training, the 2001 edition at least featured a study on "ICT Skills in Western Europe" (cf. EUROPEAN INFORMATION TECHNOLOGY OBSERVATORY 2001).

The eLearning Industry Group (eLIG)

The eLearning Industry Group is a consortium of ICT companies and e-learning content providers founded in April 2002 in conjunction with Ms V. Reding, EU Commissioner for Education and Culture.[16] The aim of the eLIG is the promotion of the implementation of e-learning in European schools and universities, at the workplace and in private households.

The view is that a breakthrough for e-learning does not so much represent a technological problem as something which can be achieved via a more user oriented approach. The eLIG has drawn up various guidelines in this respect to identify problem areas and provide action recommendations for the development and dissemination of e-learning in the EU. It also supports a range of projects implementing the recommendations which formed the objects of resolutions at the European e-Learning Summit in May 2001.

The overall objective of the Initiative is to seek to make a contribution to the achievement of the aims formulated by the EU Commission in the "eEurope 2005" Programme and the "e-Learning Action Plan".

In terms of the issues to be investigated within the scope of the present study, the main focus of interest seems to centre on the work being carried out by the eLIG within the context of the 2001 European eLearning Summit 2001, dealing with the five central thematic areas of "access and connectivity", "transforming current learning models", "learning content development", "digital literacy" and "the ICT skills gap". The last point is of particular relevance to the issues addressed within the terms of this study. Alongside the ten recommendations published as the result of the summit, of which point 6 is of relevance to the issues forming the object of

15 Cf. here and in the following (insofar as no indication to the contrary is provided) the Internet presence of the EITO-Initiative [www.eito.org; 17.11.2004].

16 There are currently 43 members representing the interests of a wide range of sectors within the IT branch (such as the areas of telecommunication, software development, training institutions, publishing houses and media companies, e-learning services, research institutes, industry associations). Virtually all the global players in the sector are members, including Accenture, Apple, Cisco Systems, IBM, Intel, Microsoft, Nokia, SAP, Sun Microsystems and Wolters Kluwer, the Bertelsmann Foundation and CEOIS also being represented alongside universities and research institutes (such as the Fraunhofer Institute for Industrial Engineering). Cf. here (insofar as no indication to the contrary is provided) the Internet presence of the eLIG Consortium [http://elig.org; 10.11.2004].

investigation ("Develop flexible curricular and assessment frameworks to provide individuals with the skills needed for participation in the Information Age"), the discussion paper which emerged from the work carried out in the "ICT skills gap" workshop is of particular interest (cf. THE ELEARNING INDUSTRY GROUP 2001a, b).

The main focus of investigation here was to identify the contribution which can be made by e-learning and those who are involved in it can make to reduce the ICT skills gap. As far as the more technical qualifications are concerned, the main focus of interest within the ICT industry, the authors accord importance to both the rapid definition and development of appropriate content and the stipulation of internationally recognised qualifications norms. Developing a change in attitude towards learning, training and the question of funding is also a fundamental necessity. Those debating the issue attach importance to the development of sustainable partnerships (such as within the context of public private partnerships) in longer term projects, the putting in place of financial incentives for retraining, the localisation of training content and an **investigation into the interrelation of qualifications from training providers and national qualifications concepts** (cf. The eLearning Industry Group 2001a, pp. 33 ff.). This last point demonstrates the endeavours of the manufacturers/continuing training providers organised within the eLIG to establish a firmer pedagogical basis to the courses they offer and allow them to become a component of established training courses, including national and international recognition in the form of assessment systems. Further to this, there are calls for informally acquired bodies of knowledge and experiences to be recognised in the interests of promoting strategies for lifelong learning (cf. THE ELEARNING INDUSTRY GROUP 2001a, p. 36). The general thrust of the approaches highlighted is to indicate the necessity of the continuation of the work of the Career Space Consortium in particular, although we are not aware of any specific projects on the part of the eLearning Industry Group itself.

International Telecommunication Union (ITU)

The International Telecommunication Union is an organisation under the umbrella of the United Nations and deals with the worldwide coordination of global radio and telephone networks and services.[17] Established as early as 1932, it roots stretch back as far as 1865 to the founding of the International Telegraph Union. The members of the ITU include both states (189 at present) and private companies (of which there are currently 634 worldwide). The ITU is divided into the three sectors of Radio Communication, Telecommunication Standardisation and Telecommunication, and its objectives include supporting the EU in the development of the information society. 2002 also saw the ITU launching a "Youth Programme" in this context with the aim of promoting IT competence and the development of skilled workers. Amongst the features of this programme are the Youth Education

17 Cf. here and in the following (insofar as no indication to the contrary is provided) the Internet presence of the ITU [www.itu.int; 16.11.2004].

Scheme and the Youth Incentive Scheme. The former aims to focus support on young people from developing countries and afford them the opportunity to complete tertiary training within the telecommunications sector (with the further aim of reducing the number of people dropping out of their studies in this area), thus providing better access to available jobs within the branch. The Youth Incentive Scheme provides young people with a practical placement period of at least three months' duration within the ITU or one of its member companies which can be credited towards university level training (cf. INTERNATIONAL TELECOMMUNICATIONS UNION 2004). As far as the development of concepts relating to occupational structures, career levels and such like are concerned, the ITU has not as yet made an appearance, at least not on the European scene. Nevertheless, the support the organisation provides support for developing countries in the establishment of information and communication technologies goes some way to addressing a wide range of educational policy issues.

International Federation for Information Processing (IFIP)

The International Federation for Information Processing (which in 2002 had 48 full, three participating and eleven associate members) was formed in 1960 under the auspices of UNESCO and pursues the aims of using international cooperation and the stimulation of academic and general research and development on data processing to promote the dissemination and exchange of data within the areas of research and technology and of improving training in the field of data processing.[18] Twelve technical committees with over 80 working groups (a total of more than 2,000 active members worldwide) are working in a wide range of operational fields on the development of discussion papers and guidelines as well as on the organisation of various conferences (such as the World Computer Congress), workshops and seminars (cf. INTERNATIONAL FEDERATION FOR INFORMATION PROCESSING 2002).

In terms of the issues forming the object of the present study, the work being carried out by the 3rd Technical Committee, which focuses on education, is of particular interest.[19] The focuses of the individual working groups has included the development of curricula for secondary education (cf. VAN WEERT 2000) and higher education (cf. MULDER/VAN WEERT 2000), although, at least as far as the website is concerned, there is no sign of adequate papers issued by the IT-Professional and

18 Cf. here and in the following (insofar as no indication to the contrary is provided) the Internet presence of the IFIP [www.ifip.or.at; 17.11.2004]. The IFIP still continues to exercise an advisory function for UNESCO as well as maintaining contacts with various other UN organs. German interests in the IFIP are represented by the German Informatics Society (GI).

19 The 3rd Technical Committee (Education) operates various working groups (WG's) focussing on Informatics and ICT in Secondary Education (WG 3.1), Informatics and ICT in Higher Education (WG 3.2), Research on Education Applications of Information Technologies (WG 3.3), IT-Professional and Vocational Education in Information Technology (WG 3.4), Informatics in Elementary Education (WG 3.5), Distance Learning (WG 3.6) and Information Technology in Educational Management (WG 3.7) (cf. International Federation for Information Processing 2004).

Vocational Education in Information Technology working group. The reason for this could lie in differing objectives to those being pursued in the groups working on elementary, secondary and higher education. The aim is less the development of specific curricula than the organisation of conferences on defined thematic areas, such as the use of computer aided training, the continuing training of IT and non-IT specialists, the activities of national specialist IT bodies, the development of IT VET provision for those in possession of the upper secondary school leaving certificate and the integration of information technology content in the higher education curricula of other disciplines (cf. IFIP WORKING GROUP 3.4 - Professional and Vocational Education in Information Technology 1999). For this reason, the analysis conducted in section 5.1 will merely be limited to a consideration of the framework IT higher education curriculum.

European Computer Driving Licence Foundation (ECDL-F)

The ECDL Foundation came into being in 1997 on the back of a 1995 EU Commission initiative to improve IT competences in industry.[20] Within the scope of this initiative, CEPIS investigated how this aim could be achieved across Europe and identified a Finnish computer driving licence which had been introduced in the previous year as a potential instrument. Following pilot studies in 1995 and 1996, the European Computer Driving Licence was introduced in Sweden in 1996. The following year saw the establishment of the ECDL Foundation in Dublin under the auspices of CEPIS, the ECDL product having since established itself as a global benchmark for end user certification in a relatively short space of time. The ECDL-F acts as merely a licensor rather than providing any training programmes or examinations itself, monitoring compliance with the standards and quality criteria stipulated in the interests of securing independence and a high market value for the certification. The members of the foundation are the licensees of the European Computer Driving Licence Programme (outside Europe known as the International Computer Driving Licence (ICDL), also including the German Informatics Society (GI).

The certification programmes of the ECDL Foundation extend, however, well beyond the well-known Computer Driving Licence. Die ECDL-F covers the complete entry level range (including both *Equal*skills and e-Citizen) via its core product ECDL and the follow-on ECDL Advanced, as well as offering specialist modules (ECDL for Computer Aided Design – ECDL CAD, ECDL Certified Training Professional – ECDL CTP). The product range is completed by the ECDL for People with Disabilities – ECDL-PD and e-Kids, a game in which children of primary school age can develop IT competences (for more detail on this, see section 5.2).

20 Cf. here and in the following the Internet presence of the ECDL Foundation [www.ecdl.com; 15.11.2004].

Career Space Consortium

Career Space is a consortium originally consisting of eleven and now numbering nine ICT companies (BT, Cisco Systems, IBM Europe, Intel, Microsoft Europe, Nokia, Philips Semiconductors, Siemens AG, Thales) and the EICTA, which is working in conjunction with the European Commission and CEDEFOP on drawing up a definition of new ICT curricula and ICT occupational profiles.[21] Career Space receives support from CEN/ISSS, EUREL, e-Skills NTO and more than 20 institutes of higher education and specialist institutes across Europe. The Consortium was initiated by the Directorate General for Employment in 1999 with the objective of achieving a better assessment of the existing shortage of skilled workers in economic areas connected with the new technologies and subsequently continued by the Directorate General for Enterprise for the purposes of using comparative analyses of existing curricula and procedural methods as a basis for the drawing up of more tailored ICT curricula and occupational profiles. These curricula and profiles are currently being piloted and developed further by the universities with the support of the Directorate General for Education and Culture (cf. CEDEFOP 2001b, S. 3). A more detailed presentation will follow in section 5.3.

Council of European Professional Informatics Societies (CEPIS)

The Council of European Professional Informatics Societies is a non-profit making umbrella organisation of 36 IT societies from 31 European countries, including the 15 which made up the EU prior to the expansion in May 2004 (German representatives being the German Informatics Society (GI) and the Association for Electrical, Electronic & Information Technologies, VDE).[22] CEPIS advocates EU-wide labour mobility and the right of IT skilled workers to start their own businesses, representing the interests of the latter in dealings with various European bodies. The organisation is also pursuing the Europe-wide establishment of awareness of computer based technologies via the promotion of contact with ICT and seeking the development of an information society by imparting user knowledge in the application of information systems, the objective being to achieve a high level of professionalism on the part of European IT specialists, implementing this via the setting of standards (Code of Professional Conduct, cf. CEPIS 2003a, p. 2). To this end, one of the aims of CEPIS is also to become an IT certification society working in conjunction with trainees, the industry and other certifying bodies (cf. CEPIS 2004). To achieve this goal, investigations have been ongoing since 2002 within the scope of the EPICS Project (European Professionals Informatics Competence Services), involving six countries and including Germany, to identify which prerequisites need to be fulfilled for a cross border certification system. The results of this project, funded by the EU, have been channelled into the CEPIS Certification

21 Cf. here and in the following (insofar as no indication to the contrary is provided) the Internet presence of Career Space [www.career-space.com; 03.11.2004].

22 Cf. here and in the following (insofar as no indication to the contrary is provided) the Internet presence of CEPIS [www.cepis.org; 10.11.2004].

System EUCIP (European Certification of Informatics Professionals), which will be presented in more detail in section 5.4.

4. EU activities and programmes affecting the IT sector

As already indicated in Chapter 2, the debate at EU level on suitable IT continuing training systems and appropriate (partial) projects is overlaid by further strands of discussion focussing on such concepts as "the knowledge society", "lifelong learning", "informal learning" or the definition of competence.

The increased significance accorded to these approaches has led to a greater focus on learning in informal contexts within the framework of educational policy, academic and economic debate over recent years. The White Paper "Teaching and learning – Towards the learning society", published by the European Union, (cf. EUROPEAN COMMISSION 1996) puts forward guidelines for action in terms of reacting to global and international development trends. The acquisition of competences in institutions, within companies or in an informal setting is, accordingly, an essential prerequisite both for the unfolding of an individual character as well as in terms of structuring a career. Within this context, informal learning and its recognition is mostly associated with vocational learning, this being clearly stressed in further European Union publications (cf. BRETSCHNEIDER 2004).

The 2002 Lisbon European Council "Memorandum on lifelong learning" presents strategies for the enhancement of lifelong learning (cf. EUROPEAN COMMISSION 2000). As far as informal learning is concerned, calls are made for a significant improvement in the methods used for the evaluation of learner participation and learning success. Subsequent European Union documentation also repeatedly underlines the need for the identification, evaluation and recognition of this new form of learning, the ultimate aim being to maintain or support learning interest at an individual level. The publication of the common European principles for the identification and validation of non-formal and informal learning in March 2004 (European Council 2004) represents the first outlining of requirements needing to be fulfilled in principle within the context of informal learning to enable a climate of trust, impartiality and credibility to be developed. In the interests of continuing to pay due regard to the specific characteristics of individual states, however, no attempt was made to formulate methodological and institutional solutions in a concrete form, a state of affairs already providing indications of a significant area of conflict inherent between European stipulations and specific solutions adopted in individual countries.

On the other hand, as indicated in section 3.1, the European Commission, for example, is calling for the comparability of learning and training outcomes in the interests of creating a basis for the recognition of qualifications. The establishment of a "European Qualifications Framework" is viewed as the key element in promoting

transparency and mobility in this area (European Commission 2003). Article 11 of the current amended proposal for a Directive of the European Parliament and of the council on the recognition of professional qualifications (cf. EUROPEAN COMMISSION 2004 pp. 12 ff.) differentiates between five qualifications levels, to which all vocational qualifications and certifications within the field of IT would need, in principle, to be aligned. The jury is, however, still out on the issue of whether such a qualifications framework can have an impact on the arrangement of the multitude of training and continuing training qualifications and certificates.

Against this background, the following will outline some of the activities and projects ongoing within the IT sector in which, although no continuous reference is made, the training policy guidelines of the EU stated above need to be "borne in mind".[23] The second phase of the EU Commission "eEurope" Programme, adopted by the European Council at its summit in Seville (**eEurope 2005**), demonstrates a significant range of initiatives within this context. The objective of this programme is the promotion of secure services, applications and content based on a broadband infrastructure offering extensive access. The aim is for this action plan to provide favourable conditions for private investment and job creation in the, leading to an increase in productivity and in modern public services as well as affording every EU citizen the opportunity of participating in the information society (cf. EUROPEAN COMMISSION 2004b). The **information society in Europe** also has its own Internet portal (cf. European Commission 2004e), presenting all 27 initiatives relating to the establishment of an information society (cf. EUROPEAN COMMISSION 2004d). A far as areas relevant to IT qualifications are concerned, the programme contains the ESDIS, eTEN, E-Learning, und eSkills Forum aspects.

- The abbreviation **ESDIS** represents a group of high-level experts in the Employment and Social Dimension of the Information Society (ESDIS), made up of representatives from the member states and set up by the European Council in Vienna in 1998. ESDIS's working areas are employment strategies in the information society, quality benchmarking relating to societal change, the eEurope action plan, and so forth (cf. EUROPEAN COMMISSION 2003e).
- **eTEN** in turn, (Trans-European "e-services" Network, a joint programme for the Europe-wide setting up of e-services for the creation of an information society for all citizens) is a programme via which the European Union is providing support for the establishment of electronic services (e-services) organised on a trans-European basis and operated via telecommunications networks (cf. European Commission 2004c, Österreichische Forschungsförderungsgesellschaft – Bereich für Internationale Forschungs- und Technologiekooperation 2004, AUSTRIAN RESEARCH PROMOTION AGENCY - DEPARTMENT OF INTERNATIONAL RESEARCH AND TECHNOLOGY COOPERATION). The main emphasis of this programme is on public services, with a particular focus on areas where Europe enjoys a

23 For a fundamental presentation and detailed descriptions of the EU initiative, strategies and research programmes in the area of the development of IT qualifications cf. MANZONI 2004, pp. 21 ff.

competitive advantage. This puts it at the heart of the eEurope initiative for the creation of an "information society for all". Support is provided for services which are in the public interest, enabling every citizen, every company and local authorities to avail themselves of the advantages of the networked society on an individual basis. ETEN is building on the foundations established by the endeavours achieve technical harmonisation undertaken during the process of creating Euro IDSN norms as a service platform. There are, however, no discernable direct links to the harmonisation of qualifications requirements or certifications.

- Within the IT context, a comprehensive range of projects is being supported by the EU in the field of **e-learning**, a total of 257 projects being identified in this area, although a rough investigation does not reveal any activities in explicit pursuit of the objective of standardising the didactic approach against the background of a qualifications and certification system enjoying pan-European validity (cf. European Commission - Directorate-General for Education and Culture 2004). The new EU **e-learning initiative** comprises four elements: equipping schools with multimedia PC's, IT training for European teachers, the development of European training services and software and the fast-tracking of network connections for schools and trainers (cf. European Commission 2004).
- The **eSkills Forum** focuses on encouraging EU dialogues and measures, plugging gaps in IT qualifications and coordinating the latter with skills profiles, a context which also saw the Cedefop funded study "**e-Skills Certification in Europe** (eSkills Cert): Voluntary Approaches to Setting European Level Quality Standards" (cf. Universität Karlsruhe (TH) - Institut für Angewandte Informatik und Formale Beschreibungsverfahren 2004a, (Institute of Applied Informatics and Formal Description Methods). The basis of this study is a survey conducted with experts in Europe on broadly accepted IT certification systems in initial and continuing IT vocational education and training within individual countries, thus also covering in empirical terms large parts of the content on which this study is based. The study provides an analysis of various certification systems for ICT specialists and users, these being of significance to the targeted, requirements oriented and high quality training for ICT specialists and users in accordance with industry needs. Publication of results is planned for the period following 30 November 2004 and should provide a good addition to the present investigation.[24]

24 For further information, cf. CEDEFOP 2004.

The major pan-European approaches to the development or systematisation of vocational structures and educational pathways are also financed via EU funding.

- The activities of the **Career Space Consortium**, outlined in section 5.3, which is attempting to use comparative analyses of existing curricula and procedural methods as a basis for drawing up tailored IT curricula and occupational profiles, also receives support and funding from Cedefop. This means that a Cedefop activity, and thus the EU, represents the driving force behind the activities of the industry dominated Career Space initiative.
- Since 2002, the umbrella organisation of national informatics societies CEPIS has been conducting the EU funded project **EPICS**, investigating the prerequisites for a cross border certification system in six EU countries. The product of the study is the certification system EUCIP, which will be described in more detail in section 5.4. EPICS is EU financed and is an offspring of the TEN Telecom initiative and its successor eTEN (see above).
- Another successful project is the **ECDL** (European Computer Driving Licence), also initiated by CEPIS. Although this is a user certificate, which has been introduced both in Germany and Europe, the ECDL demonstrates how a Europe-wide qualifications, and in particular certification model based on a licensee system can achieve a high level of acceptance in a relatively short period of time. November 2004 saw the issuing of the four millionth European Driving Licence (cf. Dienstleistungsgesellschaft für Informatik mbH (DLGI) 2004, (DLGI Accrediting Services Agency). The ECDL will be discussed in section two of Chapter 5 following.
- The **HARMONISE** Project is a reference material project from the Leonardo da Vinci Programme and is being conducted by the Institute of Applied Informatics and Formal Description Methods (AIFB) at the University of Karlsruhe.[25] The project investigates continuing vocational training and qualifications systems with a specific focus on IT certification systems for IT specialists in Europe. The objective is to collate and evaluate material and to develop recommendations in respect of how comparability and transparency of IT qualifications can be achieved at a European level. This provides a link to many of the objects of study described in this paper, although the main thrust of the analysis seems to tend towards the analysis of the IT curricula of various continuing training concepts or nationally based solutions. The project started on 1 October 2004 and is to run for 30 months. Nine project partners from seven European countries are involved, CEPIS being responsible for project coordination. No results are available as yet, although a project homepage should be activated shortly.

25 Cf. Universität Karlsruhe (TH) - Institut für Angewandte Informatik und Formale Beschreibungsverfahren 2004b, Institute of Applied Informatics and Formal Description Methods (AIFB) at the University of Karlsruhe. The "EuroCert" project mentioned above, for example, was also funded by the Leonardo da Vinci Programme.

In order to be able to provide targeted support and monitoring for development within the IT sector, the European Commission avails itself of the consultancy services of the international body **ISTAG** (Information Society Technology Programme Advisory Group). The membership of this high-ranking research committee is made up of a large number of prominent experts from trade and industry and academia. The **6th European Information Society Technology Programme** formulates the objectives and strategic direction of European support programmes within the IT field, its budget of approximately 3.6 billion euro making it the largest support programme in Europe. The aim is to deploy targeted research and development measures to enhance competitiveness within the European economic area, also paying due heed to competition from such countries as the USA and Japan. The primary focus of the functions of the advisory body ISTAG therefore lies in the area of the strategic alignment of the IST Programme. The whole spectrum of information and communication technologies forms the basis for this, the body identifying research trends and integrating innovative and visionary approaches into the programme (cf. INI - GRAPHICSNET FOUNDATION 2002, INFORMATION SOCIETY TECHNOLOGIES ADVISORY GROUP 1999, WILSON 2004).

In principle, it is fair to state that although the EU has initiated a comprehensive range of activities and programmes relating to the IT sector and corresponding themes, it is only in a few projects that the issue of IT qualifications systems and accompanying certificates has had a part to play. On the other hand, however, all the main initiatives within the European area relating to this issue have been at least periodically or partially (co-)funded from EU coffers or provided with political and administrative support from the EU institutions. Against this background, the following aims to investigate in more detail four approaches (some of which have been mentioned already) to continuing training or certification systems in the IT sector.

5. Proposals, concepts and projects relating to the development or systematisation of vocational structures, career levels and educational pathways at an EU level

The aim of the following is to present selected concepts intended for or at least demonstrating an initial approach towards the development of systematic educational pathways and career routes within the IT sector and/or in IT departments at a European level. The individual concepts will firstly be presented and described. An evaluation from a German point of view taking the results of the expert interviews into account will subsequently follow in Chapter 7.

Section 5.1 will describe the structure of the Informatics Curriculum Framework 2000 for Higher Education which, although aimed at the higher education level, provides a good opportunity to conduct a comparison with the guidelines for the development of higher education curricula published by the Career Space Consor-

tium (5.3.2), the latter also being responsible for the skills profiles described in 5.3.1. Previous to this, however, the initiatives of the ECDL Foundation will be presented (5.2), these also providing interesting approaches towards identifying a solution for the problem stated. Particular emphasis has been placed on the EUCIP concept of CEPIS (5.4), this being most readily comparable to the German IT continuing training system in the authors' view. One of the features of the EUCIP concept, and one of the things it has in common with the German approach, is its attempt to address the whole spectrum of the IT labour market and develop stringent educational pathways and career routes.

5.1 Informatics Curriculum Framework 2000 for Higher Education by IFIP/UNESCO

The aim of the following is to investigate the framework IT higher education curriculum (Informatics Curriculum Framework 2000 – ICF-2000) developed by the 3rd Technical Committee (Education) of the International Federation for Information Processing and submitted in the year 2000.[26] It represents the result of a project entitled "Modular training programme", assigned to the IFIP by UNESCO, and integrates a series of curricula and structural stipulations of specialist IT societies, hence the intention to present it as an example of international developments at higher education level within the framework of the present investigations.

Due to the constantly changing contents and differing requirements and traditions prevailing in individual countries, the ICF 2000 was developed in such a way so as to enable its smooth absorption of new content and make it possible for it to be implemented with due regard for the specific cultural, social and institutional characteristics with respect to individual states and educational systems. The aim was to create a framework opening up an effective way for ministries of education and other bodies with an educational remit to develop a systematically regulated higher education policy for the IT sector with in-built scope for change in terms of content and organisation which retains international connectivity whilst according due consideration to local conditions (cf. MULDER/VAN WEERT 2000). The process focuses exclusively on specialist IT content, other areas required for the completion of an overall course of study (such as mathematical, engineering or economic components) being objects for individual extension of the framework. The ICT 2000 uses successive qualifications profiles as a basis for the development of eight different curricular descriptions for eight categories of skilled worker, part of the framework content being based on the informatics curricula presented below, which are widely accepted and already used by leading international IT societies.[27]

26 Cf. here and in the following (insofar as no indication to the contrary is provided) MULDER/VAN WEERT 2000.

27 These curricula are updated on an ongoing basis, enabling in turn the ICF 2000, which works with reference to the curricula, to be easily kept up to date (cf. MULDER/VAN WEERT 2000, p. v).

Figure 3: **Selection of internationally recognised curricula incorporated into the ICF 2000** (MULDER/VAN WEERT 2000, p. 20)

- *Computing Curricula '91* is a report produced as a joint effort by the Association for Computing Machinery (ACM) and the Computer Society of the Institute of Electrical and Electronics Engineers (IEEE-CS). It specifies common requirements in nine subject areas and relies on three working methodologies and a dozen recurring concepts. It is to be reviewed and revised by ACM and IEEE-CS, resulting in a new version for the year 2000.
- *Curriculum IS '97* was presented in 1997 as a joint effort by ACM, the Association of Information Technology Professionals (AITP) and the Association for Information Systems (AIS). This "information systems" curriculum refers to a detailed IS body of knowledge, includes specific depth of knowledge metrics, and models courses in terms of small learning units.
- *Curriculum ISCC '99* has been developed by a task force from industry and academia with support from NSF and has been presented in draft version at the ACM/SIGCSE '98 conference. It provides an information system-centric curriculum (ISCC) that is enterprise-oriented, based on a "profile of the graduate" specified by industry, and that emphasises professional skills. A comprehensive draft report is being reviewed and used to seek endorsement by ACM, AIS and IEEE-CS.
- *An education task-force of the IEEE-CS/ACM Steering Committee is currently developing curriculum recommendations for "software engineering"* for the Establishment of Software Engineering as a Profession.
- *Curricula for Human-Computer Interaction* is a 1992 report by SIGCHI, ACM's special interest group on Computer-Human Interaction.
- "*A Modular Curriculum in Computer Science"* was produced by IFIP for UNESCO in a revised edition in 1994. It offers a curriculum framework for "computer science" specifically meant to be applied in developing countries. In a way ICF-2000 can bee seen as a successor of this UNESCO/IFIP '94 curriculum. ICF-2000, however, will have a much broader scope and evidently could benefit from the other curriculum efforts mentioned.

The ICT 2000 framework thus contains five content areas aligned to form a specific teaching and study plan in accordance with a proposed sequencing.[28] The first part presents a categorisation system dividing IT workers with a higher education qualification (the sole focus of the ICT 2000 being on such workers) into the three main categories of I-users, I-appliers (IT users from a non-specialist area) and I-workers (skilled workers), only the last mentioned being of interest within the terms of reference of the present study. This group is further sub-divided into operational, engineering and researching I-workers. In respect of the categories of workers mentioned, the second part of the ICF 2000 proposes four qualifications profiles (basic instrumental I-profiles – BIP, basic conceptual I-profiles – BCP, minor I-profiles – MIP and major I-profiles – MAP), MAP being of particular relevance to skilled IT workers (I-workers). A point of consideration, however, is the fact that each of the higher profiles encompasses the content of its respective predecessor profiles (thus MAP also contains the contents of BIP, BCP and MIP). The third part of the ICF

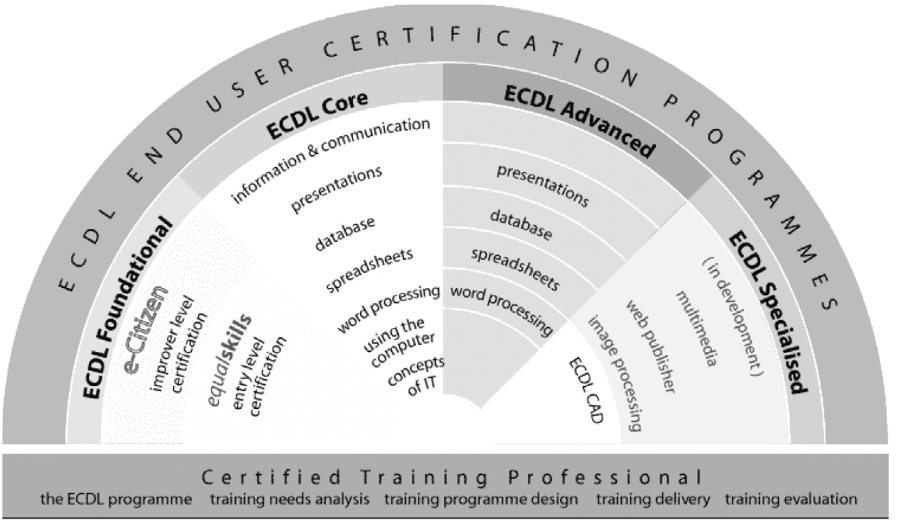
28 The first stage involves the selection of the appropriate learning content from within the framework in line with the desired target definition (for which specialist areas are the higher education graduates to be trained within the framework of the course of study?). The qualifications corresponding to the respective specific conditions are then chosen from within the framework and mapped against the aim established in stage 1. In stage 3, curriculum content is selected, support for this process potentially being provided in the form of the existing curricula and learning materials of various international IT societies (cf. MULDER/VAN WEERT 2000).

2000 identifies twelve core themes[29] covering the whole of the specialist area before the fourth part highlights integration factors and develops appropriate strategies with the aim of enabling the contents of the ICF 2000 to be adopted, either in whole or in part, into existing higher education concepts paying due regard to cultural, institutional and regional prerequisites. Finally, selected fundamental learning or curriculum units from the integrated international models are presented which culminate in the proposed qualifications.

5.2 The initiatives of the ECDL Foundation

The ECDL Foundation was founded under the auspices of CEPIS as a result of an EU initiative to improve IT competences and, after the great success of the European Computer Driving Licence, has continually expanded its range of provision (shown in Figure 4) to the extent that it is likely that some of the products developed for the certification of end user IT competences are now also applicable to IT skilled workers.[30]

Figure 4: **Range of certification provision of the ECDL Foundation** (European Computer Driving Licence Foundation 2004a)



29 The individual core themes are: representation of information, formalism in information processing, information modelling, algorithmics, system design, software development, potentials and limitations of computing and related technologies, computer Systems and architectures, computer-based communication, social and ethical implications, personal and interpersonal skills and broader perspectives and context (includes links with other disciplines), cf. MULDER/VAN WEERT 2000, S. 31 ff.

30 Cf. here and in the following (insofar as no indication to the contrary is provided) the Internet presence of the ECDL Foundation [www.ecdl.com; 15.11.2004].

The specialised modules, such as "ECDL for Computer Aided Design" and the "ECDL Certified Training Professional", seem to be of particular interest in this regard.

Provision for end users

The ECDL-F offers end user certifications in four areas, the programme *"equalskills"* and "e-Citizen", positioned in a higher position within the provision framework, being particularly designed with beginners in computer use in mind. The former is specifically targeted at people coming into contact with computers for the first time and exhibiting initial reservations. To dispel any fears, a simple programme was created, accessible to all potential users, to help develop user familiarity with easy applications via covering the four thematic areas of "Computer Basics", "Introduction to the Desktop", "The World Wide Web" and "E-Mail". *"equalskills"* is designed to enable users to avail themselves of computers in their everyday lives rather than develop competences relevant to the labour market. For this reason, no formal testing of the eight to fifteen hour course is prescribed. Candidates' skills are evaluated via project-based exercises.

For users who are familiar with the computer but have very limited experience of the Internet as a medium, the ECDL-F offers the "e-Citizen" programme, where participants acquire the necessary skills to enable them to take part in the information society in three blocks: "Foundation Skills" (the computer, files and folders, simple applications, Internet and e-mail basics), "Information Search" (searching, security measures, information) and "e-Participation" (online service provisions, practical applications). This programme is likewise aimed at equipping participants with the ability to use the Internet, e-mail and various online services rather than targeting the acquisition of conventional labour market oriented certification. The course comprises approximately 30 teaching hours, during which participants work through various thematic areas and complete exercises both in a self-directed way as well as with the support of a tutor.

The core product of the ECDL-F – the European Computer Driving Licence – is a freestanding user qualification certifying practical skills in the most common computer applications. It corresponds to the prevailing international standards in 41 European countries, its modular structure and the specific workplace related nature of the IT competences it certifies meaning it enjoys international labour market recognition as a signalling instrument or as a prerequisite for job applications.[31]

The European Computer Driving Licence records knowledge in the learning areas of concepts of IT, using the computer, word processing, spreadsheets, databases, presentations and the Internet via seven standardised modular tests which need to

31 This has led to the use of the European Computer Driving Licence in continuing training or to its stipulation as a job application requirement in an ever increasing number of companies and institutions (including BMW, Degussa, Ikea, Nokia, Siemens, Volvo, the German Confederation of Trade Unions (DGB) and the German Mining, Chemical and Energy Industrial Union (IG BCE). Cf. Dienstleistungsgesellschaft für Informatik mbH (DLGI) 2004).

be completed within three years, the "ECDL START Certificate" being awarded after four examinations have been passed and certification in the form of the European Computer Driving Licence (ECDL) following after all seven modular examinations have been passed. The necessary knowledge may be acquired via self-directed learning or via preparatory courses, the learning content contained within the Curriculum Syllabus 4.0 (cf. European Computer Driving Licence Foundation 2004c) being accessible to all.[32]

Since April 2003, "EDCL Advanced" certificates for advanced users, and for which the EDCL is not a compulsory entry condition, have existed alongside the ECDL itself, the latter being mainly aimed at office users. Thus far in Germany, advanced modules are available for the areas of word processing and spreadsheets (cf. HANFT/MÜSKENS/MUCKEL 2004, p. 38), the modules relating to databases and presentations still being in the planning phase.

The specialist certifications

In addition to the provision already described, the ECDL-F portfolio also contains the "ECDL Specialised" and "ECDL Certified Training Professional" certificates. Although the foundation still classifies the first of these as an end user certificate, the ECDL-CAD certificate, the only one implemented thus far under the latter category, evinces strong similarities to professional IT certificates, causing the present study to consider it within the framework of specialist certifications in the same way as the trainer certificate.

ECDL-CAD represents a new development on the part of the ECDL-F and aims to certify competences in two-dimensional computer aided design (CAD). The qualification was conceived for students and skilled workers seeking to make their knowledge and competences marketable in this area via an internationally recognised, manufacturer independent certificate. Candidates need to demonstrate their competences by using the standard features of established 2D-CAD applications to create, edit, print and integrate objects from other programmes and so forth (cf. European Computer Driving Licence Foundation 2004b). Such content enables ECDL-CAD to provide both a certification opportunity for end users from other disciplines as well as entry certification for IT specialists in this field.

The programme for the certification of IT trainers conducting the preparatory teaching for the European Computer Driving Licence appears to be of still greater interest. The aim here is to make sure ECDL training standards are maintained. To this end, work was undertaken in conjunction with experts to monitor international standards in the field of IT training and develop competence requirements for the ECDL trainer profile.

32 For the disabled, the ECDL-F also offers the ECDL-PD, the ECDL for People with Disabilities. For more detailed information cf. European Computer Driving Licence Foundation 2004a.

Depending on experience, there are various routes by which participants may obtain this certificate. Interested parties with teaching or training experience may begin directly with the "ECDL CTP Certification Programme". Those with no or a lesser level of training experience need to start by completing the "ECDL-CTP Development Programme", acquiring and evidencing the fundamental theoretical principles in twelve workshop days held within a three-month period and via additional self-directed study and examinations. Subsequent to this, candidates need to acquire approximately 40 further hours of work experience at an accredited ECDL training centre before being permitted to join the "ECDL CTP Certification Programme" in precisely the same way as candidates with teaching/training experience. The "ECDL CTP Certification Programme" comprises a three-day workshop, candidates also being required to provide evidence of their competences as a trainer in the form of documentation and certificates. Since many of the requirements have their basis in fundamental personal, specialist, social and methodological competences, their application is imparted and monitored within typical ECDL training contexts. After the workshop, a deadline of one month is granted for the completion of documentation. The products of this process are then checked in a meeting with the tutor responsible and subsequently verified by a further CIP tutor in cooperation with the CTP training centre. The candidate can then receive full certification from the national ECDL-CTP agency responsible.

5.3 Career-Space: ICT skills profiles and guidelines for the development of higher education curricula

The Career Space Consortium, of which mention has been made on several occasions in the above remarks and which was originally initiated with the objective of achieving better evaluation of the shortage of skilled workers in the IT sector, has in the main brought about two stages of development.

The first stage involved the drawing up of 18 skills profiles relating to the most important activities in various areas within the IT sector. These profiles encompass a description of the various activities within the industry, the functions and technologies required, the associated requirements in terms of knowledge and skills and the advancement opportunities (cf. CEDEFOP 2001a, p. 3). The basis for the profiles drawn up by the Consortium is, almost without exception, a higher education qualification at Bachelor or Masters level.

The second stage involved using these profiles as a basis for cooperation with various European universities and educational institutions and deploying analysis of existing curricula to draw up new guidelines for university ICT curricula with the aim of increasing the correlation between courses of study and the requirements of the labour market.

Since 2003, the skills profiles and guidelines for ICT higher education curricula (cf. CEDEFOP 2001a, b) have been the object of a review process of monitoring conducted by the European Committee for Standardization (CEN). The framework

of a "CEN/ISSS Workshop" was selected for this procedure as enabling the active participation of interested parties in the standardisation process and rendering it less formal than carrying out the work via the "Technical Committees". The objective of these workshops is the establishment of levels of European consensus (via so-called CEN Workshop Agreements – CWA) on certain themes in the form of "best practice agreements, codes of conduct or pre-standards" (EUROPEAN COMMITTEE FOR STANDARDIZATION 2004a) with the formal support of the CEN.

The verification process in respect of the two documents, which was requested and monitored by Cedefop, CEPIS and the Career Space Consortium, took place via two workshop meetings in each case, telephone conferences and an electronically aided review process conducted between April 2003 and February 2004. This has resulted in two agreements published by the CEN (cf. EUROPEAN COMMITTEE FOR STANDARDIZATION 2004b, c).[33]

The following presents the results of both areas of work tackled by the Career Space Consortium in their original form. The more recent developments which have emerged from the CEN/ISSS workshop will be highlighted briefly at the end of each respective part, thus enabling a prognosis to be made in respect of planned further development of Career Space initiatives.

ICT skills profiles

The Career Space Initiative was founded as a response to the shortage of qualified IT experts which had been identified, commencing its work with the development of generic skills profiles for the most important key activities mostly affected by the shortage in a bid to overcome this gap in skilled workers.

Using company analyses as a basis, 18 skills profiles were identified in the following areas: Telecommunications (activity areas Radio Frequency (RF) Engineering, Digital Design, Data Communications Engineering, DSP (Digital Signal Processing) Applications Design, Communications Network Design) Software and Services (activity areas Software & Applications Development, Software Architecture and Design, Multimedia Design, IT Business Consultancy, Technical Support), Products and Systems (Product Design, Integration & Test/Implementation & Test Engineering, Systems Specialist) and five cross sector occupational profiles (ICT Marketing Management, ICT Project Management, Research and Technology Development, ICT Management, ICT Sales Management).

33 This is in contrast to the statement made in the interview with Expert F, who attested to the passivity of the Career Space members and formulated the view that it was unlikely that any future oriented activities can emerge from this direction (cf. Chapter 6).

Alongside the description of activities, these profiles also cover an explanation of the tasks and technological areas associated with the activity via descriptions of the job, role and working lifestyle. The necessary respective skills are also formulated in personal and technical terms to build up a picture of the kind of person each job would suit. This is then followed by a description of career paths or future opportunities with examples of occupational titles. (cf. CEDEFOP 2001a):

Table 1: **Activity profiles and examples of typical occupational titles** (cf. CEDEFOP 2001a, pp. 3 ff.)

Area of activity	Example occupational titles
Telecommunications area (5)	
Radio Frequency (RF) Engineering	R.F. Designer, R.F. Engineer, R.F. Architect, R.F. System Integrator, R.F. Design Engineer
Digital Design	H.W. (Digital) Designer, Development Engineer in Digital Baseband Processing, Digital Baseband Signal Processing Engineer, Digital Logic Designer, I.C. Designer, Applications Engineer
Data Communications Engineering	Communications Software Development Engineer, Software Architect, Software Project Manager, Network Architect, Network Product Architect, Systems Engineer, Communications Product Test Engineer, Hardware Engineer
DSP (Digital Signal Processing) Applications Design	Digital H.W. and S.W. Engineer, Algorithm Designer, Information and Communication Theory Specialist, Scientist, Applications Engineer Systems Design
Communications Network Design	Data (e.g. Internet, private data networks) Network Designer, Mobile Network Designer, Hardware Engineer
Software and services area (5)	
Software & Applications Development	Applications Programmer, Software (SW) Engineer, Systems Developer, Technical Systems Programmer, Software Architect, Maintenance and Support Specialist, Integration Technicianr
Software Architecture and Design	Software Programmer, Systems Developer, Systems Architect, Systems Architecture & Design Scientist, Systems Integrator (creates specific products by putting components together), Network Designer, Computer Scientist
Multimedia Design	Multimedia Programmer, Multimedia Network Designer, Web Designer, HM Interface Designer, Multimedia Architect, Internet/Intranet, Audio, Video Engineer, Web Information Specialist, Web Content Strategist, Web Content Programmer, Web Producer, Web Creative Specialist, Web Art Specialist, Web Graphic Designer
IT Business Consultancy	Enterprise Wide Information Specialist, e-Commerce Consultant, Business Analyst, Business Architect, Application Specialist, Information Technology Strategy Consultant, Strategic Information Management Consultant, Information Management Consultant
Technical Support	Computer Operator, Operations Analyst, Help Desk Operator, Disaster Recovery Specialist, Problem Manager, Network Management Specialist, Systems Programmer, Trouble-shooter, Configuration Management Specialist, Product Support Specialist, Customer Support Engineer, Support Analyst

Continuation Table 1:

Area of activity	Example occupational titles
Products and systems area (3)	
Product Design	Design Engineer, HW Design Engineer, HW Development Engineer, Product Development, Computer Support Specialist, Computer Designer, System Integrator, Logic Design Engineer, Physical Design Engineer, Design Rule Engineer, Analogue Circuit Designer
Integration & Test/ Implementation & Test Engineering	Systems Integrator, System Implementation Engineer, Integration System Engineer, Integration Engineer, Implementation and Test Specialist, Integration and Test Specialist
Systems Specialist	Product Specialist or Consultant, Systems Engineer, IT Specialist, Customer Systems Specialist, Solution Specialist, Technical Designer, Key Account Manager
Cross sector (5)	
ICT Marketing Management	Product Manager, Services Marketing Manager, Communications Product Manager, Software Product Manager, e-Commerce Product Manager, Pricing Analyst
ICT Project Management	Product Planner, Master Scheduler
Research and Technology Development	Research Engineer, Research Scientist, Senior Research Engineer, Senior Research Scientist (Laboratory), Principal Scientist (Laboratory), Principal Engineer, Senior Technical Expert, Principle Technical Expert, Research Fellow, Senior Fellow
ICT Management	Team Manager, Department Manager, Line Manager, Senior ICT Manager
ICT Sales Management	Junior Sales Manager, Sales Manager, Account Manager, Key Account Manager

Results of the CEN/ISSS workshop on the review of the ICT skills profiles: [34]
The agreement reached within the scope of the CEN Workshop Agreement covers a wide range of results. The first of these was that the Career Space profiles were considered to represent a sensible and useful basis for the clarification of potential activities within the branch for students, academics and personnel and careers advisors alike, and it was felt the profiles should be adopted across Europe. Some individual skills descriptions and definitions still require review, there being inconsistencies and fragmentariness across the various profiles. Slight amendments have also been made to the "Software Applications Development", "Software Architecture and Design" und "ICT Management" profiles and a new profile developed in the "ICT Security Engineering and Management" area. The profiles will be reviewed on a regular basis in future (at least every three years) by CEN/ISSS, and the development of two further profiles relating to "ICT Trainer" and "Data and Network Administrator" will be pursued.

There was further stimulation of fundamental activities in various branches, including the implementation of a more detailed study dealing with the broadening of the profiles to all types of formal and informal education (not, therefore, extend-

34 In respect of the following remarks cf. European Committee for Standardization 2004b, pp. 7 ff.

ing to higher education)[35] in companies of every size category (including, by definition, SME's) in the IT branch and user industries and, secondly, pointing out the necessity of the development of a European Reference Framework mapping the complete range and depth of employment opportunities within the IT sector and associated industries and containing cross links to both the European Qualifications Framework and national career pathways in the interests of increasing mobility, transferability and permeability.[36]

Guidelines for ICT higher education curricula

In terms of planning courses of study, the qualifications profiles developed by the Career Space Consortium represent a valuable orientation guide in respect of the labour market requirements for IT academics. The aim of the guidelines for the development of courses of study is to provide institutes of higher education with assistance in the planning of adequate course provision. According to the Career Space Consortium, the developing curricula should ideally be strongly targeted at a clearly defined qualification level as well as defining "the Education Process (the sequence of adjusted lectures and exercises which deliver knowledge), the Examination Process (which evaluates the students' achievements), and the Training Process (which helps practise these skills and develop abilities)" (CEDEFOP 2001b, p. 30).

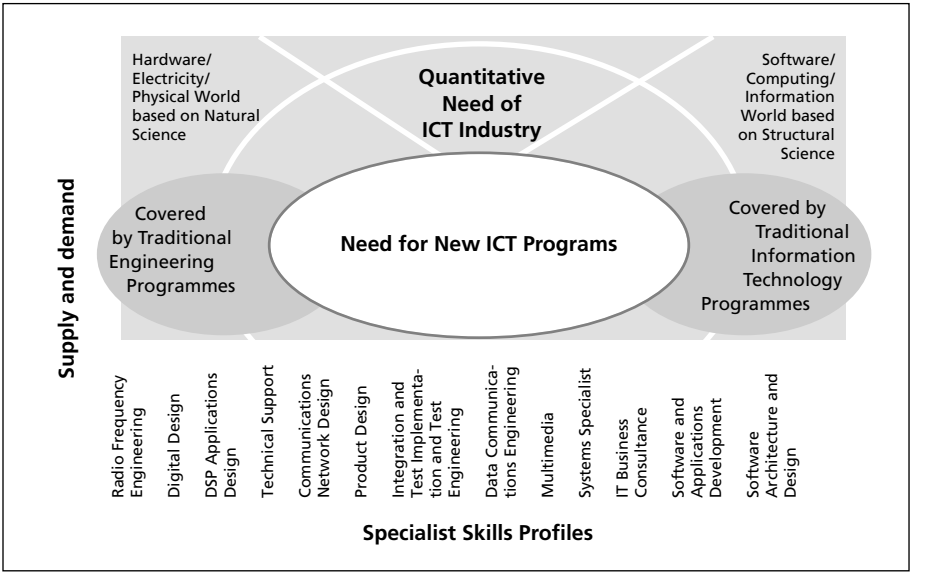
The analysis of existing ICT higher education curricula of the part of the Career Space Consortium revealed that such curricula are essentially based on two main directions, electro technology, which has developed from physics and information technology, which has its roots in mathematics. Because of their different traditions and frequent alignment to different specialist areas, both disciplines have retained their different contents and goals down to the present day, working with different methods and technologies. As well as this structural problems within the technical areas of the ICT curricula, the integration of additional relevant disciplines such as economics, business administration and design has hitherto been extremely rare, not least due to the fact that the higher education structures are oriented towards specialist areas and hamper the establishment of cross-disciplinary curricula (cf. CEDEFOP 2001b, pp. 11 ff.).

35 The issue of expansion to non-higher education areas whilst paying due heed to the levels of the European Qualifications Framework is the object of work being undertaken at CEDEFOP inter alia. Cf. here SELLIN 2004, pp. 70 ff.

36 "The Workshop recommends the establishment of a European Reference Framework for a job role/description scheme at a greater level of detail than that which exists in Career Space. This would relate to specific job processes and tasks used in ICT work. It should take into account the many national schemes which already exist such as "Skills Framework for an Information Age" – SFIA from the UK and the German "System for continuing IT training". It should also take into ac-count the fact that most large companies also have existing schemes … The Workshop recom-mends [also] the development of a method for establishing linkage between the ICT skills profiles, the European Reference Framework described above and national qualification frameworks. This should take account of the different schemes in place in different countries and companies whilst promoting a consistency of view and portability across Europe. This should allow for the establishment of a European Skills and Qualifications Framework in the next phase of the Workshop's activity" (European Committee for Standardization 2004b, pp. 11-13).

Although there continues to be a demand within the IT sector for highly specialised graduates at both ends of the continuum represented in the following graphic, there is a far greater requirement for skilled workers who possess a combination of qualifications, able to bring together to an increasing extent both economic and marked personal competences to go with skills within the two technical disciplines. The principle aim of the newly developed curricula is thus to cover mid-level qualifications needs.

Figure 5: **The skills profile of the IT branch in respect of academic qualifications** (CEDEFOP 2001b, p. 14)

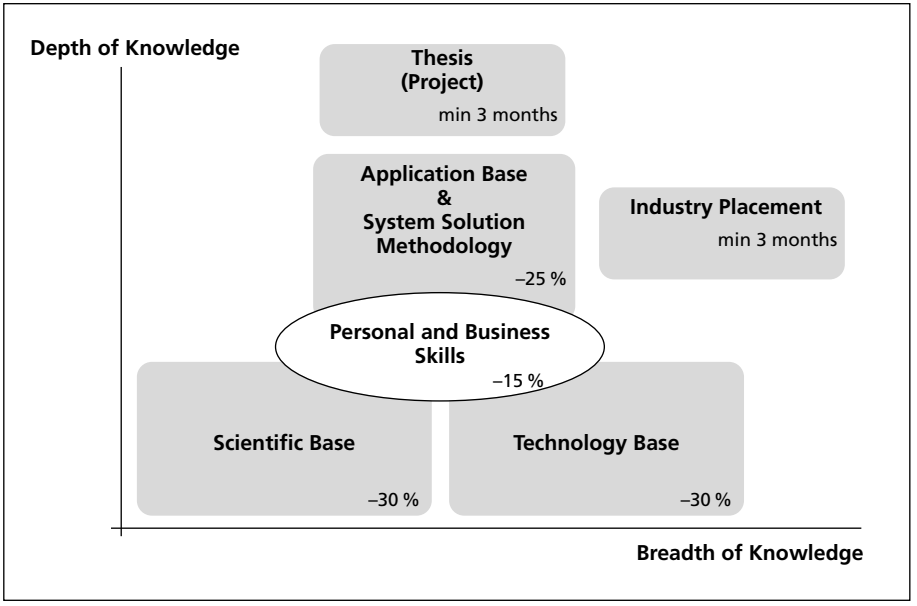


This will require study planning programmes which aim to achieve both the inclusion of elements of electro technology and information technology as well as a systematic linking of the two areas. A greater level of integration of business administration elements is also necessary in order to create an understanding for company business processes and to enable developments or IT solutions to be implemented in line with these processes. The increasing pace of change, the complexity of systems and the rising amount of work taking place in projects and within (multidisciplinary) groups this entails means IT graduates also need to be able to adapt to both different framework conditions (learning ability) and to the fact that people within the working environment change (team ability). This means graduates need to display an enhanced level of personal competences [37], business

37 The Career Space Consortium explicitly names the following areas: "Problem-solving abilities, communication and persuasion skills, awareness of the need for lifelong learning, readiness to understand fully the needs of the customer and their project colleagues, and awareness of cultural differences when acting in a global environment" (CEDEFOP 2001b, p. 18).

administration knowledge and the ability to work within projects and teams to run alongside the specialist prerequisites (cf. CEDEFOP 2001b, pp. 13 ff.). Within the process of addressing the issue as to which contents should be included in the curricula in order to fulfil the employer requirements within the IT sector mentioned above, the Career Space Consortium developed the "Basic structure of knowledge required" shown below (CEDEFOP 2001b, p. 22), which remains the same irrespective of the requirements of individual companies, specialist areas, functional fields or jobs.

Figure 6: **Scope of competence showing model ICT curriculum content**[38] (CEDEFOP 2001b, p. 28)



This requires a broad base of knowledge in the fields of mathematics, science and technology, the recommendation being that 30 percent of study content be devoted to the scientific base, including scientific analysis and design methods. The same proportion of time should be accorded to an overview of available technologies and their functions and the teaching of (applications) possibilities and limits, with an added insight into conceivable future developments. An important part of this process is the establishment of correlations between these two fields rather than undertaking a consideration of the areas in isolation. The Career Space Con-

38 All relevant mathematical, scientific and technological specialist areas are distributed along the X-axis of the graphic, the "Depth of knowledge" ordinate representing the extent of penetration of these specialist areas and extending to cover full vocational qualification (cf. CEDEFOP 2001b, p. 28).

sortium believes a weighting of around a quarter of the curriculum should be allocated to the acquisition of deeper knowledge within specialist areas, familiarity with trouble shooting methods and system functions and specific knowledge of applications relating to the respective activity profiles. A further central aspect, to which around 15 percent of an ICT curriculum should be devoted, is the ongoing promotion of personal and business competences such as "through team projects, commercial simulations, negotiations, presentations etc." (CEDEFOP 2001b, p. 31).

The view of the Career Space Consortium is that a course of study in the IT field should also comprise two further key areas: firstly a period of practical work experience of at least three months' duration, enabling practical experience to be gathered within a context of real commercial and problem solving processes and, secondly, a thesis which also extends over a minimum of three months and which is project related and group oriented where possible (cf. CEDEFOP 2001b, pp. 33 ff.).

The influence of the Bologna Process and the objective of creating a European Higher Education Area with a two-tier study system (comprising a three to four year undergraduate phase and a one to two year postgraduate phase) by the year 2010, something which is also welcomed by the European IT sector, has led the Career Space Consortium to recommend the establishment of new ICT courses of study in the following four areas (cf. CEDEFOP 2001b, pp. 41 ff.):

(a) first cycle degree (FCD) ICT programmes (3-4 years) focussing on education of ICT specialists for different ICT generic skills profiles groups (new courses at basic level ICT education);

(b) consecutive second cycle degree ICT programmes (1-2 years) for graduates with FCD in ICT leading to a higher level of specialisation primarily for R&D activities in specialised ICT sectors;

(c) conversion second cycle degree (SCD) programmes for graduates with FCD in ICT, such as MBA's, qualifying them for a wide range of tasks in industry where both solid ICT and business skills are required;

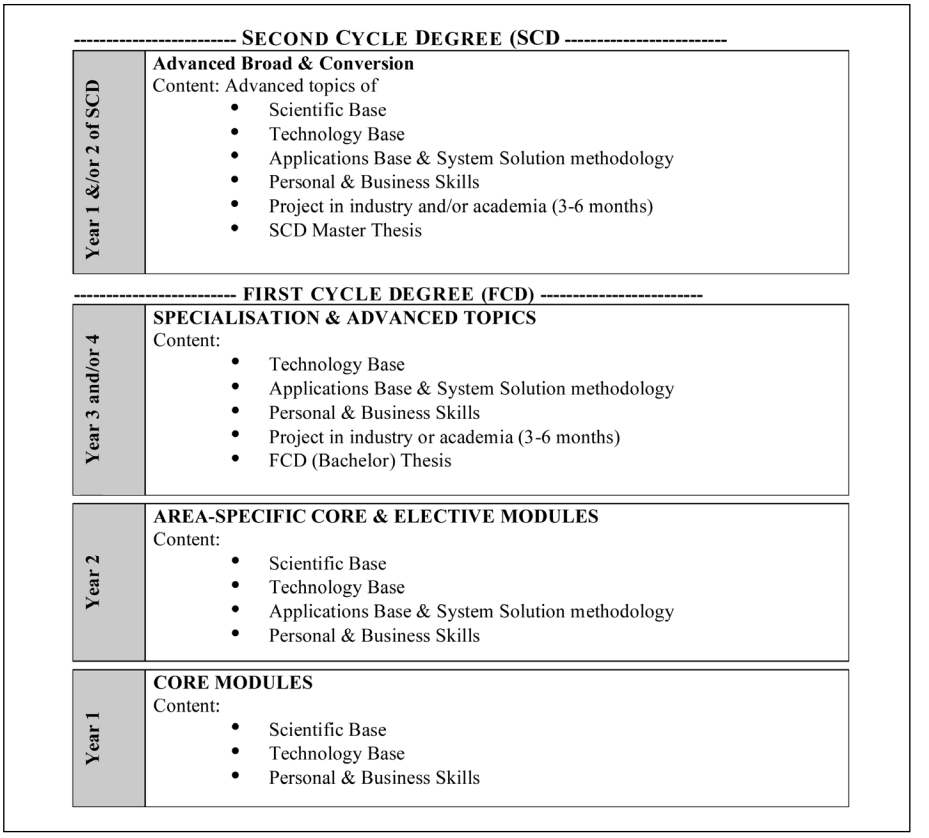
(d) conversion SCD ICT Programmes for graduates with FCD in non-ICT disciplines so that they can become effective innovators in many application areas in the ICT industry.

Within this process, planning for opportunities for distance, part-time and continuing education needs to be included taking the specific requirements of those in employment into account. Explicit reference is also made to the fact that, wherever possible, admission to higher education studies should be on the basis of an examination of skills including existing occupational experience rather than being made contingent on previous qualifications (cf. CEDEFOP 2001b, p. 41).

In general terms, the courses of study need to be constructed in a modular form to allow for flexibility of combination (for specific alignment to individual target groups) and rapid convertibility of individual elements (in order to delete obso-

lete content and incorporate new content). For this reason, the Career Space Consortium proposes that, in principle, ICT curricula should comprise core modules, subject specific core modules and elective (optional) modules, which could be structured as follows:

Figure 7: **Generic structure of ICT curricula** (CEDEFOP 2001b, p. 44)



Within this system, the core modules impart the basic scientific and technological knowledge forming the basis of all generic skills profiles and which is comparatively unchanging. The area-specific core modules, on the other hand, provide the characteristic body of knowledge for the respective group of skills profiles, whilst also containing knowledge which is subject to rapid change. The elective modules in particular are used to impart especially up-to-date knowledge (mostly with a half-life of not more than three to five years). These modules are a vehicle for area-specific advanced topics and the ironing out of differences, enabling more flexibility and a greater level of specialisation in certain fields. Development of personal and business skills is fostered over the whole of the duration of the course

of study by integrating appropriate components into the specialist teaching. The same structure can be applied to the postgraduate phase, a more advanced level being stipulated in all areas (cf. CEDEFOP 2001b, pp. 44 f.).[39]

Results of the CEN/ISSS workshop on the review of the guidelines for ICT higher education curricula[40]

The review of guidelines conducted within the scope of the CEN/ISSS Workshop led to a revised version of the 2001 document, which is recommended to European universities and technical institutes for use in the development of teaching/study plans within the scope of the Agreement. The following amendments were made. Firstly, the weighting accorded to the electro technology component was reduced, and, secondly, the personal skills mentioned were stated in broader terms so as to include social communicative and (foreign) language skills. Alongside more minor textual amendments, institutes of higher education were also called upon to make themselves available for continuing training by opening their doors to those in employment.

5.4 The EUCIP certification concept of CEPIS

Origins

The Council of European Professional Informatics Societies (CEPIS) is an umbrella organisation of national information technology associations with the objective of improving the professionalism of the approach adopted towards IT. To this end, it pursues a three-tier strategy, the first stage of which imparts basic knowledge to lay persons in their dealings with PC's and the Internet (ECDL), the second having the aim of improving training in IT training occupations. The third step represents advanced vocational training for practitioners and specialists within the profession (cf. No author 2002b). To this end, CEPIS seeks to "[…] develop a harmonised certification procedure with the aim of enabling qualifications to be evidenced in a modular system extending over several levels […]" (CEPIS 2003b), thus also making it possible for IT skilled workers to enjoy lifelong learning and skills development within structures standardised and recognised across Europe (cf. CEPIS 2002, p. 1).[41]

In order to achieve this objective, seven member societies from Germany, Greece, Ireland, Italy, England, Finland and Norway had undertaken investigations within the scope of the EU funded EPICS Project (European Professionals Informatics Competence Services) into the marketability of harmonised certification procedures for evidencing vocational qualifications since September 2002. (cf. CEPIS 2003b, No author 2002b).[42] The results of this study were integrated into the EUCIP Concept

39 For information on the clustering of profiles/profiles groups within courses of study cf. CEDEFOP 2001b, pp. 46 ff.

40 In respect of the following remarks, cf. European Committee for Standardization 2004c, pp. 7 ff.

41 The statements made in the interview with Expert F are of interest within this context. This expert attested great market potential to the concept despite considering it lacked a systematic approach (cf. Chapter 6).

– "European Certification of Informatics Professionals". Within the scope of the EPICS Project, the use of the respective national language, both in training and in the qualifications recognition process, was particularly identified as a key criterion for pan-European harmonisation. The need to take country specific and cultural differences into consideration when deciding upon the approach to be adopted and the indispensability of integrating institutes of initial and continuing vocational education and training for the establishment of long-term success in terms of a cross national system were also identified (cf. CEPIS 2003b).

EUCIP was launched in March 2003 with the first official publication of the Core Level Package, initial difficulties and the economic downturn meaning EUCIP met the same fate as the German system in being unable to achieve the originally stated objective of achieving 5000 certifications in 2002 (the plan was for 100,000 by the year 2006, cf. No author 2002b). A total of nine national CEPIS member societies have currently adopted the EUCIP system, IT societies in Estonia and Rumania having now joined the certification model alongside the pilot associations in Germany, Greece, Ireland, Italy, England, Finland and Norway with a view to its practical implementation (cf. EUCIP Ltd. 2004a).

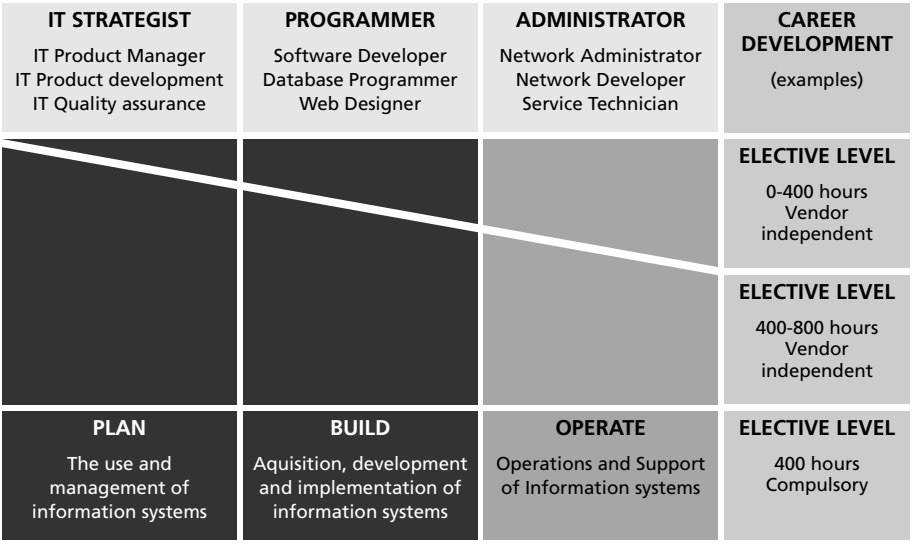
The structure of the certification concept

The aim of the EUCIP certificate is to certify a solid, specialist high level of training independent of any manufacturer certification wherever possible (cf. Gesellschaft für Informatik e.V. 2002, *German Informatics Society* p. 8). In order to achieve this, EUCIP is seeking to accredit training providers operating independently of manufacturers, continuing training providers or e-learning companies and extends this process to include the advanced training sectors of IT companies and higher education, all of which develop and submit for approval their own courses in accordance with stipulations issued by EUCIP and CEPIS rather than wishing to act as a provider of continuing training in its own right. At the end of 2002, amongst the total of 50 advanced training providers then operating within Europe, (cf. No author 2002b) five major German seminar providers (CDI German Private Academy for the Economy, the Dekra Academy, The German College for Employees (DAA), the Advanced Training Institution of the German Confederation of Trade Unions, DGB and the Aachen Chamber of Crafts and Trades) were accredited EUCIP partners (cf. EUCIP Ltd. 2003).

42 The study involved the investigation of existing market standards. Alongside Career Space, the specific manufacturer certification schemes of Microsoft, Cisco, Novell etc. and both British (NCC, City and Guilds, Cambridge Certifications) and American approaches (such as A+) were examined. The results revealed a clear dominance of specific manufacturer certification (associated with the well-known problems in respect of flexibility and transferability when changing jobs etc.). Due to the degree of difficulty anticipated with regard to transferability to other countries and a lack of up-to-dateness and breadth of content in some areas, the British and American models do not appear to be transferable to the European level, leading EPICS to decide on an integrated approach, with the aim of achieving based on a wide basis of usability of skills (and applicability to the labour market) whilst also permitting the integration of specific manufacturer certification qualifications (cf. Arff 2004, pp. 82 ff.).

The main target group is lateral entrants to the profession and skilled IT workers wishing to acquire a marketable qualification or have their existing competences certified to further their careers. EUCIP has developed a framework with two planned levels, in which 400 (Core Level) and 800 (Elective Level) hours of learning time respectively need to be completed, each learning phase concluding with an examination (predominantly Internet supported tests). Credits are awarded for the completion of modules, the accumulation of 32 EUCIP points being required to achieve an Elective Qualification. The main focus is on the imparting of theoretical knowledge by a locally accredited training provider (formal seminars) or as in-service training via e-learning.

Figure 8: **EUCIP framework structure** (Dienstleistungsgesellschaft für Informatik mbH (DLGI) 2002)



Contents are divided into the three IT system knowledge areas of Plan, Build and Operate, thus achieving virtual correlation with the IT life cycle. In the Plan area "[…] commercial processes are analysed and IT requirements are defined in the form of business strategies. This involves the candidates' familiarity with such themes as finance, risk factors and return on investment (ROI) as well as having knowledge of the technology. IT Build focuses on the specification, development and purchase of IT products. A pre-requisite here is for the learners to study the whole of the technological life cycle. The IT Operate area involves the installation, monitoring and maintenance of IT systems" (No author 2002b).

The Core Level is compulsory and provides candidates with over 400 hours of basic training in all three areas (evenly distributed).[43] The Core Level Certificate enables access to further specialisation at the second level, the Elective Level. This involves focussing on one area, 800 hours of learning time being planned. A maximum of half this time may be spent on manufacturer specific courses. Within this level, candidates are accorded a certain flexibility in terms of the compilation of modules which are relevant to their position. The Elective Level Certificate attests to professionalism in the specialist area covered and is intended to provide a qualification both for occupations within the IT sector as well as for positions within IT departments in al other companies (cf. EUCIP Ltd. 2004g, p. 2). In light of the fact that EUCIP is not pursuing the objective of providing a complete classification of all titles, levels and career pathways within the IT sector, the Elective Profiles each cover a wide spectrum of real job profiles. Instead of developing a European occupational structure (integration of the various country specific vocational and career pathways within a single standard framework), which EUCIP believes can only result from harmonisation endeavours at a European level, EUCIP has drawn up criteria which enable comparability to be established with existing approaches and for evaluation of such approaches to take place in respect of the definition of profiles. To this end, various existing variations were investigated and integrated into the EUCIP model:

There is fundamental provision for the recognition of learners' certificates. This also applies in part to certificates acquired at institutes of higher education. In other words, EUCIP is planned as an open model, which, apart from certain fixed elements, enables cross-links to be established with other elements such as existing job profiles, university courses, manufacturers' certificates and certificates and courses offered by independent providers. In order to achieve high quality and the ensuing high market value of the certificates, despite this recognition procedure, the "EUCIP Product Development and Quality Management Board" was set up, which consists of international experts and representatives of the specialist societies and has the responsibility of heading a continuous quality review, improvement and update programme (cf. EUCIP Ltd. 2004g, p. 9).

43 There is a Core Level curriculum describing contents and learning contents for all three knowledge areas in terms of differentiated "learning goals" (cf. EUCIP Ltd. 2004c). The knowledge area *"Plan – use and management of information systems"* thus comprises seven components (Organisations and their Use of IT, Management of IT, IT Economics, Internet and the New Economy, Project Management, Presentation and Communication Techniques, Legal and Ethical Issues), the knowledge area *"Build – development and implementation of information systems"* four (Systems Development Process and Methods, Data Management and Databases, Programming, User Interface and Web Design) and the specialist area *"Operate – operation and maintenance of information systems"* a further seven sub-headings (Computing Components and Architecture, Operating Systems, Communications and Networks, Network Services, Wireless and Mobile Computing, Network Management, Service Delivery and Support).

Figure 9: **Sources of the EUCIP Elective Level documents** [44] (EUCIP Ltd. 2004g, p. 3)

- the Industry Structure Model© release 3.3, kindly made available to EUCIP by the British Computer Society,
- the Skills Framework for the Information Age© (SFIA),
- the advanced IT training and certification system based on work processes (APO, "Arbeits-Prozess-Orientierung") promoted by the German Federal Government,
- the results of the Career Space© project carried out by a consortium of nine major ICT companies and supported by the European Commission,
- other **Internal** certifications proposed by CEPIS, such as the ECDL® and the IT Administrator programme, or by member societies, such as ISEB from the BCS®,
- the qualifications proposed by **ICT vendors** or by independent organisations (e.g. EXIN in the Netherlands).

As of February 2004, EUCIP had defined four profiles at Elective Level, EUCIP Business Analyst, EUCIP Information Systems Analyst, EUCIP Software Developer and EUCIP Network Manager. The Business Analyst relates mainly to the Plan area, the Software Developer to the Build area and the Network Manager to the Operate area. The Information Systems Analyst is positioned between the areas of Plan and Build. A definition is provided for each profile, containing the designation and a brief description and giving an overview of job requirements and main personal pre-requisites.[45] There are also detailed lists of the competences which need to be acquired and a summary of the respective accredited learning modules. The appropriate learning content is presented in a form resembling a curriculum and specified in terms of levels (depth of knowledge needing to be acquired), categories (specialist areas to be covered) and topics (themes needing to be covered within the specialist areas). The levels stipulated by EUCIP, which are presented below, are used to determine knowledge to be acquired and for the evaluation of candidates in examinations (cf. EUCIP Ltd. 2004g, pp. 3 ff.).

Within this system, Level 0 does not, of course, constitute a target level, only coming into play after a negative examination result. In general terms, Level 1 should be covered with the scope of the Core modules. This means that the required learning goals for the Elective learning units mainly relate to Levels 2 and 3, Level 4 merely being applied to an excellent examination result and not constituting a target level as such.

44 These include the Industry Structure Model 3.3 and the Information Systems Examinations Board (ISEB), both British models, as well as the Skills Framework for the Information Age (SFIA) which was co-developed by the British Computer Society, a sister society of the GI. Alongside the German approaches, the initiatives of Career Space and the ECDL-F, which have already been highlighted, provision developed by the Dutch IT continuing training provider EXIN was also examined.

45 For descriptions and content structure of the four profiles cf. EUCIP Ltd. 2004b, d, e, f.

Figure 10: **EUCIP Levels of Skills and Experience** (EUCIP Ltd. 2004g, p. 5)

0	***extraneous***	:	almost no knowledge, scattered ideas;
1	***introductory***	:	some concepts, general smattering;
2	***incisive***	:	concepts reinforced by experience;
3	***deep***	:	sound competence and experience;
4	***major***	:	area of specialism.

The contents of an Elective Profile are presented in the form of a matrix, also making it clear the areas in which candidates can choose between several modules:

Figure 11: **Sample matrix for EUCIP Network Manager** (EUCIP Ltd. 2004g, p. 6)

EUCIP ACCREDITED COURSES (sample) / **EUCIP ELECTIVE PROFILES (sample)**	...	NETWORK MANAGER	...	**EUCIP Points**
EUCIP CORE PLAN		X		5
EUCIP CORE BUILD		X		6
EUCIP CORE OPERATE		X		5
ISEB IT SERVICE MANAGEMENT		1a		5
IT Administrator - 1.HW				3
IT Administrator - 2.OS		1c		4
IT Administrator - 3.NET				4
IT Administrator - 4.NWS		X		4
IT Administrator - 5.SEC		X		5
Univ. Information Systems		1a		7
Univ. Telecommunication Network		1b		9
Cisco – CCNP		1b		9
MS 70-270: Installing, Configuring, and Administering Microsoft Windows XP Prof. + 70-215: Installing, Configuring, and Administering Microsoft Windows 2000 Server		1c		8
Sun WT-1301-180 + WT-1302-180 Red Hat Linux System Administration		1c		8

For the example of the EUCIP Network Manager presented here, the X indicates the respective obligatory courses (the Core modules representing the entry requirement), but the system is otherwise extremely flexible. Identical letters always indicate an elective opportunity, the figures preceding the letters indicating the

number of parts of the Elective modules which need to be completed.[46] When the individual modules are completed via examinations, EUCIP points are awarded (up to ten per module), each of which corresponds to 25 hours of learning time (the "ISEB IT Service Management" module thus comprises 125 hours). 32 points need to be accumulated within a total capacity of 800 hours, at least 75 percent of which must take place at EUCIP or one of its accredited partners.[47] Since some of the modules typically overlap in several EUCIP qualifications, profiles rarely reach the maximum learning time of 800 hours (cf. EUCIP Ltd. 2004g, pp. 6 ff.).

After acquiring 32 points, candidates may be admitted to the final examination, in which they must:

- submit a portfolio containing a curriculum vitae et studorium, a description of the way in which competences have been acquired (which modules have been attended, which examinations and projects have been undertaken to achieve the required number of points), copies of all pertinent certificates and a 20-page description relating to a particularly relevant project or to work experience which has been acquired,
- and take an oral examination, consisting of a 20-30 minute discussion about the portfolio and a 20-30 minute evaluation of the candidate's knowledge and skills through questions on syllabus topics and on the general relationships between them.

The examining board, which also previously evaluates the portfolio which has been submitted, should consist of at least two members appointed by EUCIP and the local member society. Once all partial learning outcomes have been achieved, the candidate is awarded the title of EUCIP Network Manager (cf. EUCIP Ltd. 2004g, pp. 7 ff.).

EUCIP is planning a future review and expansion of the EUCIP Elective Profiles and qualifications which may be acquired. A further 18 qualifications are to be added to the four existing profiles (in bold type in Figure 12) in the near future, meaning a breadth similar to that of the German IT continuing training system would be achieved.

46 Contents within area "c" can thus be acquired either via completing the examinations in respect of the manufacturer independent EUCIP modules "IT-Administrator – 2.OS" and "IT-Administrator – 3.NET" or via an equivalent Microsoft or Sun Microsystems qualifications measure. If the table stipulated "2c", evidence would need to be provided in respect of two of the "c" modules on offer, e.g. the qualifications offered by Sun Microsystems and Microsoft.

47 Participants may currently cover up to a quarter of content via non-accredited courses and qualifications. The aim is for this to be reviewed as the number of accredited modules contained within the framework rises (cf. EUCIP Ltd. 2004g, p. 7).

Figure 12: **Overview of EUCIP Elective Profiles planned for the future** [48] (EUCIP Ltd. 2004g, p. 9)

Before moving on to an assessment of the concepts described in this chapter with regard to the issues raised in section 2.4, we firstly intend to present the results of the expert interviews (Chapter 6). The aim is to incorporate the assessments expressed to proceed to a recapitulatory evaluation leading to the identification of further research and structuring requirements (Chapter 7).

Prio (3=min)	*EUCIP Elective Profiles*	
1	IS Manager	
3	IS Quality Auditor	
2	Enterprise Solutions Consultant	(PLAN)
0	**Business Analyst**	
3	Logistics & Automation Consultant	
1	Sales and Application Consultant	
3	Client Services Manager	
1	IS Project Manager	
1	IT Systems Architect	
0	**Information Systems Analyst**	(BUILD)
2	Web & Multimedia Master	
1	Systems Integration & Testing Engineer	
0	**Software Developer**	
2	Database Manager	
3	X-Systems Technician	
2	Telecommunications Engineer	(OPERATE)
1	Network Architect	
3	Security Adviser	
0	**Network Manager**	
2	Configuration Manager	
3	Help Desk Engineer	
2	IT Trainer	

48 The profiles are once again aligned to the three areas of Plan, Build and Operate. The figures stated under Prio (priority) represent priority or progress, "3" denoting less urgent and "0" representing profiles already completed.

6. Results of the expert interviews

As already indicated, the materials thus far evaluated for the presentation of concepts within the scope of the present study originate from the context in which the respective stakeholders operate and, to some extent, represent (vested) political interests or need to be interpreted as a portrayal of a certain vision or implied political agenda. Our aim, therefore, is to supplement and "reflect" some of the results hitherto presented by means of personal statements on the part of selected experts from the IT continuing training sector.[49] The main focus of the survey was the correlation between the German IT continuing training system and parallel or corresponding developments in Europe. As a result, the following central questions were formulated:

Central question 1:	Which concepts for continuing IT training of European significance are you aware of? Do these represent competition for the German IT continuing training system?
Central question 2:	Were European requirements taken into consideration in the conception and implementation of the German IT continuing training system and, if so, to what extent? Can the IT continuing training system be "transposed" to other European countries or to the EU as a whole?

In the period from September to November 2004, we interviewed experts either via e-mail or telephone, personal contact generally resulting in more expansive responses. A total of six persons agreed to be interviewed and addressed the central questions posed. This empirical investigation is, however, merely of a supplementary or illustrative nature, the limited availability of resources not permitting field interviews with the appropriate persons to be conducted, and does not thus claim to be representative. The following presents the statements made in anonymised form (cf. Table 2), slightly edited and with a brief recapitulatory commentary on the part of the authors in respect of each of the central questions.

49 The experts work in various German institutions of vocational education and training in the widest sense and have many years of experience in the IT sector or in initial and continuing VET in the IT branch, although they do not represent a neutral position in terms of content. Some were personally known to the authors before work on this project commenced and some were contacted within the scope of the research relating to the present study.

Table 2: **Anonymisation of the experts**

Expert	Characterisation of occupational position	Mode of response
A	Expert from the field of VET certification	Oral
B	VET expert from a branch association	Oral
C	University academic (vocational education theory) with experience of a range of IT projects	Written
D	University academic (information technology) with experience of a range of IT projects	Written
E	Stakeholder in the development of the IT continuing training system	Written
F	Stakeholder in the development of the IT continuing training system	Written

Results for central question 1:
Which concepts for continuing IT training of European significance are you aware of? Do these represent competition for the German IT continuing training system?

A: Difficult question. The first thing to say is that, although there are competing projects in Europe, no activities have really been implemented. In terms of projects pursuing a similar objective to the German IT continuing training system, both EUCIP and the activities from the year 2000 under the umbrella of Career Space are certainly both worthy of mention. In both of these cases, at least as far as Career Space is concerned, the requirements and interests of trade and industry have been identified, albeit exclusively on the supply side, meaning that attention has been paid to such companies as Microsoft and Nokia without necessarily involving the Deutsche Bank or the railways or the post office. A similar statement may be made in respect of EUCIP, where the influence of trade and industry is also palpable, although the demands this concept exerts on higher education are heavy, without wishing to evaluate that in a negative light. As far as I am aware, neither concept is presently really in an active implementation phase, although attempts are underway to reach a cooperation agreement with EUCIP. The latter concept features a level of qualifications and therefore transferability which is at least similar. (...) The institutes of higher education are involved via the corresponding information technology societies within the individual countries, and it has been established that the general objectives are comparable to a practice-integrated concept. For this reason, I would very much view EUCIP as a potential future partner rather than as a competitor to the IT continuing training system. The last word has not yet been said on this matter, and it is an ongoing process both in terms of content structure and cooperation, although talks have been in progress for six months and are set to continue in the hope that something can be achieved by working together. To this extent, I do not necessarily view this as a competitive relationship.

B: The first thing that needs to be said is that the particular regulatory context concerning the role of the social partners is something very specific to Germany, although the situation is repeated in the Netherlands. There is a watered down version of the same system in France, whereas in the United Kingdom it is more or less unheard of. As a consequence, we are faced in this area with completely different general conditions, largely dependent on political culture, the development of association representations and trade union co-determination rights. To this extent, I do not believe that such a legal construct can be exported. If anything, it can merely serve as an example. What I do find eminently conceivable is that the further training system can, alongside other systems and even within the European context, exert an effect on sharpening the focus on certain aspects, such as work process orientation, the promotion of informal learning within companies and the use of real commercial projects for the training of employees. Work and continuing training must not always be viewed as separate issues which are mutually exclusive entities in terms of time. If we look at what is happening in other European countries, large differences can be observed. Only a few countries really have a national system. This applies in part to the educational systems of some countries and to Great Britain, although the system of the latter is designed along quite different lines to the continuing training system in Germany. The fact that this system contains detailed specifications of competence fields at various levels which are even more closely meshed than is the case in Germany without providing descriptions of whole processes means there is at least a common framework. There are, therefore, areas of comparability which certainly provide opportunities of virtually mapping the two systems in places. In other countries, such as the Netherlands, there are areas where links exist between similar structures, especially in respect of the principles of continuing training, whereas in the EU member states in Eastern or Central Europe there is scarcely any evidence at all of comprehensive continuing training structures at a national level. In these countries, it is apparent that initial orientation within the IT sector is very firmly aligned with manufacturer certification, reflecting the fact that these were the first to arrive on the market. As in Germany, non-branch associations have not become actively involved in the formulation of continuing training standards. This means that general conditions at a national level have a significant impact in determining the introduction of continuing training systems.

C: At a European level, I am familiar with the Career Space Consortium documentation issued by Cedefop. This involves guidelines for curricular development of higher education courses of study. The qualifications requirements for the ICT industry are probably largely identical with those Germany is seeking to achieve via work process oriented continuing training. Since this concept is directed at higher education training, it may be viewed as being more alternative or supplementary in nature.

D: IT continuing training concepts differ according to target group. The English speaking countries exert a strong influence on the designation of target groups (see the latest state of the debate in the European e-Skills Forum, cf. here CEDEFOP 2004).

- ICT end users: formal training, ECDL, industry based certificates (such as Microsoft), various national provision in the field of continuing VET in the IT sector.
- ICT practitioners: various industry based certificates (especially Microsoft, but also including Cisco Systems etc.), EUCIP, national provision of initial and continuing VET and initial and continuing VET in the IT sector (such as AITTS or APO in Deutschland).

E: After the development of the IT continuing training system in Germany, I accorded less attention to all other concepts, since these usually describe only limited segments, very specific qualifications (company certificates) or qualifications at a low level (such as the Computer Driving Licence) and are all capable of integration into the new German continuing training system. Although I appreciate that company certificates possess significance in international terms and, to some extent, require high levels of learning achievement, they do not, in themselves, result in the process oriented occupational competence which forms the objective of the German IT continuing training system. The analyses known to me of the activation of informal learning conducted in other countries have yet to convince me in terms of providing solutions.

F: There are interesting approaches being adopted in the field of IT continuing training in some EU countries which may well be of import at an EU level. In addition, there are also the activities being undertaken by EUCIP and Career Space. To consider these individually:

- **EUCIP** is more in the nature of a spin-off from CEPIS. EUCIP has, in effect, entered the market without a system of its own and has a particular focus on certification rather than being interested in issues connected with continuing training. The ECDL is proof positive that there is (a great deal of) money to be earned with certification. EUCIP's "Elective Level" is aimed at a more qualified target group. EUCIP has financial resources, experience with the roll-out of certification structures, and its affiliation with CEPIS provides it with transnational infrastructures. If EUCIP is able to get a better handle on quality assurance and a profile system becomes established in Europe (emerging from the meta-framework debate, for example), it has a good chance of becoming a strong provider of certification.
- **Career Space** is to all intents and purposes history. The achievements of this project have already been integrated across the board. In my view, Career Space has not generated any new input for about the last two years. There is currently a considerable degree of passivity on the part of the industrial

partners. There was never a focus on continuing training and quality assurance.

- **Great Britain (SFIA from e-Skills)**: alongside Germany, Great Britain probably has the most elaborate system, although the paradigms are quite different and are very rigidly structured along subject lines. The advantage of this is that it is relatively easy to achieve a modularisation of training provision. Many training providers have adopted the British Computer Society "Industry Structure Model", which forms the basis for the SFIA. The linking of every kind of course and training pathway is impressive, even if ultimately there has been a loss of transparency. The "competitive situation" in terms of the German IT continuing training system is, if anything, unclear, vocational training being organised in a different, less formal way in the UK. To this extent, the British system needs to take on tasks relating to quality assurance, these being covered indirectly by the training occupations. Of course, the popularity and transportability of English solutions is an advantage.
- **The Netherlands**: GRIP deals with the consistency and structure of profile systems rather than issues relating to continuing training. The fact that it is not an independent system means that there is no competition. EXIN operates more as an arbitrator between different certification structures, but possesses a high level of expertise.
- **Italy** is currently becoming significantly more active in IT continuing training and has the advantage of being able to fall back on the results of a European debate which has already reached a consolidated stage. There are various initiatives, but none as yet at a standardised national level. (See ISFOL, OBNF, IFTS).
- As far as **France** is concerned, the information available to me is limited. Current developments involve the addressing of process orientation and recognition of vocationally acquired qualifications for academic (continuing) training. This initiative is, however, being pursued by government institutions rather than by the social partners, raising questions of acceptance and realisability.
- **USA**: CompTIA has now become very active in Europe. This is a pragmatic approach backed up by a great deal of experience (from the USA). This involves a high level of vested commercial interests (with aggressive marketing/lobbying) and cultural problems (the concept of the "social partners" is largely secondary, different educational structures). The system has established transparency for the time being and provides information on qualifications opportunities. Any kind of social aspect (lifelong learning, educational structures, social dialogue) is, however, excluded.

Conclusion: genuine **continuing** training structures currently represent only a component of work process orientation in the UK ("NVQ's"). The Scandinavian countries have created extremely flexible structures based on European and American best practice rather than firmly establishing systems which are set in stone in terms of educational policy. These open structures enable them to react with great spontaneity and flexibility, mobility and efficiency appearing to be significantly higher than in Germany or England. These comments are, however, made on the basis of my personal impression rather than being rooted in any specifically validated criteria!

Authors' commentary: we may conclude that the experts interviewed within the scope of this survey are not aware of any IT continuing training systems which have attained significance at a European level apart from the Career Space Consortium and EUCIP concepts portrayed within the present study, although expert F refers to the strengths of the British system. It is also clear that, in terms of its target group, the German system addresses other areas than those previously mentioned, resulting in a complementary type of relationship. The industry or manufacturer certificates, which are firmly established on the market, are extremely significant and thus represent competition to the German system. There is also indirect allusion to the fact that IT continuing training of course also involves a competitive and, in economic terms, highly significant market now increasingly being penetrated by new providers, such as from the USA. This problem area is also apparent in the difficulties experienced in the implementation of the IT continuing training system in Germany. In many respects, this also seems to be a system in line with "typically" German framework conditions, internationality apparently not being accorded an especially high level of relevance in the view of the selected experts. Experts B and F in particular, however, point to the overarching principles of the Germany system (such as work process orientation, the consideration of informal learning) indicating that trends of European significance have been assimilated in these areas. Expert E also highlights the significance of this as well as the innovative nature of the IT continuing training system. In summary, the overall impression is that the integration of national IT continuing training concepts into a pan-European process remains in its infancy and that competition or integration will be a more pressing issue in the future[50] and also involve instigating the integration of existing concepts (expert E). As a supplement to studies of individual countries, such as Denmark, France and the Netherlands (see the articles contained within this volume), an investigation of the Anglo-American systems and the influence these exert on IT continuing training in the EU could certain produce some interesting findings.

50 This is also evidenced by the fact that the Leonardo da Vinci project "HARMONISE", which investigates vocational continuing training and qualifications systems with a specific focus on IT certification systems for IT specialists in Europe, did not commence its work until October this year, cf. Universität Karlsruhe (TH) – Institut für Angewandte Informatik und Formale Beschreibungsverfahren 2004b, *University of Karlsruhe Institute of Applied Informatics and Formal Description Methods.*

Results for central question 2:
Were European requirements taken into consideration in the conception and implementation of the German IT continuing training system and, if so, to what extent? Can the IT continuing training system be "transposed" to other European countries or to the EU as a whole?

A: We need to differentiate between the validity of an international norm or the certification procedure and actual recognition in the sense of the public profile of a system. We in Germany are also not yet in a position to make any real claim that the IT continuing training system is an object of general awareness. There is, however, at least a level of recognition and a great deal of interest in Europe outside Germany, including Switzerland. The fact that this is a German product means that there is a degree of difficulty in Austria. Although this may be no bad thing, the fact remains that the system is not an original, European product. Even if companies operating on an international basis (such as Deutsche Telekom or Siemens) were involved in the development process, the main thrust of the specific design of the structure took place in Germany. This all leads me to believe that the level of interest indicates that transfer is not an impossibility. There is also interest from Eastern Europe, although recognition remains some way off. The aim and necessity of achieving a greater level of integration at EU levels presents another area of difficulty. Although various bodies in Brussels are dealing with the issue and conversion work is being conducted in such areas as the IT continuing training system, this involves political processes which, as we are all aware, tend to be longer in duration. Endeavours to drive forward European dialogue are, however, very much in place.

B: As far as measuring competence or the certification system is concerned, orientation at a European level should take place. There is, however, an absence of European standards of the type which could have been accorded consideration. An initial and quite conscious decision was also reached that the system developed in Germany will not encompass the possibility of accrediting the various manufacturer certificates within the continuing training system either as vertical or horizontal elements. The reason for this goes back to the fact that the methodology of certification used in such certificates in 1999 and 2000 is in stark contrast to the requirements of the continuing training system. Today, a certain convergence has become apparent, reflected in the fact that such aspects as occupational orientation are making an appearance in an increasing number of training certificates. Material projects are also being accorded an ever-greater level of consideration. I believe it is quite conceivable that, in a few years, there will be an opportunity to collate the two approaches and waive elements of the requirements of the continuing training system in cases where certain other certificates have already been acquired. This is also the path being pursued by the Council of European Professional Informatics Societies in respect of the EUCIP certification system. This involves the issuing of certificates which can be recognised and included in a so-

called portfolio compiled on an individual basis. The system also involves the submission of a project, however, which is less flexibly structured in comparison with the German system. To this extent, I would say that the continuing training is certainly capable of exporting some of its underlying principles. The system is certainly in a position to appeal to companies operating transnationally and to demonstrate how personnel development can take place on a cross border basis. I do not, however, believe that it will be adopted as an overall system in Europe. My view is that a reduction in the number of profiles and the integration of an exemption clause for foreign certificates would increase its chances.

C: I am not really in a position to address the issue relating to orientation in line with standards. I am sure they were taken into account in the process of defining the skills profiles. I have no knowledge of whether explicitly European standards or international standards were involved or of the nature of the basis of stipulation. Other standards, such as the ISO certifications, have, on the face of things, not been integrated or considered. The fact that the IT training occupations form the basis of the IT continuing training system limits its transferability as a whole. The basic philosophy of regulated vocational qualification linked to higher education training is, however, certainly worthy of transfer.

D: The German IT continuing training system is a national solution which has found recognition at European level without yet achieving a general level of acceptance. IT continuing training generally is very much characterised by industry and manufacturer certificates, which need to be viewed as "industry standards". Within the scope of our survey, independence from manufacturers was stated to be a central and extremely important criterion for the pan-European acceptance of a programme. The ECDL (although positioned at ICT end user level) is a good example of an industry standard which is both manufacturer independent and enjoys a broad level of acceptance.
The standards are set by lobbies or consortia from within the IT industry, for example. A clear differentiation needs to be made between the terms of certificate and certification procedures.

E: The German IT continuing training system builds on the German system of dual initial vocational education and training. This meant that the initial development priority was to create a system which is a good overall match for the IT sector in terms of these German vocational training conditions. A further consistently pursued aim was to make the system conform to European conditions. This involved both striving to achieve recognition for German qualifications abroad and developing a system capable of being adopted by other countries. The aim was to bring about internationalisation via two routes, the completion of the specialist level with a certificate in compliance with European norm DIN EN 45013 and the accreditation of the professionals qualifications, regulated by public law, towards Bachelors and Masters courses of study by means of the awarding of credit points. The

first of these has been achieved in formal terms, even undergoing further internationalisation via conversion to the ISO norm 17024. The interlinking of the Professionals level with higher education, however, has not yet succeeded.

During the development process of the IT continuing training system, most stakeholders were presumably familiar with the following European Commission documents:

- The EU White Paper "Teaching and learning – towards the learning society" (1996): this formulates requirements which were addressed within the German IT continuing training system, such as:
  – the organisation of work so as to promote qualifications (I A),
  – the acquisition of knowledge and methodological skills facilitating self-directed learning, key specialist competences and social competences such as team work, creativity and quality (III A),
  – flexible evaluation of qualifications irrespective of the nature of their acquisition (III B 1),
  – alignment of vocational education and training to the perspectives of the labour market and employment (IV),
  – certification and recognition of competences acquired in the course of practical work (IV C 2),
  – adult education as a focus for initiatives and development projects (IV C 3) and
  – mutual recognition of higher education and vocational qualifications by means of the introduction of the ECTS system (Part II, I b).
- The EU Green Paper on Innovation (1996): In 1996, Deutsche Telekom formulated the following official response to Route of Action 3 (Develop initial and further training): "We view competency for lifelong learning as a new, key qualification. Education and continuing vocational training in particular will need to take place within leisure time to a greater extent than has hitherto been the case. (...) Young people are, however, inadequately prepared for learning in their free time. Competences relating to time management, self-directed learning techniques, the formation of learning teams and inquisitiveness for new content are not sufficiently acquired or stimulated during general and vocational education." This makes it clear that the basic philosophy of IT continuing training relating to such aspects as self-directed learning has already formed an object of debate in connection with EU documents.
- The EU Green Paper "Living and Working in the Information Society" (1996): this Green Paper also stimulated a review of general and vocational education, taking up the concept of the "learning company". The following points have exerted a particular influence on the development of the IT continuing training system:
  – We need a new interplay between work and training, instead of the old interplay between work and non-work (4.6).

  - Reference is also made to the "vicious downward spiral of job destruction, long-term unemployment and skill obsolescence" (4.6).
  - Since learning retention is much higher (80%) by "doing" rather than reading or hearing (5-10%) the potential for self-learning using ICT is immense (4.6 para. 76).
  - Renewing education within working time will be more important than reduction in working time itself (4.6 para. 76).
  - This Green Paper, however, also puts forward a requirement which has not been implemented by the IT continuing training system in a conscious and well-founded way: it should be a right, and an obligation, for all unemployed to maintain and develop basic skills for the information society and have them imbued with relevance to the real, dynamic, labour market. Reintegration should start long before people become long-term unemployed and discouraged.
- Finally, the communication issued by the Commission "Towards a Europe of Knowledge" (1998) emphasised the skill of learning how to learn and to solve and activate problems on a lifelong basis.

The time the IT continuing training concept was being developed coincided with the submission of the "Proposal for a Recommendation of the European Parliament and of the Council on transnational mobility within the Community for education and training purposes" from the year 2000, this in turn picking up on the ideas expressed within the 1996 Green Paper "Education - Training - Research - The obstacles to Transnational Mobility". The IT continuing training system thus evolved within the context of these EU documents.

Within the scope of the publication of the IT continuing training system, a workshop addressing the issue of "IT qualifications within the European context" was held during a specialist congress, the IT continuing training system being presented to representatives from Europe and counter drafts being debated.

The development of the IT continuing training system was driven by the vision that this system, unique in global terms, could hold an attraction for other countries. Particularly the method by which informal learning has been rendered measurable and certifiable for the first time seems to me to be appropriate for other countries and other occupations. The creation of a training system which is universally and methodologically consistent from initial vocational education and training right through to strategic commercial competence seems to me to be worthy of admiration, if not of imitation. Certification in accordance with an ISO norm is certainly easy transferable to other countries. The norm, however, does not as yet have any relevance in respect of the level of the competences certified, meaning international recognition of IT specialists is still some way off. Expansion of the system in other European countries would be facilitated if its attractiveness could firstly be demonstrated by means of expansion within Germany. This has yet to happen.

There is, however, anecdotal evidence of interest in the German system from Eastern European countries. Particularly certification in accordance with ISO 17024 seems to interest some countries.

F: Yes! The issue of personal certification is international. The concept and its basis – ISO 17024 – provide a good foundation for internationalisation. Especially in the targeted area of "Specialists" already in possession of occupational experience (in accordance with work process orientation terminology) or Professionals (not in the work process orientation sense), independence from national educational institutions/systems or from "industry based certificates" is required. The level means that the system is, in principle, also transferable to other countries. The problem is more the paradigm shift to a process-oriented point of view and the issue of quality assurance with regard to the level of entrants to the system.
To state the matter in absolutely blunt terms, certification is a billion euro business. The German IT continuing training system has succeeded in linking qualification and certification organically. This is an achievement. Since the system can only be sold as a whole, competition with other certification providers is, of course, inevitable.
One advantage would be to integrate those manufacturer certificates which contain genuine, practice oriented training elements and which can generate correlation with the processes presented within the IT continuing training system. Any other form of approach is bound to come up against the problem that teaching cannot secure occupational competence, and occupational competence is a central objective of the IT continuing training system.

Authors' commentary: with reference to the second central question, the experts also indicate that the German continuing training system is enjoying an increasing level of awareness and recognition, at least in some states. Expert D, however, points out that there is no general level of acceptance. One of the reasons for which initial conditions in Germany in particular played a leading role in the development process was, however, the fact that European standards relating to the conception of qualifications and certification systems are not (yet) available and it is not possible to wait for political stipulations. Notwithstanding this, the assessment of expert E was that central European Commission documents had been evaluated in the system design process and the certification of Specialists implies that recourse has been made to an internationally recognised norm. Expert F points out that neither orientation to a national state educational system nor to an industrial standard can represent a good basis for the expansion of the IT continuing training system. Expert A suggested that there was at least "interest" on the part of individual states in cooperation with or even adoption of the German system, although a firm footing in Germany would significantly improve "exportability" (expert E). The signs are, however, that a system will have a better chance at a European level if it integrates existing certificates, particularly those of the manufacturers, and stipulates appropriate crediting opportunities, even if the latter are

not in accordance with the intended forms of learning. Companies operating on an international basis are evincing a particular interest in mutual integration, accreditation, recognition and linkage to the higher education system. All of this amounts to a positive assessment of the nature of the IT continuing training system in particular and a view that it is sustainable, at least in terms of the intended access routes and transitions to other qualifications systems (such as in higher education).

In conclusion, the expert survey, which was, of course, not representative and reflects a snapshot of the time it was conducted (autumn 2004), gives rise to the impression that European requirements of a continuing training system accepted at an EU level are, if anything, unclear in nature, individual terminology also being used differently within this context. For this reason, the possibility of developing an IT continuing training system recognised on a pan-European basis seems to lie within the framework of bottom-up processes, such as individual country initiatives, rather than within the scope of top-down processes on the part of EU bodies. No final conclusion can therefore be reached in respect of the issue of whether transferability or even marketability of the IT continuing training system can be achieved, although the systematic approach adopted by the German model can be accorded archetypal status in many respects, insofar as it manages to become established in the country where it originated.

7. Assessment from a German perspective and forecast

In the preceding chapters, a multi-dimensional approach was selected in respect of the clarification of the issue as to which concepts exist at an EU level relating to vocational structures, career phases and educational pathways, the first stage involving an analysis of the starting position in Germany and prevailing general conditions in Europe before moving onto a brief presentation and outlining of groupings and organisations and EU stakeholders active within the European IT sector and their endeavours in the field of initial and continuing vocational education and training. Four concepts were then presented, these having claim to supraregional validity and thus representing a focus of interest within the scope of the present study. The aim of the following is to subject the approaches described in Chapter 5 to an evaluation comprising three areas.

- Firstly, an attempt will be undertaken to provide answers to the questions raised in respect of each concept in section 2.4.
- Secondly, an assessment from a German perspective will be conducted with the aim of clarifying, where possible, whether the model represents competition to the approach being pursued in this country, whether it in fact addresses other target groups and/or other educational sectors or whether there are any opportunities for linking or integration.

- The aim is to include both the assessments of the experts interviewed and the points of view of the present authors into the evaluation.

Our final aim is to conduct an appraisal of the results of the study and outline future research and structural requirements.

7.1 Critical appraisal of the concepts presented

Informatics Curriculum Framework 2000 for Higher Education of IFIP/ UNESCO:
Being aimed at the higher education level, the ICF-2000 relates to the issues forming the object of the present study only to a limited extent. Although a structuring of IT related working areas is undertaken and training pathways are described in the form of higher education courses of study, the proposals remain extremely abstract and are restricted to the outline description of levels and areas of activity, reference being made to other curricular documentation in terms of content level. If country specific data is factored in, the concept enables the structuring of the IT sector to be addressed, although it represents an instrument for the development of courses of study rather than providing career routes. In line with its objective, the ICF-2000 statements are directed exclusively at higher education (although this can certainly include higher education continuing training), thus rendering it only partially comparable with a concept such as the German IT continuing training system, which seeks to open up vocational structures and career routes/educational pathways. The ICF-2000 also contains only general statements on access entitlements and qualifications, the former being left to the specific regulation of individual countries (higher education entrance qualification) and tiered profiles being developed for the qualifications. The institutes of higher education implementing the ICF-2000 are largely given a free hand in terms of organisational and didactic structuring, only outline proposals and examples being provided. The main thrust of the ICF-2000 is thus the creation of a framework for models outside the levels and target groups addressed by the German IT continuing training system. Since this concept is not explicitly targeted at Europe and is mainly aligned with higher education, the issue was not addressed within the scope of the expert interviews. Notwithstanding this, from the perspectives of internationality and the high qualifications standards within the branch, it seems sensible to include such approaches in a systematic consideration.

The initiatives of the ECDL-F:
Within the scope of focus on concepts for IT skilled workers adopted by the present study in terms of the ECDL-F products depicted, the main area of interest is accorded to the last mentioned certificate for ECDL trainers (ECDL-CTP) as well as, to some extent, to the CAD certification. Most notable in the context of the ECDL-CTP is the level of similarity of the process of Specialist certification to the German IT continuing training system. The ECDL-CTP also adopts an approach which is closely allied to the realties of working life (providing evidence of a minimum of

40 hours' training experience and the implementation of content within typical ECDL contexts) as well as, after an introductory workshop, making use of written documentation and tutor support (in the IT continuing training system the so-called learning process monitors assume this role) before proceeding to certification via an accredited agency. In contrast to the IT trainers at the specialist level within the German IT continuing training system, however, the ECDL Foundation does not place such a clear degree of emphasis on work process orientation, and the process is directly tailored to ECDL training, the German model being "manufacturer independent". In principle, however, it may be stated that although the certificates of the ECDL-F are of interest to IT skilled workers to a certain extent, they provide a sensible supplementary provision to the range of products offered by the ECDL rather than representing any systematic career routes or occupational structures within the scope of the German IT continuing training system. Against the background of wide-ranging expansion and the success enjoyed by the basic ECDL product, however, the activities pursued by this institution remain a focus of interest, successful structures having been already established and action strategies implemented. This means there is a distinct possibility that the products of the ECDL Foundation focussing on the Professional level will exert a competitive influence on the German model, although integration (especially in the light of the at least similar nature of some of the didactic and organisational approaches) also seems conceivable, the role of the IT trainers providing a possible starting point.

The ICT skills profiles of the Career Space Consortium:

There are several reasons why it is fruitful to consider the 18 ICT skills profiles published by Carer Space (not including the CEN/ISSS new development). Firstly, this represents a stringent concept for the occupational structuring of the various sectors within the IT branch which is capable of generating detailed workplace descriptions and requirements profiles originating from the practice of participating companies. Secondly, development routes typical to the respective profiles and career stages are recorded. The main focus of interest of the profiles generated, however, is in respect of the curricular development guidelines for institutes of higher education presented below, since these represent the basis for a wide range of study fields and advanced studies. In connection with the requirements facing institutes of higher education (including consideration of the needs of those in employment, such as distance and part-time learning, continuing training courses of study and increased permeability, see below) these enable the development of a range of individual educational and career pathways. The only problem within the process appears to be the high initial level which the Career Space Consortium uses as a starting point for the profiles described, the entry prerequisites virtually without exception consisting of a higher education qualification at Bachelor or Masters level. Our view is that a description of fields of activity below this level is required for a comprehensive occupational structuring of the branch (particularly from a German point of view), thus enabling those who have completed VET in training occupations and lateral entrants without a higher education qualification

to be integrated into the concept and be provided with individual career and advancement opportunities. Notwithstanding this, consideration needs to be accorded to the fact that the reason why Career Space was established was to highlight the attractiveness of the branch to students and other interested parties at a time when there was a prevailing lack of skilled workers and demonstrate possible working areas and career routes rather than to establish a structured career system extending across the whole of the sector: "There was no intention to have a one-to-one alignment between profiles and educational courses (curricula)" (EUROPEAN COMMITTEE FOR STANDARDIZATION 2004b, p. 5).

The Career Space guidelines for ICT higher education curricula:

The four proposed forms of ICT courses of study presented, of which variations (b) to (d) (consecutive and second cycle courses of study) are of particular interest against the background of the issue forming the object of the present study, combine with the requirements for consideration of those in employment and for a greater degree of permeability to create a concept which opens up new educational pathways and career stages within the IT sector. Variation (c) thus enables continuing training of IT skilled workers for work areas where a greater emphasis is placed on business skills, for example, and where pursuing an MBA qualification would probably result in a career break. Variation (d), on the other hand, provides an opportunity for the large number of lateral entrants to the profession to acquire an appropriate higher education qualification related to their area of activity and thus enabling them to obtain certification for competences acquired within IT occupational practice.

In overall terms, the Career Space approaches cover a broad spectrum of the IT labour market, although the current focus is mainly on the field of higher education and there is still an absence of transferability to the levels of initial and continuing vocational education and training.[51] In our view, the results of the work of this consortium can be integrated into the German system, and indeed this has already partially happened. In principle, the relationship of the Career Space documents to the German approach is not competitive in nature, since the aim of the former is to present the requirements industry has of such training provision rather than be used as the basis for the development of an independent certification and/or continuing training model.

51 As is evident from both CEN documents and the article by SELLIN, an increased amount of work is currently ongoing in respect of this point, meaning further developments are to be expected in this area in future which would then once again need to be looked at from the point of view of the German concept. Cf. here SELLIN 2004, pp. 69 ff. and European Committee for Standardization 2004b, pp. 8 ff.

The EUCIP concept

In the light of the issues raised in section 2.4 and against the background of the German IT continuing training system, the EUCIP concept is of particular interest in that it is pursuing an aim similar to the domestic approach of establishing a comprehensive model to cover occupational structures within the individual sectors of the IT branch and to use modularly designed and cumulatively training courses to open up career pathways.

Notwithstanding the similarity of aims, a comparison of the two systems reveals some differences: "The qualification process and the establishment of level precede the issuing of certificates. The work process oriented approach transfers continuing training into companies. EUCIP places the emphasis on tried and tested training providers. EUCIP also requires a defined basic knowledge as a prerequisite for the certification process. Only someone who already has this determined basic qualification can then go on to acquire a certificate showing specialised built-on specialist knowledge" (CEPIS 2003a). Whereas the German project features a strong level of orientation to commercial processes and real projects, during which the work process is learned, the EUCIP model places the main focus on the imparting of theoretical knowledge either via e-learning or within conventional continuing training structures, meaning within the framework of courses offered by training providers which conclude with an examination. These standardised tests used by EUCIP are in contrast to the individual German examination conducted via project documentation. It should be noted, however, that the German IT continuing training system also features an enhanced level of examination at the Professional level (albeit via holistic tasks rather than in a standardised form, the validity of such tasks being somewhat of a bone of contention). Similarities certain exist in that EUCIP also stipulates the preparation of documentation.

In terms of access rights, a positive view can be taken of both systems in that no formal qualifications are stipulated as an entry requirement, meaning lateral entrants to the profession are targeted in both cases. Both systems also contain provision for recognition of previously acquired learning achievements. In the case of the EUCIP concept, these may replace up to a quarter of learning time (input oriented), whereas the German work process oriented approach does not undertake any explicit evaluation of such achievements, merely checking that the competences needed to complete the qualification are available and that requirements have been fulfilled (output oriented). Another issue which needs requires consideration in this context is the fact that completion of the Core Level certificates is a prerequisite for the acquisition of a EUCIP Elective Profile. Although a positive view of the German system is justified as far as the quality of the qualifications is concerned, these including output level provision for permeability through to higher education (including transferability), only a declaration of intention has been made in this direction thus far. By way of contrast, there is no such provision in the EUCIP model, although this is counterbalanced by the fact that individual higher education achievements can be credited (input level). The EUCIP concept offers advan-

tages in terms of its wide ranging validity, however, being both internationally oriented and integrating the manufacturer certificates, which have held enormous significance within the branch thus far, whereas the German system is struggling for acceptance and has very low levels of awareness, even within its domestic market.

As far as organisational and didactic structuring is concerned, both constructs go their separate ways. Whereas the EUCIP concept puts its faith strongly in the modular imparting of stipulated content via conventional seminars and e-learning, the candidates in the German systems are required to map reference processes against real, company processes which they themselves have selected against, planning, conducting, monitoring, documenting and reflecting on these. They are able to access the support of specialist advisors and learning process monitors, whereas the EUCIP concept provides personal supervision in the form of local, accredited (continuing) training providers. This puts the German product firmly into the in-service qualification camp (with all the problems this brings, especially for the qualification of the unemployed and within small and medium-sized companies), whereas the EUCIP model makes use of block release seminars. Alongside this are the differing learning venues. Whereas the German continuing training system involves learning in the workplace, the EUCIP model requires at least some attendance of the continuing training centres operated by the provider (apart from e-learning-aided modules).

The overall picture therefore seems to be that both models present respective specific advantages and disadvantages, the reason for this lying in their differing aims. The German Informatics Society (GI), which was the leading player in the development of the EUCIP concept, but which also supports the work process oriented IT continuing training system, has come to the following conclusion on the matter: the EUCIP model is a "certification system for information technology professionals at a European level. The aim of this certification system is the comparability and the standardisation of European qualifications at a high level within the IT sector. The IT continuing training/work process oriented system is, [on the other hand], an integrated continuing vocational training system developed by the social partners and defining a national standard (with an international orientation) for continuing vocational training in Germany. It is possible that the transfer of this continuing vocational training system to European countries will be a difficult and also long-term task". (Gesellschaft für Informatik e.V. 2002, German Informatics Society p. 7). In principle, however, both concepts are certainly justified and not mutually exclusive, as is evinced by the ongoing endeavours to achieve compatibility (cf. CEPIS 2003a). There appears to be further need for coordination on respect of the definition of levels and the qualifications resulting from these: "[…] an IT Professional with EUCIP has, according to work process orientation standards, merely a qualification as a Specialist, (…) whereas an IT Professional in line with the work process orientation system is a manager" (No author 2002b). Further work on common attitudes and standards is therefore required to permit the objectives set

by the GI to be attained: "The GI will work towards the mutual recognition and complementing of both systems. At a national level, the EUCIP system will deliver "input qualifications" for the IT continuing training/work process oriented system and vice versa" (Gesellschaft für Informatik e.V. 2002, German Informatics Society p. 7).

From the authors' point of view, it may be stated in conclusion that the EUCIP concept displays starting points for possible integration or compatibility with the German system. In terms of the way it has been structured up until now, the advantages it enjoys on account of the broader European basis accorded via CEPIS and its subsidiaries means it may represent strong competition for the German model. In contrast to the German operators, CEPIS is already in a position to fall back on the experience of implementation gained within the process of setting up the ECDL on a European basis. It is also able to provide two further features which the German system (consciously) does not deliver: the integration of the manufacturer certificates and the involvement of continuing training providers, whose significance as promoters and multipliers of such a concept is not to be underestimated.

7.2 Conclusion and forecast

The present study provides an overview of the current status of IT continuing training at an EU level and of the stakeholders involved in this area without, however, presenting and discussing individual country specific regulations. The results of the study show that there have been thus far only a few qualifications and certification systems which may be accorded EU-wide significance. In addition to this, comparability is relatively limited, levels of awareness and acceptance thus far having been restricted and confined to selected target groups. The tendency within a unified Europe will be, however, for the importance of internationally recognised, clear, documented and connective training pathways and appropriate certifications to increase. This particularly applies to the IT field, which already features a high degree of internationalisation and all the attendant mobility requirements for its workers. Within this context, national systems such as the German IT continuing training system face an initial battle for regional recognition and acceptance, a process requiring them to position themselves and win out against other certification systems, such as those operated by the industry. A system is not likely to achieve international significance until it has been firmly implemented within its own home country. Nevertheless, the strength of the German system does not necessarily lie in the certificate awarded upon completion of a qualification, but rather in its accentuation of the learning process and its intended vertical and horizontal connectivity, which could receive enhanced value through the possibility of integration with qualifications from other systems.

In conclusion, our view is that the following structural and research issues could be formulated and could have an impact on making progress towards the demand for IT continuing training and certification which enjoys pan-European recognition or compatibility.

- Continuing vocational education and training and certification is also a commercial area subject to considerable economic interest. In this regard, it would make sense to subject a range of IT continuing training provision to scrutiny in the form of a training audit process, taking regulatory action on both an individual state and European basis if necessary, since the increasingly neoliberal economic policies being pursued in some parts of the EU can lead to social differentiations within IT continuing training, and this has the potential to exclude job seekers from certain qualifications instruments. A further recurring issue is the question of quality and the actual "(exchange) value" of certificates.
- Further country studies, particularly from the Anglo-Saxon countries, could help identify additional, interesting qualifications models offering at least the potential for partial transferability, especially if certification providers from these countries continue to force their way onto the European market and continue to gain rapid acceptance from Anglo-American IT companies already present in the EU.
- Issues relating to the organisation of training and the specific structuring of the teaching and learning process, both in comparative terms and in terms of the competition between IT continuing training approaches, should, as a matter of principle, be subjected to a more precise investigation, it being particularly the case that not enough consideration is accorded to the didactic perspective within a context where, in some areas, there is a discernable dominance of the "certificate perspective".
- There is, in some areas, the perception that EU objectives and programmes relating to educational and social policy are reflected only to a limited extent in the individual continuing training concepts. Existing certificates need to be investigated in respect of their connectivity as a document within the context of lifelong learning and also in terms of whether they accord conceptual consideration to integration of informal phases of learning.
- The indications are, however, that competition between national systems and further coordinating endeavours at EU state level and on the part of the associations and social partners are necessary in order to draw upon a continuing training system as a means of orientation for an adequate level of European unity within the scope of a bottom-up process, the activities of the EU within top-down processes being unlikely to result in pan-European harmonisation of IT continuing training and legal restrictions rendering such a process virtually impossible.

The issue of the significance of the German continuing training system is ultimately a matter which needs to be addressed within this context, both our view and the views of the experts interviewed being, however, that no final clarification can be reached as yet. The further process of implementation needs to be observed, modifications may have to be undertaken and, not least, the ongoing process of European integration needs to be tracked. In terms of its construct, comprising the

basic principles of work process orientation, modularisation, accumulation of achievement, transnational recognition and permeability, the German system possesses features which should be in conformity with both the educational policy direction of the EU and the requirements of IT workers, IT manufacturers and IT user companies.

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Abbreviations

ACM	Association for Computing Machinery
ACM-SIGCHI	ACM Special Interest Group on Computer-Human Interaction
AIFB	Institut für Angewandte Informatik und Formale Beschreibungsverfahren an der Universität Karlsruhe (TH) *(Institute of Applied Informatics and Formal Description Methods at the University of Karlsruhe)*
AIS	Association for Information Systems
AITP	Association for Information Technology Professionals
APO	Arbeitsprozessorientierung *(German abbreviation for "work process orientation")*
BBiG	Berufsbildungsgesetz (Vocational Training Act)
BCP	Basic Conceptual I-Profile
BCS	British Computer Society
Biat	Berufsbildungsinstitut Arbeit und Technik der Universität Flensburg *(Vocational Education and Training Institute for Work and Technology (Biat) at the University of Flensburg)*
BIP	Basic Instrumental I-Profile
BITKOM	Bundesverband Informationswirtschaft, Telekommunikation und neue Medien e. V. *(German Association for Information Technology, Telecommunications and New Media)*
BMBF	Bundesministerium für Bildung und Forschung *(Federal Ministry of Education and Research)*
CARDS	Community Assistance for Reconstruction, Development and Stabilisation
Cedefop	European Centre for the Development of Vocational Training
CEN	European Committee for Standardization
CEN/ISSS	Information Society Standardization System at CEN
CEPIS	Council of European Professional Informatics Societies
CWA	CEN Workshop Agreement
DSP	Digital Signal Processing
EACEM	European Association of Consumer Electronics Manufacturers
ECDL	European Computer Driving Licence
ECDL-F	European Computer Driving Licence Foundation
ECTA	European Competitive Telecommunications Association
ECTEL	European Committee of Telecommunication and Electronic Industries
EICTA	European Information, Communications and Consumer Electronics Industry Technology Association
EIF	European Internet Foundation
EITO	European Information Technology Observatory
eLIG	The eLearning Industry Group

EPICS	European Professionals Informatics Competence Services
ESDIS	Employment and Social Dimension of the Information Society
e-Skills NTO	UK national training organisation for ICT
eTEN	Trans-European "e-services" Network
ETF	European Training Foundation
ETP	European Telecommunications Platform
ETSI	European Telecommunication Standards Institute
EU	European Union
EWR	Europäischer Wirtschaftsraum *(European Economic Area)*
EUCIP	European Certification of Informatics Professionals
EUREL	Convention of National Societies of Electrical Engineers of Europe
EXIN	Exameninstituut voor ICT'ers
FHG-ISST	Fraunhofer-Institut für Software- und Systemtechnik *(Fraunhofer Institute for Software and Systems Engineering)*
GI	Gesellschaft für Informatik e. V. *(German Informatics Society)*
ICF	Informatics Curriculum Framework
ICT/IKT	Information and Communications Technology
IEEE-CS	Institute of Electrical and Electronics Engineers – Computer Society
IFIP	International Federation for Information Processing
IKT	Informations- und Telekommunikationstechnik/-technologie
ISEB	Information Systems Examinations Board
ISO	International Standardization Norm
IST-Program	Information Society Technology Program
ISTAG	IST Advisory Group
IT	Information technology
ITU	International Telecommunication Union
MAP	Major I-Profile
MBA	Master of Business Administration
MEDA	Principal financial instrument of the European Union for the implementation of the Euro-Mediterranean Partnership
MEP's	Members of the European Parliament
MIP	Minor I-Profile
ONP-CCP	Open Network Provision Co-ordination and Consultation Platform
SFIA	Skills Framework for the Information Age
UNESCO	United Nations Educational, Scientific and Cultural Organization
ZVEI	Zentralverband Elektrotechnik- und Elektronikindustrie e.V. *(German Electrical and Electronic Manufacturers' Association)*

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Continuing vocational training of IT professionals and the interplay between vocational training and university education in Denmark

Søren Kristensen

Executive summary

The employment situation on the IT labour market in Denmark has changed quite drastically with the "bursting of the IT bubble" in 1999/2000. From a situation characterised by a lack of labour at all levels, unemployment figures are now above the average for the labour market as a whole. Vocational education and training remains a key issue, however, as unemployment has hit primarily those with the lowest levels of qualifications, and the lack of people with skills at the level of higher education in IT is still perceived as a bottleneck for a new economic growth in the field. There is a therefore a pressing need to get people already on the labour market to upgrade their skills and qualifications.

The situation on the IT labour market shares many characteristics with the situation on the labour market as a whole. The government has consequently reacted with a number of reforms of education and training that affect not only IT-related programmes, but the Danish educational system as a whole. First among these is the introduction of a "dual track system" that allows people on the labour market to upgrade their skills and qualifications while remaining in employment. Hand in hand with this goes the modularisation of courses at all levels and the accreditation of prior learning. Further reforms have aimed at enabling the educational system to react much faster to changes in technology and (global) work organisation through "marketisation" and deregulation. "Marketisation" means giving educational establishments more autonomy and incentives to establish new types of programmes and courses that reflect market needs. As part of its deregulation drives, the Ministry of Education is furthermore making educational regulations more broad and less detailed, which allows social partners and the institutions themselves to bring their courses and programmes closer to market-leading products, without actually offering certification in these. Specifically for the field of IT, the government set up a specialised university – the Danish IT-University – which offers programmes and courses exclusively within the field of IT. Moreover, it facilitated the establishment of so called business academies, where new types of short-cycle higher professional education are offered.

1. Introduction

The training of IT professionals in Denmark both at initial and continuing level has undergone many changes within a relatively short period of time, both in terms of contents and structure. This reflects both the rapid technological development and the fluctuations on the labour market. A major study undertaken by various Danish ministries with interest in the IT field (including the Ministry of Education) in 2001 [1]

1 Besides the Danish Ministry of Education, the Danish Ministry of Labour, the Danish Ministry of IT and Research and the Danish Ministry of Economics and Business Affairs.

shows that despite the efforts, the composition of the labour force in the field of IT is very diverse, with only 28% of those working in the IT profession having an educational background from the IT field. The rest have drifted in from other professions or are self-taught (frequently on the background of general upper secondary education). The study therefore concludes that there is a need not just to continue and increase the recruitment of young people in IT training courses and programmes, but also to offer those already on the labour market a possibility not only to constantly upgrade their skills and have them recognised within a formal structure. Especially skills at the level of higher education are needed.

Even though the situation in the field of IT certainly lies at the extreme end of the spectrum, it is nevertheless a situation that is typical of the labour market of the 21st century, where constant changes cause job profiles to disappear almost overnight and new ones to appear with an equal rapidity. Education and training is thus no longer a once-and-for-all proposition that an individual undertakes at a young age and which will last him or her for the remainder of the working life. On the contrary, skills have to be constantly upgraded and extended, and an individual will in all likelihood have not one, but several careers during working life, and for quite a few it will also entail a change away from the profession they were once trained in. Lifelong learning thus becomes a vital condition for retaining one's employability. The Danish education and training system has reacted to these new challenges with a series of structural reforms, which has affected all levels. Despite the somewhat extreme situation in the field of IT, no particular models have been developed for this, as is the case in Germany. An understanding of the reforms is therefore an essential prerequisite for an explanation of the IT continuing vocational training system. These reforms have affected initial vocational training (2000) higher education (2003), and continuing vocational training (2001 & 2004).

2. The task

The task concerns a description of continuing vocational training (CVT) in the field of IT in Denmark, with specific emphasis on the links between this and higher education. The aim of the description is to provide material for comparison and contrast to the German system, and the description should therefore focus on divergences and differences between the two countries, rather than giving a general presentation.

The study is part of an overall evaluation of the German CVT system in the field of IT, which besides Denmark also comprises comparisons with France and the Netherlands.

3. Methodology

The description has been elaborated on the basis of written sources of information, primarily from the Danish Ministry of Education, social partners and educational establishments. The written sources have been complemented with information gleaned from a number of qualitative interviews carried out with various stakeholders in CVT (social partners, educational establishments, private course providers, Ministry of Education). Besides the provision of information, a further aim of the interviews has been to elucidate stakeholders' view on the system, i.e. how do they perceive its efficiency, what are the perceived strengths and weaknesses etc. The study was carried out in the period October 2004 – June 2005.

4. Vocabulary, abbreviations and bibliographical references

As the study is carried out in a setting involving several countries (Denmark, Germany, France and the Netherlands), it is important to precisely define key terms to avoid misunderstandings. What, precisely, do we mean by "IT education and training"? In most, if not all, lines of education and study, it is impossible to avoid IT as an element.

In this study, the following key terms are used with the following meanings:

Skills: Generic term used to denote all kinds of abilities and aptitudes, whether acquired in a formal, non-formal or informal environment.

Qualifications: Skills acquired in a formal environment (i.e. a public or private educational establishment recognised by the Ministry of Education) and leading to a general educational level.

Certification: (here) assessment of skills related to a specific industrial product, and usually delivered by private course providers.

Competences: Broad transversal/personal skills

Formal learning: learning provided by an educational establishment, structured in terms of objectives, learning time and support and leading to recognised qualifications

Non-formal learning: Learning that is not provided by an educational establishment, but structured in terms of objectives, time and support (e.g. workplace learning).

The following abbreviations have been used:

VET: Vocational education and training
IVT: Initial vocational training
CVT: Continuing vocational training
AMU: Labour market training (ArbejdsMarkedsUddannelser)

Bibliographical references and references to sources of information have been given as footnotes at the bottom of the relevant pages.

5. Perceived challenges to IT training in Denmark

The main general objectives of the public vocational education and training system are in Denmark (as indeed everywhere else) to:

- supply the labour market with a constant flow of fresh labour with up-to-date qualifications and skills;
- provide companies and individuals with the possibilities for maintaining and upgrading skills and qualifications;
- retrain or upgrade the skills and qualifications of unemployed to facilitate their re-entry into the labour market.

In order to reach these objectives, however, the system has to make allowance for a number of factors - or challenges - which according to actors and stakeholders[2] prevail in the field of IT.

Rapid changes in technology (hard- and software) and work organisation: The technological development in the field of IT is happening at a very fast pace, and changes are often paradigmatic rather than incremental. Concrete skills and qualifications may therefore become more or less obsolete almost overnight. Concomitant changes in work organisation both at local and global level further accentuate this process, when whole lines of production and development are outsourced as part of efficiency drives or moved to other countries/regions where costs are lower. In Denmark, many administrative IT employees were made redundant as the introduction of new technology took over their functions, and others again lost their job when large companies moved large parts of their IT departments abroad (e.g. the SAS airline) where salary levels were much lower. This puts pressure on the education and training system to move along at the same speed, and for providing high quality possibilities for continuing vocational training for employees (and unemployed) that allow them to remain on the labour market despite these changes.

2 See interviews with stakeholders

A sector very sensitive to fluctuations in market conditions: In the latter half of the 90's, the IT labour market in Denmark was booming, and there was a perceived deficit of qualified labour. The system was under constant pressure to deliver trained manpower to the industry to avoid bottlenecks that would impede the development of the sector. One result of this was the creation of two new short initial vocational training (IVET) courses (..) to alleviate the lack of manpower. However, at the time when these courses were fully developed and operational, the situation had changed dramatically. IT developments (and especially e-trade) had failed to develop as favourably as predicted, and the first half of the new decade after the millennium has been characterised by a high degree of unemployment among IT professionals, as the so called "IT-bubble" burst. Prospects for new entrants on the labour market with qualifications from these new IVET courses (derisively known as "discount courses" because they last only two years as opposed to the 3 1/2 - 5 years for mainstream IVET courses) are therefore considered bleak.

A slide towards higher- level skills/qualifications: In tandem with the growing sophistication of technology, companies are increasingly demanding labour with qualifications/skills at a higher level. In the 80's and early 90's, the most prevalent qualification in the field of IT and computering was the EDP Assistant, an initial vocational training course of 4 years duration. In course of the 90's, however, the standard qualification became that of the (datamatics), a short-cycle higher education course of two years' duration, taught by the same institutions that teach IVET.[3] At the present time, this course is seen by some stakeholders as too narrow and confined, and they are lobbying to have it replaced by a proper bachelor-degree in IT[4] and computering, i.e. a university-based course.

Status of formal qualifications: In 2001, a statistical analysis revealed that only some 25% of all people employed in the IT sector did actually possess formal qualifications in IT.[5] The rest had other educational backgrounds, or had acquired their skills through on-the-job training and self-study. Employers in a recent study revealed that they placed relatively little importance on formal qualifications when hiring people[6], but looked more at the concrete skills/experience of the applicant in relation to the specific hard- and/or software that they were going to work with. Several of the stakeholders interviewed mentioned that "papers didn't count for much" among IT professionals. This may not be a problem in some of the large IT companies who run their own internal training programmes and thus ensure that employees have the possibility of constantly updating and improving their skills (e.g. IBM). In smaller companies with a more narrow focus, which are more vuln-

3 Commercial colleges or lately in the so called "business academies".

4 Prosa, the only trade union dedicated to IT professionals

5 The Danish Ministry of Education, the Danish Ministry of Labour, the Danish Ministry of IT and Research & the Danish Ministry of Economy and Business Affairs: "IT-arbejdskraft og –uddannelser. Udbud og Efterspørgsel", Copenhagen 2001, pp. 7-8.

6 Shapiro et al.: "Comparison of ICT educational preparation and ICT employment in the United States and Denmark" Teknologisk Institut, Copenhagen 2001

erable to changing market conditions and developments in technology and work organisation, the low "street value" of formal qualifications is a problem, as it may impede employees from developing their skills base and acquire formal qualifications that make them more versatile and employable in difficult times.

Capacity of vocational education and training establishments in the IT field: The IT-field is a relatively new field that has been rapidly expanding within the last 20 years. The challenge here is not just one of adapting the educational establishments to accommodate new courses and participants, but also to create viable learning environments of a size that is capable of ensuring the financial resources necessary to constantly modify and develop courses in step with advances in technology and market developments. The IT field is also a field that to a large extent cuts across traditional boundaries in the education and training sector, and it may be necessary to create so called "cross-over courses"; i.e. courses that span different types of institutions.

A number of these challenges are, to a bigger or lesser degree, not just particular to the field of IT, but are applicable across the board in all sectors. This goes for the development in technologies and work organisation, which threaten to make qualifications and skills outdated in most sectors of the economy, unless these are constantly updated and expanded. Also the slide towards qualifications from higher education is a general feature, and the it is the declared ambition of the Danish government (2005) that 50% of all young people (and not just in the IT field) should get qualifications at the level of higher education.[7] The struggle to overcome these challenges is therefore one that concerns the educational system as a whole, and not only in an IT context.

6. Some general characteristics VET in Denmark[8]

The aim of this brief section is not to give an exhaustive description of VET and CVT in the Danish educational system, but merely to highlight and explain certain aspects, which are necessary to know in order to understand of the following sections.

VET in Denmark is dispensed at a number of educational establishments. Traditionally, courses at the level of IVET can be taken at various vocational schools (who themselves prefer the term "colleges"): technical colleges (for crafts and technical subjects), commercial colleges (for IVET in the field of trade, finance and commerce), agricultural colleges, social and health care colleges, and nautical colleges. Some technical colleges and commercial colleges furthermore offer courses at the level of higher professional education, which are short-cycle higher education courses

7 See e.g. www.rks.dk/sider/tema_debat/valg05/reggrund.htm

8 For a more extensive description, see CORT, P. & MADSEN, Anne-Grethe: Portrait of the Danish VET-system – an inside perspective. DEL, Ringsted 2003

(2 years duration or less) building on a completed IVET-course. AMU Centres[9] are training centres dispensing adult continuing vocational training for unskilled and skilled workers. They do not confer any formal qualifications, and courses are mostly of a short duration.

All IVET courses in Denmark are alternance-based; i.e. structured according to the dual system, where periods at the vocational school are followed by placements in real companies. Students have the status as apprentices; i.e. they are paid special apprenticeship wages when in their placements, and they enjoy the same protection as workers. All employers above a certain size – also those who do not have any apprentices – pay a certain percentage of their total wage-sum to a central fund (AER – the employers' reimbursement scheme), and apprentices are paid their wages from this fund during their school periods. Apprentices in IVET spend app. 1/3 of their time in the vocational school, and 2/3 in the company with which they have concluded an apprenticeship agreement.

A significant feature of VET in Denmark is the involvement of the social partners at all levels: at government level, at national (trade) level, and at local level. At government level, the social partners form the so called "VET council" *(erhvervsuddannelsesrådet)*, which advises the government on all matters related to VET. For individual trades at IVET-level, so called trade committees *(faglige udvalg)* are formed at national level by the social partners. These trade committees decide on profile, contents as and structure of individual courses. For CVT, 12 continuing training committees *(efteruddannelsesudvalg)* have been formed, which decide on content and structure of CVT. These decisions are afterwards officially sanctioned by the Ministry of Education in educational regulations *(uddannelsesbekendtgørelser)*. At local level, each vocational school has a local trade committee *(lokalt uddannelsesudvalg)* for each of the trades they offer. These local trade committees advise the school on matters related to the trade and organise the journeyman's test. Local trade committees can also, together with the institution, give a local "colour" to a particular course; i.e. to a certain extent adapt it to regional peculiarities in the sector. However, this local influence must never be so strong that it prevents a trainee from changing school.

The role of the social partners is a very strong one, and in a sense they can be said to "own" the VET system at this level. Trade unions membership is traditionally very high in Denmark, and more than 80% of the total work force are organised. Practically all major Danish companies are organised in one of the employers' associations under the umbrella of the Confederation of Danish Employers Associations.[10]

9 AMU Centre = Arbejdsmarkedsuddannelses-Center (labour market training centre)
10 See www.da.dk

Higher education in Denmark at Bachelor-, Masters (Candidate)[11] and Ph.D.-level is dispensed at institutes of higher education. Denmark has at present 12 universities, 5 of which are "full" universities with the traditional faculties, and 7 of which are specialised universities. In addition to this, a number of "university colleges" *(Centre for Videregående Uddannelse)* dispense higher professional education at Bachelor level. The courses here lead to qualifications as nurses, primary school teachers, occupational therapists, child care professionals etc. A special feature of higher education in Denmark is the so called short-cycle higher education courses, which are courses of higher professional education of a duration of typically 2 years, and building on qualifications at IVET-level. These courses are not taught at universities or university colleges, but at vocational schools (technical and commercial colleges). Universities are by tradition self-governing, and social partners are not formally involved in any decisions concerning the nature, contents and structure of the courses offered.

In addition to the system of public VET, also private providers are active. In the field of IT, these primarily offer short courses in specific software programmes (certification), or longer courses for unemployed with non-IT backgrounds, offering an introduction to IT-related issues (e-trade, e-learning etc.) with a view to gaining employment here. The latter courses are often financed or co-financed by the national Labour Market Authority, whereas the former are organised wholly on a commercial basis.

7. Response of the educational system to perceived challenges in the field of IT training

In order to cope with the perceived challenges, the system of public educational provision has reacted with a number of reforms and innovations that affect all parts of the system. Most of these reforms and innovations concern the educational system in general, whereas a couple are specifically aimed at the IT field. They can be subsumed under the following headings:

- A "dual track system" within public provision
- Acceditation of prior (experiential) learning and interplay with the world of work
- Modularisation
- "Marketisation" of VET
- Rapid response to changes in technology and market trends
- New institutions and institutional structures
- Alignment of VET-programmes with industrial product certification

11 Please see section on the "dual track"-system for an explanation of the terms "Master" and "candidate"

These reforms and innovations can be seen as part of a coherent strategy that aims to adapt the education and training system to serve an economy and a labour market that is characterised by almost constant change.

7.1 The "dual track" educational system

In order to face up to the challenges of the 21st century labour market, a major structural reform of the whole area of adult learning took place in 2001 (extended and further developed in 2004).[12] The basic aim of this reform was to introduce the concept of life-long learning as the mainstay of the whole education and training system. In a brief and succinct form, some of the major objectives of the reform are

- to offer good and relevant adult education and training offers to adults at all levels, from low skilled to the highest university level;
- to ensure the possibility of bridging education programmes and education levels in order to avoid blind alleys, where participants can proceed no further;
- to offer new possibilities of more systematic recognition of continuing vocational training courses into adult vocational education and training programmes;
- to introduce innovative and more flexible possibilities of recognising non-formal and informal learning, especially workplace learning, at all educational level;
- to ensure that provision of further and continuing education and training constitutes a transparent and coherent system of competences, with well-known and comparable competence levels, which closely and consistently mirrors the traditional (initial) education and training system.

The Danish adult education and training system is graphically represented in Annex 3 and contrasts it with the traditional (initial) education and training system (column on the left). As is evident, the adult vocationally oriented education system consistently mirrors the traditional (initial) education and training system, offering the same possibilities at all levels, from initial vocational training to long-cycle higher education. In principle, therefore, a low-skilled worker can, whilst remaining on the labour market, pursue vocational training right up to master craftsman level (and even beyond to Ph.D). He/she may proceed from unskilled to skilled status through the adult apprenticeship scheme (GVU), from skilled to short-cycle further education, and from here to medium cycle ("diploma") and long-cycle ("Master") higher education.

A few words of caution are needed here concerning the use of language, as the terms that have been introduced to designate the new courses may cause some

12 For a more extensive description in English of the new adult vocational training concept, see http://eng.uvm.dk/publications/newadult/

confusion when compared to Anglo-Saxon and Germanic equivalents. The "diploma" course thus represents medium-cycle higher education, and is equivalent to the Anglo-Saxon Bachelor degree. The "Master" course does indeed correspond to the Anglo-Saxon Masters degree – however, since it is different in nature (but not in status) to the long-cycle higher education degree awarded in the traditional (initial) education and training system in Denmark, these are known as "Candidate" degrees (from Latin: candidatus). Both a "kandidat" and a "Master" from a Danish university would therefore use the term "Master" when describing their educational level to a foreign audience, whereas they would stick to the Danish term inside the borders of Denmark. Some further elucidation of the difference between these equivalent titles may be useful, also to illustrate the difference in approach between the two tracks of the parallel system.

A traditional Bachelor degree would typically involve three years of full-time study at a university or university college ("Hochschule"). The entry requirement is an exam at baccalaureate level ("Abitur"). The education offered would either be general within a particular field of traditional university studies (e.g. Law, Sociology, various branches of Philology etc.), or geared towards a specific vocation (e.g. nurse, primary and lower-secondary teacher). Upon completion of the Bachelor degree, the student may continue (or, in the case of the so called "Vocational Bachelors", switch to a university) for another two years of full-time study in order to obtain the "Candidate" degree. There is no course fee, and the student is entitled to government student grants ("Bafög").

A diploma course constitutes the equivalent of one year's full-time study, but may take up to 6 years to complete. Students are usually in full-time employment, and can only attend lessons intermittently or at weekends or evenings, or when on educational leave. The entry requirement is qualifications from higher education (short-cycle, medium-cycle or long-cycle) plus appropriate work experience. Diploma courses are thus created not only for linear, but also for lateral progression. An important target group for the diploma courses is thus people who already have a degree in another field, but who wish to obtain qualifications in a new field. The lines of study are usually more specialised than in a traditional Bachelor course, and students can choose between a number of specialisations and also to a large degree tailor-make their own course. There are good possibilities for combining studies with their present work tasks in the shape of project work. Students in diploma courses pay a fee of typically around EUR 900 per subject or project (EUR 2000 for the final project), and can as a rule not receive government student grants.[13] The student or his/her employer must pay the fee.

13 This and the following price example are taken from the courses offered by the Danish IT-University (/www1.itu.dk/sw428.asp).

For a Master course, the entry requirement is a completed degree at bachelor-level (all Bachelor degrees can give admission) and at least two years of relevant work experience. The course corresponds to one and a half year's of full-time study, but may take up to 6 years. As for the diploma course, the course is specifically geared towards people who already are in employment, and offers good possibilities for integrating work and studies through projects and specialisations. A fee of approx. EUR 10,000 is payable, and covers participation in the entire course.

7.2 Accreditation of prior (experiential) learning and interplay with the world of work

It is a consistent feature of the Danish education and training system that accreditation of prior learning – in particular of work-based learning – is sought to be implemented at all levels of the system. This entails a move away from older time-served conceptions of education and training to a system based on the actual skills that a person possesses, and makes possible a modularisation and flexibilisation of education and training (see also below on open education). This principle has become one of the mainstays of the adult education and training system with the reforms of 2000, 2001 and 2004.

In IVET, the so called adult apprenticeship scheme *(VEUD – voksenerhvervsuddannelse)* has been introduced. Here, persons with work experience within a specific field are offered the opportunity to do a fast-track apprenticeship *(GVU - grundlæggende voksenuddannelse)*, in some cases consisting only of parts of the theoretical aspects of the total apprenticeship course. In order to avail him- or herself of this opportunity, the applicant must be at least 25 years of age and have at least two years of work experience within the chosen trade. Prior to starting, the participant will undergo a process which aims at clarifying his or her competence level. Both work experience and previous participation in courses are assessed, and on the basis of this an individual training plan is put together for the trainee, involving both practical and theoretical aspects. This process is undertaken by the local vocational school, which then, together with the participant, puts together an individualised action plan leading to the journeyman's test. In principle, a trainee may go straight from this process on to doing his or her journeyman's test, on the basis of a recognition of prior learning.

For university-level CVT (diploma and Master courses), prior learning is not directly taken into account other than in the admission phase, where students may be admitted on the basis of an assessment of their actual skills, rather than on the basis of formal qualifications.[14] Indirectly, however, students have the possibility of bringing previously acquired skills into play through work-based projects and the possibilities for specialisation, where the students themselves have a high degree of influence on the subject(s) of their specialisation.

14 See interview with the Danish IT University in Annex 2.

7.3 Modularisation

It is a consistent feature of the VET system after the reform that it is modularised, and that modules may be taken independently as "single subjects" and later (if the participant wants to) be used towards a full qualification. Many students enrolled in diploma and Master courses choose to register as single subject-students rather than going for the full degree at the onset. Single subjects are offered under the Act on Open Education (see below).

7.4 The "marketisation" of VET

As part of the efforts to make education and training offers more responsive to the needs of the market, changing governments since the early 90's have endeavoured to decentralise education and training provision and give institutions more leeway to extend and develop their course offer in response to local/regional/national demands. The means for achieving this has been

- a change in the status of educational establishments from public institutions to private foundations; and
- the Act on Open Education[15], which allows educational establishments to offer courses which are partly financed through tuition fees (user payment).

In the case of the former, the reforms of the Danish education and training system have also entailed a growing deregulation in matters concerning the status of educational establishments. Starting with the vocational schools in the 90's, the different types of educational establishments have been transformed from public institutions to private foundations. In the case of the universities, the new university law passed in 2003[16] largely severed the links between universities and the state, making universities private foundations, which in principle can act independently of the government very much in the manner of commercial enterprises. This means among other things that their economy is now in principle independent of the public purse, and they may build up their own capital through savings, investments, sponsored research, income accruing from patent rights and student fees. Even though education in principle is free in Denmark, universities may – as described above – charge students in the adult education and training system fees for their participation. Moreover, recent legislation has opened up for the possibility of demanding general fees from students coming from outside the EU and the Nordic countries (Norway and Iceland). However, the new financial freedom also includes the freedom to go bankrupt, if the university cannot balance income and expenditure in a sensible way. An important point in the argumentation behind this new status is that universities are now agents on the free market. They will therefore be more open to the demands in terms of qualifications and courses,

15 LBK no. 956 Lov om åben uddannelse (Act on Open Education), 2003. This is the latest version of the law, which was first introduced in the early 90's.

16 L-125 Lov om universiteter (Act on Universities), 2003

since it contributes actively to their budgets instead of being merely a duty undertaken on behalf of the state.

Along with this economic freedom also come other changes – notably in the management structure of the universities. As a new feature, universities now have external boards of directors, which often include representatives of the social partners (employers), as well as foreign capacities in the field of education and research. This board of directors stipulate the overall policies of the institution, including the lines of study that will be offered. The rector is no longer elected from staff, but employed by the board. The same goes for deans and heads of department, who are employed by the rector. This is done in an attempt to professionalise management.

Through Act on Open Education[17], educational establishments are free to offer education within the areas where they are recognised by the Ministry of Education. The teaching may take place both in the daytime, in the evening, in the weekends, in the form of distance learning, as part-time or full-time courses, and as combinations of these. The courses may be modularised and offered as single subject courses, where participants over a number of years may piece together a full education course. Open education confers the same qualifications as the corresponding courses taken in other ways, and the admission criteria are in principle the same as for these. Open education courses are open to everybody, i.e. employees who educate themselves in their spare time or during working hours or on educational leave, and unemployed persons. The institution itself decides what courses to offer, in what form, the intake, and the tuition fee (user payment). For each paying participant in open education courses, the state pays a fixed grant, which goes towards paying part of the costs. The remaining costs (and any profit for the institution) must be covered by the tuition fee. The size of the tuition fee is fixed by the institution itself, in accordance with the actual costs and what the market is prepared to pay. Courses organised under the Act on Open Education must be open to the public, and cannot be reserved for e.g. a particular company. Institutions, however, may offer tailor made courses to companies as an income-generating activity. This means that the company must pay the full costs, and that no public grants are awarded.

7.5 Rapid response to changes in technology and market trends

In order to make possible more rapid changes in the contents of public vocational education and training, the educational regulations issued by the Ministry of Education are now deliberately made less detailed than before. This means that the direct actors (the social partners and the institutions themselves) have more leeway for introducing new developments into the curriculum. Amending the educational regulation for a particular course is a cumbersome process, but with the less de-

17 For a description in English, see http://eng.uvm.dk//publications/factsheets/fact5.htm

tailed regulations, new developments may be implemented in as little as 6 weeks (for shorter courses in the AMU-system).

7.6 New institutions and institutional structures

A report from the Ministry of Education from 2001 concludes that there is a big need for labour with qualifications from higher education, and that this need will continue despite the weakening economic trends – that people with higher level qualifications are, in fact, a condition for an improvement of the employment situation.[18] The government reacted by setting up a new institutions and institutional structures. Of particular relevance here is the new IT University in Copenhagen, and the so called academies of higher professional education.

The IT University of Copenhagen is Denmark's 12th and most recent university.[19] It was set up in 1999, and granted full rights as a university in 2003. It presently has some 1400 students enrolled, and a staff of app. 250. The IT University offers a Ph.D.-programmes, 6 full candidate programmes (Master of science), 4 Master programmes and 1 diploma programme. It does not offer any full-time Bachelor degree.[20] It represents a new departure in other ways than being Denmark's one specialised IT University. The courses differ from what is available at the computer science departments of other universities, and are above all characterised by being more "open", allowing access also to people with non-IT backgrounds. Programmes at the university are modularised, and students compose their own trajectories by choosing from some 70 modules on the course list. Out of the 70 modules, 40 represent combinations of IT with other areas (project management, legal issues, design etc.), and are sufficiently basic to be available to non-specialists. The entry requirement for the university is a completed Bachelor degree, but not necessarily in the field of IT (for diploma/Master programmes, a minimum of two years of practical experience is furthermore required). At present, approx. half of the enrolled students at diploma level have qualifications from short-cycle higher education, whereas the other half possesses a Bachelor or Master degree. As of the academic year 2005/6, the university will allow entry to people without any formal educational qualifications on the basis of an assessment of actual skills and competences *(realkompetencer)*. This new entry regulation has been introduced because it is deemed to better reflect the situation on the current IT labour market, where many employees do not have formal qualifications. In addition to those enrolled in full programmes, some 150-200 persons enrol for single subjects (modules) per semester; using these as part of their continuing vocational training. The university is governed by a board of directors consisting of staff and student representatives and representatives of major IT employers in Denmark. There are no representatives of trade unions.

18 Undervisningsministeriet: IT-arbejdskraft og –uddannelser. København 2001.

19 The following builds on information from the website of the university (www.itu.dk), and from information gleaned from the interview with head of development Jane ANDERSEN (see Annex 2).

20 For a description of the programmes offered, see Annex 1.

In addition to the creation of a new university, also another structural initiative has been taken in order to strengthen education and research in the field of IT. Jutland, a number of already established universities (Arhus School of Business, the University of Southern Denmark, Aalborg University and the University of Aarhus) set up the educational network IT-Vest (IT University West) in 1999. IT-Vest does not have any physical location of its own, but is best described as a coordination of activities and a pooling of resources of the involved institutes of higher education. The network offers 23 degree programmes in IT, including a series of full-time ("kandidat") and part-time Master of Science Technology degrees and two part-time diploma degrees. There are eight major areas of research within IT-Vest:

- Software engineering
- Multimedia
- Industrial IT
- IT product development
- IT/communication and organisation
- E-business
- IT and learning
- Bioinformatics

In 2004, 162 students enrolled for full-time Master of Science Technology degrees (kandidatuddannelser), and 244 for part-time Master and diploma degrees. In total, a number of nearly 800 students (443 full-time/351 part-time) were enrolled in 2004.[21]

IT-Vest has a status as an independent education and research centre, and is governed by a board of directors consisting of representatives of the involved universities (one from each) and five representatives of IT-employers.

A second innovation at institutional level has been the so called academies of higher professional education. At present, the main educational background in the field of IT is the so called "datamatics"-, a short-cycle higher education programme of 2 years' duration. Short-cycle higher education – i.e. courses of typically 2 years' duration – has been offered at many vocational schools (technical and commercial colleges) for many years. Until the turn of the millennium, however, the range of courses offered was very dispersed, both in terms of geography and contents. Many schools offered only one or two courses, and were thus in no position to create a viable study environment. Moreover, many of the courses had a narrow focus, and were tied to the initial vocational training courses, which formed the main *raison d'être* for the particular institution at which they were taught. This meant that it was difficult to create "cross-over" courses – i.e. courses that combined elements from e.g. commercial and technical subjects, particularly in the field of IT.

21 See www.it-vest.dk/it-vest/ITV_tal.shtml

In connection with the reform of short-cycle higher education instigated by the government in the year 2000, the concept of the "academy of higher professional education" was adopted as a key element. Short-cycle higher education itself was reorganised to conform to the principle of lifelong learning and split in two modes: short-cycle higher education (KVU), which is full-time and overwhelmingly school-based and targets young people upon completion of secondary education/training; and adult short-cycle higher education (VVU), which is organised on a part-time basis and has a target group of people already in employment. A council of academies of higher professional education ("Erhvervsakademirådet") consisting of national-level representatives of the social partners was entrusted with the task of defining the precise needs for vocational education at this level to ensure consistency with the needs of the market. Education and training strategies were linked to strategies of regional development, and vocational schools were strongly encouraged to combine their efforts in the field of short-cycle higher education and form academies of higher professional education that could create strong study environments and function as knowledge centres for business and enterprise at regional level.

The creation of the specific academies of higher professional education did not happen as a result of legislation, but took place on the basis of initiatives taken at regional level by the main stakeholders (i.e. the schools). There was, however, a strong financial encouragement from the ministry in the shape of development grants that could help finance the establishment of the academies. The ministry stipulated that the academies should be broadly based and comprise a variety of actors: technical colleges, commercial colleges, agricultural colleges, training centres etc. There are at present 13 academies in Denmark, which between them offer 17 short-cycle higher education courses and 10 adult short-cycle higher education courses. Many of the courses have very prominent IT components, and several focus directly on this:

Short-cycle higher education: datamatics, IT and electronics engineering, multimedia design and communication

Adult short cycle higher education: information technology[22]

7.7 Alignment of mainstream VET programmes with industrial product certification[23]

Public VET in Denmark cannot, as a principle, promote certain industrial products at the expense of others. On the labour market, however, industrial certifications for particular products (Microsoft, Oracle, SAP, Cisco etc.) are very widespread. In order to approach mainstream VET to the factual conditions and to increase the

22 For a full list of academies and courses offered, see www.erhvervsakademierne.dk/. (also in English).

23 The information in this section come from the interview with the Danish Metal Workers Union (see Annex 2), and a supplementary telephone interview with EUC-Syd (IVET institution).

"street value" of this, a new set of regulations[24] for IVET has now laid down that vocational schools must offer training at the level of the current market-leading certification. In more concrete terms, this means that teachers and instructors often will be qualified instructors in industrial certifications, and that participants are given theoretical and practical instruction that enable them, with little extra effort, to present themselves at an accredited certification institute and obtain the certification, paying only the assessment fee (and not for tuition). The vocational school cannot, however, make the assessment and provide the actual certifications itself.

8. Conclusions and perspectives vis-à-vis the German situation

The situation as regards VET in the field of IT is in many ways characteristic of the challenges to the education and training system in general. Constant change both in technology and (global) work organisation makes constant learning a necessity, which in turn dictates a flexibilisation and a modularisation of VET that allows workers to constantly upgrade their skills without disrupting production. The realisation of this has prompted a series of reforms in the Danish education and training system in the past 5-10 years that has markedly changed the configuration of the educational landscape in Denmark.

The most significant element in these reforms is arguably the introduction of the "dual track" system, which allows workers (in the broadest sense of the word) to gain new qualifications without losing their attachment to the labour market. Hand in hand with this go modularisation and the accreditation of prior (experiential) learning. One of the major consequences of these changes has been to bring the universities on the scene as actors in CVT. Previously, universities almost exclusively concentrated on conferring traditional academic qualifications on the basis of full-time study: they represented the "ivory tower" of academia that had little to do with the outside world. With the diploma and Master degrees, a new type of academic qualifications has been created and new forms of teaching have been introduced, that have entailed a much more intense interplay with the labour market. If this change had not been made, these skills and qualifications would have to be obtained elsewhere, and there would have been not one, but two systems: a public one, which would continue to give traditional academic qualifications for full-time students; and a private one, which would endeavour to confer these skills and qualifications to people on the labour market. The advantages of the "dual track" system over a situation where two parallel systems exist are that

- it is possible to exploit resources (expertise and physical structures) better, since lecturers and buildings are the same for both tracks;
- the credibility of the traditional university system is transferred to the new track, as it uses the same name, buildings and lecturers;

24 Not yet fully implemented

- the acceptance of the qualifications conferred is less problematic, as they are conferred by the public system, and not by one of the stakeholders only;
- since all activities take place within the public system, the state has more possibilities for intervention and control than over a private one.

The involvement of the stakeholders (i.e. the social partners) in the provision of public vocational education and training means that there is a high degree of consensus in all matters related to this. In the interviews, no interview contained serious criticism of the system, except for one[25], which pointed to the possible negative effects of the "marketisation" of education and training. The fact that institutions now had their own budgets could have as a consequence that they became more interested in making profits than offering quality education and training. The person interviewed also maintained that it made the institutions less willing to recognise prior learning in order to keep students longer at the institutions (and thereby making more money). A further point of criticism concerns the access of unemployed to higher education. Unemployed people must be available for the labour market, and hence cannot enrol in full-time programmes and at the same time retain their unemployment benefits. To upgrade their qualifications, they must use the opportunities afforded by the diploma and Master programmes, but access to these is dependent on the payment of a tuition fee. This tuition fee is typically around 10,000 euro for a Master degree; i.e. a significant sum for somebody who is dependent on unemployment benefits. The labour market authorities will only pay the tuition fee in exceptional cases, e.g. for people who are in revalidation. Otherwise, all that an unemployed person may hope for is to get participation in a single module paid. The payment of the tuition fee thus constitutes a significant barrier to the participation of unemployed persons in diploma and Master programmes. These programmes are therefore an option almost exclusively for people who are in employment and who can afford the tuition fees out of their salary, or who manage to make their employer pay the costs of their participation. "Marketisation" and deregulation, on the other hand, are seen as indispensable elements in the reforms, as it enables institutions to react quickly to new demands and generates revenue to boost institutional budgets at a time when the sector is expanding, but public per capita funding diminishing.

There are at present no analyses of the impact of the educational reforms on employment in the IT sector. The number of people having completed e.g. a diploma or a Master degree in IT is at any rate probably not substantial enough yet to determine whether they have had any influence on economic development and employment in the field. According to a recent analysis[26] made by the Trade Union for Commercial and Clerical Workers and the Economic Council of the Labour Movement, and based on figures from Statistics Denmark, employment in

25 See interview no. 3 with the Trade Union for Commercial and Clerical Workers in Denmark (HK).
26 See www.itportalen.dk/sw1075.asp

the field is rising slightly again, after a few years of decline. This may be due to market trends that are entirely unconnected to education and training issues, however.

What the figures do show, however, is that the system as such with flexible Master and diploma degrees has become and accepted and integral feature of the education and training "landscape" within the field of IT, with numbers enrolled that are approaching those for enrolment in traditional full-time (kandidat) programmes. As the overwhelming majority of students enrolled here are people in employment with student fees paid fully or at least in part by their employers[27] it would seem that these have acknowledged these new programmes as a worthwhile investment in a qualification upgrade of their employees.

Annex 1:
IT education and training programmes in Denmark

When reading the following description of the current education and training possibilities in the field of IT in Denmark, it should be taken into consideration that it is a field permanently under construction, both in terms of contents and structure. It should therefore be seen, metaphorically, as a snapshot rather than as an elaborate oil painting in a gilt frame. A further complication in a description is the selection. Many courses and lines of study are difficult to place in distinct categories, since IT in one shape or the other is an element in most, and the possibilities for specialisation make it possible to give them a strong twist in that direction, even though the point of departure was not directly IT-related. The modularisation introduced as part of the reforms has further accentuated this aspect. Generally, the higher up in the educational system the courses are found, the less standardised they are, offering many possibilities for individually structured courses. Courses offered under the same heading may moreover differ from institution to institution. Another expert may thus have included other courses in the description, or excluded some of those already present.

The description comprises both aspects of the education and training system, i.e. the full-time strand and the parallel strand for continuing vocational education and training. To facilitate an overview, it has been divided into 5 parts:

Pre-vocational courses
Initial vocational training
Short-cycle higher professional education
Medium-cycle higher education
Long-cycle higher education

27 No figures exist, but this view is unanimously shared by all actors in the field (see e.g. interview with HK, Prosa, and the Danish IT University)

The description of the concrete range of education and training offers builds on the description of general systemic features of the Danish continuing education and training system, and should not be read out of context with this.

The information for this description has mainly been taken from the websites of the Danish Ministry of Education describing education and training possibilities in Denmark (www.ug.dk and www.vidar.dk). In some cases, this has been supplemented with information gleaned from the websites of educational establishments.

Pre-vocational courses
These are courses which courses confer a "title", but which do not give any formal vocational qualifications in the IT-field. They are used as continuing vocational training for people who wish to add an IT-dimension to their working life, or unemployed wishing to increase their general IT-competences. The courses in this category are offered as either full-time, part-time, evening, or distance learning courses, and participants may opt to take one or two subjects only. The skills acquired here may later be formally accredited and used towards e.g. an adult apprenticeship.

PC-user
PC-user is a vocationally oriented part time training course aimed at equipping the participant with the skills necessary to use a PC work station. A completed PC user gives admission to the IT administrator course (see below). A PC user training course consists of 7 subjects, two of which (basic information technology and the PC and its operating system) are obligatory. The remaining 5 have to be selected from a list containing in all 11 optional subjects:

Word processing
Spreadsheets
Databases
Presentation programmes
Information networks
Desktop publishing
Financial management via electronic data processing
Integrated information treatment and mediation
Advanced spreadsheet
Advanced databases

Each of the subjects corresponds to approx. 60 lessons, but people with practical experience or skills acquired in other contexts may take considerably less time. The course is offered mainly by technical colleges and business colleges, but also other types of educational establishments may offer the course.

The PC-user course is in many ways similar to the internationally known "Computer Driving Licence", which is also offered in Denmark by a number of different course providers.

IT-administrator
IT-administrator is a vocationally oriented part time training course aimed at persons wishing to undertake a practical IT training course at a more advanced level than the PC user. In the IT-administrator course the participant learns to use, estimate and adapt IT tools in vocational environments, and to give guidance and support to others in their use. The course contains four specialisations:

IT support
System administration
Database administration
Web presentation

The course consists of 3 joint subjects (Practical IT, IT development and IT communication), which all students must complete. Once these are completed, the participant selects one of the four specialisations, or puts together an individual line with elements from several specialisations. All specialisations are concluded with a final project, which is based on a practical problem in an enterprise. The IT-administrator course is of a duration of approx. 360 working hours, excluding the final project.

The IT-administrator course is offered by business colleges. All subjects are concluded with a state-controlled exam.

Initial vocational training
Qualifications at initial vocational training level may be acquired either through traditional apprenticeships (sandwich system) or through the two special tracks for adults, known as "adult VET" and "basic adult education". Adult VET corresponds to traditional apprenticeships, but the participant must be over 25 years of age and possess relevant work experience. Participation in adult VET requires an apprenticeship contract with a company as the traditional (mainstream) apprenticeships, but the total training period is shortened in accordance with the previously acquired theoretical and practical experience of the participant. Basic adult education does not require an apprenticeship contract, and will normally consist of theoretical elements only. The target group here is workers with no formal qualifications but with ample work experience, skilled workers with obsolete qualifications, and immigrants with qualifications acquired abroad. For both categories, an individual competence assessment procedure is carried out in order to assess the training requirements. This may last up to 3 weeks, at the end of which a training plan is put together for the individual participant. Initial vocational training is carried out in vocational schools, i.e. technical colleges, business colleges and agricultural colleges.

Both adult VET and basic adult education confer the same qualifications as mainstream initial vocational training, and it is possible to pursue the same lines of training. The main IT-related areas are:

Data and communication
The data and communication branch is focused around technical aspects (repair and maintenance) of IT systems, and consists of 3 specialisations

Data technician
Data technicians learn how to repair and maintain computers as well as computer-controlled systems. Other important tasks are the installation of hard- and software, and the setting up of networks. A data technician apprenticeship lasts 5 years. It is, however, possible to do a shorter version (known as IT-supporter), which lasts app. half the time (2 years and 6 months).

Office technician
Office technicians learn to work with modern office technology; i.e. installation and repair of telefax machines, printers, photocopiers etc. Length of mainstream apprenticeship is 4 years.

Communication technician
Communication technicians are concerned with the installation and maintenance of telephone connections, switchboards, high-speed communication networks (ISDN, ADSL), and computer networks. Length of mainstream apprenticeship: 4 years.

Digital media
This branch is concerned with the digital media, i.e. the integration of sound, video, graphics and text by means of IT-based tools, and to plan and execute production sequences in a rational manner. The course comprises subjects like graphics, storyboarding, integration of sound and video, digital video, webproduction, image-editing etc. Within digital media it is possible to choose between 2 (3) specialisations:

Multimedia integrator
The multimedia integrator learns advanced programme instruction and the integration of sound, video and text in interactive user environments. A further learning goal is the setting up of communication servers. Duration of mainstream apprenticeship: 3 years and 6 months.

Multimedia animator
This specialisation is concerned with advanced modelling, surface constructions and animation. A further focus is on the transformation of ideas into products. Duration of mainstream apprenticeship: 3 years and 6 months.

It is also possible to avoid specialisation and do a short version of the course, known as *digital integrator*. This version lasts 2 years and 6 months in the mainstream version.

Frontline PC-supporter
Frontline PC-supporter is a new apprenticeship course, which was only started up as of January 1st 2005. The frontline PC-supporter works with both hard- and software aspects of personal computers. He/she gives advice and guidance to users, either in terms of hotline- or offline support, or in connection with sales work. Typical practical tasks could e.g. be the dimensioning of a server to a concrete function, selecting appropriate processor, motherboard, hard disk, graphic board etc.; or the installation of a new PC including testing and error detection. On the software side, the tasks are concerned with the installation of operating systems, programmes and standard applications, and their adaptation to individual users as well as upgrading to new versions. Also the installation and maintenance of smaller networks is included in the course.

The mainstream apprenticeship course lasts 2 years.

Web-integrator
The web-integrator course is, like that of the frontline PC-supporter, a recent introduction that only started up as of 1 January 2005. A web-integrator works with network solutions and learns to produce dynamic web sites, which e.g. co-function with databases. This includes digital photography, scanning and image-editing etc., and the integration of all these elements into complex web-solutions with clear and logical navigational structures. Also, the web-integrator has learnt how to set up web-servers and is informed about security and legal issues in connection with web-aspects (e-trade etc.). The training course lasts 1 year and 9 months, but contrary to all other courses in initial vocational training, this course does not require an apprenticeship contract with a company and is, in fact, entirely school-based.

Short-cycle higher vocational education
Courses in short-cycle higher vocational education are non-university based vocationally oriented courses, which are taught in vocational schools (technical colleges and business colleges) and of a duration of under 3 years. These courses are also called vocational academy courses. They are not at academic level, but may be partly accredited if the participant later decides to enter a university course. Typically, a completed short-cycle higher vocational education course will mean that a full-time bachelor-degree (duration: 3 years) can be shortened by up to 1-1 1/2 (in some cases 2) years. Entry requirements are qualifications from a completed relevant initial vocational training course, or general upper secondary education (baccalaureate) with the appropriate subjects. There are 3 short-cycle higher vocational education courses within the field of IT:

IT- and electronics technologist
In this course the participant is trained in the production and maintenance of electronic and data-technical systems. The duration is 2 years, 3/4 of which is constituted by an obligatory part, and the remaining 1/4 by a special subject, which the

participants selects him-or herself. This subject must also be integrated into the final exam project. During the course, the participant must choose between two specialisations: either electronics and data, or communication technology (IT). The obligatory part is divided into three subject fields:

The general subject field, which comprises the subjects of linguistic communication, technical documentation, technical mathematics, information technology and electronics;

The enterprise subject field, which comprises the subjects of commercial buying and selling, business economy, organisation, project management, environmental and safety issues, and quality;

The technological subject field, which comprises subjects related to the two specialisations; i.e. either electronics and data, or communication technology. He participants must choose between one of two blocks of subjects. In the first, the participant learns about electronic circuits, product development, production and testing equipment, software and networks. The second contains IT-systems, networks, network hardware, transmission media, database systems, and data security.

Diploma course in advanced computer studies
The diploma course in advanced computer studies (datamatikeruddannelsen) is a full-time course[28] designed to meet the requirements of the business sector for practice-oriented IT specialists with a sound theoretical knowledge and a broad profile within IT. The course thus offers a wide range of applications within IT. The duration is 2 years and 3 months. It is divided into five semesters consisting of a combination of IT-disciplines and a number of commercial subjects. The first four semesters are subject oriented and in the fifth semester a thesis is elaborated in close cooperation with a company. The obligatory subjects are divided into five subject fields:

General topics – among other things communication, mathematics, and the connection between technology and the development of society;

The business enterprise – e.g. financial management, organisation, logistics and environmental management;

Systems development – e.g. analysis, design, project management and computer tools;

28 Please note that the use of the term "diploma course" in this context is somewhat misleading, since this term with the new reform of the education and training system is now used generically to designate the part-time courses at Bachelor level, which belongs to the continuing education and training strand of the system. The term has traditionally been used in connection with this course, however, and has therefore been retained for the time being. See also note on diploma engineer courses further on.

Programming – e.g. algorithms and data structures, programming languages software architecture and database programming;

Technology – e.g. security, computer architecture, distributed systems and networks.

Multimedia Designer
The multimedia designer course emphasises theory and methods relating to the development of multimedia applications (e.g. home pages) from the initial idea to the finished product. During the course, the participant learns to understand organisational structures and processes in connection with multimedia development. The course brings together elements from communication and media theories, development of web pages, graphic design, audio/video and 3D animation, aesthetics, marketing, journalism and data communication. The course lasts 2 years, and consists of an obligatory part, comprising 3/4 of the course, where the participant must cover four different subject fields:

The enterprise – comprising organisational design, strategic development, society and technological development:

Communication and mediation – comprising communication, commercial communication, and media sociology;

Visualisation and concept development – comprising multimedia-design, multimedia-development, and multimedia integration;

Interactional development – comprising interactional construction, construction and modelling, construction and databases.

In the last $^{1}/_{4}$ of the course, the participant specialises within one of the above subject fields of his or her own choice, and writes an exam project within this specialisation.

Medium-cycle higher education
Courses in medium-cycle higher education are taught at institutes of higher education (universities or university colleges). Basically, a distinction is made between full-time bachelor-courses and diploma courses, which confer the same qualifications but which are structured differently and aimed towards people with job experience/in employment. Contrary to e.g. the UK, very few people leave universities after full-time Bachelor degree, but continue to do a Masters degree. The only exceptions occur with the so called vocational Bachelor degrees, a group which comprises certain health professionals (e.g. nurses, physiotherapists) teachers in primary and lower secondary education, and various kinds of child care professionals. A further group is the so called diploma engineers (diplomingeniører).[29]

29 Which have nothing to do with the part-time diploma courses in the parallel strand of the system. Please see note 1.

Diploma engineers (Bachelor of science in engineering):
The term "diploma engineer" is a traditional one, and should not be confused with the diploma courses. Diploma engineering courses are full-time Bachelor courses of $3^{1}/_{2}$ years' duration (3 years of theoretical instruction and $^{1}/_{2}$ year in a placement), which lead into employment (even though participants may continue to do a Master's degree). Full-time medium cycle higher education courses in the IT-field are found in this category, and comprise the following courses:

Bachelor of science in engineering – information and communication technology
This engineering course concerns the planning, development and realisation of IT projects and IT project management. It contains subject areas like software engineering, programming, networks, tele- and data-communication, IT-systems, automation, signal processing, information processing and presentation, organisation and technology assessment.

Bachelor of science in engineering – electro-engineering
Electro-engineering is concerned with the construction of electronic systems, monitoring and regulation of technical systems as well as the reception, transmission and processing of signals. Electro-engineering is divided into three major fields: low current, data technology and strong current. Within each of these fields there are several possibilities for specialisation.

Diploma degrees:
Diploma courses are part-time degrees at Bachelor level that correspond to one year's full time studies (60 ECTS points), but which may take up to 6 years to complete. The target group is people in employment who already have a degree (Bachelor or Master) from higher education and at least two years of relevant work experience. The degrees are made up of a number of modules (courses) that may also be taken individually as continuing vocational education/training, and this often happens. Diploma degrees within the field of IT are currently awarded at 3 universities in Denmark.

Diploma degree in information technology – IT University of Copenhagen
The degree is intended to qualify students to participate in the development of IT-systems, either by elaborating specifications or by being directly involved in the technical work. The education is divided up into 4 modules. During the 3 first modules, the student must complete 5 courses and carry out one project. The university offers a number of basic courses, but students with a more advanced IT background may choose freely from the university's catalogue of more advanced courses. The basic courses are:

IT: platforms and organisation
Basic programming
Web programming

Database-supported web-publishing
Design of user-interfaces and data
Database systems
System development
IT project management
Pilot study

There is no set curriculum, and the student may freely choose between the courses offered. In the 4th and final module, the student carries out a final project, which is formulated by the student and often undertaken in the enterprise where the student is employed. There are therefore ample opportunities for individualising the education.

Diploma degree in software construction – University of Aalborg
Contrary to the diploma course offered by the IT University of Copenhagen, which is more general in scope, the diploma degree in software construction from Aalborg University is targeted towards the continuing education of IT professionals with qualifications from short-cycle higher vocational education. The education is therefore more specialised, and demands a degree in IT/computer science as the entry requirement, plus two years of relevant work experience.. It is divided into 4 modules, each of which comprises one course and one project. At the end of the education, the student carries out a final project. The courses are selected from a course list that may change from year to year. For the academic year 2004/5, the following courses are offered:

Object-oriented programming
Algorithms and data structures
Design of user interfaces
System analysis and design
Distributed systems
Programming paradigms
Language and translation
Computer and network architecture
Principles for concurrency and operative systems
Syntax and semantics
Database systems
Software engineering

Diploma degree in information technology and software construction – University of Aarhus
This education is similar in nature to the degree offered by the University of Aalborg; i.e. it addresses IT professionals, and the entry requirements are therefore the same as above. To complete the degree, the student must take 4 obligatory courses and 2 optional courses, and carry out a final project. The obligatory courses are the following:

Programming and large systems
Regularity and automats
Security
Model-driven software development

The optional courses (from which the student must choose two) are:

Web technology
Concurrency
Human-computer interaction
Human-computer interaction and hypermedia
Hypermedia

Long-cycle higher education
Long-cycle higher education consists – like medium-cycle higher education – of two parallel systems; one of which consists of full-time studies and aimed at (young) people coming from the traditional full-time educational system, the other of part-time studies and aimed at people from the labour market. A further difference between the two is that the latter is made up of modules/courses, which can be accessed by individuals even though they have no intention of doing a full degree study. They are known as Candidate and Master degrees respectively, even they would both in the anglo-saxon terminology be known as Masters degrees. In order to mark the distinction between them, however, I have in the following kept the anglicised versions of the Danish denominations.

Candidate degrees:
Full-time Candidate degrees are awarded at universities, of which there are 12 in Denmark; one of which is exclusively dedicated to IT (the IT-University of Copenhagen). A Candidate degree requires a completed Bachelor degree (3 years) plus 2 years of full-time study at Candidate level (120 ECTS points). It is, of course, possible to leave university with a Bachelor degree, but very few choose to do so.

Master of Science in Engineering/civil engineer
The Master of Science in Engineering is the longest and most theoretical engineering degree. IT is an element in practically all lines of engineering, but several specialisations focus particularly on IT.

Software engineer
Software engineering is concerned with the development of computer systems – e.g. for computer games, cellular telephones, cars, hearing aids, the internet etc. Besides common theoretical subjects like mathematics, chemistry and physics, the education contains the following elements:

Programming systems
Algorithms and data structures
Software engineering
Programming languages and translation
Information retrieval
Design of graphic user interfaces

Electronics and IT
The student learns to design and build electronic equipment and electric appliances – from transistors to elaborate computer systems. The education includes courses in modelling, programming and computer-based development tools.

Data technology and IT
The student learns to develop computer programmes and to programme microcomputers. The relationship between the technology and the user is a major aspect of the education, as well as both hard- and software-construction. Within data technology and IT it is possible to choose from 7 specialisations:

Computer graphics and image editing
Communication networks
Medicinal informatics
Multimedia
Process-control and satellites
Signal processing and 3D-sound
Software and embedded software

Communication technology
This education is at present only available up to Bachelor level. The student learns to develop technology for the communication media of the future. This entails working with optical communication, antennae and mobile communication, and with the implementation of IT in organisations. Besides basic subjects like mathematics, physics and chemistry, the education contains subjects like

Digital electronics
Programming
Algorithms and data structures
Software engineering
Mobile technology

Master of Science
Besides engineering studies, it is possible to obtain Candidate degrees in a number of IT-related fields.

Computer science
This is the classical – and most theoretical – education in the field of IT. The focus is on problem analysis and the design of systems for the processing of information. Mathematics and statistics constitute major elements of the study, whereas the focus on practical programming abilities varies from university to university.

Technical information technology
This study contains two specialisations:

Distributed real time systems, and
Multimedia technology

In the former, the student learns to develop software to both stand-alone instruments, or instruments that can be linked with others in a network (e.g. hospital equipment), whereas the latter is concerned with the processing of signals in the shape of sound and images. This can e.g. be the construction of algorithms that can remove background noise, or image editing of medicinal pictures. The study is at present only available as a Master degree; i.e. the entry requirement is a Bachelor degree from a related field.

Multimedia
This study is cross-disciplinary, and contains elements from computer science and aesthetics and media science. It is only available at Candidate level, and the entry requirement is a Bachelor degree in computer science.

Master degrees
Master degrees are specifically created for people who are already in employment, and who possess qualifications at Bachelor level (or diploma level) and at least 2 (in some cases 3) years of relevant work experience. They correspond to $1^{1}/_{2}$ years of full-time study (90 ECTS points), but students may take up to 6 years to complete a degree. Currently, there are the following Master degrees available in Denmark:

Master of Information technology/design, communication and media
This study is offered by the IT-university of Copenhagen. The subject areas are:

Media and communication – e.g. theoretical and empirical analysis of computer-mediated communication in a cultural, societal and historical context.

Interaction design – e.g. design methods, user interfaces, computer-mediated communication, aesthetics

Construction – e.g. analytical methods, programming, 2 and 3-dimensional graphics, sound and image-editing, animation and multimodal interaction areas.

In addition to the subjects in these 3 areas, the education comprises optional subjects and a final thesis.

Master of information technology/multimediatechnology
This line of study is offered by the IT University of Copenhagen. The subject areas are:

Multimediasystems and implementation, e.g. system construction, development of systems for virtual reality and simulation, multimedia databases, technology for distributed multimedia and implementation of systems and basis technologies.

Multimedia basis-technologies, e.g. signal processing, image analysis, speech analysis and synthesis.

In addition to the subjects in these 2 areas, the education comprises optional subjects and a final thesis.

A similar education is offered by the University of Aarhus.

Master of information technology/software development
This line of study is offered by the IT University of Copenhagen. It consists of 2 main subject areas:

Technical subjects – e.g. programming, algorithms, data structures and distributed data processing (at least 15 ECTS points)

Applied subjects – e.g. pilot studies and specification, system development methods, software design, software project management, software quality (at least 15 ECTS points).

In addition to the subjects in these 2 areas, the education comprises optional subjects and a final thesis.

Similar courses are offered by the universities of Aarhus and Aalborg.

Master of information technology/internet and software technology
This line of study is offered by the IT University of Copenhagen. It consists of 3 main subject areas:

Distributed systems – e.g. communication between processes, resource allocation and data security, development and organisation of networks, network protocols, cryptographic techniques and standards, architecture and models for distributed systems.

Software technology – e.g. construction of software, including databases, parallel and distributed systems, embedded and mobile systems, algorithms and data structures, domain-specific languages, and the reliability of programmes.

Internet technology in products and organisations, including IT-supported collaboration, human-machine interaction, financial, juridical and organisational aspects of IT projects.

In addition to the subjects in these 2 areas, the education comprises optional subjects and a final thesis.

Master of information technology/communication and organisation
This line of study is offered by the University of South Denmark together with Aarhus Business School. The aim is to offer continuing vocational education and training for employees who are trying to mediate between information technology and the organisational and communication-related functions in an enterprise at strategic level. The education differs from most other Master courses in that it only corresponds to one year of full-time study (60 ECTS points), and is carried out in a combination of distance learning and weekend seminars. The course contains the following subjects:

Teamwork
Databases and web
Business analysis and organisation
Communication and marketing
Description methods (specification of requirements to functionality, structure and costs of IT-systems)
Project management and organisational aspects of IT
Integrated market communication
System development
Legal aspects of IT
Design of integrated systems
Business intelligence (data warehouse and data mining)
E-business strategies
Theory of Science

At the end of the study, the student must write a final thesis.

The University of Aarhus offers a Master degree with a similar focus (Master of IT, communication and organisation), but with more extensive technical contents. This education corresponds to 1 1/2 years of full-time study (90 ECTS points).

Master of information technology/industrial IT
This line of study is offered by the University of Aalborg. It is targeted at people who work with development and implementation of information technology in private and public enterprises. The education differs from most other Master cour-

ses in that it only corresponds to one year of full-time study (60 ECTS points), and is carried out in a combination of distance learning and weekend seminars. It consists of 2 modules:

Development of internet applications - comprising www-technologies, graphic user interfaces, databases, client server, programming, technology-supported project co-operation, data networks models and architecture), and object oriented system development.

Development and implementation of IT-systems – comprising software development in theory and practice, modelling of intelligent systems, industrial use of IT-systems, management, administrative IT-systems, applied computer science, knowledge and information, multimedia and interactive systems.

Each of the two modules is concluded with a project, but there is no final thesis.

Annex 2: Stakeholder interviews

The empirical basis for the study comprises 6 semi-structured face-to-face interviews and 2 telephone interviews with actors and stakeholders. The face-to-face interviews lasted approx. 1 hour each. After the interview, a summary of the interview was made and sent to the person interviewed, who could then change and amend the text if he or she felt misunderstood or misrepresented in the text. The telephone interviews were shorter, and mainly served to clarify factual questions. No summary was made of these. The selection of persons for the interviews was made in order to get a balanced representation of actors and stakeholders. It comprised representatives of

- trade unions (3 interviews)
- employers' associations (1 interview)
- trade committees (1 interview)
- the Ministry of Education (1 interview)
- educational establishments (2 interviews)

The apparent overrepresentation of trade unions is due to the fact that IT-employees are organised in 3 different trade unions, whereas the IT-field on the employers' side mainly is represented by one organisation.

The aim of the interviews was twofold: firstly, to get concrete information about issues concerning education and training and IT; secondly, to hear about the stakeholders' views on the system. The second issue – stakeholders' and actors' perception of the system – yielded relatively little material. Most were generally well satisfied with the system. This can undoubtedly be ascribed to the fact that CVT in Denmark mainly takes place within the public system, where the social partners have a substantial influence on both objectives, contents and structure.

The interviews were conducted with people at the level of senior adviser/management, who could claim to represent the views of the organisation. In the summaries of the interviews given below, the names of the informants have been withheld as a matter of routine.

Interview no. 1: Confederation of Danish Industry

Danish Industry (DI) is the largest Danish employers' association, representing some 6.400 Danish companies in the field of industrial production and service. It presently accounts for over 50% of the total membership of the Confederation of Danish Employers' Associations (DA).

The general trend on the IT labour market is one of decreased employment opportunities compared to the situation of just a couple of years ago. This is not merely a result of the collapse of the "IT-bubble" at the beginning of the millennium, but also of a more long-term development where IT systems are steadily becoming more user-friendly and robust. As a consequence of this, skills needs on the market have moved in an upwards direction, and those with limited skills and/or experience are encountering increasing difficulties in finding and maintaining employment. People with the short IT-supporter training course are thus in a difficult situation, while the situation for data technicians, whose training course is more than double the length than that of an IT-supporter, is significantly better.

The IT labour market has traditionally always integrated a high amount of people with no formal qualifications the IT-field, and this is still the case. These people acquire the necessary skills on the job and through certification courses offered by the private market, and are not using the official vocational training system to the degree that is desirable. There is a tendency to see formal qualifications as less important; indicated by the fact that there is no directly proportional connection between formal qualifications and salary level. In a field that is constantly developing and at a fast pace and where on-the-job training is of vital importance, employment tends to be the most telling indicator. Once somebody has lost his or her job, it is very difficult to get into the labour market again.

The legal conditions governing hiring and firing on the Danish labour market make employers less dependent on formal qualifications as an indicator of employability. It is generally easy for them to take on new employees for a probationary period to test out their real competences - and to get rid of them again, should their skills not match the required level.

DI is conducting skills needs analyses and is participating in the tri-partite committees both at national, regional and local level where decisions on training provision are taken. They therefore exercise a degree of influence over both contents and structure, and are generally satisfied with the provision here. DI fully supports the development where vocational schools and training centres become private foundations with increased possibilities for defining for themselves the exact pro-

file of their training provision. Only the general framework of the system should be provided centrally – the exact profile of individual courses should be particular to each institution and decided upon by the school directorate/boards together with the social partners at local level (trade committees). This leads to increased user-orientation, and thus to a better coverage of training needs at local/regional level. A greater degree of cost-efficiency becomes a vital element here, as the institutions must now invest heavily in developing attractive, individualised training offers, instead of merely providing off-the-peg standard courses, both a the level of short AMU CVT-courses and in IVET. This is a process that is still in progress, and many schools have yet to fully exploit the possibilities inherent in the new legislation in the field. This has led to a situation where there are big differences between vocational schools/training centres. Some have not managed to adapt well enough, and have consequently encountered financial difficulties; even to the point where they are threatened by bankruptcy.

The independent financial status of the vocational schools/training centres does, however, raise some problems concerning the involvement of the social partners on the boards of these establishments. To what extent can they, as in other commercial ventures, be made personal responsible for losses incurred through mismanagement?

DI also looks favourably on the diversification of the financing of the vocational training system. Before it was the state that paid the full operational costs of the system, but now there is only a fixed sum available per participant (the so called "taximeter") and any additional costs will have to be provided via user payment – either from the individual participant or the company where he/she is employed. In the collective agreements on the labour market, funds have been set aside to pay for continuing vocational training in order to meet the demand for lifelong learning and to offset the decrease in state financing. This is a positive tendency, because it has increased the overall performance and efficiency of the system, as it is now more market driven.

It is difficult to say anything about the transferability across borders of formal IT qualifications acquired in the Danish system. In the field of IT, however there are many certifications of competences related to individual products from major providers of software (Microsoft, Cisco, SAP etc.) that are identical all over the world, and thus valid also in other national contexts.

Interview no. 2: The Danish Metal Workers' Union

"Dansk Metal" is the Danish Metal Workers' Union. It has currently app. 150,000 members; some 20,000 of which are employed in the IT-field. These members are mainly (but not exclusively) working with technical (hardware) issues, and the most frequent educational background is the data technician course (5 year initial vocational training course).

The IT-field is an extremely dynamic and volatile one, where concrete hardware and software skills may become obsolete more or less overnight. It is therefore necessary to have a very solid educational background in order to retain one's employability, and competences and skills must be kept updated at all times. New entrants on the labour market who have qualifications from one of the shorter initial vocational training courses – e.g. that of the IT-supporter – will have difficulties in finding a job. This course was created at a time when the IT-field was booming, and when there was a desperate need for labour. Now when employment prospects have become much less bright, a full data technician course is a much more attractive qualification. The IT-supporter course is therefore already more or less obsolete, even though it was only recently introduced. Data technicians will, in fact, set the agenda for training in the field. PM foresees that it will also be accepted as entry requirement for diploma-courses, even though it is not an academic course, since universities may admit participants to these on the basis of a test of real competences. Currently, some 800-1000 data technicians are trained per year, but as there are severe problems with finding adequate placements, this will drop to app. 300 per year when the possibility of doing an entirely school-based training course is abolished.

Unemployment is a serious problem among IT professionals. Losing one's job also means losing one's access to the on-the-job learning facilities, which are very important in this field. Moreover, due to the dynamism of the market, personal contacts and networks start eroding from Day One, and after only one month of unemployment, the prospects of getting a new job have deteriorated significantly. Unemployed IT professionals have access to vocational training courses, but the possibilities are in reality limited due to financial costs. Master and diploma studies are organised under the Act on Open Education and thus require user payment, and unemployed participants will have to cover these out of their own pocket.

Dansk Metal is heavily involved in the design and ongoing revision of initial vocational training courses through their participation in the trade committees at both local/regional and national level. Here they have a very close and productive co-operation with the employers (DI) with very few divergences. The trade union has taken the initiative for introducing new elements into IT-training courses – e.g. in the field of IP-telephony and data security. Currently, the contents of IT courses are updated every six months by the trade committees, with the Ministry of Education involved only as the provider of the very broad legal framework. This also

opens up for some local characteristics, but these must not be too pronounced as apprentices must be able to change school, if they so wish, without suffering setbacks in their course. A major new element in initial vocational training courses is the alignment with major industrial systems (Cisco, Microsoft, SAP, Oracle etc.). Initial vocational training courses in the IT-field will thus now offer instruction "up to the level of" products of large companies, and vocational schools will consequently have to qualify their teachers for this. This is an expensive process, and schools pay $^{1}/_{2}$ million DKK (approx. 70,000 euro) to send their teachers on courses to get the necessary qualifications. The costs involved mean that not all vocational schools are able to offer the courses, and currently nine schools in Denmark offer technical IT courses at initial vocational training level. Dansk Metal hopes that in time these schools will develop into IT competence centres, offering training to the most exacting international standards.

There are no formal possibilities for influencing courses at academic (university) level – this must happen informally, through lobbying. Dansk Metal are also organising short courses themselves for their members (mostly introductory courses), if they feel that the provision is not adequate.

Dansk Metal estimates that Danish IT courses will increase their market value in other countries now that they include the facilitation of the possibility for certification.

Interview no. 3: The Trade Union for Commercial and Clerical Workers (HK)

HK organises workers within trade and commerce in the broadest sense of these terms. Within the IT sector , HK accepts membership from anybody working administratively with IT or with software (development, adaptation, maintenance), regardless of educational background.

There are many of HK's members in the field of IT who are unemployed, and HK is generally pessimistic about the prospects for employment. Especially outsourcing to other countries means that many jobs are lost in Denmark. HK estimates that there are, at the present time, some 1500 persons with qualifications from short-cycle higher professional education within the IT field who are unemployed – primarily datamaticians and multimedia-designers. This unemployment, however, is often camouflaged in the figures that the schools put forward about employment prospects for their students. Especially people with qualifications from the multimedia-designer programme experience great difficulties in finding employment. According to HK, only 30% of the graduates from a given year find relevant employment, while 40% are unemployed. 40% drift away from the IT field into other trades and find employment here. This is interpreted by the schools as "70% in employment", and is used to "prove" that the programme is a success.

Generally, education does not count for much in the IT sector , where employers traditionally give more emphasis to actual skills and experience than exam papers. In this very dynamic sector a large part of skills acquisition happens on an ongoing basis on the job in a non-formal environment. When a person loses his or her job, skills very quickly become outdated. Certification in connection with industrial products is a very popular instrument and is seen as being of high value, but because of the elevated prices for the courses leading up to this, certification is in reality only possible for those who are in employment and whose employer has agreed to pay the costs. They are therefore not an option for unemployed, even though employment prospects afterwards are very positive. Currently, SAP-certification is a big hit with employers, but unemployed cannot get to these courses unless they are prepared to pay the costs out of their own pocket. The labour market authorities are not prepared to pay for such courses – in general, there is no money for CVT of jobless IT professionals. As a consequence, they very quickly lose their market value, and have to look for work in other sectors.

FH is rather sceptical about the provision of IT courses and programmes. Companies are in general not very good at offering placements and at formulating clearly the skills that they are looking for. They are not living up to their part of the responsibility for quality VET. In the case of IVET, the social partners have a large degree of influence over both contents and structure through their participation in local and national trade committees. To a certain degree this influence is an illusion, however, because the low taximeter grants from the state make it very difficult to raise the quality of the programmes and courses offered. In the case of higher education, it is the universities alone who decide about what to offer, and here financial calculations reign paramount – i.e. the focus is on attracting as many students as possible rather than covering the real needs of the labour market. This is a natural consequence of the fact that the institutions have now become private foundations, which control their own budgets. Some of the programmes in higher education in the IT field – especially those in short-cycle higher professional education – have very bad employment prospects. HK sees the new IT University more a "political trophy" than any real qualitative improvement of IT-programmes. The diploma and Master courses are not an option for the unemployed because of the high tuition fees, and are therefore primarily directed at those with an employer who is willing to foot the bill. The regular "Master of Science" programmes ("cand.it") of the university have not yet proven their worth on the labour market, and HK does not believe in any particular high degree of success for the graduates. It would have been better, according to HK, to increase the number of graduates in the traditional computer science programmes at the old universities, because these qualifications give nearly 100% guarantee of employment after graduation. But certain Stakeholders in the IT world, primarily employers, made a huge lobbying effort to get a proper IT University to underline the importance of the sector – hence the designation "a political trophy".

It is furthermore a problem that the possibilities for accreditation of prior learning (both formal and non-formal) are very bad, despite the rhetoric to the opposite effect. People with qualifications from short-cycle higher professional education programmes, who wish to upgrade their skills by taking a proper academic exam at Bachelor/diploma or Master level can only get very little of their previous educational background recognised, and must therefore remain longer in the programme than necessary. One exception from this is the Medialogy programme offered by Copenhagen Technical College in collaboration with the University of Aalborg. This short-cycle higher professional education may be converted into a regular bachelor-degree with relatively few supplementary courses.

HK has as a trade union tried to redress some of the imbalances in the educational system by establishing their own training centres – HK Modul Data – which offer courses to private as well as companies. Because of the very high costs of this, however, HK has since pulled out of this activity.

IInterview no. 4: Prosa

Prosa is the only trade union in Denmark dedicated exclusively to IT professionals. It was set up in 1967 and counts at present approx. 13,000 members; some 3,000 of which are students. All IT professionals, regardless of educational level, are eligible for membership. The most frequent educational background of Prosa members is the diploma course in advanced computer studies (datamatikeruddannelsen), a short-cycle higher education course of approx. 2 years' duration.

The employment prospects for IT professionals are currently at a low ebb. This is due to several factors. The collapse of the "IT-bubble" in 2001 had a negative effect on employment; but this is coupled with other trends, notably outsourcing, where IT-work is relocated elsewhere, and the general development in IT hardware and software, where many tasks that previously required professionals can now be handled by the users themselves. Another aggravating factor here is that the intake of students on IT courses in the late 90s and the first year of the millennium was exceedingly high, which has led to an overproduction of qualified labour in 2001 and onwards. The IT market is very volatile, however, and a competent labour force is likely to become a bottleneck in the not too distant future, as recruitment of people on e.g. the diploma course for advanced computer studies has dropped dramatically.

The IT field is a very dynamic one, and competencies have to be renewed constantly in order to keep abreast of developments and retain employability. Much of the skill acquisition happens on the job, and people who lose their jobs are therefore also very quickly losing their attractiveness on the labour market. Prosa is trying to help unemployed members keep their competence level intact by negotiating with educational establishments (both private and public) in order to secure relevant training opportunities for this group. Private course providers are as a rule very

expensive, however, and are in reality only an option for people in employment whose employers are willing to cover the costs. Within the public system, the possibilities are very limited too, as the labour market authorities are very unwilling to finance education and training, especially since a change in politics introduced by the liberal/conservative government has made it a requirement that costs for activation and education/training activities respectively must be balanced equally. As activation placements are difficult to find, education and training activities are curbed correspondingly, even though there is a great need for these. Diploma and Master courses are carried out under the act of open education, which means that they must be economically viable for the educational establishment offering them. They are thus practically impossible for the unemployed to access due to the prohibitive level of user payment required. Prosa is actively trying to address this problem by offering short courses for their members, but these are mainly brief introduction courses held over a weekend, and cannot seriously redress the situation.

Apart from the problem of *accessibility*, Prosa sees a major problem in the *provision* of vocational education and training in the IT field. Skills requirements are generally moving upwards, as systems get more and more complex. There is a need for raising the overall competence level of those entering the labour market. Currently, the diploma course in advanced computer studies is the main dedicated IT course. This short-cycle higher education course was introduced in the mid-80s where it replaced the so called "EDP Assistant", an initial vocational training course which had so far been the main qualification for people entering the IT field. Now the diploma course in advanced computer studies is in danger of becoming obsolete itself, as it is no longer capable of providing competences, which can match the complexity of the IT-systems now in operation. Prosa sees a need to upgrade this and create a self-contained IT Bachelor degree, which can become the benchmark entrance level for the IT labour market. Such an opportunity does not presently exist – "traditional" Bachelor degrees at the universities are almost exclusively meant as a basis for further studies, and do not provide the practical competences needed on the labour market. The diploma engineer courses, on the other hand, are too technically oriented, and do not provide the general competences, which are also necessary. There is thus a need for rethinking both structure and contents, and Prosa is lobbying hard for this Bachelor degree for IT professionals. They have no direct influence on decision-making processes, however, neither at the level of initial vocational training or in higher education. They see a very serious problem in the way education and training is becoming increasingly market driven. This line of thinking is usually quite short-sighted, as it inevitably leads to a focus on short-term profits rather than long-term skills requirements.

Prosa has not collected any systematic information on the transferability across borders of IT qualifications acquired in the Danish system. It is at any rate not a big issue on the very dynamic IT labour market, where many operate with no for-

mal competences whatsoever. The trade operates with internationally recognised certifications, however, that are linked to specific products (Oracle, SAP, Microsoft etc.).

Interview no. 5: The Danish Ministry of Education

The interview was conducted with the General Inspector of education in charge of the development of educational programmes at the so called "academies of higher professional education", which represent a new feature of the Danish educational landscape. The academies offer short-cycle higher professional education, principally for people with qualifications from initial vocational training.

Short-cycle higher professional education – i.e. courses of typically 2 years' duration – has been offered at many vocational schools (technical and commercial colleges) for many years. Until the turn of the millennium, however, the range of courses offered was very dispersed, both in terms of geography and contents. Many schools offered only one or two courses, and were thus in no position to create a viable study environment. Moreover, many of the courses had a narrow focus, and were tied to the initial vocational training courses, which formed the main *raison d'être* for the particular institution at which they were taught. This meant that it was difficult to create "cross-over" courses – i.e. courses that combined elements from e.g. commercial and technical subjects, particularly in the field of IT.

In connection with the reform of short-cycle higher education instigated by the government in the year 2000, the concept of the "academy of higher professional education" was adopted as a key element. Short-cycle higher education itself was reorganised to conform to the principle of lifelong learning and split in two modes: short-cycle higher professional education (KVU), which is full-time and overwhelmingly school-based and targets young people upon completion of secondary education/training; and adult short-cycle higher education (VVU), which is organised on a part-time basis and has a target group of people already in employment. A council of academies of higher professional education *("Erhvervsakademirådet")* consisting of national-level representatives of the social partners was entrusted with the task of defining the precise needs for professional education at this level to ensure consistency with the needs of the market. Education and training strategies were linked to strategies of regional development, and vocational schools were strongly encouraged to combine their efforts in the field of short-cycle higher education and form academies of higher professional education that could create strong study environments and function as knowledge centres for business and enterprise at regional level.

The creation of the specific academies of higher professional education did not happen as a result of legislation, but took place on the basis of initiatives taken at regional level by the main stakeholders (i.e. the schools). There was, however, a strong financial encouragement from the ministry in the shape of development

grants that could help finance the establishment of the academies. The ministry stipulated that the academies should be broadly based and comprise a variety of actors: technical colleges, commercial colleges, agricultural colleges, training centres etc. There are at present 13 academies in Denmark, which between them offer 17 short-cycle higher education courses and 10 adult short-cycle higher education courses. Many of the courses have very prominent IT components, and several focus directly on this:

Short-cycle higher education: datamatics, IT and electronics engineering, multimedia design and communication

Adult short cycle higher education: information technology

For a full list of academies and courses offered, see www.erhvervsakademierne.dk/.

The academies are established as a partnership between several educational establishments within a region. In some cases, the academy is physically located on the premises of these institutions, but in most cases the academy has a separate location away from these. The day-to-day economy is based on regular per capita grants from the government for short-cycle higher education courses, and a combination of government grants and payments from participants for adult short-cycle higher education courses.

The academies can only offer courses from the list of the 17+10 courses that have been recognised by the Ministry of Education, but have the possibility of slightly varying contents to suit regional requirements (e.g. in the choice of course literature, cases etc.). These variations must not be so pronounced as to constitute a difficulty for students wishing to switch academy in the middle of a course, however. New courses are constantly developed, and the initiative for this may very well come from an individual academy, as well as from the council for academies of short-cycle higher education or the Ministry of Education. If the proposal responds to a defined need, it is sent to all stakeholders for a hearing, and in the event of a positive reception, the ministry will prepare an executive order. After this, a detailed curriculum will be drawn up by the schools.

The academies are the main providers of qualifications at higher education level to private enterprise, and they thus play a key role in the government's ambition that 50% of the workforce should possess qualifications at this level. Despite the short time they have been in existence, they have established themselves as a significant element in Danish education and training policy and practice.

Interview no. 6: The Danish IT-University

The IT University of Copenhagen was set up in 1999 as Denmark's 12th university. It is a specialised institution entirely dedicated to IT and IT-related subjects, and offers nothing else. It is housed in custom-built premises centrally located in Copenhagen. It offers full-time IT-programmes at MSc (Candidate) and Ph.D.-level, as well as Masters and diploma programmes. Currently (2004) a total of some 1400 students are enrolled.

The basic logic behind the establishment of the university is the realisation that a massive investment in high-level qualifications in the IT field is needed in order to preserve employment in Denmark. Besides an added job security for the individual, research has shown that persons with high-level qualifications ensure added growth and thus create jobs for people at lower levels.

The IT University represents a new departure in other ways than being a specialised institution. The courses that are offered differ from what is available at the computer science departments of the other universities, and are above all characterised by being more "open", allowing access to people with non-IT backgrounds. Out of a catalogue of some 70 modules, 40 represent combinations of IT with other areas (project management, legal issues etc.) or are sufficiently basic to be accessible to non-specialists. The entry requirement for enrolment at the university is a completed Bachelor degree, but not necessarily in the field of IT (for diploma/Master programmes, a minimum of two years of practical experience is furthermore required). At present, approx. half of the enrolled students at diploma-level have qualifications from short-cycle higher professional education, whereas the other half possess a Bachelor degree. In the future, the university will allow entry to people without any formal qualifications, on the basis of a test of real competences. This will reflect the situation on the current IT labour market better, since many employees here do not have any formal qualifications.

The main bulk of the students are at the Master of Science programme level; i.e. full-time Candidate students. This group accounts for 197 of a total of 234 students admitted to the university in the spring semester 2005. Of the remaining students, 24 were enrolled at diploma level, and 13 at Master level. Programmes at the IT University are modularised, and students compose their own trajectories by choosing from the 70 modules on the course list. Due to the relatively low number of students, a viable solution is to let diploma/Master students and full-time Candidate students attend the same modules. Because of this, it is possible to offer a full range of modules and avoid cancellations. The fact that full-time students and the Master/diploma students are attending the same modules/classes in fact works out as an advantage, since it ensures an admixture of mature students with professional work experience. On the whole, however, there is little age difference between Master/diploma students and full-time candidate students, and many full-time students have prior work experience or are working on IT-projects in their spare time.

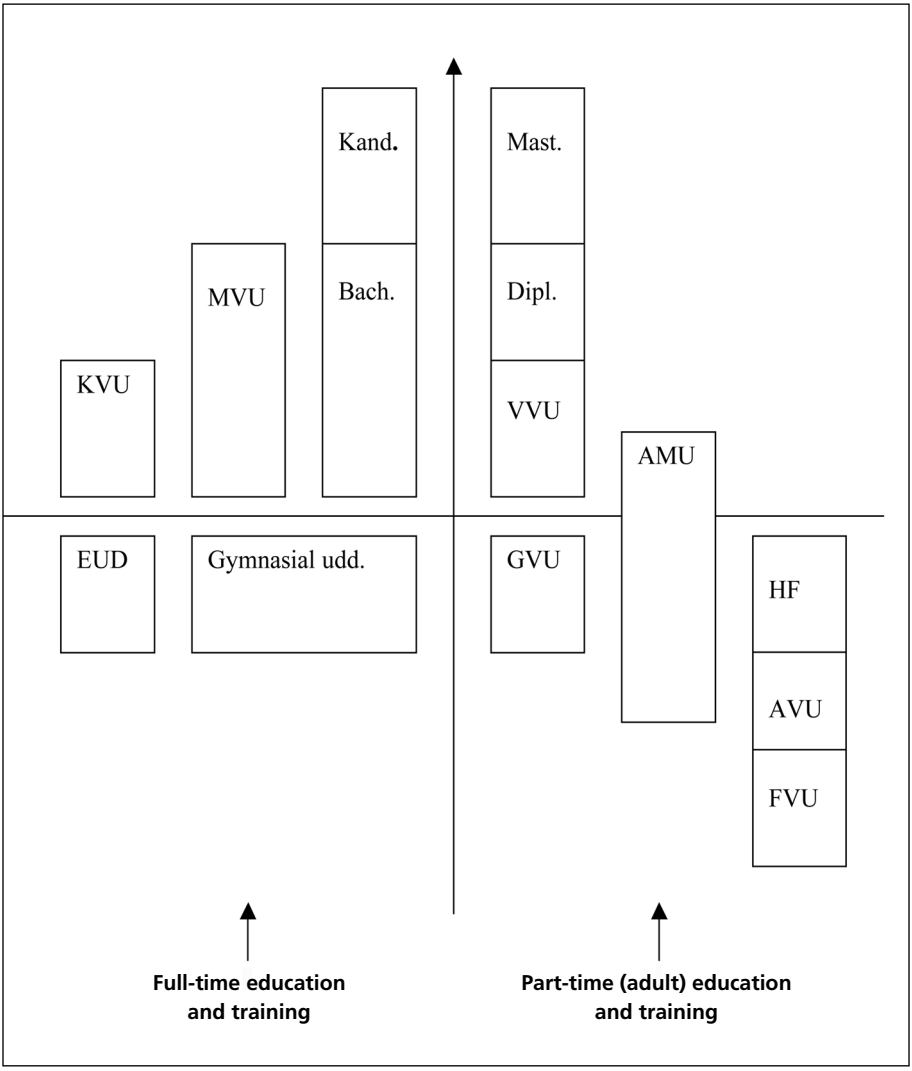
In addition to those enrolled as proper students on a programme, people may also take individual modules without going for a full degree from the beginning. Many (app. 150-200 per semester) are availing themselves of this opportunity as part of their continuing vocational training.

According to an extensive survey carried out among students in the autumn 2004, students – both full-time and Master/diploma students – are overwhelmingly satisfied with the university; both in terms of facilities and learning outcome. A survey among full-time students on the MSc programme (Candidate students) moreover showed that 88% were in employment within one year of graduation. This was the case both for those who had chosen "harder", more technologically oriented modules, and those who had chosen "softer" ones. The university is sovereign in taking decisions on what modules/courses to offer, but has been assisted by an advisory panel, which consisted of 25 persons representing mainly employers. It also has conducted an annual survey of IT-skills needs among Danish employees. This is done together with the Danish Technological Institute under the project name the "IT-Radar".

The university also sets price-levels for the programmes and modules offered under the Act on Open Education (i.e. diploma and Master courses), but is required by law not to offer unfair competition to private course providers. In general, this is not perceived as a problem, since the university offers programmes and modules that are not offered by others. Prices are not seen as high by companies, but participants have to put in a substantial amount of self-directed work in order to pursue their studies, and in this way they may be called "expensive". Some unemployed are using the IT University, mainly on individual modules. These participants get their tuition fee covered by the labour market authorities as part of their personal action plans for employment. A few unemployed have been allowed to follow full Master programme as part of a rehabilitation scheme.

Annex 3:

Graphic presentation of the "dual track" Danish education and training system[30]



30 Adapted from "Taxametersystemet for de videregående uddannelser", København (UVM), 2001

Abbreviations used:

EUD: Initial vocational education and training (apprenticeship)
Gymnasial udd.: Secondary level general education ("Abitur")
KVU: Short-cycle higher education
MVU: Medium cycle higher education
Bac.: Bachelor degree
Cand.: Full-time Master-degree ("kandidat")
Mast.: Master degree (part-time)
Dipl.: Diploma degree (part-time)
VVU: Part-time short-cycle higher professional education (Videregående Voksen Uddannelse)
GVU: Adult initial vocational education and training (Grundlæggende Voksen Uddannelse)
AMU: Adult vocational training (ArbejdsMarkedsUddannelser)
HF: Secondary education (Højere Forberedelseseksamen)
AVU: Adult general education at 9th/10th grade level (Almen VoksenUddannelse)
FVU: Adult general education (Forberedende VoksenUddannelse)

IT continuing training and networking with higher education in the Netherlands[1]

Dietmar Frommberger

1 The present paper is based on a final report on initial and continuing vocational education and training in the Netherlands commissioned by the Federal Institute for Vocational Education and Training. Reasons of space unfortunately mean that no reference can be made to the report's extensive annex.

Introduction

In conceptual and strategic terms, the newly created German IT continuing training system is integrated into a cross border specialist structure and aims to achieve international connectivity in respect of the competences which are acquired. A sensible approach, therefore, is to supplement any analysis of successes and problems relating to the strategic and practical implementation of new continuing training and qualifications structures within the IT sector in Germany with an internationally based comparison in the form of a consideration of the situation in selected European countries. The concepts and experience emanating from the neighbouring country of the Netherlands, where a positive view is taken of reform and innovation, can represent a valuable contribution in this connection, and this forms the initial assumption of the present study. Figure 1 depicts the thematic areas and issues of the Netherlands country study.

Figure 1: **Thematic areas and issues of the Netherlands country study**

No.	Thematic areas and issues	Relevant section within the present study
1.	Basic features of initial and continuing vocational education and training in the Netherlands	Section 2
2.	Provision and structure of initial and continuing IT vocational education and training in the Netherlands: • Which publicly regulated initial and continuing IT vocational education and training profiles provide the basis for training and accreditation? • How are the initial and continuing IT vocational education and training profiles configured and structured in didactic and curricular terms? • How are the initial and continuing IT vocational education and training profiles integrated in terms of regulatory policy? • Which institutions / social stakeholders / branches are responsible for the development, realignment and updating of the initial and continuing IT vocational education and training profiles? • Which institutions / social stakeholders / branches are responsible for the awarding of qualifications and certificates?	Sections 3 + 4
3.	Linking of initial and continuing IT vocational education and training to upstream and downstream educational sectors • How is IT training linked to the general educational system? • How is a link created between initial and continuing IT vocational education and training and the higher education system • To which extent and in which form does accreditation of training achievements take place within the higher education sector?	Section 5

The acquisition of data in respect of the programmatic level of regulated initial and continuing IT vocational education and training in the Netherlands is based on Internet research, expert interviews, documentary analysis and primary and secondary sources. The author's relevant experiences and preliminary work provide a further basis for the present remarks.

Alongside the descriptive results in respect of the country study, comparative conclusions both in respect of the situation in Germany and with a view to European developments in VET and the qualification of IT skilled workers will be provided. Figure 2 depicts the specific issues and comparative aspects of the Netherlands country study.

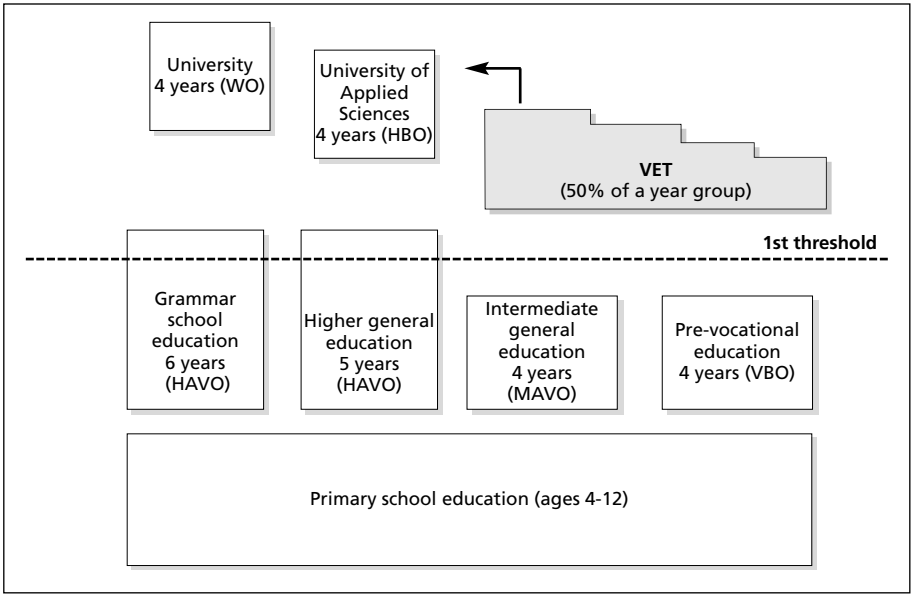
Figure 2: **Specific issues and comparative aspects of the Netherlands country study**

No.	Specific issues and comparative aspects	Relevant section within the present study
1.	In which form does coordination take place between typical IT industry certificates (Cisco, Microsoft, Oracle etc.) nationwide provision of initial and continuing IT vocational education and training profiles under public law?	Section 6
2.	What is the quantitative significance of the IT continuing training system regulated under public law? What is the vocational qualification value and "labour market value" of qualifications and certificates regulated under public law?	Section 6
3.	In accordance with which didactic principles should initial and continuing IT vocational education and training take place? What is the role of work process orientation?	Section 6
4.	How is the acquisition of knowledge and skills determined? Which forms of examination and evaluation are practised?	Section 6
6.	To which European and international standards does the initial and continuing IT vocational education and training system correspond?	Section 6
7.	In which areas are there notable convergences and divergences compared to IT continuing training in Germany? In which areas can major conclusions be drawn in respect of the German IT continuing training system?	Section 7

1. Principle features of initial and continuing vocational education and training in the Netherlands

In the Netherlands, around 50 percent of young adults within a year group decide to embark upon a course of initial vocational education and training at the first threshold[2] (cf. Figure 3). The other half of the year group pursue further general education with the aim of achieving entry to a University of Applied Sciences or a general higher education entrance qualification. In contrast to the prevailing situation in Germany, only very few young people who obtain an upper secondary school leaving certificate decide subsequently to move onto vocational education and training. Young people in the Netherlands who succeed in acquiring a general higher education entrance qualification in the course of their general schooling either progress to the differentiated system of institutes of higher education and universities or go on to in-company trainee schemes.[3]

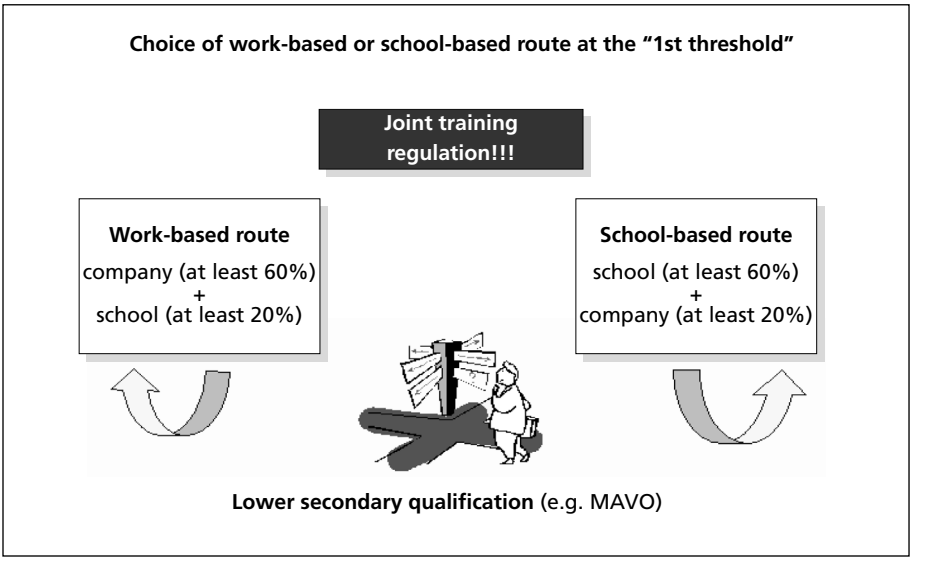
Figure 3: **Transition to vocational education and training at the "first threshold" in the Netherlands** (own representation)



2 In labour market and VET research terms, the "first threshold" is the point marking the time when young adults make a career choice having attended general lower secondary education and completed their period of compulsory schooling. At the age of about 16, school leavers make a choice whether to embark upon vocational or vocationally related training or to pursue further education. The "second threshold" denotes the transition of young people who have completed training into the employment system in a full-time or part-time capacity or their progression to the higher education system or to other voluntary and less voluntary walks of life.

3 The fact that a large number of those obtaining the upper secondary school leaving certificate in Germany initially go on to complete a course of initial vocational education and training, especially

Figure 4: **Equivalence of the work-based and school-based route at the "first threshold"** (own representation)



Since the mid-seventies, reform of vocational education and training in the Netherlands has explicitly taken place under the guiding principle of coordination and cooperation between the various school-based and company initial and continuing vocational education and training areas and institutions. Some of the aspects which have been highlighted by a range of commissions calling for the restructuring and fundamental modernisation of the VET sector are as follows (cf. Rapport van de Adviescommissie inzake het industriebeleid 1984; Rauwenhoff-Commissie: Onderwijs-arbeitsmarkt: naar een werkzaam traject 1990; Commissie Dualisering: Beroepsvorming langs vele wegen 1993; for detailed information: FROMMBERGER 1999).

- the promotion, standardisation and coordination of in-company initial and continuing VET measures (practical placements) within the scope of school-based vocational education and training;

Continuation note 3:
within the dual in-company and school-based system, is an exception in European terms. Practice in other European countries tends to view as unusual the fact that a high number of young adults complete upper secondary education twice, in order to obtain successively a higher education entrance qualification and a vocational qualification. In formal terms, those attending grammar school in Germany who complete a course of initial vocational education and training subsequent to acquiring their upper secondary school leaving certificate, German skilled workers, skilled employees and journeymen complete upper secondary education twice. This requires five to six years. In other European countries, now also including Austria and Switzerland, the massive demand for both qualifications is met by nationwide provision of double qualifications courses. This enables young adults to obtain a vocational qualification and acquire entry entitlement to higher education at the same time within a time frame of three to four years, a course which a considerable and growing number of young people are pursuing. Further reference will be made to this aspect below.

- the reactivation and further development of VET schemes provided by the employment offices and the integration of these into a comprehensive and vocationally oriented adult education system;
- the consolidation of the scattered VET centres to form larger units, later to become the ROC's ("Regionaal Opleidings Centra"). The aim of the consolidation or coordination of the various vocational training measures (part-time, full-time, continuing training, initial VET in both dual and school-based form) was to enhance both the differentiation and permeability of training provision and improve coordination between initial and continuing vocational education and training;
- the promotion of the coordination between in-company and school-based components of initial and continuing vocational education and training, so-called "dualisering", accompanied by ongoing joint responsibility for VET qualifications on the part of the social partners.

The endeavours towards modernisation with a view to restructuring vocational education and training ultimately resulted in the Adult Education and Vocational Training Act (Wet Educatie en Beroepsonderwijs, WEB), which came into force in 1997. This law covers the two areas of general adult education and non-academic vocational education and training. The aim is for this to be used as a basis for the achievement nationally of a high level of standardisation, transparency and comparability between VET pathways and qualifications. The new law abolishes the division into school-based and work-based/dual vocational education and training, which had had its roots in historical developments and had become established in law. The main aim of the WEB is the coordination of training and adult education provision (cf. Ministerie van Onderwijs Cultuur en Wetenschappen 1996).

The main feature of the new act is the introduction of a nationwide qualifications structure relating to the organisation, coordination and management of initial and continuing VET and adult education provision in the Netherlands. The full-time, school-based and work-based, dual-based VET variations, which were once regulated separately, are organised on the basis of a joint qualifications structure. School-based vocational training and vocational school institutions are consolidated within regional training centres (ROC's). There is a significant rise in the level of responsibility accorded to the national, branch related social partner organisations for both school based and work-based vocational education and training, these organisations since having been involved in the development of national standards and curricula for work-based and school-based qualifications in conjunction with the state ROC's.

Vocational education and training takes place on the basis of nationally standardised initial and continuing VET profiles developed by national branch organisations ...

In a similar way to in Germany, vocational education and training in the Netherlands takes place on the basis of nationally standardised initial and continuing VET

profiles (such as "Commercieel Medewerker Banken", "Commercieel Medewerker Binnendienst", "Verkoop Medewerker", "Netwerkbeheerder" etc., see further remarks relating to the IT sector). Initial and continuing VET profiles in the Netherlands are broad-based, cross-company and cross-functional "initial or continuing training occupation profiles", based on a standardised national initial or continuing training ordinance comprising the knowledge and skills deemed necessary and appropriate for learners to acquire within the scope of their course of initial or continuing VET in order subsequently to be able to take up employment as a salaried employee, skilled worker, journeyman or woman, master craftsman or woman etc. with the greatest possible level of success.

In the Netherlands, approximately 500 initial or continuing training occupation profiles are available nationally, these being used as the basis for the preparation for the specialised forms of subsequent employment within the various branches and sectors. This represents a relatively low number in comparison to the situation prevailing in Germany, where, alongside the approximately 350 initial VET variations pursuant to the Vocational Training Act and Crafts and Trades Regulation Code, there is provision for a multitude of school-based and non school-based advanced training opportunities as well as for a large number of full-time, school-based vocational qualifications training variations also enjoying national recognition which are based on federal state law administrative regulations.

In the Netherlands, on the other hand, school-based and work-based provision of initial and continuing vocational education and training is contained within a national "qualifications structure" based on the WEB. In other words, all forms of vocational education in the Netherlands, which are subject to a greater or lesser extent of state support and regulation, relate to a nationally based qualifications structure encompassing both initial and continuing VET, allowing provision which is predominantly school-based or which is mainly work-based and integrating both into the same structure whilst according the two forms equivalence.

The initial or continuing training occupation profiles ("beroepsprofile") are developed within various sectors or branches in conjunction with the social partners and the state representatives of vocational schools. The IT initial and continuing vocational training area is covered by the national organisation LoketMBOIct. This forms part of a series of national organisations[4] with a remit for the development of respective initial or continuing training occupation profiles and which conducts research and development work. In addition to this, the national branch organisations are responsible for the monitoring of the quality of work-based training. Companies wishing to provide initial and continuing VET require authorisation, this being awarded by the branch institutions on the basis of certain quality criteria.

4 The national branch organisations previously bore the title of "Landelijke Organen Beroepsonderwijs" (LOB). Recently, however, these institutions have been known as "kenniscentra beroepsonderwijs bedrijfsleven" (KBB) in the Netherlands. The national umbrella organisation of the various branch institutions is called COLO ("Vereniging kenniscentra beroepsonderwijs bedrijfsleven").

The basis for the national provision of initial and continuing VET courses is the national branch organisations. Each national branch organisation has developed a qualifications framework collating and coordinating the various initial and continuing vocational education profiles from the respective sector.

VET provision within the scope of the national qualifications structure comprises systematically interrelated horizontal and vertical dimensions ...

Figure 5 depicts the regulated VET training courses for a selected branch. These are aligned to various fields of occupation ("horizontal dimension" of the qualifications structure). Alongside this, the VET training courses are also allocated to four different performance levels or stages ("vertical dimension" of the qualifications structure).[5]

Young people embarking upon vocational education and training are thus accorded the opportunity of making a choice in relation to a performance level as well as being able to decide on various vocational directions. Level 1 mainly serves as a VET entry level for those who have either achieved a poor school leaving qualification or else failed to obtain one at all, are disadvantaged socially, in terms of the market or learning and thus start out from a relatively unfavourable position. The system also provides for direct entry to the various courses at levels 2, 3 and 4, although level 4 stipulates higher entry requirements (in terms of qualifications obtained at upper secondary level) than levels 2 and 3.

After having successfully completed VET at one level, students are also able to move up to the next highest level within the qualifications structure, ideally pursuing their own educational pathway by progressing from level 1 to level 4. Progress within the various fields of occupation typically involves the pursuit of typical pathways rather than being arbitrary, however.

Vertical transitions within the qualifications structures are supported by the fact that systematic accreditation can be awarded for training performances and qualifications which have already been achieved. Students successfully completing a course of continuing training at level 3 can receive credit for those learning units which may have been passed within the scope of training at level 2. Partial qualifications obtained in the course of a horizontal transition (retraining) can also be accorded recognition. This credit transfer system avoids redundant time and content within learning progress and promotes advancement and vocational reorientation. The system is based on the opportunity to acquire separate qualifications and certificates for the learning units which have been completed. Chapter 4 will provide a depiction of the composition of the IT initial and continuing training

5 Figure 5, which is taken from a source dating from 2002, also encompasses the ICT occupational field. Initial or continuing training occupation profiles which are predominantly commercial in nature and those profiles which mainly feature technical aspects have now been coordinated and consolidated into a joint qualifications structure (cf. the following remarks).

Figure 5: **Horizontal and vertical dimension of the Dutch national qualifications structure using a selected branch as an example**[6]

	Fields of occupation							
	Secretarieel	Commercieel	Logistiek	Automatisering ICT	Juridisch	Informatie-Dienst-verleniging	Beveiliging	Bedrijfs-administratief
Level	**Final qualifications (initial and continuing training occupations)**							
IV	– Directie-secretaresse/Management Assistent	– Commercieel Medewerker Marketing & Communicatie – Commercieel Medewerker Bank- en Verzekeringswezen	– Medewerker Logistiek Management – Fysieke Distributie – Medewerker Logistiek Management – Material Management	– Applicatie-Ontwikkelaar(s) – Applicatiebeheerder – Netwerkbeheerder(s) – ICT-beheerder(s)	– Sociaal Juridisch Medewerker – Sociale Zekerheid – Sociaal Juridisch Medewerker Arbeids-voorziening/personeelswerk – Administratief Juridisch Medewerker	– Medewerker Informatiedienst – verlening bibliotheken – Assistent bedrijfsarchivaris – documentaire informatieverzorger overheid en semioverheid		– Administrateur
III	– Secretaresse	– Commercieel Medewerker Binnendienst	– Logistiek Medewerker – Fysieke Distributie – Logistiek Medewerker – Material Management	– Medewerker Beheer ICT			– Coordinator beveiliging	– Boekhoudkundig Medewerker
II	– Secretarieel Medewerker	– Commercieel Administratief Medewerker		Service Medewerker ICT			– Beveiliger – Medewerker vre-de en veiligheid	– Bedrijfs-administratief Medewerker
I	– Administratief Medewerker						– Assistent orde en veiligheid – particulier onderzoeker – Toezichthouder	

6 Depiction based on: Netwerkbeheerder: Eindtermen vanaf 2003/2004, published by LOB ECABO, Amersfoort 2002.

courses in terms of content. This will make it clear that certain learning units form components of various vocational directions, enabling both horizontal and vertical transitions to be made whilst adhering to the principle that learning areas which have already been completed do not need to be repeated.

This "vertical" dimension of the qualifications structure is based on various requirements and training levels within the vocational directions which are curricularly stipulated. Categorisation of the respective vocational directions takes place with reference to the assumed future occupational requirements, these being differentiated on the basis of criteria of "complexity", "responsibility" and "transfer". In order to increase the level of European mobility and recognition of the qualifications, the vertical dimension makes explicit reference to European regulation pursuant to Article 2 Paragraph 2 of the Council Directive 85/368/EEC (cf. WESTERHUIS 2001). Level I serves as an "entry corridor" to vocational training measures, especially in respect of participants who have not achieved a school leaving certificate, level IV representing a higher level of specialist vocational training which is also combined with entry entitlement to higher education (double qualification, cf. the following remarks). Levels II and III cover typical, vocationally related initial courses of education and training. Qualifications at levels I to IV always provide vocational qualifications, thus equipping the students who complete them with a basis for submitting applications on the labour market. Depending on the vocational direction and level, the initial or continuing vocational education and training lasts between six months and four years and may be completed on a part-time or full-time basis. The objective of the vertical differentiation is a genuinely vocational aim within the meaning of the German understanding of the term and features both flexibility in terms of time and a high level of "upwards" permeability, pursuing the creation of solutions which are tailored to the greatest possible extent to specific target groups within the VET system by means of the establishment of specific "corridors". Thus one of the aims of the introduction of level I is to offer young people who have not embarked upon a course of vocational training upon completion of their compulsory schooling, or have left school without gaining a leaving certificate, clear provision for the resumption of formalised learning in terms of time and content. Level IV, on the other hand, is targeted at young people and young adults in possession of higher specialist vocational qualification and who wish to acquire an option for transition to the higher education system. To this extent, this educational provision, which from a German point of view would be characterised as "upgrading training" is seamlessly integrated into this qualifications structure (cf. FROMMBERGER / REINISCH 2004).

In general terms, all training variations at the individual levels are also accessible for adults wishing to acquire an initial VET qualification or a continuing vocational qualification at a higher level (vertical) or who are seeking to move into another branch profile. From a German point of view, the Dutch qualifications structure thus comprises the separate areas of initial training, advanced training and retraining. This means that each of the approximately 500 profiles currently

available can be a training, advanced training or retraining occupation, the characterisation of the individual profiles in this sense relating exclusively to the respective learners and their learning and educational biographies rather than being based on any "objective" consideration of the curricular and legal features of the profiles.

The initial and continuing vocational education and training profiles consist of "independent" partial qualifications which may be completed, passed and certified separately ...

Initial and continuing vocational education and training profiles in the Netherlands consist of learning elements ("partial qualifications") which refer to a complex, vocationally related action and functional field and represent "independent" modules of one or more VET directions. Successive acquisition of these partial qualifications results in overall qualification, this process also being followed by an overall final examination. A reorganisation of training regulations and curricula is currently ongoing in the Netherlands, these being realigned towards "competence orientation". Within the scope of these endeavours to achieve modernisation, the field of IT initial and continuing vocational education and training represents a model example. Within the further scope of the present country study, clarification will be required in respect of which new didactic and curricular features characterise the "competence oriented" organisation of vocational education and training in the Netherlands.

Vocational education and training in vocational schools and in companies providing training takes place on the basis of a joint training principle ...

A central feature of vocational education and training in the Netherlands is that the forms of vocationally related learning offered in vocational schools and in companies providing training are in principle equivalent and are based on joint training or advanced training regulations. Entry to vocational education and training or switching between the various directions and levels takes place within VET forms which are either predominantly work-based or mainly school-based.

This means that pupils completing lower secondary education and reaching the first threshold need to determine whether they wish to learn preponderantly within a company providing training or mainly in a vocational school as well as deciding on a VET direction and level. Although prevailing regional, structural or economic conditions mean that provision of work-based initial and continuing vocational education and training is limited, school-based provision covers the VET variations, ensuring that, in principle, everyone has the opportunity to pursue his or her chosen occupation.

Learning areas within the various VET directions can thus be pursued and completed in companies or vocational schools. The principle is based on alternating variations, only the proportions of school-based or work-based VET and qualification

varying. At least 20 percent of training components within a work-based route must be thus acquired at vocational schools. Situations can, however, also arise, such as in cases where a vocational direction features a high proportion of theoretical knowledge, where 40 to 50 percent (up to a maximum level of 60 percent) of training is acquired in schools. As far as the school-based route is concerned, at least 20 percent of training components must be completed within a work-based environment (mostly within the scope of placements, or so-called "stages"). Here too, however, the proportion of work-based elements may be higher, again up to a maximum level of 60 percent.

The equivalence between school-based and work-based VET opens up an increased level of flexibility between supply and demand within vocational education and training. In areas where an insufficient number of companies is available to satisfy demand, learners are also able to avail themselves of school-based variations providing an equivalent vocational and continuative qualification.[7] This structure is also linked to an alternative view of learning. Companies can and should depart from the idea of providing exclusively "practical" learning, the same applying to schools in respect of "theoretical" learning. Completion of the learning units stipulated within the initial and continuing training guidelines and the achievement of vocational education and training objectives are far more significant. The combination of work-based and school-based proportions and forms of learning is variable, one reason for this being that optimum training within the various vocational directions and levels is mostly achieved on the basis of varying proportions of work-based and school-based elements.

Regional training centres as the main entity for the organisation and realisation of vocational education and training in the Netherlands ...

The above remarks have already made clear that, compared with the situation in Germany, vocational schools in the Netherlands fulfil a different function with the vocational education and training system. The "Regionalen Opleidingen Centra" (ROC) constitute relatively large, amalgamated schools representing the main providers of the various forms of initial and continuing vocational education and training, retraining, updating qualifications and adult education within a region. In the Netherlands, there is a total of 40 ROC's training and qualifying a total of 15,000 (!) students.

In the Netherlands, the central role played by vocational schools comes into force as early as the first threshold. It is usual for young adults to go to the ROC in order to find out about available training provision in the region. Vocational guidance

7 In contrast to Germany, greater professional value is attached to a school-based vocational qualification in the Netherlands, meaning those acquiring a school-based qualification enjoy better prospects in terms of subsequently securing permanent employment, although there is now a wide difference in practice in this area within the various branches and companies. More information needs to be gathered for the IT sector.

thus constitutes a major task of vocational schools. In addition to this, the ROC's are also the central providers of continuing vocational training, upgrading training and of measures relating to refresher training. Within the scope of so-called "contract activiteiten", the ROC's are able to offer attractive qualifications provision to local companies, thus enabling additional income to be generated alongside state funding. The "contract activiteiten" also facilitate close exchange of content between the schools and the companies, and this impacts upon the quality of conventional areas of provision of initial and continuing vocational education and training.[8]

A central role is allocated to the vocational schools in the area of the evaluation of training results. A major part of the initial and continuing VET results achieved within the schools and companies are examined and marked by teachers at the vocational schools. Although the ROC is the central examining and certification authority, a large proportion of the examination results it assesses and certifies are evaluated by external bodies in the form of state authorised inspection agencies. Examination forms, on the other hand, are extremely multifarious in nature, ranging from typical multiple-choice exercises to simulated work tasks or observations conducted within the context of in-company, order related activities.

Funding of vocational education and training ...

In the Netherlands, the state is traditionally responsible for the area of initial vocational education and training. The same applies to continuing training, insofar as this is provided within the national qualifications structures (see above). As a result, the state has also provided funding for VET from taxes. In the meantime, as outlined above, companies have also assumed part of the responsibility for and area of competence relating to vocational education and training. They operate as training and learning venues, thus assuming the costs for such parts of VET which, according to the Dutch Vocational Training Act (WEB), take place in the companies.[9] Alongside state and company funding, learners also assume part of the direct and indirect costs relating to vocational education and training and qualifications. Assumption of costs via these "three pillars of financing" (state, companies, indi-

8 Qualification measures within the framework of the "contract activiteiten" also partly relate to the early recognition of typical and necessary qualifications components which may then, as the case may be, form a systematic component of and be integrated into the initial and continuing vocational education and training profiles.

9 Looking abroad makes it clear that the prevailing situation in Germany, where the fact that companies participate in initial vocational education and training means that they bear a large proportion of real costs, represents somewhat of an exception in terms of European comparison. In all other countries, the consequence of the relatively low level of participation on the part of the companies is that proportion of VET costs funded by the state is much higher. Set against this, the benefits gained by companies in Germany as a result of in-company training are comparatively high.
The debate centring on the costs and benefits of vocational education and training and qualifications is moving away from the comparative view and taking on a new perspective. The educational policy debate, which until recently centred on the issue of training place levies, would also have been far more differentiated in nature had due regard been paid to developments abroad.

viduals) is, however, subject to detailed funding mechanisms. A differentiation is made between the funding of initial vocational education and training (Initieel Beroepsonderwijs), financing for continuing training for those in employment (Scholing voor werkenden) and the funding of initial and continuing VET and retraining for the unemployed (Scholing voor werkzoekenden). The aim of the following is to provide a brief outline of the most important funding mechanisms relating to initial vocational education and training and continuing training for those in employment (for more detail, cf. ROMIJN 2000).

As described in more detail above, initial VET takes place in the vocational schools and in companies providing training, whereby young adults pursue either the school or work-based variation. Both variations consist, more or less, of both school and work-based training requirements. The work-based training element is largely financed on an individual company basis, although the introduction of the new Vocational Training Act in 1996 has afforded companies the opportunity of setting off training costs against their tax liability.

The costs for vocational schools are predominantly met via the budget of the Ministry of Education, Culture and Science (Ministerie van Onderwijs, Cultuur en Wetenschappen) alongside some local authority grants. This direct state funding of vocational education and training in vocational schools recognised under public law has been used as an explicit management instrument since the year 2000. As well as the input oriented funding, which centres on long-term equipment and staffing needs of the schools, part of state allocation of funds (between 20 and 30 percent) is provided on the basis of output oriented criteria (number of students, scope of new knowledge and qualifications acquired (toegevoegde waarde) and the number of qualifications successfully imparted). Alongside this, there is usually provision of grants for specific training requirements, such as for socially or market disadvantaged young adults.

Funding of VET for those in employment (Scholing voor werkenden) takes place on the basis of branch funds regulated via collective agreement, so-called "fondsen voor onderwijs en/of onderzoek en ontwikkeling" (O&O-fondsen), to which contributions comprising a proportion (0.1 – 0.64 percent) of total gross wage bills or of company turnover are made.[10] Vocational education and training for this target group comprises both work-based continuing training and qualifications and measures taking place in vocational schools or organised by other, private educational providers. A large part of these measures corresponds to the branch related qualifications structures outlined above and thus takes place in accordance with the

10 These agreements on the funding of VET via branch funds, which form part of collective wage negotiations between employer and employee representative bodies (CAO, Collectieve Arbeidsovereenkomst), have been in existence since 1984 and originated from a proposal by the "Commissie Wagner", which was commissioned at the time by the government of Wim Kok to formulate recommendations relating to the reform of the labour market, employment and vocational education and training (cf. Rapport van de Adviescommissie inzake het industriebeleid 1984).

forms stipulated in public law pursuant to the basis of the Vocational Training Act (WEB). The in-service variation in particular is funded via the O&O-fondsen. There are, however, considerable differences in the specific regulations and modalities for the drawdown of funds, especially in respect of the decision-making criteria for the nature and scope of the VET and qualifications, in other words predominantly regarding the issue of the extent to which company management or the employees determine the forms and time frames of the measures (for more detail, cf. WATERREUS 1997).

The transition from vocational education and training to employment ...

As described above, the transition from vocationally related initial and continuing training at the first threshold in the Netherlands is relatively independent of the generally prevailing employment situation. Where no in-company training places can be provided, young adults are afforded the opportunity of switching to recognised school based VET variations ("principle of communicating tubes").

This is in contrast to the transitions from VET to employment as an employee, skilled worker or journeyman or woman, which takes place at the so-called second threshold, where in the Netherlands there is also a close correlation with economic, structural and regional economic conditions, placing this within the context of the general employment situation. It is fair to assume that there is a relatively high degree of flexibility and elasticity within the relationship between the VET and employment systems in respect of the successful placement of employment contracts due to the following reasons.[11]

- The structure of the provision within the system of initial and continuing vocational education and training in the Netherlands enables the individual determination of short or longer term durations of training and of returns to training. This enables a fruitless search for employment to be relatively easily compensated for by continuing training measures which can be structured differently in terms of time.
- ROC provision predominantly takes place on both a full and part-time basis, enabling completion of continuing training or retraining to take place concurrently with employment.
- At least compared to the prevailing situation in Germany (former West Germany), the link between the acquisition of initial VET qualifications and pay scale groups when making the transition to employment is less marked. In Germany, a traditional differentiation is made between the status of "unskilled" and "trained". In the Netherlands, the four different initial and continuing vocational education and training levels manifestly result in a somewhat more differentiated transition to the employment system.

11 This does not, however, represent an attempt to formulate any statement as to the extent to which these constitute long-term and stable employment contracts, especially in terms of drawing any comparison with Germany. No empirical information is available in respect of comparing and contrasting the respective situations in Germany and the Netherlands.

- The "entry corridor" to vocational education and training (level 1) also affords relatively easy VET entry or re-entry to those who have been on the labour market for a longer period of time or who have not been able to commence or complete initial vocational education and training, rendering it scarcely possible for them to compete with others on the jobs market.
- The VET framework in the Netherlands allows for the systematic acquisition of "double qualifications". Those successfully completing level 4 are in possession of a subject related higher education entrance qualification. Especially at times when demand is high, transition to the higher education system relieves the pressure on the labour market whilst also leading to higher quality qualifications and better employment opportunities.
- The modular nature of the system fosters close coordination between employment and training in terms of content and vocational specialism. Changes on the labour market and additional requirements placed on vocational education and training can rapidly be assimilated into regular VET in the form of new learning areas without the necessity for a complete reworking or realignment of a vocational training profile. If the new components do not prove their practical worth, they can be deleted from the occupational profile. In the Netherlands, the national VET branch organisations are charged with the regular and ongoing coordination and monitoring of training content and objectives.

Of course, the above remarks in respect of the possibilities of coordination between the VET and employment systems in the Netherlands are expressed with the proviso that no systematic, and especially international comparative studies have taken place to date. For this reason, the arguments can only be put forward on the basis of supporting assumptions of plausibility.

2. Provision and structure of initial and continuing IT vocational education and training in the Netherlands in intermediate VET

2.1 IT vocational education and training between initial and continuing VET and higher education

As described in Chapter 1, no structural separation between initial and continuing vocational education and training takes place in the Netherlands. In contrast to Germany, where there is provision of an explicit system for initial VET (IT training occupations) alongside a system of continuing vocational education and training (IT continuing training system), in the Netherlands initial and continuing VET is amalgamated in terms of the structure of vocational education and training provision and mapped within an overarching qualifications framework. The extent to which those completing VET are undergoing initial or continuing vocational education and training depends, therefore, on individual educational and occupational careers. Those seeking IT qualifications in the intermediate VET sector can,

depending on their previous learning, which is normally documented on the basis of school and vocational qualifications achieved, gain direct entrance to the various levels within IT vocational education and training or successively progress from level to level within the structure (cf. further remarks).

Compared to Germany, therefore, consideration needs to be accorded to the fact that the profiles presented below for vocational education and training, qualifications and certifications within the IT sector serve both as initial training profiles as well as representing the basis for processes of continuing vocational training. Or, to put it another way, the IT continuing training system in the Netherlands also encompasses initial vocational education and training.

Alongside this, the fact that the University of Applied Sciences sector in the Netherlands, the "Hogescholen" (institutes of higher education) or the "Hoger Beroepsonderwijs" (higher professional education sector) possess considerable importance within the VET structure represents a fundamental and important difference compared to the German perception of vocational education and training. Although the Dutch Universities of Applied Science also form part of the tertiary sector, they are, nevertheless, systematically integrated into the conception of vocational education and training. A key central strategic objective of Dutch VET policy is the promotion of the transitions between various educational and vocational education and training sub-systems ("doorstrooming"), specifically from secondary and post-secondary VET to higher professional education at the Universities of Applied Sciences.

In comparison to Germany, a further point needing to be accorded consideration is the fact that the profiles presented below for vocational education and training, qualifications and certifications within the IT sector represent only part of IT vocational education and training. The view of the present author is that a much greater level of consideration also needs to be accorded to the University of Applied Sciences, especially to the Bachelor ICT, than is the case in Germany.

2.2 Initial and continuing vocational education and training profiles for VET in the IT sector

In intermediate vocational education and training, six qualifications profiles allocated to the ICT sector ("Informatie- en Communicatietechnologie") are offered:

- Applicatiebeheerder (4)
- Applicatieontwikkelar (4)
- ICT-Beheerder (3)
- Medewerker beheer ICT (3)
- Netwerkbeheerder (4)
- Service Medewerker ICT (2)

With reference to the national qualifications structure (cf. Chapter 1), the qualifications profiles are allocated to levels 2 to 4, three profiles being at level 4, two at level 3 and one profile at level 2. The underlying principle is that progression and changes within the qualifications structure are possible:

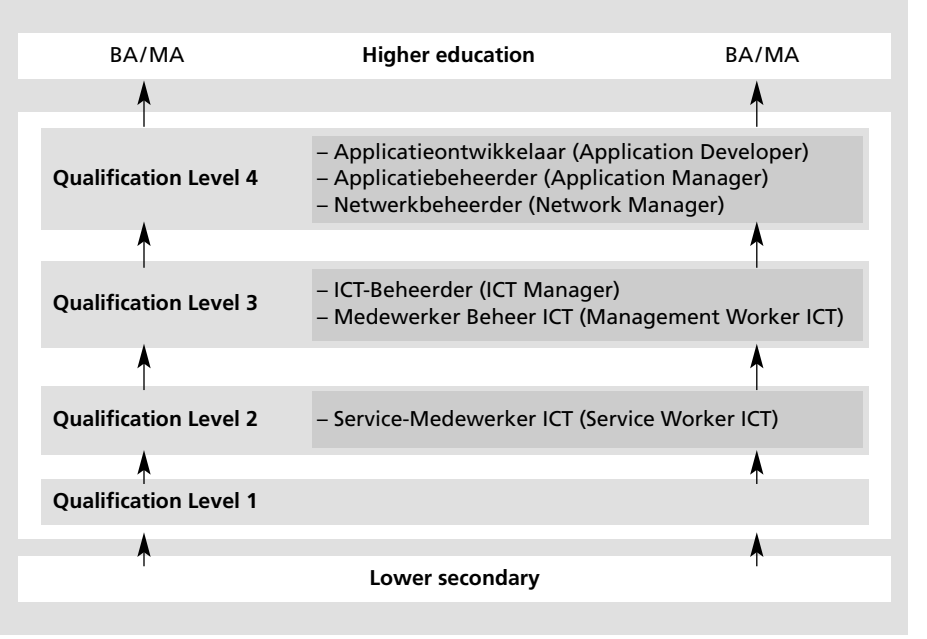
Figure 6: **ICT qualifications profiles**

Level	ICT Qualifications profiles
4	• Applicatiebeheerder (Application Manager) • Applicatieontwikkelar (Application Developer) • ICT-Beheerder (ICT Manager) • Netwerkbeheerder (Network Manager)
3	• Medewerker beheer ICT (Management Worker ICT)
2	• Service Medewerker ICT (Service Worker ICT)
1	---

As described in Chapter 1, compared to the German VET system, levels 2 and 3 represent skilled worker and employee qualification, level 4 representing a higher level of qualification, which in Germany would represent vocational upgrading training within the confines of the IT continuing training system. However, given fulfilment of appropriate school based previous learning requirements, qualifications at level 4 also serve as initial vocational education and training, in other words representing the entry to IT vocational education and training.

Qualifications at level 4 enable direct access to higher professional education at the Dutch Universities of Applied Sciences. This allows those completing such courses to acquire qualifications at Bachelor and Masters level, although those completing intermediate VET gain access to the Bachelors only (cf. HBO-I stichting 2004, p. 54). In the Netherlands, intermediate vocational education and training provision for the IT sector is, in the same way as other VET provision, systematically aligned between vocational orientation in the lower secondary sector and higher education in the tertiary sector.

Figure 7: **Hierarchical structure of IT initial and continuing training profiles**



The following pages present a designation of IT initial and continuing training profiles on the basis of a general activity and occupational description (section 2.3). This is followed by the profiling of a selected IT qualification, Network Manager ("Netwerkbeheerder"), on the basis of detailed curricular stipulations (section 2.4).

2.3 *Activity and occupational description of the initial and continuing IT vocational education and training profiles in intermediate VET*

Application Developer

The application developer develops new applications and adapts existing products. Besides analytical and problem-solving capacity, a thorough knowledge of development techniques, programming tools and operating systems is called for.

The Application developer is generally issued tasks by a project leader. Work must be carried out according to the rules of the project. Because the Application developer is not the only individual working on the project, he must be able to harmonise his work of that of other Jobs are often urgent, so working under time pressure must be non-problematic. And in a profession like this, working to plan is essential. The switch to other operating systems or other development environments, including web-based systems, should be easily within the capacity of the application developer.

Main tasks of the Application Developer

- designing, developing and testing administrative applications
- contributing to the management and maintenance of the existing applications
- advising on and implementing new developments
- (jointly) organising and issuing user instructions for software packages
- writing user instructions
- documenting all activities within system development, both technical and user-related
- maintaining contacts with end users, system analysts and application managers
- translating information needs into usable applications

Job requirements

- good spoken and written mastery of Dutch
- good spoken and written mastery of English (including professional jargon)
- good communication skills
- ability to work to plan
- ability to work in a team
- accurate
- initiative-taking
- flexible
- independent
- analytical and conceptual thinking capacity
- pragmatic and result-oriented

Application Manager

The Application manager ensures that departments always have access to smoothly operating administrative software. To this end, he organises everything necessary in the field of software, storage structures, peripheral equipment and manuals. As far as possible, he matches the system to the requirements and wishes of users. If innovation is called for, he advises the management. The Application manager is also responsible for the introduction of new applications. He organises acceptance tests and user training courses, and as necessary prepares a manual. He is constantly involved in determining whether the users are making use of all opportunities available, or whether adaptations are necessary. He selects the best systems (or parts thereof), introduces them and manages all data. He is the contact person for the continuity and reliability of the information system.

Main tasks of the Application Manager
- assessing and translating users' wishes
- functional design of the user work environment
- installing software
- organising and providing training to (small) user groups
- drawing up (new) guidelines or procedures, and supervising the correct use of applications
- acting as general reference point for users, in the event of urgent problems
- preventing and where necessary rectifying contamination by viruses and unauthorised use of the system
- developing procedures for securing software, data and documentation, in consultation with the system manager
- implementing and maintaining the security procedures drawn up
- maintaining contacts with suppliers on new versions and releases
- testing system components delivered by suppliers, in collaboration with users, both technical and functional
- providing administrative management for operational applications
- contributing to thinking on primary administrative processes in the organisation
- documenting work carried out (on the system)

Job requirements
- good communication skills
- good spoken and written mastery of Dutch
- good spoken and written mastery of English (including professional jargon)
- initiative-taking
- flexible
- independent
- analytical and conceptual thinking capacity
- result-oriented

Network Manager

The network manager focuses primarily on the maintenance, management and security of small to medium-sized hybrid networks. With this in mind, he uses a whole range of protocols, operating software and application software. Independently or as part of a team, the manager manages, maintains and monitors the (local) network, including intranet and Internet. He also advises management and supports the users. (To ensure optimum functioning, it is essential for the network manager to be fully up to date with developments within his field of specialisation. He is conversant with the current state of development and has a good understanding of new developments).

Main tasks of the Network manager

- maintaining contacts with hardware and software suppliers
- supervising and contributing to the installation of LAN and WAN networks
- drawing up guidelines for the use of the hardware and the network
- managing access security to the technical infrastructure
- localising errors in the hardware and software
- correcting faults, or where necessary calling in experts
- documenting the various activities relating to network management
- informing users of the possibilities offered by the hardware, and the application of information and communication technology
- (jointly) providing for the daily management of the technical infrastructure
- issuing user support
- developing procedures for the security of software, data and documentation
- preventing and where necessary rectifying infection by viruses and unauthorised use of the network system
- drawing up, implementing and maintaining the drawn up security procedures

Job requirements

- good spoken and written mastery of Dutch
- good spoken and written mastery of English (including professional jargon)
- ability to work in a team
- organisational qualities
- accurate
- initiative-taking
- flexible
- independent
- analytical and conceptual thinking capacity
- pragmatic and result-oriented

ICT-Manager

The ICT manager is an ICT generalist, active in the fields of procedures and hardware and software. As the central figure within the automation department, he is involved in the management, security and maintenance of the automated information system. He is responsible for management of both applications and infrastructure. The ICT manager is also tasked with introducing new software. He draws up guidelines and procedures for the management and use of the systems, and ensures that they are in fact implemented. He assists application managers and other system users. Together with his colleagues, he searches for solutions to automation problems.

Main tasks of the ICT manager

- keeping all software, network equipment and automated information systems operational
- maintaining contacts with hardware and software suppliers
- installing and maintaining hardware and software
- establishing network infrastructures
- participating in the setting up of a professional management organisation
- supervising correct application of the procedures, identifying bottlenecks and proposing improvements
- advising and informing users on possible applications for existing and new equipment and software, and assisting in its use
- adapting standard software to the wishes and requirements of the organisation
- organising and coordinating courses for users
- ensuring the smooth operation of the helpdesk
- initiating and/or supporting campaigns aimed at further quality improvement
- providing documentation and registration of hardware and software
- advising on the purchase of new hardware and software and supplies

Job requirements

- good spoken and written mastery of Dutch
- good spoken and written mastery of English (professional jargon)
- good communication skills
- ability to work in a team
- organisational qualities
- insight into administrative procedures
- accurate
- initative-taking
- flexible
- independent
- analytical and conceptual thinking capacity
- pragmatic and result-oriented

Management worker ICT

The automated provision of information is the field of work of the management worker ICT. He not only carries out standard procedures, but also comes up with his own solutions and procedures for specific areas. One essential component of his tasks is support for users of the information system. The ICT management worker must be able to analyse and communicate clearly. He also is up to date on developments in his area of expertise. In his work, he is subordinate to the ICT manager and/or Application manager

Main tasks of the ICT management worker

- installing hardware and software, updates and expansions
- adapting hardware to new situations
- securing the system by taking preventive measures
- adapting software to the computer system
- connecting computers to a network (including e-mail, printers, CD-ROM, fax, etc.) and preparing the computers for use
- securing the software and as necessary repairing viruses
- correcting errors in hardware and software
- offering instruction and support to users
- issuing advice on the purchase of hardware and software and supplies
- carrying out and maintaining backup and repair procedures
- maintaining and managing data and files at local level

Job requirements

- good spoken and written mastery of Dutch
- good spoken and written mastery of English (professional jargon)
- good communication skills
- ability to work in a team
- accuracy
- initiative
- flexibility
- independence
- ability to work to plan
- analytical and conceptual thinking capacity
- pragmatic and result-oriented attitude

Service Worker ICT

The service worker ICT ensures that all employees have a correctly functioning computer on their desk. He assembles plug and play computers, from components, and replaces any faulty items. Service workers ICT can be found in any number of places. Their work can be combined with commercial activities in the computer retail trade, or with administrative activities in SMEs. There are also service workers ICT who carry out support work in education, or who are employed in the reuse of hardware components. The service worker ICT is provided with tasks for example by a management worker ICT or an ICT manager.

Main tasks of the service worker ICT

- installing/assembling and making and keeping (new) computer configurations ready for use
- installing hardware and software, updates and expansions
- adapting hardware to new situations
- testing hardware for possible reuse
- adapting software to the computer system
- physically connecting computers to a network
- correcting errors in hardware and software
- carrying out and maintaining backup and repair procedures
- maintaining and managing data and files at local level

Job requirements

- good spoken and written mastery of Dutch
- good communication skills
- good ability to work according to procedures
- ability to work in a team
- accurate
- flexible
- result-oriented

2.4 Example case study Network Manager ("Netwerkbeheerder")

The definition of the Network Manager takes place in a "competence oriented" fashion. The main focus of the "curriculum stipulations" is on the occupational competences the future IT skilled workers will need to acquire and use.[12] This new "competence orientation" of vocational education and training, which is also reflected in the structuring of the underlying curricular principles, has been in use since the start of 2001 and is fundamentally applied to all occupational fields and branches in the Netherlands. As far as vocational education and training in the IT sector is concerned, implementation took place extremely rapidly, meaning com-

12 The principle of "competence orientation" will be described in section 5.2.

petence orientation has largely been fully achieved in this area, at least in conceptual terms.

Limitations of space dictate that it is not possible to present details for the "Netwerkbeheerder" or complete curricular stipulations for the further IT initial and continuing training profiles. Notwithstanding this, the initial and continuing training occupational profile will be presented in the following. Curricular definition of the initial and continuing VET profiles comprises a maximum of 80 percent of total training, the remaining scope being available to the learning venues for the purposes of including local and regional focus.

Figure 8: **Competence profile "Netwerkbeheerder"**

Kwalificatieprofiel Netwerkbeheerder
1 KERNTAKEN
De volgende kerntaken maken deel uit van de **kern** van het kwalificatieprofiel: 1. Ontwerpt een netwerkinfrastructuur 2. Installeert netwerken 3. Beheert een netwerkinfrastructuur
2 KERNOPGAVEN
De volgende kernopgaven maken deel uit van de kern van het kwalificatieprofiel:
Kernopgave 1: Simultaan werken
De netwerkbeheerder staat voor de opgave om zijn kerntaken niet opeenvolgend maar simultaan uit te voeren. Bovendien kunnen activiteiten van de ene kerntaak onderdeel vormen van een andere kerntaak. De netwerkbeheerder werkt zelfstandig of maakt deel uit van een projectteam en staat regelmatig voor de opgave om prioriteiten te stellen, overzicht te bewaren, ordelijk, assertief en flexibel te zijn.
Kernopgave 2: Klantgericht en pro-actief werken
De netwerkbeheerder staat voor de opgave om zich klantgericht en pro-actief op te stellen. Door de toenemende informatiebehoefte en de steeds kundiger wordende gebruikers worden er steeds hogere eisen gesteld aan de netwerkbeheerder. Hij moet daarom van veel aspecten op de hoogte zijn, goed kunnen communiceren en samenwerken en zich dienstverlenend, pro-actief en flexibel opstellen.
Kernopgave 3: Voorbeeldfunctie vervullen
De netwerkbeheerder staat voor de opgave procedures na te leven en is zich er continu van bewust dat hij een voorbeeldfunctie heeft m.b.t. het naleven van procedures
Kernopgave 4: Veilig werken
De netwerkbeheerder staat voor de opgave om te zorgen voor zijn eigen veiligheid. Hij moet daarbij de relevante regelgeving op het gebied van kwaliteitszorg, arbo en milieu in acht nemen en zorgvuldig en nauwkeurig werken. Fouten in het werk kunnen hemzelf en gebruikers duperen.

Continuation Figure 8

3 COMPETENTIEMATRIX

	Kerntaak			Kernopgave			
De netwerkbeheerder is in staat om op adequate wijze	1	2	3	1	2	3	4
1. een netwerkinfrastructuur te ontwerpen	x			x	x		
2. een implementatieplan te schrijven		x		x	x		
3. besturingssystemen en netwerk-componenten te installeren		x		x	x		x
4. te documenteren en documentatie te onderhouden	x		x	x			
5. te testen of een netwerk voldoet		x		x	x		x
6. procedures op te stellen en te onderhouden			x	x	x	x	
7. storingen te verhelpen en de continuïteit te waarborgen			x	x	x	x	x
8. een netwerkinfrastructuur te beheren			x	x	x	x	x
9. projectmatig te werken	x	x	x	x	x		
10. opdrachten te toetsen	x	x	x	x	x		x
11. werkzaamheden planmatig te verrichten	x	x	x	x	x		
12. schriftelijk en mondeling te communiceren	x	x	x	x	x		
13. samen te werken	x	x	x	x	x		
14. te adviseren en te informeren	x	x	x	x	x		
15. Zich constructief en dienstverlenend op te stellen	x	x	x	x	x		
16. zijn eigen handelen te evalueren	x	x	x	x			
17. nieuwe ontwikkelingen toe te passen	x	x	x	x			

4. KERNTAKEN

Kerntaak 1: Ontwerpt een netwerkinfrastructuur

Proces	Binnen deze kerntaak werkt de netwerkbeheerder vaak in een project samen met collega's. De netwerkbeheerder overlegt met zijn opdrachtgever over de uit te voeren werkzaamheden, inventariseert eisen en wensen en bepaalt wat de mogelijkheden zijn. Met behulp van alle gegevens stelt de netwerkbeheerder een netwerkontwerp op. Tevens bepaalt hij of er voor de realisatie van de netwerkinfrastruc-tuur derden ingeschakeld moeten worden. Het netwerkontwerp legt hij voor aan zijn opdrachtgever en hij adviseert hem bij de te nehmen beslissingen.
Rol/verantwoordelijkheden	De netwerkbeheerder werkt zelfstandig, maar ook samen met collega's, veelal binnen een project. Hij is mede verantwoordelijk voor het ontwerp van het netwerk en daarmee ook voor de technische inrichting van het netwerk en hij wordt beoordeeld op de resultaten. Hij is verantwoordelijk voor zijn eigen werkzaamheden en in geval van teamwerk kan de verantwoording gedeeld worden. De netwerkbeheerder is een specialist en heeft vooral een uitvoerende rol. Vanuit zijn specialisme adviseert hij collega's en/of opdrachtgevers. Ook vertegenwoordigt hij het bedrijf bij klanten.

Continuation Figure 8

Complexiteit	De complexiteit van deze taak wordt bepaald door de toenemende informatiebehoefte, de globalisering en technische ontwikkeling van netwerken, de steeds groter wordende overlap tussen telecom en informatietechnologie, en de steeds hogere eisen die worden gesteld aan de capaciteit, de beschikbaarheid en de beveiliging van een netwerk. Hierdoor worden ook steeds hogere eisen gesteld aan het netwerkontwerp. Er wordt van de netwerkbeheerder verwacht dat hij van deze aspecten op de hoogte is en dat hij de technologische ontwikkelingen en innovaties kent en zich deze snel eigen maakt. De netwerkbeheerder werkt bij het uitvoeren van deze taak vaak samen met anderen in een project. Hij moet derhalve ook goed kunnen communiceren en samenwerken.
Betrokkenen	De netwerkbeheerder heeft contact met en overlegt met mensen op diverse niveaus: leveranciers, vakgenoten binnen zijn afdeling, zijn direct leidinggevende, klanten, gebruikers en externe partijen/deskundigen.
Hulpmiddelen	De netwerkbeheerder maakt gebruik van specifieke gereedschappen en hulpmiddelen waaronder testapparatuur, componenten en transportmiddelen, alsook van documentatie in de vorm van kwaliteitshandboeken, opdrachtomschrijvingen, werkprocedures, naslagwerken en internetsites.
Kerntaak 2: Installeert netwerken	
Proces	Binnen deze kerntaak werkt de netwerkbeheerder vaak in een project samen met collega's. De netwerkbeheerder analyseert een al opgesteld implementatieplan of werkt mee aan het schrijven/aan-passen van een implementatieplan. Hij stelt voor zijn eigen werk-zaamheden een plan van aanpak op. Vervolgens voert de netwerk-beheerder de geplande installatie- en configuratiewerkzaamheden uit. Tijdens, maar ook vooral na, de installatiewerkzaamheden test hij de werking van het netwerk grondig. Leidraad hierbij zijn de doel-stellingen en specificaties uit het netwerkontwerp. Resultaten worden gerapporteerd aan de leidinggevende of projectleider. Tenslotte zorgt de netwerkbeheerder ervoor dat het geïnstalleerde netwerk (of delen hiervan) volledig en op de juiste wijze wordt gedocumenteerd.
Rol/verantwoordelijkheden	De netwerkbeheerder werkt zelfstandig, maar ook samen met collega's, veelal binnen een project. Hij is verantwoordelijk voor de technische inrichting en een correcte installatie van een netwerk en hij wordt beoordeeld op de resultaten. Hij is verantwoordelijk voor zijn eigen werkzaamheden en in geval van teamwerk kan de verantwoor-ding gedeeld worden. De netwerkbeheerder is een specialist en heeft vooral een uitvoerende rol. Fouten in de uitvoering van het werk kunnen gebruikers duperen; het afbreukrisico is dus hoog. Vanuit zijn specialisme adviseert hij collega's en/of opdrachtgevers. Ook ver-tegenwoordigt hij het bedrijf bij klanten.

Continuation Figure 8

Complexiteit	De complexiteit van deze taak wordt bepaald door de toenemende informatiebehoefte, de globalisering en technische ontwikkeling van netwerken, de steeds groter wordende overlap tussen telecom en informatietechnologie, en de steeds hogere eisen die worden gesteld aan de capaciteit, de beschikbaarheid en de beveiliging van een netwerk. Er wordt van de netwerkbeheerder verwacht dat hij de technologische ontwikkelingen en innovaties kent en zich deze snel eigen maakt. De druk waaronder hij moet presteren kan –bijvoorbeeld door gestelde deadlines- hoog zijn, wat deze taak complexer maakt. Ook stellen de gebruikers, die steeds kundiger worden op ICT-gebied, steeds hogere eisen aan het netwerk en de netwerkbeheerder. De vereiste communicatie en klantgerichtheid verhogen daarom de complexiteit van de werkzaamheden. De netwerkbeheerder werkt bij het uitvoeren van deze taak vaak samen met anderen in een project. Ook hiervoor moet hij goed kunnen communiceren en hij moet kunnen samenwerken.
Betrokkenen	De netwerkbeheerder heeft contact met en overlegt met mensen op diverse niveaus: leveranciers, vakgenoten binnen zijn afdeling, zijn direct leidinggevende, klanten, gebruikers en externe partijen/deskundigen.
Kerntaak 3: Beheert een netwerkinfrastructuur	
Proces	De netwerkbeheerder voert ter voorkoming van storingen regelmatig test- en serviceactiviteiten uit en toetst of het netwerk voldoet aan de gestelde eisen en benodigde performance. Vanuit zijn beheerfunctie dient de netwerkbeheerder storingen te lokaliseren, de oorzaak van storingen te achterhalen en storingen op te lossen. Storingsmeldingen en oplossingen documenteert de netwerkbeheerder volgens geldende regels, zodat er een bruikbaar naslagwerk ontstaat. Tenslotte wordt van de netwerkbeheerder verwacht dat hij indien nodig verbetervoorstellen formuleert en dat hij procedures opstelt en onderhoudt voor het beheer van de netwerkinfrastructuur. Uiteraard dient hij deze procedures ook na te leven en dient hij te evalueren of de procedures door anderen worden nageleefd.
Rol/verantwoordelijkheden	De netwerkbeheerder werkt zelfstandig, maar ook samen met collega's. Hij ziet het belang in van beheeractiviteiten en preventieve activiteiten om de continuïteit van het netwerk te waarborgen. De netwerkbeheerder wordt beoordeeld op de resultaten. Omdat hij meestal zelfstandig werkt is hij vooral verantwoordelijk voor zijn eigen werkzaamheden, maar in geval van teamwerk kan de verant-woording gedeeld worden. De netwerkbeheerder is een specialist en heeft vooral een uitvoerende en controlerende rol. Fouten in de uit-voering van het werk kunnen gebruikers duperen; het afbreukrisico is dus hoog. Vanuit zijn specialisme adviseert hij collega's en/of opdrachtgevers. Ook vertegenwoordigt hij het bedrijf bij klanten.

Continuation Figure 8

Complexiteit	De complexiteit van deze taak wordt bepaald door de toenemende informatiebehoefte, de globalisering en technische ontwikkeling van netwerken, de steeds groter wordende overlap tussen telecom en informatietechnologie, maar vooral door de steeds hogere eisen die worden gesteld aan de capaciteit, de beschikbaarheid en de beveiliging van een netwerk. Er wordt van de netwerkbeheerder verwacht dat hij de technologische ontwikkelingen en innovaties kent en zich deze snel eigen maakt. Gebruikers verwachten een 100% beschikbaarheid van het netwerk en worden steeds kundiger op ICT-gebied. De vereiste communicatie en klantgerichtheid verhogen daarom de complexiteit van de werkzaamheden. Daarnaast wordt door de toenemende computercriminaliteit de beveiliging van het netwerk steeds belangrijker.
Betrokkenen	De netwerkbeheerder heeft contact met en overlegt met mensen op diverse niveaus: leveranciers, vakgenoten binnen zijn afdeling, zijn direct leidinggevende, klanten, gebruikers en externe partijen/deskundigen.

3. Regulatory policy for the integration of IT continuing training in the Netherlands

Regulatory policy ("Ordnungspolitik") is a German term which has its origins in the influence of the German economist Walter EUCKEN and is still used today to refer to the central issue of the extent of regulatory intervention on the part of legitimate state agencies into the original free power exercised by the market and thus also relates to power or market relations within various sectors of society.

The issue requiring clarification is the effect exercised by legitimate bodies under public law and the standardised qualifications, vocational education and training and certification in the IT sector developed by such bodies which extend beyond the governing principles of private law and in-company operations and, ultimately, outstretch the fundamentals governing a pure market economy.

The six IT initial and continuing training profiles outlined in Chapter two represent the main educational pathways and qualifications of a public law nature within the IT sector and are regulated pursuant to Dutch law relating to vocational education and training and adult education (WEB). The Wet Educatie en Beroepsonderwijs covers the area of adult education, insofar as this does not extend into the tertiary sector, and VET.

Article 1.2.1 of the WEB defines the objective of the areas of adult education *(educatie)* and vocational education and training (*beroepsonderwijs)*:

"1. Educatie is gericht op de bevordering van de persoonlijke ontplooiing ten dienste van het maatschappelijk functioneren van volwassenen door de ontwikkeling van kennis, inzicht, vaardigheden en houdingen op een wijze die aansluit bij hun

behoeften, mogelijkheden en ervaringen alsmede bij maatschappelijke behoeften. Waar mogelijk sluit de educatie aan op het ingangsniveau van het beroepsonderwijs. Educatie omvat niet activiteiten op het niveau van het hoger onderwijs.

2. Beroepsonderwijs is gericht op de theoretische en praktische voorbereiding voor de uitoefening van beroepen, waarvoor een beroepsqwalificerende opleiding is vereist of dienstig kan zijn. Het beroepsonderwijs bevordert tevens de algemen vorming en de persoonlijke ontplooiing van de deelnemers en draagd bij tot het maatschappelijk functioneren. Beroepsonderwijs sluit aan op het voorbereidend beroepsonderwijs en het algemeen voortgezet onderwijs. Beroepsonderwijs omvat niet het hoger onderwijs."

["1. The aim of educatie is the fostering of personal development within the service of integrating adults into society in terms of developing knowledge, insights, skills and attitudes linked to their requirements, opportunities and experience as well as to the benefits of these for society. Wherever possible, educatie connects with the entry level for beroepsonderwijs. Educatie does not encompass any activities within higher education.

2. The aim of beroepsonderwijs is the theoretical and practical preparation for the exercise of an occupation for which qualified vocational training is required or can be of use. Beroepsonderwijs also fosters general education and personal development as well as making a contribution towards integration into society. Beroepsonderwijs connects with pre- vocational and general teaching. Beroepsonderwijs does not encompass higher education."] [13]

The aim here is not to present the circumstantialities and standards of the Dutch Vocational Training Act in detail. The fundamental principle is that there is provision for six central qualifications under public law which run alongside the industrial certificates regulated under private law and the wide range of qualifications provision available on the free continuing training market relating to the acquisition of IT competence.

Development of qualifications takes place within the remit of the Ministry of Education and under the auspices of the national branch organisations ECABO (commercial and administrative VET) and Kenteq elektro, formally known as VEV (electro-technical VET).[14] Both branch organisations have established a joint plat-

13 Ministerie van Onderwijs, Cultuur en Wetenschappen (1996), pp. 6 ff.

14 The national branch organisations were previously known as "Landelijke Organen Beroepsonderwijs" (LOB), the name of the institutions in the Netherlands recently having been changed to "kenniscentra beroepsonderwijs bedrijfsleven" (KBB). The national umbrella organisation of the various branch institutions is COLO (Vereniging kenniscentra beroepsonderwijs bedrijfsleven).
In the Netherlands, there are KBB's for 21 defined branches, these being responsible for VET within these sectors. The body of last instance of the national organisations, the board, is usually tripartite in nature, having equal voting representation of employers, schools and employees. Commissions, the so-called COB's (Commissies Onderwijs-Bedrijfsleven) are attached to these boards. The main work takes place within these COB's. Here, the composition is mostly bipartite, in that the schools are allocated half of the votes, the employers and employees being jointly accorded the other half. In

form specifically for the development of IT initial and continuing training profiles: LOKET MBO ICT.

LOKET MBO ICT (cf. www.loketmboict.nl) is the central instance for the development and realignment of IT initial and continuing training profiles in intermediate VET.

The state vocational schools (Regionale Opleidingen Centra, ROC) operate alongside the branch organisations, planning, carrying out and evaluating the majority of initial and continuing vocational education and training in the Netherlands.

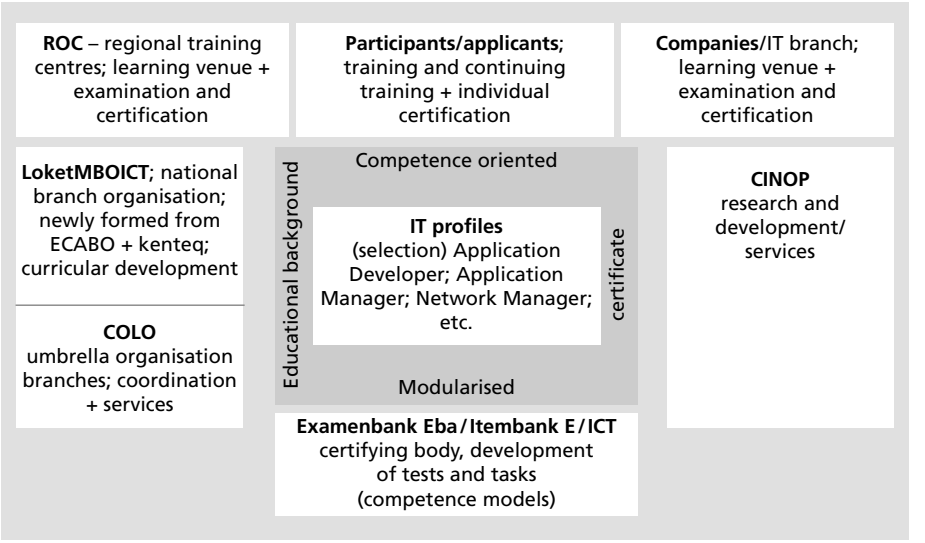
The six IT initial and continuing training profiles outlined above form the basis for teaching, training, examinations and certification in the vocational schools, thus rendering the vocational school the central examining and certification body. External legitimation and quality control of examinations and certificates takes place via the "KwaliteitsCentrum Examinering" (cf. www.kce.nl).

In individual companies, where initial and continuing training takes place in coordination with the ROC's, identification and evaluation of competences acquired by trainees is conducted only to a limited extent, this function being the responsibility of the vocational schools.

COLO (www.colo.nl) is the umbrella organisation of the national branch organisations, coordinating and supporting the development of the IT initial and continuing training profiles within the various branches. Cinop (www.cinop.nl) is a central research and advisory institution for VET in the Netherlands. The Examenbank EBA (cf. www.examenbank.nl) supports the vocational schools in the development of test tasks and examinations.

Continuation note 14
some national organisations, votes are distributed on a bipartite basis in the LOB's, whereas a tripartite system prevails in the COB's. All final arrangements need ultimately to be monitored by the Ministry of Education. The COB's have the following central functions: (1) development of learning goals and qualification elements (modules); (2) introduction of new and withdrawal of obsolete training courses within the area of intermediate vocational education and training; (3) drafting of examination plans. The COB's are advised in their work by bodies known as Adviescommissie Onderwijs-Arbeidsmarkt (ACOA), the members of which are VET experts.

Figure 9: **Stakeholders and profiles in IT initial and continuing training in the Netherlands**



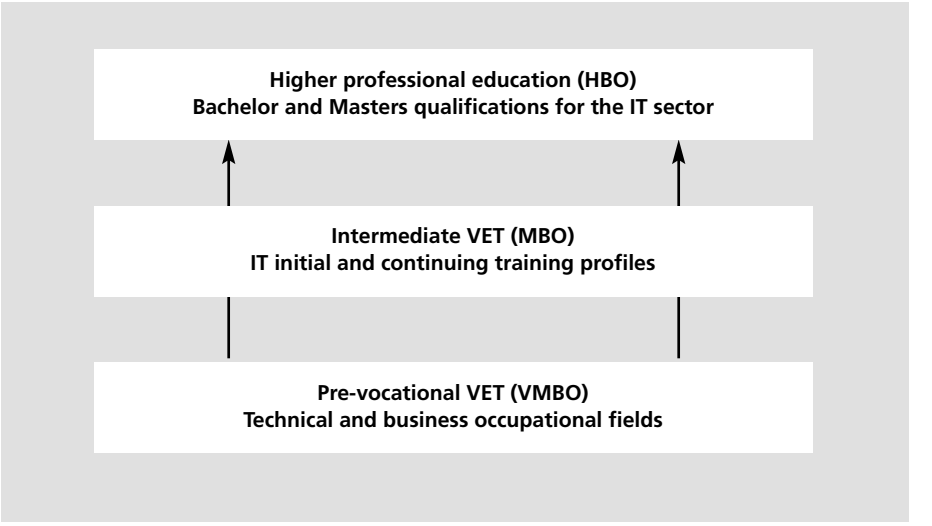
4. Linking of initial and continuing IT vocational education and training to upstream and downstream educational sectors

4.1 The principle of "doorstrooming" in the Dutch education and vocational training system

A central objective of Dutch educational and VET policy is the facilitation of and support for permeability between the various educational sub-systems ("doorstrooming"). The core of vocational education and training, intermediate VET (Middelbaar Beroepsonderwijs, MBO), which from a German point of view comprises initial VET and vocational upgrading training, is aligned between vocational orientation and qualification in the lower secondary sector and higher professional education in the tertiary sector.

In the Netherlands, vocational education and training extends from the lower secondary area, via initial and continuing VET, into the higher education sector (Universities of Applied Sciences). This means that the Dutch apply a different terminology to VET compared with Germany. Both upstream and downstream educational sub-systems play a much greater functional role within vocational education and training than is the case in Germany.

Figure 10: **Linking of and transition between pre-vocational education and training, intermediate VET and higher professional education**



4.2 On the transition from pre-vocational education to intermediate VET

As in many European countries, (the key word for this in England being "vocationalism", cf. FROMMBERGER 2005c) pupils in the Netherlands are afforded the opportunity as early as the lower secondary stage to acquire knowledge and skills of use to them in vocational education and training, some of this knowledge and these skills even being capable of accreditation.

In Germany too, the basic principle is that preparation is provided within the various types of school, especially at secondary general schools and intermediate secondary schools, in the form of vocational guidance and with a view to establishing the ability to make career choices, for the decision to be taken at the time of the first threshold. The way in which this provision is anchored into the curriculum is subject to varying stipulations within the different federal states, it either being delivered on the basis of an explicit subject, such as employment studies, or being provided for in the form of specific learning areas within conventional subjects, such as sociology, economics or technology and so forth. Ever since the recommendations made by the German Education Committee (Deutscher Ausschuss für das Erziehungs- und Bildungswesen) in the nineteen-sixties, the last decades have seen the proposal and implementation of various concepts relating to vocational guidance and establishing the ability to make career choices within the fields of educational policy and research, especially in the area of work oriented didactics for lower secondary level.

Notwithstanding this, the fact that no linking of teaching content with the range of provision at the first threshold takes place means vocational guidance and preparation for career choice in Germany at lower secondary level is and remains irrelevant for most young people. Although pupils are informed of the impending first threshold options and also receive some opportunity to gain experience in the form of work experience, the lower secondary sector does not afford young people the opportunity to acquire systematic knowledge and capabilities which can be of use to them in subsequent VET courses.

The Dutch concept of providing a close link between lower secondary level and vocational education and training pursues two main motives.

Firstly, the aim is to provide content to support transitions which take place at the first threshold in terms of the opportunity for a conscious career choice attitude based on a depth of knowledge and in terms of the possibility of accrediting completed learning areas towards subsequent vocational education and training. This concept receives explicit support from the national branch organisations responsible for the area of vocational education and training, where part of the work relating to the coordination of the various curricula also takes place.

The second motive consists of using increased relevance of teaching content in the final years of the lower secondary sector as a vehicle for raising the learning motivation and willingness of the young people. The aim is to improve the learning and teaching situation, the thesis underlying this concept being that the integration of certain content areas into learning fields which are discernibly relevant and vocationally related will also enhance young adults' learning ability.

Such a high level of vocational orientation within the framework of compulsory schooling is initially extremely unusual from a German point of view. The presumption is, and this may well have some basis, is that such an approach will lead to specific channelling of pupils and a restriction of opportunities for individual development at a very early stage.

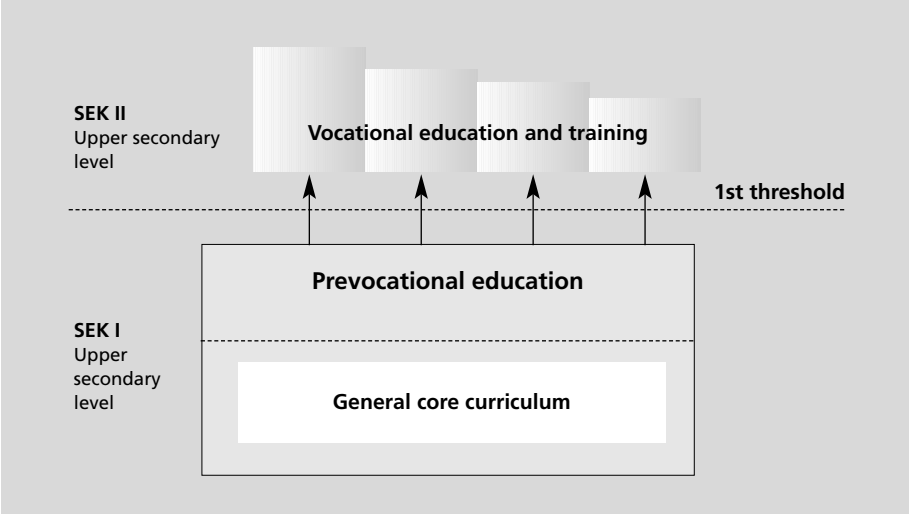
On the other hand, the concept is also marked by a high degree of "permeability" and opportunities for transition. The principle is that transitions between the various subject areas are possible, the choice of a specific subject direction at the first threshold also not being stipulated, at least not on formal terms. This certainly affords the young people the opportunity of deciding to pursue alternative subject areas or occupational fields. Transitions and progression are also explicitly fostered within the subsequent area of initial vocational education and training, a process which extends to include acquisition of a higher education entrance qualification, for which there is systematic provision within the VET area in the form of a double qualification.

Given that this high level of vocational preparation has only existed within the lower secondary curricula for a few years and in light of the fact that a transition process of several years' duration is inevitably involved before teaching can take

place in the form envisaged, the impact cannot currently be identified. What the Dutch vocational orientation model does display, however, is an extensive linking of vocationally oriented content areas and objectives at lower secondary level and initial training at upper secondary level. The two final years of compulsory education already deliver vocational orientation, pre-vocational education and partial vocational qualification.

After two years at lower secondary level within the usual MAVO or VBO types of school, usually at the age of 14, young people choose an educational pathway which has the aim of preparing them for future VET. In the final two years of compulsory schooling, therefore, youngsters complete a programme which is integrated systematically, organisationally and in terms of the curriculum.

Figure 11: **Transition to vocational education and training at the "first threshold": vocational orientation, pre-vocational education and partial vocational qualification within the scope of compulsory schooling**



Young people select a "learning trajectory" from the following provision.

- "Theory oriented learning trajectory" (theoretische leerweg)
- "Mixed learning trajectory" (gemengde leerweg)
- "Vocationally oriented learning trajectory I" (kaderberoepsgerichte leerweg)
- "Vocationally oriented learning trajectory II" (basisberoepsgerichte leerweg).

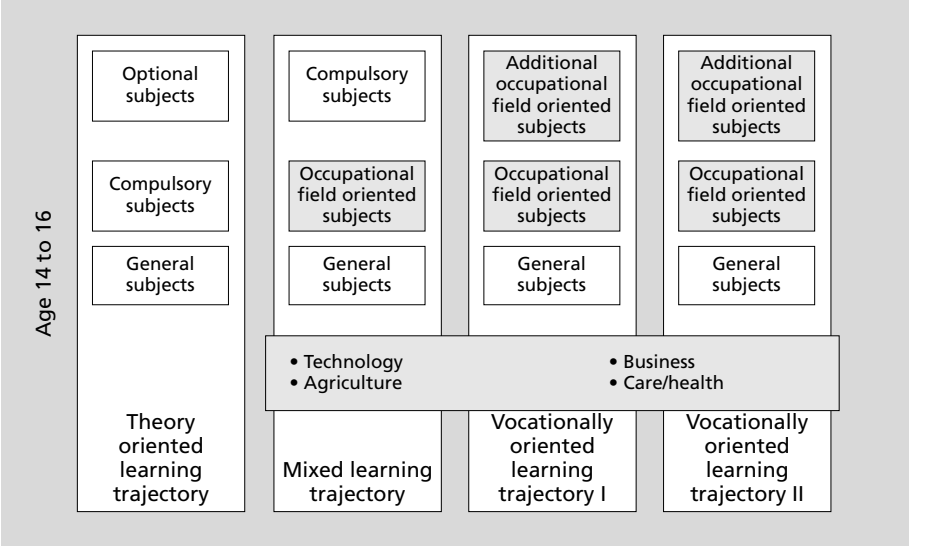
Young people who do not choose the theory oriented learning trajectory select one of the following four occupational fields:

- technology,
- care and health,
- business,
- agriculture / landscape conservation.

Alongside typical, general educational subjects, each of the four variations has the Dutch and English languages as a compulsory component. In addition to this, the three vocationally oriented variations require the completion of appropriate occupational field oriented subjects or learning areas. The two more closely vocationally oriented learning trajectories feature the highest proportion of vocationally oriented learning areas, 960 teaching hours being planned for the two years. A further aim is for the teaching to include a high level of practical orientation. Vocationally oriented learning trajectory II stipulates the integration of a high proportion of learning to take place outside school (work experience placements). These variations correspond to the old VBO variation. The scope of the two other learning trajectories, mixed and theoretical, is less vocationally oriented.

The aim of the choice of a learning trajectory is to accord due consideration to differentiated learning requirements and motives. The theory oriented learning trajectory corresponds to the old MAVO variation and is thus directed more at able young people and young adults.

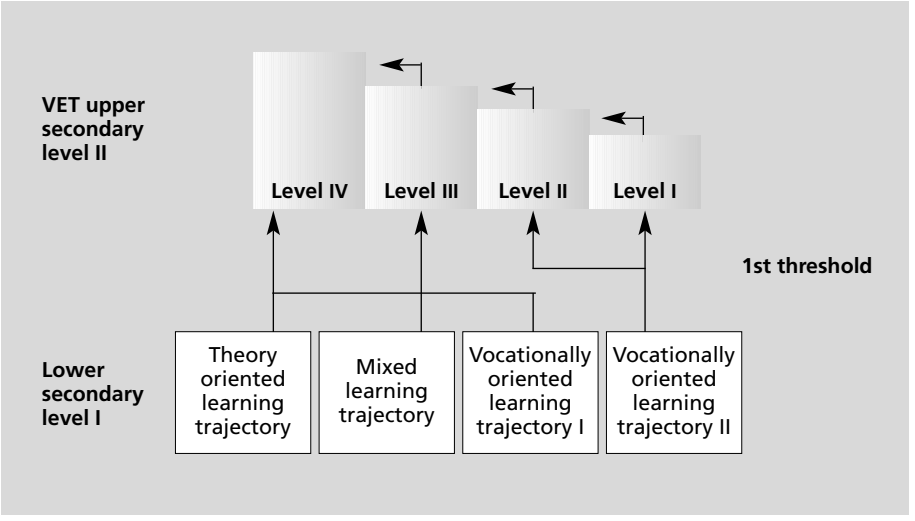
Figure 12: **Pre-vocational education (VMBO): organisational and curricular structure**



The aim of the selection of an occupational field is to orientate teaching towards a subsequent course of initial VET. Within the scope of the second half of the lower secondary level, the intention is, especially in the two vocationally oriented variations, to provide specific preparation for a subsequent course of initial vocational education and training. The system is to go one stage further: the aim is for completed learning area from lower secondary level to be recognised in the VET area, thus fostering a seamless transition to vocational education and training.

Qualifications achieved in the theory oriented, the mixed, and the first of the vocationally oriented learning trajectories are equivalent, whereas completion of vocationally oriented learning trajectory II only permits transition to VET at level II. Those who achieve no qualification may move to vocational education and training at level I.

Figure 13: **Transition from pre-vocational intermediate VET to intermediate vocational education and training itself**



The occupational fields shown do not form the only basis for the transition to vocational education and training. Within these occupational fields, pupils may take on specialisations or subject directions, some of which are indirectly related to future occupational areas of activity. In addition to this, learning areas may be completed at lower secondary level which are accorded recognition within intermediate VET.

The occupational field of technology in particular offers provision aimed at the commencement of vocational education and training for the IT sector, this field offering a variety of main areas of focus, such as metallurgy, installation techno-

logy, electro technology and so forth. Units of learning covering the basic knowledge and skills within the technical infrastructure of modern information and communications technologies available to the pupils represent a particular area of focus.

To this extent, a seamless transition is in place between the pre-vocational education at lower secondary level and the provision of IT initial and continuing training within intermediate VET at upper secondary level. The following illustration depicts the learning elements for pre-vocational education at lower secondary level.

Figure 14: **Learning goals for IT focused teaching within pre-vocational education**

ICT – bedrijfsoriëntatie

De kandidaat kan:

1. Begrippen als organisatie, bedrijf en onderneming beschrijven
2. Doelstellingen, producten en/ of diensten van een organisatie beschrijven
3. Taken en functies binnen een werkorganisatie/afdeling weergeven
4. Aan de hand van werkrooster de planning en taakverdeling aangeven
5. Verslag uitbrengen over de voortgang van eigen werk
6. Benoemen van kenmerken van enkele in de wet geregelde organisatievormen
7. Benoemen van verschillen tussen particuliere en overheidsorganisaties
8. Doel van een functieomschrijving aangeven
9. Kenmerken van een lijn/staf- en matrixorganisatie beschrijven
10. Organisatieschema's hanteren
11. Stappen ondernemen die kunnen leiden tot het vinden van betaald werk
12. Benoemen van belangrijkste rechten, plichten en verantwoordelijkheden die voortvloeien uit een arbeidsovereenkomst
13. Regels met betrekking tot beveiliging van gegevens aanpassen
14. Beschrijven van veiligheids-, gezondheids-, en welzijnsaspecten in een werksituatie
15. Procedures, richtlijnen en voorschriften m. b. t. Arbo- zorg in een werksituatie opvolgen
16. Rapporteren van veiligheids-, gezondheids-, en welzijnsrisico's in een werksituatie

ICI – werkveldoriëntatie

De kandidaat kan:

1. Beschrijven van ontwikkelingen op het gebied van ICT binnen industriële, grafimedia en administratieve omgevingen op hoofdlijnen
2. Beschrijven op hoofdlijnen van de rol van computersystemen binnen industriële, grafiemedia en administratieve bedrijfsprocessen
3. Beschrijven op hoofdlijnen van aspecten die een rol spelen bij het onderhoud en beheer van informatiesystemen
4. Beschrijven van de praktische gevolgen van ICT voor de werkplek
5. Beschrijven van de milieuregelgeving m. b. t. hardware en computersupplies
6. Beschrijven van de relevante ARBO- regelgeving

Continuation Figure 14

7. Een eenvoudige elektronische schakeling realiseren m. b. v. een specifieke toepassing aan de hand van instructies
8. Een eenvoudige digitale presentatie realiseren aan de hand van instructies m. vb. v. een specifieke toepassing
9. Eenvoudige mutaties verwerken aan de hand van instructies m. b. v. een eenvoudige administratieve toepassing

Basisvaardigheden

De kandidaat kan:

1 Zelfstandig leren en werken
2 Werken met informatie- en communicatietechnologie
3 De Nederlandse taal functioneel gebruiken
4 De Engelse taal functioneel gebruiken
5 Vaardig omgaan met verbale en cijfermatige informatie
6 In het leer- en werkproces adequaat omgaan met zichzelf en anderen

Leervaardigheden

De kandidaat kan:

1 Informatie beoordelen op betrouwbaarheid, representativiteit en bruikbaarheid, informatie verwerken en benutten
2 Strategieën gebruiken voor het aanleren van nieuwe kennis en vaardigheden zoals memoriseren, aantekeningen maken, schematiseren, verbanden leggen met aanwezige kennis
3 Strategieën gebruiken voor het begrijpen van mondelinge en schriftelijke informatie
4 Op doordachte wijze keuzeproblemen oplossen
5 Een eenvoudig bedrijfsmatig vraagstuk planmatig onderzoeken
6 Op basis van argumenten tot een eigen standpunt komen

ICT gebruik

Gebruik van onderdelen van ECDL

De kandidaat kan:

1 Tekstverwerken
2 Werken met een spreadsheet programma
3 Werken met een databaseprogramma
4 Een presentatie maken

Continuation Figure 14

Installatie hardware

De kandidaat kan:

1 Beschrijven van de afzonderlijke componenten van een computersysteem
2 Beschrijven van de noodzaak van het gebruik van werkvoorschriften en standaard-procedures m. b. t. installatie en hardware
3 Lezen van eenvoudige montage-/ installatietekeningen
4 Veilig werken met zwakstroom en laagspanning in computersystemen
5 Bepalen of aanvullende hardware op een computersysteem kan worden aangesloten vanuit elektronisch perspectief
6 Installeren en gebruiksklaar maken van de componenten van een computersysteem aan de hand van instructies
7 Lokaliseren en opheffen van eenvoudige storingen in een bekabelingsysteem aan de hand van instructies
8 Eenvoudige test-, afregel- en controlewerkzaamheden verrichten, inclusief elektrische metingen aan de hand van instructies
9 Demonteren van een computersysteem aan e hand van instructies
10 Gedemonteerde componenten testen op mogelijk (her) gebruik

Installatie software

De kandidaat kan:

1 Beschrijven van de toepassing van software binnen industriële, grafimedia en administratieve omgevingen
2 Installeren van besturingssoftware op een computerconfiguratie
3 Installeren van applicaties op een computerconfiguratie
4 Installeren van software voor aansluiting van een stand- alone computerconfiguratie op een netwerk, aan de hand van instructie
5 Installeren van eenvoudige datacommunicatiesoftware aan de hand van instructies

Onderhoud en beheer informatiesystemen

De kandidaat kan:

1 Benoemen van de componenten van een datacommunicatie- en netwerksysteem
2 Beschrijven van de functie van de afzonderlijke componenten van datacommunicatiesystemen
3 Bijstellen van systeemdocumentatie t. a. v. de samenstelling en inrichting van computerconfiguraties aan de hand van instructies
4 Signaleren van conflicten tussen componenten van een computerconfiguratie
5 Lokaliseren en opheffen van eenvoudige storingen t. a. v. een computersysteem, aan de hand van instructies
6 Uitvoeren van procedures ter opsporing en verwijdering van virussen
7 Uitvoeren van herstel- en back- upprocedures, aan de hand van instructies
8 Eenvoudig bestandsbeheer uitvoeren, aan de hand van instructies
9 Onder supervisie gebruikers ondersteunen bij het werken met computersystemen

Continuation Figure 14

10 Verzorgen van uitgifte en het intern transport van hardwarecomponenten en computersupplies
11 Realiseren van een eenvoudige datacommunicatieverbinding, aan de hand van instructies
12 Engelstalige installatie- instructies gebruiken
13 Relevante Engelstalige ICT- terminologie plaatsen

The following figures show the exact coordination between the learning elements at lower secondary level at the contents and aims of initial or continuing vocational education and training within the IT sector. The aim of this coordination of content between the various stages of education and training is to improve transition at the first threshold and afford trainees the opportunity of being accorded recognition in respect of competences already acquired.

Figure 15: **Content coordination between IT focus (VMBO) and IT VET (MBO)**

Deelkwalificatie Installeren en inrichten van hard- en software 3 **CREBO** 56096/ICT 17.3				kenniscentrum: **ECABO**	
MBO				**VMBO**	
Nr.	*Eindterm*	*Leerweg*	*Bron*	*Nr.*	*Kerndoel*
	De kandidaat kan:				De kandidaat kan:
1	onderdelen en componenten van samen te stellen systemen selcteren	B/K/G/T	ICT/K	1-1	beschrijven van de afzonderlijke componenten van een computersysteem *(installatie hardware)*
2	systemen installeren en configureren, zowel als onderdeel van een computernetwerk als stand-alone, en vervolgens in de organisatie geldende procedures, de installatie- en configuratiegegevens van opgeleverde systemen documenteren	K/G	ICT/K	1-2 1-3 1-4 1-3	installeren van besturingssoftwae op een computer-configuratie installeren van applicaties op een computerconfiguratie installeren van software voor aansluiting op een stand-alone computerconfiguratie op een netwerk, aan dehand van instructie *(installatie software)* bijstellen van systeemdocumentatie t.a.v. de samenstelling en inrichting van computerconfiguratie aan de hand van instructies *(onderhoud en beheer informatiesystemen)*
3	geïnstalleerde systemen testen, fouten lokaliseren en oplossen, en desgevraagd verbetervoorstellen doen voor assemblage-, installatie- en/of configuratieprocessen	B/K/G/T	ICT/K	1-8 1-4	eenvoudige test-, afregel- en controlewerkzaamheden verrichten, inclusief electrische metingen aan de hand van instructies *(installatie hardware)* signaleren van conflicten tussen componenten van een computerconfiguratie *(onderhoud en beheer informatie-systemen)*
4	eigen werkzaamheden planmatig verrichten en houdt rekening met veranderende eisen en omstandigheden	B/K/G/T	Preambule	5-1 3-5	een leer- en/of werkplanning maken *(leren reflecteren op het leer- en werkproces)* een eenvoudig bedrijfsmatig vraagstuk planmatig onder-zoeken *(leren leren)*
5	projectmatig werken en werkt volgens algemeen geldende procedures en regels binnen de organisatie en die van de klant	B/K/G/T	Preambule	5-1 5-2 4-6	een leer- en/of werkplanning maken het leer- en/of werkproces bewaken *(leren reflecteren op het leer- en werkproces)* omgaan met formele en informele afspraken, regels en pro-cedures *(leren communiceren)*

Continuation Figure 15

Nr.	*Eindterm*	*Leerweg*	*Bron*	*Nr.*	*Kerndoel*
6	rekening houden bij de uitvoering van zijn taken, met zijn eigen taken, verantwoordelijkheden en bevoegheden, en die van collega's binnen de organisatie- en/of projectructuur	B/K/G/T	ICT/K	1-6	in het leer- en werkproces adequaat omgaan met zichzelf en anderen (basisvaardigheden)
7	schriftelijk en mondeling communiceren, zowel in de Nederlandse als in de Engelse taal	B/K/G/T	ICT/K	1-3 1-4	de Nederlandse taal functioneel gebruiken *(basisvaardigheden)* de Engelse taal functioneel gebruiken *(basisvaardigheden)*
8	Relaties onderhouden en teamgericht samenwerken met klanten, leveranciers, en collega's op verschillende niveaus	B/K/G/T	Preambule	4-2	overleggen en samenwerken in teamverband *(leren communiceren)*
9	nieuwe ontwikkelingen in het beroep volgen en toepassen, en kan hoofd- en bijzaken onderscheiden	B/K/G/T	Preambule	6-3	het zicht krijgen op beroepen, de beroepspraktijk en actuele ontwikkelingen darbinnen *(leren reflecteren op de toekomst)*
10	de effectiviteit en de efficiëntie van zijn eigen werkzaamheden bepalen en op basis van de verkregen informatie zijn inzichten bijstellen	B/K/G/T	Preambule	5-3	een eenvoudige product- en procesevaluatie maken en hieruit conclusies trekken *(leren reflecteren op het leer- en werkproces)*
Deelkwalificatie Beheren van hard- en software 3 **MBO**		**CREBO** 56098/ICT 18.3		kenniscentrum: **ECABO** **VMBO**	
Nr.	*Eindterm*	*Leerweg*	*Bron*	*Nr.*	*Kerndoel*
	De kandidaat kan:				De kandidaat kan:
1	storingen lokaliseren, de oorzaak van storingen achterhalen, documenteren en verhelpen met beschikbare methoden, hulpmiddelen en informatie uit gedocumen teerde storingsmeldingen	B/K/G/T	ICT/K	1-4 1-5	signaleren van conflicten tussen componenten van een computerconfiguratie lokaliseren en opheffen van ennvoudige storingen t.a.v. een computersysteem, aan de hand van instructies *(onderhoud en beheer informatisystemen)*
2	ter voorkoming van storingen diverse hard- en software-onderdelen (inclusief de netwerkinfrastructuur) beheren, beveiligen en testen, en kan zonodig verbetervoorstellen doen	B/K/G/T	ICT/K	1-8	eenvoudige test-, afregel- en controlewerkzaamheden verrichten, inclusief electronische metingen aan de hand van instructies *(installatie hardware)*
3	inschatten wat de consequenties van innovaties voor zijn eigen beheerwerkzaamheden zijn	B/K/G/T	Preambule	3-2	strategieën gebruikuen voor het aanleren van nieuwe kennis en vaardigheden zols memoriseren, aantekeningen maken, schematiseren, verbanden leggen tussen aanwezige kennis *(leren leren)*

Continuation Figure 15

Nr.	*Eindterm*	*Leerweg*	*Bron*	*Nr.*	*Kerndoel*
4	systemen demonteren en gedemonteerde componenten testen	B/K/G/T	ICT/K	1-9 1-10	demonteren van een computersysteem aan de hand van instructies gedemonteerde componenten testen op mogelijk (her)gebruik (installatie hardware)
5	eigen werkzaamheden planmatig verrichten en houdt rekening met veranderende eisen en omstandigheden	B/K/G/T	Preambule	5-1 3-5	een leer- en/of werkplanning maken (leren reflecteren op het leer- en werkproces) een eenvoudig bedrijfsmatig vraagstuk planmatig oderzoeken (leren leren)
6	projectmatig werken en werkt volgens algemeen geldende procedures en regels binnen de eigen organisatie en die van de klant	B/K/G/T	Preambule	5-1 5-2 4-6	een leer- en/of werkplanning maken het leer- en/of werkproces bewaken *(leren reflecteren op het leer- en werkproces)* omgaan met formele en informele afspraken, regels en procedures *(leren communiceren)*
7	rekening houden, bij de uitvoering van zijn taken, met zijn eigen taken, verantwoordelijkheden en bevoegdheden, en die van collega's binnen de organisatie- en/of projectstructuur	B/K/G/T	ICT/K	1-6	in her leer- en werkproces adequaat omgaan met zichzelf en anderen (basisvaardigheden)
8	schriftelijk en mondeling communiceren, zowel in de Nederlandse als in de Engelse taal	B/K/G/T	ICT/K	1-3 1-4	de Nederlandse taal functioneel gebruiken *(basisvaardigheden)* de Engelse taal functioneel gebruiken *(basisvaardigheden)*
9	relaties onderhouden en teamgericht samenwerken met klanten, leveranciers, en collega's op verschillende niveaus	B/K/G/T	Preambule	4-2	overleggen en samenwerken in teamverband *(leren communiceren)*
10	zich dienstbaar opstellen en toont begrip voor de belevingswereld van klanten en collega's	B/K/G/T	ICT/K	1-6	in het leer- en werkproces adequaat omgaan met zichzelf en anderen (basisvaardigheden)
11	nieuwe ontwikkelingen in het beroep volgen en toepassen, en kan hoofd- en bijzaken onderscheiden	B/K/G/T	Preambule	6-3	het zicht krijgen op beroepen, de beroepspraktijk en actuele hontwikkelingen daarbinnen *(leren reflecteren op de toekomst)*
12	de effectiviteit en de efficiëntie van zijn eigen werkzaamheden bepalen en op basis van de verkregen informatie zijn inzichen bijstellen	B/K/G/T	Preambule	5-3	een eenvoudige product- en procesevaluatie maken en hieruit econclusies trekken *(leren reflecteren op het leer- en werkproces)*

Continuation Figure 15

Deelkwalificatie Ondersteunen van systeemgebruikers 3		**CREBO** 56098/ICT 19.3			kenniscentrum: **ECABO**
	MBO		**VMBO**		
Nr.	*Eindterm*	*Leerweg*	*Bron*	*Nr.*	*Kerndoel*
	De kandidaat kan:				De kandidaat kan:
1	de werking van systemen mondeling toelichten en in gebruikersinstructies beschrijven, afgestemd op (de werkzaamheden van) de diverse gebruikersgroepen	K/G/T	ICT/K Preambule	1-4 4-7	beschrijven van de praktische gevolgen van ict voor de werkplek *(ict-werkveldoriëntatie)* zichzelf en eigen werk presenteren *(leren communiceren)*
2	informatieverzoeken van gebruikers en servicedesk-medewerkers afhandelen	B/K/G/T	Preambule	4-3	passende gesprekstechnieken hanteren *(leren communiceren)*
3	incidentmeldingen van gebruikers en servicedesk-medewerkers registreren, specificeren en oplossen, en kan hierover leidinggevenden informeren	B/K/G/T	ICT/K	1-1 1-9	Informatie beoordelen op betrouwbaarheid, representativiteit en bruikbaarheid, informatie verwerken en benutten *(basisvaardigheden)* onder supervisie gebruikers ondersteunen bij het werken met computersystemen *(onderhoud en beheer informatiesystemen)*
4	projectmatig werken en werkt volgens algemeen geldende procedures en regels binnen de eigen organisatie en die van de klant	B/K/G/T	Preambule	5-1 5-2 4-6	een leer- en/of werkplanning maken het leer- en/of werkproces bewaken *(leren reflecteren op het leer- en werkproces)* omgaan met formele en informele afspraken, regels en procedures *(leren communiceren)*
5	rekening houden bij de uitvoering van zijn taken, met zijn eigen taken, vrantwoordelijkheden en bevoegdheden, en die van collega's binnen de organisatie- en/of projectstructuur	B/K/G/T	ICT/K	1-6	in het leer- en werkproces adequaat omgaan met zichzelf an anderen *(basisvaardigheden)*
6	schriftelijk en mondeling communiceren, zowel in de Nederlandse als in de Engelse taal	B/K/G/T	ICT/K	1-3 1-4	de Nederlandse taal functioneel gebruiken *(basisvaardigheden)* de Engelse taal functioneel gebruiken *(basisvaardigheden)*
7	relaties onderhouden en teamgericht samenwerken met klanten, leveranciers, en collega's op verschillende niveaus	B/K/G/T	Preambule	4-2	overleggen en samenwerken in teamverband *(leren communiceren)*

Continuation Figure 15

Nr.	*Eindterm*	*Leerweg*	*Bron*	*Nr.*	*Kerndoel*
8	zich dienstbaar opstellen en toont begrip voor de belevingswereld van klanten en collega's	B/K/G/T	ICT/K	1-6	in het leer- en werkproces adequaat omgaan met zichzelf en anderen *(basisvaardigheden)*
9	nieuwe ontwikkelingen in het beroep volgen en toepassen, en kan hoofd- en bijzaken onderscheiden	B/K/G/T	Preambule	6-3	het zicht krijgen op beroepen, de beroepspraktijk en actuele ontwikkelingen daarbinnen (leren reflecteren op de toekomst)
10	de effectiviteit en de efficiëntie van zijn eingen werkzaamhedenv bepalen en op basis van de verkregen informatie zijn inzichten bijstellen	B/K/G/T	Preambule	5-3	een eenvoudige product- en procesevaluatie maken en hieruit conclusies trekken (leren reflecteren op het leer- en werkproces)

4.3 "Doorstrooming" within intermediate vocational education and training

A key feature of intermediate vocational education and training in the Netherlands is the vertical division of the structure of the provision into four levels. Intermediate VET for the IT sector begins with level 2 with the qualification of Service Medewerker ICT (Service Worker ICT). Those completing this qualification at level 2 can progress as far as level 4 via the provision at level 3. Selected partial achievements can be accredited towards subsequent courses of continuing training, enabling continuing training to be shortened. At this point, however, reference should once again be made to the fact that direct entry to levels 3 and 4 is possible, insofar as candidates have completed certain school qualifications or fulfil the entry requirements.

Alongside direct vertical progression, horizontal switching ("retraining") is also possible, providing certain partial achievements have been recognised.

4.4 On the transition from intermediate vocational education and training to the higher education sector

The principle of the systematic promotion of transition between the various levels of education and training is continued into the transition from vocational education and training into the higher education sector.[15]

Those successfully completing level 4 of intermediate VET are in possession of the entry requirements for the commencement of further higher education training in IT related subjects (subject related University of Applied Sciences entrance qualification). This enables qualifications to be acquired at level 4 which provide a higher education entrance qualification as well as leading to a vocational qualification.

Universities of Applied Sciences in the Netherlands, however, enjoy a high measure of autonomy, which also applies in respect of admission to the various courses of study. Therefore, although the fostering of transitions from intermediate VET to higher professional education involves the acquisition of the right of entry to a higher education course of study, this is not linked to a specific place at a specific University of Applied Sciences.

15 The issue of the extent to which transitions take place between intermediate VET and higher professional education, which difficulties are involved in such transitions in terms of structure, biography and didactics of content and how the principle of "doorstrooming" can be improved and fostered has formed the object of various academic studies in the Netherlands over the course of recent years. The following selected publications provide interesting and significant VET policy and vocational education results: Het Platform Beroepsonderwijs (2004): Werkboek Versterking doorstroom van MBO naar HBO. Uitgangspunten, Modellen, Instrumenten. Den Haag; JANSEN, L / SEIJ, E. / SEMEIJN, B. (2003): Oriëntatie op het HBO: Hoe kiezen mbo-leerlingen hun vervolgopleiding? Een onderzoek naar studievoorlichtingsmateriaal. Amersfoort: ECABO; LUKEN, T. / NEWTON, I. (2004). Loopbaanbegeleiding bij de doorstroom van mbo naar hbo. Amsterdam: NOA/VU.

Entry to a university course of study, insofar as students are not in possession of a classical, general higher education entrance qualification, is only possible on completion of a qualification within the University of Applied Sciences sector.

Entry to the University of Applied Sciences sector can take place on the basis of the following IT qualifications:

- Applicatiebeheerder (Application Manager)
- Applicatieontwikkelar (Application Developer)
- ICT-Beheerder (ICT Manager)
- Netwerkbeheerder (Network Manager)

The principle applies that those completing these qualifications may have partial achievements already acquired accredited towards the higher education course of study, thus leading to a shortening of the duration of study and enabling redundant content to be avoided. It is incumbent on the Universities of Applied Sciences to grant such partial recognition, considerable differences being possible locally and regionally.

Agreements between the regional VET centres (ROC's) and the regional and local Universities of Applied Sciences are not infrequent, the aim of these being the coordination of content of selected VET provision and the promotion of transitions to higher professional education.[16]

In quantitative terms, transition from intermediate VET to higher professional education is highly significant. Just under a third of those completing intermediate VET go on to the University of Applied Sciences sector to continue their vocational education and training (cf. Het Platform Beroepsonderwijs 2004, pp. 11 ff.). The majority of these persons come from the BOL variation of vocational education and training, i.e. having pursued the school-based route (cf. Chapter 1). According to research conducted thus far, no data is as yet available in respect of how many of those completing intermediate VET from the IT field specifically progress to the University of Applied Sciences sector.

Alongside the local and regional coordination measures described above for the promotion of individual decisions for the commencement of a higher education course of study, vocational students also receive current information on study possibilities. The regional training centres are responsible for vocational guidance and careers advice for the young adults.

16 At the University of Applied Sciences in Rotterdam, for example, systematic and regular coordination between providers of intermediate VET and higher professional education takes place as a result of an initiative by the information technology specialist division ("Rotterdams Instituut voor Informatica Opleidingen"). This extends to include the deployment of lecturers from the University of Applied Sciences for the teaching of level 4 vocational education courses within the final year of schooling and for the preparation of those completing such courses for higher education study.
A further example: www.leerverder.nl provides those who have completed various subject areas within intermediate VET with the opportunity of obtaining a wide range of information as to which study possibilities are available at the Universities of Applied Sciences in the various regions.

In addition to this, the regional training centres provide courses offering preparation for the commencement of a higher education course of study. These courses impart learning strategies as well as content related specialist knowledge and skills. Fundamentally speaking, higher professional education in the Dutch Universities of Applied Sciences Netherlands is accorded considerable significance within the endeavours ongoing within vocational education and training policy to provide the initial and continuing training for the required skilled staff within the IT sector. In contrast to the situation prevailing in Germany, the two forms, both intermediate VET and higher professional education, are integrated into the structure of provision.

For the Universities of Applied Sciences sector, a nationwide "Bachelor of ICT" profile has been developed, the aim being that this will serve as a basis for Bachelor provision within institutes of higher education. Development took place under the auspices of the HBI-I-Stichting, a higher education association focussing on the development, establishment and promotion of IT training at the Universities of Applied Sciences (cf. www.hbo-i.nl). The full ICT Bachelor concept, featuring a "competence oriented profile description", may be viewed at www.hbo-i.nl, which also provides a comparison between the ICT Bachelor and European provision, including the German IT continuing training system. This comparison is, however, drawn in extremely unsystematic terms, and it is not the intention at this point to enter into any further detail.

4.5 "Double qualifications" in vocational education and training: German traditions, comparative findings and conclusions for the IT continuing training system

4.5.1 "Double qualifications" as a concept and as an instrument for linking VET to higher education in Germany

Within German vocational education and training policy and VET theory, the issue of "double qualifications" has for decades been accorded a central significance within the context of the requirement for equivalence of VET and general education.

The explicit objective of the German IT continuing training system, which serves as a reference system and starting point in respect of the present comparative study, is use the planned linking with and connectivity to courses of higher education as a vehicle to increase the attractiveness of vocational and in-company qualifications on offer. As well as facilitating access to higher education, the aim of the qualifications of the IT continuing training system very much focuses on establishing equivalence between the higher qualifications, the Professionals, and the new higher education Bachelor degrees (cf. BORCH/WEIßMANN 2002).

To this extent, the objective of the German IT continuing training system also focuses on fulfilling a VET policy and theory requirement virtually traditional in nature.

The aim of the following is to provide a brief explanation of the issue of "double qualifications in vocational education and training" from a specifically German point of view and from a comparative perspective, the objective being to make clear that, in European terms, the relationship between general, vocational and higher education and training in Germany takes on a "special role".

In Germany, "double qualifications" are defined as those qualifications which, in the upper secondary and post secondary sectors

- both lead to a school or higher education related entry qualification (such as to a general higher education entrance qualification) and
- result in a vocational qualification which is fundamentally labour market related and relevant to employment.

Within a narrower definition of the term, "double qualifications" can also be viewed as qualifications simultaneously obtained within a self-contained educational or vocational course where various organisational and curricular modifications have been coalesced to form the basis of the acquisition of the two qualifications mentioned above, qualifications which in their original form are provided within separate educational and VET courses. In a wider sense, however, "double qualifications" also represent qualifications which successively result in a (higher) education and a vocational qualification (cf. DAUENHAUER/KELL 1990, pp. 47 ff.).[17]

As already indicated, a differentiation of "double qualifications" needs to be made in respect of the entitlements issued. "Full double qualifications" combine a general higher education entrance qualification with a recognised vocational qualification, "partial double qualifications" comprising alternative variations of the linking between school-route related and vocationally qualifying entitlements, such as the accreditation of school-based vocationally related courses to the labour and training places market or the establishment of equivalence between a vocational qualification with a lower secondary qualification.

In contrast to the prevailing situation in many European countries, double qualifying courses and qualifications in Germany are not standardised on a national basis. The picture is far more one of a confusing multitude of double qualifying variations, which have emerged particularly as a consequence of the different (school) legislation stipulations within the federal states. A fundamental differentiation needs to be made between double qualifying provision offered by vocational schools and the possibilities for double qualifications which exist within the scope

17 In other areas, a differentiation is made in this regard between "integrative" and "additive" double qualifications (cf. PILZ 2003). The main theme addressed within this approach is the scope of interlinking, convergence or coordination of the contents and objectives of double qualifying courses in terms of the curriculum and teaching methods adopted.

of non-school based initial and continuing vocational education and training pursuant to the Vocational Training Act and the Craft Trades Code.

Examples of the typical double qualifying provision offered by the vocational schools are represented by the full-time vocational schools and the vocational upper secondary schools, which offer a full or partial vocational qualification linked with additional further school and higher education access entitlements. This "full-time school based VET provision" is structured in widely differing ways across the federal states in terms of designations, objectives, contents and access entitlement functions (cf. REINISCH 2001).

It is not usually possible to acquire double qualifications within the framework of non-school based vocational education and training pursuant to the Vocational Training Act and Craft Trades Code. There are some exceptions to this in the form of the possibilities of using the successful acquisition of a VET qualification or extra certifications obtained at vocational school as the basis for gaining recognition for an additional school leaving certificate, although this is limited to the recognition of a lower secondary school leaving certificate or an intermediate school leaving certificate depending on the prior learning of the students. Acquisition of a general higher education entrance qualification within the scope of work-based VET is not possible, pilot projects (cf HÖPFNER 1996) forming one of the few exceptions to this. Notwithstanding this, there is a wide selection of various higher education access opportunities deriving from qualifications obtained within the scope of work-based upgrading training, such as "Banking Specialist", "Balance Sheet Accountant" or on the basis of technical master craftsman qualifications. A multitude of stipulations in federal state and higher education law govern this area.[18]

In educational and VET policy terms, the underlying intention of the creation of double qualifying courses is an interest in raising the attractiveness of vocational training courses, especially against the background of plans to increase demand for non-school based VET variations. The argument for equality of opportunity within the context of the demand for equivalence of VET and general education also serves as a rationale for double qualifying qualifications. A further aim of double qualifying courses is to assist in directing educational flows at the first threshold (after completion of compulsory schooling) towards vocational education and training, thus also fulfilling the educational policy objective of bringing about a long-term increase in the rate of students at institutes of higher education.

In Germany, however, this issue is imbued with educational policy reservations and remains contentious, meaning that, in contrast to all European neighbouring countries, there can be no question of a strategy aimed at the creation of double qualifying educational and VET courses.

18 See here the article by REINISCH within the present volume.

Strictly speaking, double qualifying initial and continuing vocational education and training variations are based on the assumption in principle that it is possible in some degree to acquire both pre-higher education competences (in the sense of study ability) and vocationally qualifying competences in an integrative manner within a joint course. This thesis has left a lasting mark on both the history and establishment of VET within the German-speaking world as well as upon the development of VET research and the firm establishment of the academic discipline of vocational pedagogy and business education at the universities.

This has led to a series of studies, which have taken the disjunction of general education and VET as their starting point, describing and explaining the phenomenon of the separation of general education and VET, traditionally anchored in terms of educational organisation and entitlement policy. Particularly well-known in this field are the social history and system theory structured studies on the development of in-company VET [19], on the professionalisation of vocational schools[20] and on the general educational area, focussing on the implementation and establishment of university entrance examinations and qualifications.[21] The basis of the school-based college and school pilot projects in North Rhine-Westphalia, where double qualifications formed a central objective, was the work focussing on the historical analysis of problems and VET theory conducted by Herwig BLANKERTZ.[22]

These studies address the development of the German educational and VET system, highlighting conditions and vested interests within the framework of the genesis of typical educational and VET structures which have impacted upon the disjunction of the lack of equivalence between general education and vocational education and training.

From a vocational education point of view, it could be stated that underlying these studies is the virulent VET theory problem of the extent to which it is also possible to acquire additional school pathway related entitlements and competences within the framework of school-based and work-based vocational education and training. The VET theory argument runs that conventional general schooling content and learning areas do not represent the only basis by which school entitlements, such as the general higher education entrance qualification, may be obtained. The assumption is that, in principle, teaching and learning processes focussing on specialist vocational subjects may also result in propaedeutic, functional achievement in academic terms.

Against this VET policy and theory background, the benefits afforded by double qualifying qualifications and courses need to be measured against the attendant "objective exchange values and subjective practical values" (KUTSCHA 2003). The

19 Reference may be made to such works as STRATMANN/SCHLÖSSER 1990; STRATMANN 1992; STRATMANN 1993.

20 Cf. here JOST 1982; HARNEY 1980.

21 Cf. LESCHINSKY/ROEDER 1983; LUNDGREEN 1980; WOLTER 1987.

22 BLANKERTZ 1963; 1969.

benefits or success of double qualifying qualifications and courses should, therefore, also be evaluated in terms of the extent to which a) the further school entitlements result in the following completion of subsequent educational courses (such as the study success achieved by those who have achieved a higher education entrance qualification on the basis of a "double qualification" as opposed to those who have acquired an upper secondary school leaving certificate in a "classical" way and b) the extent to which those holding a "double qualification" are able to pursue their careers successfully and enter into adequate career routes compared to the conventionally trained cohort, rather than by means of an assessment on the basis of which entitlements are established in terms of the further education or employment system (exchange value).

It should be stated that there has been to date a dearth of studies providing an empirical investigation into the subjective practical value of double qualifications (especially in terms of comparison with conventional qualifications).[23]

4.5.2 On the issue of "double qualifications" from an international comparative perspective

The dual system of vocational education and training in Germany occupies a special position in Europe. The predominant form of VET pursuant to the Vocational Training Act and the Craft Trades Code results in qualifications of exceptionally high vocational value. The qualifications resulting from this classical form of initial and continuing vocational education and training represent a "hard currency" on the labour market. Those completing such VET are able to obtain relatively stable employment as employees and skilled workers in task and functional areas (cf. MOHR/KROSCHEL/KEINER 2001, here based on HARNEY/KISSMANN 2000) which in other countries are not infrequently be occupied by higher education graduates (cf. MAURICE/SELLIER/SILVESTRE 1979; later HEIDENREICH 1991; DREXEL 1993; BACKES-GELLNER 1996; BRAUNS/MÜLLER/STEINMANN 1997).

Apart from the exceptions outlined above, however, these qualifications do not traditionally confer any nationwide or systematic general educational entitlement in respect of further schooling or higher education courses.

As far as school-based VET courses are concerned, however, the opposite situation applies. They confer additional general education entitlements extending as far as a higher education entrance qualification, although their vocational qualification status enjoys only a relatively low status on the labour market, again with a few exceptions.

23 There are, however, various studies conducted by the HIS Higher Education Information System in Hanover on the study success of those who have completed VET; cf. for example HIS Project Report (Final Report, November 2001, unpublished) on the evaluation of the North Rhine-Westphalian pilot project "Hochschulzugang ohne Hochschulreife für besonders qualifizierte Bewerberinnen und Bewerber gemäß § 45a Fachhochschulgesetz (FHG) Nordrhein-Westfalen" *("Higher education access without general higher education entrance qualification for particularly qualified applicants pursuant to § 45a Universities of Applied Sciences Law (FHG) of the State of North Rhine-Westphalia").*

Within the logistics of the development and profiling of educational and VET systems, the increase in school-based and theoretical components within the VET curriculum are leading to a higher level of recognition within general education ("upgrading" principle).[24]

There is, however, no traditional linking of work-based practical vocational education and training and its predominantly experience related learning processes with the acquisition of "study ability", either in Germany or other European countries. In most countries, school-based VET qualifications enjoy a much greater level of recognition on the labour market, the school-based VET route, as opposed to work-based or dual in-company VET, being the more attractive variation for young adults making a training course decision at the first threshold (cf. FROMMBERGER 2005d).

As a consequence, German qualifications from the dual VET system are also accorded a relatively low level of recognition in terms of European comparison. Within the "comparability system"[25], qualifications acquired at skilled worker and employee level, in the same way as will probably ensue with the development of the EQF (European Qualifications Framework)[26], are "only" aligned at level 2.[27]

Initial vocational education and training in most other countries, which are based on full-time school based VET variations, is allocated to level 3 (for more detail, cf. FROMMBERGER 2005).

The tradition and VET philosophy of most European states, where it is customary for those who have been relatively unsuccessful in the general schooling system and in coming to terms with school-based learning to opt for work-based qualifications and VET, makes such an alignment plausible.

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24 The principle of "upgrading", which takes place via the introduction of a more school-based approach and the development of a "culture of explicit knowledge" (cf. here HARNEY/KISSMANN 2000) is clearly traceable in the history of both the German and the Dutch VET systems (for more detail, cf. FROMMBERGER 1999).

25 Cf. Council Decision of 16 July 1985 on the comparability of vocational training qualifications between the Member States of the European Community (85/368/EC), OJ. L 199 of 31 July 1985; cf also Commission of the European Communities 1992.

26 Cf. GEHMLICH 2004; HANF/HIPPACH-SCHNEIDER 2005.

27 The five-level SEDOC register *(Register of Occupations and Professions in International Exchange)* was used as a reference framework for the differentiation of qualifications levels within the comparability system. This system links general and VET qualifications acquired with the expected occupational and work-based activity requirements and ranges from semi-skilled occupations to the higher education graduates level.
The SEDOC system represented an attempt to create a joint, predominantly statistical procedure as a vehicle foe the establishment of a certain homogeneity within cooperation between respective communication partners, not withstanding the varying labour market and occupational structures prevailing within the individual countries. A series of problems, including statistically related comparability problems, very soon meant that the procedure had to be reformed. In 1993, a much more broadly based system was adopted, providing a wide range of supplementary country specific data and facts extending beyond statistics. This EURES (European Employment Services) Network was established on the basis of a European Commission Decision of 22 October 1993 (OJ L274, 6 November 1993); cf. European Commission (Ed.): EURES (European Employment Services) – Report on the operation of EURES, Brussels 1996.

From a German point of view, however, the alignment of German training occupations to level 2 has met with hefty criticism which is still ongoing today. The feeling is that no appropriate assessment and evaluation of the competences acquired has taken place in respect of the future in-company and occupational activities of those completing such training occupations. A further object of criticism is that the European comparability framework of 1985 (see above) assumes an equivalence between formal school and higher education and the subsequent activity, something which rarely corresponds to the reality of the European labour markets.

The negotiation partners have not, however, thus far been able to reach an amicable decision in respect of the allocation of the German training occupations to the higher level of 3, the view of many other member states being that the high proportion of training which takes place via in-company training does not secure the necessary theoretical knowledge.[28]

This leads to the conclusion that the proportion of school-based learning fundamentally increases the quality rating of vocational qualifications, both with a view to the domestic situation in Germany and in terms of the situation in other countries.[29] This is a principle firmly established within Germany and the Netherlands, just as it is all educational and VET systems, as far as can be judged.

The characteristic of the particular German situation is the fact that a system of dual vocational education and training, which could be said to determine the supply and demand of vocational education and training recognised under public law, has become established alongside the formally higher value school-based VET. The German model of VET, the "dual system", is accorded a special position both in

28 Note: it will probably also not be possible in the long term to position German initial VET, with its strongly varying levels, appropriately within the European Qualifications Framework. It also needs to be admitted that not all training occupations pursuant to the Vocational Training Act lead to such competences and activities such as would constitute level 3 from a German point of view. In addition to this, the basis of the training occupations is, in formal terms, the lower secondary school leaving certificate.
A successful strategy in terms of an appropriate European comparison can only lie in the differentiation of the German qualifications levels, a process which will involve explicit formulation of entry requirements. This would, however, mean that school leaving certificates acquired would constitute the benchmark for entry into vocational education and training. This would be in contradiction of a German VET tradition, at least in formal terms, that entry to the vocational education and training system is not linked to general education qualifications (cf. FROMMBERGER 2005c).

29 This description presents the traditional framework conditions for the development of vocational education and training. More recent developments have seen a massive rise in the significance of so-called "alternating VET" in Europe, for example (for more detail, cf. FROMMBERGER 2005c). This means that even in areas where traditional, school-based VET predominates, in-company, practical proportions are growing and being systematically integrated into the vocational education and training. VET choice patterns, however, continue to be characterised by the classic pathways, meaning those who are relatively able and achieve good qualifications in general education usually complete a general higher education entrance qualification or a full-time, school based VET variation.
In the Netherlands, despite the equivalence between work-based and school-based VET applying since the mid-nineties, there is also a observable trend for young people with higher value school qualifications to opt for the full-time, school based VET variations (cf. KROM/VAN GRINSVEN 2003).

international comparative terms and in Europe. In no other country is there such a marked tradition of participation and commitment on the part of companies in the training of young people after the end of compulsory schooling, and in no other country does in-company socialisation and work-based learning by experience enjoy such a high reputation within trade and industry and society. The traditional form of German vocational education and training has encountered a massive amount of criticism, some of which has been has been manifest, within political and academic debate. And yet: the fundamental principles of vocational education and training within the "dual system" and the high vocationally qualifying function which they characterise continue to be viewed mostly positively and are underpinned down to the present day by the social partners, educational and VET policy and the broad sweep of public opinion.

The international comparative perspective thus throws up a central deficit. A clear majority of qualifications acquired within VET, including therefore qualifications pursuant to the Vocational Training Act and the Craft Trades Code, do not display any connectivity to the educational and higher education system.

In terms of the organisation of the educational and VET system, as described above, Germany has a special role within Europe. The burgeoning "Europeanisation of vocational education and training", not least within the context of the "Copenhagen-Bruges Process", is rendering the differences increasingly apparent and creating an urgent necessity not to decouple the German system. In the light of VET developments in Europe, the linking of the various educational sub-systems and the attendant connection between "vocational education and training", "general education" and higher education, an old and traditional focus within German VET research, is thus more topical than ever.

4.5.3 Conclusions for the German IT continuing training system in terms of the linking to the area of higher education

This section does not seek to clarify the issue why the work-based, dual form of qualification and training for skilled workers and young employees has been able to establish itself in Germany and why school-based VET is accorded subordinate importance.[30]

The focus is far more on determining which conclusions may be drawn from the above remarks in respect of the German IT continuing training system and the issue of connectivity to the higher education system.

30 Alongside the description of the VET situation within various national areas, comparative vocational education and training research seeks to identify findings relating to the issue of why, in contrast to virtually all other countries, the work-based, dual system of vocational education and training has been able to establish itself in Germany against school-based VET or individually based company qualifications (cf. FROMMBERGER/REINISCH 2004b). This produces explanatory findings regarding the divergences and convergences of various national VET systems. The present study, however, does not aim to present any further remarks in respect of this.

To a greater extent than is the case in other forms of work-based upgrading training, the German IT continuing training system is linked to in-company work and business processes and the functional occupational competences acquired within the course of these (work process orientation principle). It is a fair assumption that those who successfully acquire an IT continuing training qualification are highly qualified and may directly and rapidly be deployed within the various and respective in-company task areas.

The didactic focus of the IT continuing training system is on the acquisition of work process knowledge, the advantages of this, at least from a conceptual point of view, lying in the fostering of opportunities for application and transfer and the directly activity related evaluation and certification of the competences targeted.[31]

Nevertheless, the issue of the "study ability" of those completing training centres on the extent to which the strongly work-based and functionally oriented knowledge, skills and experience acquired are capable of being successfully deployed within a higher education course of study, in order to tap into knowledge which is more systematically and explicitly structured and imparted, and on being able to convert this into additional, academic competences.

To a greater extent than in all other forms of initial and continuing vocational education and training, the profiling of the IT continuing training qualifications takes place on the basis of the dissolution of content and learning venue related standards. It is a fair assumption that there is a distance between this form of vocational education and training and the usual academic, didactic and methodological conceptual, sequencing and structural forms essentially focussing on the theoretical gaining and imparting of knowledge.

In the interests of establishing the IT continuing training system and underpinning its aims, particularly with regard to linking to the higher education sector, investigations will need to be conducted in respect of the level of study success achieved by those completing qualifications and, as the case may be, which additional provision or coordination of content will be helpful in giving preparation for higher education study.

Long-term studies and broadly based surveys are being conducted in the Netherlands to explore the conditions under which transitions take place between VET and higher education and the consequences of these transitions (see above). The findings are used to bring about improvements in the interfaces and transitional processes. There is a need for such information in respect of both the German IT continuing training system specifically and the basic issue of transitions from vocational education and training to higher education generally.

31 Notwithstanding this, according to a thesis propounded in GROLLMANN/TUTSCHNER, this appears to relate to a concept of work process knowledge not compatible with traditional German vocationalism, especially due to the modular nature of the basic structure.

Alongside the fundamental question of entitlement, which is assessed here as a educational and VET policy issue, the success or failure of the IT continuing training system in terms of the link to the higher education sector will manifest itself mainly against the background of the imparting of "study ability". The main focus of consideration will also need to be placed on the conceptual design and structuring of the continuing training profiles in terms of content as well as on the didactic and methodological approach adopted towards the imparting and acquisition of the qualifications.

The IT continuing training system compensates for deficits which are apparent from an internationally comparative perspective in terms of the fundamental linking of vocational education and training to the higher education sector (see above). The exclusive equipping of those completing qualifications with additional entitlements will not, however, be sufficient in the medium to long term. The ability to acquire such knowledge and competences evincing a sustainable benefit for the pursuit of an academic course of study will prove much more important.

5. Specific issues and comparative aspects of the Netherlands country study

5.1 Introduction

Figure 16: **Specific issues and comparative aspects**

No.	Specific issues and comparative aspects	Relevant section within the present study
1.	According to which didactic principles should initial and continuing IT training operate? What is the role played by the principle of work process orientation?	5.2
2.	According to which procedures are the IT vocational education and training profiles developed?	5.3
3.	How are knowledge and skills acquired ascertained? Which examination and evaluation forms are practised?	5.4
4.	How is the coordination conducted between typical IT industry certificates and the nationwide IT initial and continuing training profiles provided under public law?	5.5
5.	What is the quantitative significance of the IT initial and continuing VET system regulated under public law? What is the vocational and "labour market" value of the qualifications and certificates regulated under public law?	5.6
6.	To which European and international standards does the IT initial and continuing training system correspond?	5.7
7.	Concluding remarks	Chapter 6

5.2 Principle of "competence orientation"

"Competence orientation" is a new concept in the Netherlands for the modernisation of vocational education and training. Although it impacts upon the development and structuring of basic VET curricular principles, it is particularly aimed at creating a new or different understanding of vocational learning. The intention in terms of VET policy focuses on bringing about an improvement in coordination between vocational education and training and qualifications and current and future labour and employment demands and the necessary requirements placed on in-service and lifelong further development of specialist and cross-sectoral competences:

"An important reason for the popularity of the concept of competence is the expectation held by many stakeholders in the VET field that the gap between the labour market and education can (and will) be reduced through competence-based-education. The underlying idea is that vocational education should enable students to acquire the competencies needed in their future professions, and in society in the whole (…) Thus there is a growing recognition of the need for vocational education to be directed at developing competencies, and not just at acquiring a diploma; the emphasis has to be on capabilities and not on qualifications." (BIEMANS/NIEUWENHUIS/POELL *et al. 2005, pp. 1 ff.)*

Within the curricular determination of vocational education and training, the aim is to close the "gap" described by stipulating which skills and competences learners should acquire. This means that only secondary importance is attached to what should form the content related and specialist basis by which these competences may be acquired, at least at the level of curricular standardisation:

"The new qualifications structure is a logical step in the development of the VET system. VET developed from the lower secondary sector, where thinking operates very much along subject lines. The learning process was traditionally split into individual parts, mostly free standing and relatively unrelated. The enactment of the Vocational Training Act (WEB) brought a departure from the old subject model, the knowledge and skills of employees becoming the starting point for the form and content of the training. Occupational requirements were described within the qualifications structure. Notwithstanding this, subject tradition has still been playing a part in the recent past, such as in the way isolated occupational skills are imparted in modules (...) Qualifications had been described in far too much detail, the order in which they were to be provided sometimes also being stipulated in advance." (COLO *2004, pp. 1ff.)*

In the Netherlands, the principle of "competence orientation" is thus also resulting in the gradual dissolution of the partial qualifications which have determined the curricula since the introduction of the new Vocational Training Act in the mid-nineties and their replacement by amended learning units, the vehicle for which is the so-called qualifications profiles, composed of occupational competences, core

tasks and core activities (see case study example in Chapter 2, see also subsequent remarks):

*"Competence oriented qualifications profiles impart a good picture of the requirements associated with the core of the occupational activity. They provide participants such as schools with the opportunity of determining for themselves the route they take to reach them. The fact that they are both recognisable and allow leeway creates a tension between the detailed way in which the whole thing is described (such as often was the case with examination requirements up until now) and requirements which are formulated in too general terms and have thus lost any meaning." (*COLO *2004b, p. 7)*

5.3 On the development of the IT vocational education and training profiles

The IT initial and continuing training profiles ("kwalificatieprofiel") represent standardised descriptions targeted at the starting position of those who, on completion of a course of initial or continuing VET, switch over to full employment as an employee or skilled worker.

The IT initial and continuing training profiles are composed of one or more "occupational competence profiles", these being the products of close-knit, work-based qualifications research. The occupational competence profiles represent the formalised and standardised description of a set of core activities ("kerntakten"), core tasks ("kernopgaven") and occupational competences ("beroepscompetencies") targeted at direct, work-based practice (cf. COLO 2004; 2004b):

Kerntaken: a set of occupationally related activities, connected in terms of content, which are largely completed by those in employment. The learning activities reflect the characteristic activities of employees, in the logical order which occurs within the occupation as far as possible.

Kernopgaven: a core task is a critical occupational situation which has to be dealt with by an employee on a regular basis, which is characteristic of the occupation and where a targeted approach and a solution are expected from employees. Such a situation, confronting the employee with decisions, problems, dilemmas, areas of conflict and opportunities, is complex in nature. Core tasks relate to occupational situations which go across core activities, referring to several or all core activities needing to be dealt with within one or several specific organisational contexts. The core activities relate to the occupation in its entirety.

Beroepscompetencies: occupational competences are skills which people possess enabling them to react in an adequate, target oriented, motivated process and results oriented way in specific situations, meaning they are capable of selecting appropriate approaches and of achieving the right results. Occupational competences refer to areas of skills, knowledge and attitude, being applied and developed within a certain context.

In addition to these, each "kwalificatieprofiel" comprises a "learning and civic thought and action" profile. The learning competences describe the competences required by someone to be able to continue his or her training in another occupation or at a further level. The civic competences describe the competences needed for personal development and for engagement within society.
Colo 2004b provides a further and precise description and explanation of the individual steps comprising development of the curricular elements. It is not the intention to reproduce these details here.

5.4 Examination and certification

The basic principles relating to examination and certification within the area of vocational education and training were presented in Chapter 1. IT initial and continuing VET being provision under public law pursuant to the Vocational Training and Adult Education Act, the examination and certification requirements also correspond to these framework conditions.

The vocational schools are the central instances in respect of the identification of learning outcomes within the framework IT initial and continuing training, both conducting examinations and issuing certificates.

Examination forms vary, depending on the learning units and competences to be examined. They comprise written examinations, oral examinations and various "practical and holistic" examination forms (in respect of this division, cf. EBBINGHAUS/SCHMIDT 1999). Teaching staff at vocational schools assesses achievement, the development of sets of examination instruments by the Examensbank EBA (cf. www.examenbank.nl) also providing a basis for this.

External legitimation and quality control of the examinations are conducted by the "KwaliteitsCentrum Examinering" (cf. www.kce.nl). No recertification is required in respect of acquisition of the qualifications under public law.

Alongside the school-based evaluation forms, examination relocation to the learning venue of the company also takes place where necessary, this being conducted on the basis of local and regional coordination between VET stakeholders. The main emphasis here is on the evaluation, observation or assessment of practical competences.

"External" candidates, who have mainly acquired practical, occupational experience rather than having pursued conventional IT initial and continuing VET provision, may attempt to register for "external" examinations at the vocational schools. Admission depends on the evidence of occupational experience submitted (references, work samples etc.). In the Netherlands, expansion is taking place in respect of the accreditation of such competences which are acquired outside conventional forms of initial and continuing training, although it is not the traditional practice to award certificates and qualifications for learning outcomes which

are not linked to the conditions applying within systematic forms of learning (learning venues, stipulations in respect of time and content, teaching staff, and so forth).

The Dutch vocational schools being responsible for all forms of adult education and vocational education and training (training, continuing training, retraining), the IT initial and continuing VET qualifications may be acquired by a diverse range of groups, irrespective of whether persons are in possession of a work-based training place or are employed in an IT company.

5.5 Relation of public law IT qualifications to manufacturer and user qualifications

The development of the six central public law IT initial and continuing training occupational profiles is coordinated with the widespread user and manufacturer certificates from within the IT sector, these connections being referred to in the curricular stipulations. The following synopses contrast typical IT certificates ("niet reguliere certificeringslijnen") and three selected IT initial and continuing training occupational profiles (cf. ECABO 2004b).

The public law IT qualifications have been compared to the certification systems operated by EXIN, CompTIA A+, ComTIA Network+, Microsoft MCP, MOS and ECDL. Not included were certificates from Cisco, Novell and various other ComTIA and Microsoft modules (cf. ECABO 2004b, p. 3).

The following synopses provide a comparison for the following three IT initial and continuing training occupational profiles:

- Servicemedewerker ICT
- Medewerker Beheer ICT
- ICT-Beheerder.

Figure 17: **Medewerker beheer ICT versus industry certificates**

	Competenties Medewerker beheer ICT						
ICT Competenties	1.1	1.2	1.3	2.1	2.2	2.3	2.4
	De kandidaat kan onderdelen en componenten van samen te stellen systemen selecteren.	De kandidaat kan systemen installeren en configureren, zowel als onderdeel van een computernetwerk als stand-alone, en volgens in de organisatie geldende procedures de installatie- en configuratiegegevens van opgeleverde systemen documenteren.	De kandidaat kan geïnstalleerde systemen testen, fouten lokaliseren en oplossen, en desgevraagd verbetervoorstellen doen voor assemblage-, installatie- en/of configuratieprocessen.	De kandidaat kan storingen lokaliseren, de oorzaak van storingen achterhalen, documenteren en verhelpen met beschikbare methoden, hulpmiddelen en informatie uit gedocumenteerde storingsmeldingen.	De kandidaat kan ter voorkoming van storingen diverse hard- en software-onderdelen (inclusief de netwerkinfrastructuur) beheren, beveiligen en testen, en kan zonodig verbetervoorstellen doen.	De kandidaat kan inschatten wat de consequenties van innovaties voor zijn eigen beheerwerkzaamheden zijn. competentie is meer	De kandidaat kan systemen demonteren en gedemonteerde componenten testen. A+ is troubleshooting (2.0)
CompTIA	1.0 A+ Core Hardware	1.0 A+ Core Hardware	1.0 A+ Core Hardware	1.0 A+ Core Hardware	1.0 A+ Core Hardware	1.0 A+ Core Hardware	1.0 A+ Core Hardware
			2.0 A+ Core Hardware	2.0 A+ Core Hardware	2.0 A+ Core Hardware	2.0 A+ Core Hardware	2.0 A+ Core Hardware
		3.0 A+ Core Hardware	3.0 A+ Core Hardware		3.0 A+ Core Hardware	3.0 A+ Core Hardware	3.0 A+ Core Hardware
	4.0 A+ Core Hardware		4.0 A+ Core Hardware	4.0 A+ Core Hardware	4.0 A+ Core Hardware	4.0 A+ Core Hardware	4.0 A+ Core Hardware
	5.1 A+ Core Hardware	5.1 A+ Core Hardware	5.2 A+ Core Hardware	5.0 A+ Core Hardware	5.0 A+ Core Hardware	5.0 A+ Core Hardware	5.0 A+ Core Hardware
	6.0 A+ Core Hardware	6.0 A+ Core Hardware		6.0 A+ Core Hardware	6.0 A+ Core Hardware	6.0 A+ Core Hardware	6.0 A+ Core Hardware
	1.1 A+ OS	1.0 A+ OS	1.0 A+ OS	1.0 A+ OS	1.0 A+ OS	1.0 A+ OS	1.0 A+ OS
	1.4 A+ OS	2.0 A+ OS	2.0 A+ OS	2.0 A+ OS	2.0 A+ OS	2.0 A+ OS	2.0 A+ OS
	2.1 A+ OS		3.0 A+ OS	3.0 A+ OS	3.0 A+ OS	3.0 A+ OS	3.0 A+ OS
	2.2 A+ OS	4.0 A+ OS	4.0 A+ OS	4.0 A+ OS	4.0 A+ OS	4.0 A+ OS	4.0 A+ OS
	1.0 Network +	1.0 Network +	1.0 Network +	1.0 Network +	1.0 Network +	1.0 Network +	1.0 Network +
	2.0 Network +	2.0 Network +	2.0 Network +	2.0 Network +	2.0 Network +	2.0 Network +	2.0 Network +
	3.0 Network +	3.0 Network +	3.0 Network +	3.0 Network +	3.0 Network +	3.0 Network +	3.0 Network +
	4.0 Network +	4.0 Network +	4.0 Network +	4.0 Network +	4.0 Network +	4.0 Network +	4.0 Network +

Figure 18: **Servicemedewerker ICT versus industry certificates**

ICT Competenties	Competenties Servicemedewerker ICT				
	1.1	1.2	2.1	2.2	2.3
	De kandidaat kan systemen volgens instructie assembleren en de hardwaregegevens vastlegen.	De kandidaat kan geassembleerde systemen testen, fouten lokaliseren en oplossen.	De kandidaat kan besturings-systemen en standaardapplicaties volgens instructie installeren, testen en installatiegegevens documenteren.	De kandidaat kan eenvoudige storingen lokaliseren, oorzaken van storingen achterhalen, storingen documenteren en verhelpen met behulp van stan-daard methoden, hulpmiddelen en informatie uit gedocumen-teerde storingsmeldingen.	De kandidaat kan systemen volgens instructie demonteren en gedemonteerde componenten testen.
CompTIA	1.1 A+ Core Hardware				1.1 A+ Core Hardware
	1.2 A+ Core Hardware				1.2 A+ Core Hardware
	1.3 A+ Core Hardware				1.3 A+ Core Hardware
	1.4 A+ Core Hardware				1.4 A+ Core Hardware
	1.5 A+ Core Hardware				1.5 A+ Core Hardware
	1.6 A+ Core Hardware				1.6 A+ Core Hardware
	1.7 A+ Core Hardware				1.7 A+ Core Hardware
	1.8 A+ Core Hardware				1.8 A+ Core Hardware
		2.0 A+ Core Hardware		2.0 A+ Core Hardware	2.0 A+ Core Hardware
	3.2 A+ Core Hardware	3.0 A+ Core Hardware		3.2 A+ Core Hardware	3.2 A+ Core Hardware
	3.3 A+ Core Hardware			3.3 A+ Core Hardware	3.3 A+ Core Hardware
	4.1 A+ Core Hardware				4.1 A+ Core Hardware
	4.2 A+ Core Hardware				4.2 A+ Core Hardware
	4.3 A+ Core Hardware				4.3 A+ Core Hardware
	4.4 A+ Core Hardware				4.4 A+ Core Hardware
	5.1 A+ Core Hardware	5.2 A+ Core Hardware		5.0 A+ Core Hardware	5.0 A+ Core Hardware
	6.1 A+ Core Hardware				6.1 A+ Core Hardware
	6.3 A+ Core Hardware				6.3 A+ Core Hardware
			1.0 A+ OS		
			2.0 A+ OS		
				3.0 A+ OS	
				4.0 A+ OS	

Figure 19: **ICT Beheerder versus industry certificates**

	Competenties ICT Beheerder					
	1.4	1.5	2.1	2.2	2.3	2.4
ICT Competenties	De kandidaat kan op basis van een functioneel en technisch ontwerp een informatiesysteem realiseren.	De kandidaat kan -op basis van meetbare doelstellingen uit het functioneel ontwerp- door het opstellen van testprocedures en het uitvoeren van testactiviteiten toetsen of het informatiesysteem voldoet aan de specificaties en kan resultaten uit testactiviteiten interpreteren, bevindingen beschrijven en leidinggevende adviseren.	De kandidaat kan storingen lokaliseren, de oorzaak van storingen achterhalen, documenteren en verhelpen met behulp van beschikbare methoden, hulpmiddelen en informatie uit gedocumenteerde storingsmeldingen.	De kandidaat kan ter voorkoming van storingen diverse onderdelen van het informatiesysteem beheren, beveiligen en testen, en kan zonodig verbetervoorstellen doen.	De kandidaat kan beheer- en gebruiksprocedures opstellen, onderhouden en toezien op naleving ervan door diverse disciplines.	De kandidaat kan een inschatting van de consequenties van innovaties maken voor zijn eigen beheerwerkzaamheden en werkzaamheden van collega's waarvoor hij verantwoording draagt. 1 Installing Windows 2000 Server
Microsoft	1 Installing Windows 2000 Server					
		2 Installing, Configuring, and Troubleshooting, Access to Resources	2 Installing, Configuring, and Troubleshooting Access to Resources			
			3 Configuring and Troubleshooting Hardware Devices and Drivers	3 Configuring and Troubleshooting Hardware Devices and Drivers		
				4 Managing, Monitoring, and Optimizing System Performance, Reliability, and Availability		
			5 Managing, Configuring, and Troubleshooting Storage Use	5 Managing, Configuring, and Troubleshooting Storage Use		
			6 Configuring and Troubleshooting Windows 2000 Network Connections	6 Configuring and Troubleshooting Windows 2000 Network Connections		
			7 Implementing, Monitoring, and Troubleshooting Security	7 Implementing, Monitoring, and Troubleshooting Security	7 Implementing, Monitoring, and Troubleshooting Security	7 Implementing, Monitoring, and Troubleshooting Security
CompTIA			1.0 A+ Core Hardware	1.0 A+ Core Hardware		
			2.0 A+ Core Hardware	2.0 A+ Core Hardware		
			3.0 A+ Core Hardware	3.0 A+ Core Hardware		
			4.0 A+ Core Hardware	4.0 A+ Core Hardware		
			5.0 A+ Core Hardware	5.0 A+ Core Hardware		
			6.0 A+ Core Hardware	6.0 A+ Core Hardware		
			1.0 A+ OS	1.0 A+ OS		
			2.0 A+ OS	2.0 A+ OS		
			3.0 A+ OS	3.0 A+ OS		
			4.0 A+ OS	4.0 A+ OS		
			1.0 Network +	1.0 Network +		
			2.0 Network +	2.0 Network +		
			3.0 Network +	3.0 Network +		
			4.0 Network +	4.0 Network +		

5.6 *On the quantitative significance of the IT continuing training system regulated under public law*

Figure 20: **Participant numbers IT initial and continuing training from 2001-2004**[32]

	Participants in IT initial and continuing vocation education and training	**School years**					
		2001–2002	2002–2003	2003–2004		2004–2005	Stijing to.v
Level	Profile	Number of participants			2002–2003		2003–2004
2	Medewerker ICT	5.560	6.794	6.945	2,22%	5.003	-27,96%
3	Medewerker beheer ICT	8.568	10.184	9.669	-5,06%	8.497	-12,12%
4	ICT beheerder	11.470	9.911	9.482	4,33%	8.852	-6,64%
4	Applicatie - beheerder	157	81	47	-41,98%	56	19,15%
4	Applicatie ontwikkelaar	39	125	197	57,60%	329	67,01%
4	Netwerk beheerder	610	330	209	-36,67%	418	100,00%
		26.404	27.425	26.549	-3,19%	23.155	-12,78%

The above figure shows the number of participants for the six profiles between 2001 and 2004. In relation to other initial and continuing training courses in the various branches and sectors in the Netherlands, about seven percent complete such a course of initial or continuing VET in the IT sector (cf. ECABO 2004).

5.7 *On the international connectivity of initial and continuing IT vocational education and training in the Netherlands*

In the Dutch VET sector, international connectivity is fundamentally accorded an extremely high level of significance (cf. FROMMBERGER 2004). Internationalisation of vocational education and training takes place via the curricular consideration of internationally relevant occupational components for various initial and continuing VET courses rather than merely finding its expression in the coordination of the national qualifications structure with European stipulations relating to VET organisation.

In the Netherlands, the internationalisation of vocational education and training is viewed as an explicit contribution towards "quality improvement" in VET. Within national quality reports and the regular "accountability reports" produced by the vocational schools (ROC's), the aspect of internationalisation has been ab-

32 Cf. loketMBOICT: Deelnemers ICT-Opleidungen 2001-2004 (www.loketmboict.nl; accessed on 18 June 2005)

sorbed as a criterion for the assessment of the quality of VET measures provided by stakeholders. To this extent, the form and scope of internationalisation within Dutch vocational schools represents a quality feature (cf. Ministerie van Onderwijs, Cultuur en Wetenschappen 2000):

"An important though often neglected theme is the increasing internationalisation of vocational education and training. When it comes to preparation for practising a profession and functioning in society, the influence is inescapable, especially from Europe (…) Particularly ROC's, in which senior secondary vocational education and adult education are united under one roof, can be seen as expertise centres in the area of internationalisation. They need to develop this aspect further for today's market. Internationalisation is becoming an increasingly important quality aspect. It is up to the ROC's and the national bodies for vocational education to help shape this (…) A condition for this is that internationalisation should be integrated in the strategic policy of ROC's and the national bodies" (Ministerie van Onderwijs, Cultuur en Wetenschappen 2000b).

The aspect of internationalisation is also explicitly formulated within the current law governing VET in the Netherlands, the Vocational Training and Adult Education Act of 1996:

"In order to prepare future workers for an international society, education has to internationalise. For educational institutions, international co-operation will have to lead to a clear added value for content and quality of education. In this regard, internationalisation deserves a firm position in the general policy aimed at innovation of vocational education (…)" (Ministerie van Onderwijs, Cultuur en Wetenschappen 1996; vgl. NOOTER / JACOBS *2000, p. 11).*

This also formed the background for the drawing up of the IT initial and continuing training profiles with the explicit consideration of developments in other European countries and with due regard for European conceptions of IT initial and continuing training (cf. ECABO 2004b).

In view of the significance of the University of Applied Sciences sector for VET in the Netherlands and the Bachelor qualifications offered in this area, a high level of international connectivity also exists in respect of vocational education and training. Bachelor qualifications are well known internationally and across Europe.

The differentiation of Dutch IT initial and continuing VET qualifications based on the tiered model, which is communicated and used on a pan-European basis (cf. Chapter 4), also represents an important prerequisite for appropriate alignment of qualifications achieved within the scope of cross-border mobility. Systematic coordination of domestic structural principles and European standards takes place, something which also applies to the principles of competence orientation and modularisation of the curricular fundamentals. All of this means that the formal prerequisites for cross-border European equivalences and recognitions are in place (for more detail, cf. FROMMBERGER 2004b; 2005b).

6. Concluding remarks

The present study depicts the main features of IT initial and continuing training in the Netherlands.

The main focus has not been placed on analysing and comparing direct qualifications and training achievement in respect of the acquisition of the IT competences targeted and the results obtained. Extensive and representative investigations to measure and compare competences are required for this. Such studies are significantly more involved and, in overall terms, do not as yet exist from a national or international perspective in respect of other VET areas either. Investigations of this nature would, however, have been of immense assistance in terms of being able to formulate manifest statements regarding the effects of IT initial and continuing training on the acquisition of the desired competences. The present investigations cannot, therefore, form a reasonable basis for findings allowing of reliable and valid statements in respect of IT competences achieved by those in possession of the IT qualifications.

For this reason, the present remarks conclude by expressly drawing attention to the fact that the study does not enable a basis to be established for conclusions regarding "the more successful model" in terms of providing a contrast with IT continuing training in Germany, for example. Such a research goal involving comparative investigations requires criteria which have to be developed in advance of the comparative work and which are sustainable in international or at least bilateral terms.

The present study focuses much more on the presentation of results for the description and analysis of VET structure in the Netherlands, with a specific emphasis on IT vocational education and training, whilst also formulating considerations and statements in comparison to the German model of IT continuing training, especially in Chapter 4.

Chapter 4 focuses on examining the main issue in terms of the central difference between the Dutch and German VET models and systems of IT initial and continuing training. Compared to Germany, the Dutch VET system and IT initial and continuing training is much more strongly integrated into the educational and higher education system. Transitions at the first threshold and from VET into higher education are supported and fostered curricularly, structurally and systematically on a national basis.

The new "competence orientation", which has been a characteristic of the ongoing process of modernisation in the Dutch VET system for some years and which involves changes to the curricular conditions by which teaching and training takes place, does not seem to be leading to a compartmentalisation of the higher education system, parts of which also have academic VET provision following the principle of competence orientation.

Within the comparison of the IT initial and continuing training systems, the University of Applied Sciences sector is of great significance to VET in the Netherlands. This sector is referred to as "higher professional education" in the Netherlands (hoher Beroepsonderwijs, HBO) and is strategically integrated into the structuring of initial and continuing vocational education and training. The relatively early and wide-ranging provision of Bachelor qualifications for the IT area also meant that trained graduates were available at times when demand for IT skilled workers was high. The authors of a German-English comparative study on IT qualifications strategies in England also arrived at the same conclusion (cf. STEEDMAN/WAGNER/FOREMAN 2003).

A further obvious difference in the structuring of initial and continuing IT training in Germany and the Netherlands is the fact that the Dutch system only provides six central profiles for initial and continuing training. In order to complete these profiles and acquire the qualifications, it is also possible to gain recognition for partial competences and/or conduct "external examinations". The qualifications may be gained irrespective of employment status.

As far as IT initial and continuing training is concerned, the emphasis in the Netherlands is on the "occupation-based approach" ("Berufskonzept") which is designed only to provide qualifications on the basis of relatively broad-based competences, enabling these to be deployed in a variety of branches, functional areas and sizes of company. Analogous to this are the IT training occupations available in Germany.

In German IT continuing training, on the other hand, specialisation takes place along the lines of a functionally differentiated modularisation concept, which corresponds to the division of labour in the market's leading IT companies in relatively extensive terms. The extent of acceptance the system will enjoy from the broad base of VET, which in Germany is borne by small and medium-sized companies, remains to be seen.

In an explicit comparison with the standard and strongly functionally and task related industry and manufacturer certificates, it is clear that the "added value" of qualifications under public law is to be found in a strongly structured and differentiated concept targeted at the diversity of future career and continuing training opportunities.

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IT continuing training and networking with higher education in France

JUTTA BREYER

1. Introduction

The rapid rate of innovation contained within the ongoing changeover to a knowledge society is bringing in its wake both an extremely dynamic development in knowledge on a global scale and a high level of demand for education and continuing training, something which manifested itself shortly before the end of the last millennium in the form of an unprecedented shortage of IT skilled workers in Europe.

Although IT experts were in demand and attracted high levels of payment in many areas, those in charge of personnel and qualifications often struggled with the uncontrolled growth in job titles, qualifications requirements and certificates within the branch. Employers complained of a lack of transparency in the qualifications of their skilled IT workers and of the frequent difficulties in documenting such qualifications. Many projects ultimately cost their instigators a great deal of money, not the least of the reasons for this being the lack of internal project coordination within teams. The view of the branch is that it proved impossible to take appropriate action in this regard before the end of the millennium. As late as 2001, 80 percent of employees within the IT sector were lateral entrants without specialist training,[1] 2002 seeing every second information technology student discontinuing his or her studies[2] and only 6,000 IT graduates completing their studies at institutes of higher education in the face of an estimated need of 30,000.[3]

Subsequent to the unusually rapid development and enactment of the four IT training occupations, the implementation of which may now be regarded as a major success, Germany reacted to this shortage of skilled workers by undertaking a second step and creating an innovative continuing training system enjoying equal approval from politicians, employers and employees.

The IT Advanced Training Ordinance passed in May 2002 lends considerable potential for innovation to the German VET landscape. It regulates occupational profiles and career routes within the IT branch for the first time, also enabling lateral entrants to achieve a regulated vocational qualification. The aim is for a total of 35 occupational profiles at Specialist and Professional level to create genuine transparency for human resources departments and their employees. A further innovation is the connectivity of the system to the higher education sector, opportunities for recognition of partial examination achievements at Specialist and Professional level being negotiated and tested within various contexts at the time of writing (status June 2005).

1 Cf. EHRKE, M./HESSE, J.: Das neue IT Weiterbildungssystem - Eine Neuordnung mit hohem Reformanspruch *("The new IT continuing training system - a realignment with a high level of reform objectives")*. In: Gewerkschaftliche Bildungspolitik (Trade Union Educational Policy), 11/12, 2002, pp. 4-8.

2 Die Zeit/Hochschule 11/2002: IT-Experte ohne Studium? Bundesbildungsministerin stellt neues IT-Weiterbildungssystem vor *("IT expert without higher education study? Federal Minister of Education presents the new IT continuing training system")*.

3 Cf. EHRKE, M./HESSE, J. (2002).

International connectivity of qualifications and certificates is a crucial competitive factor, applying to the IT sector in particular. The linking of the IT continuing training system to an international level was one of the aspects considered during development. Clarification of the issue as to the extent to which the system can be competitive with other concepts within Europe and identification of areas where sensible references between the systems within the individual countries can be made will, however, presumably involve further years of political and market related decision processes.

With regard to neighbouring European countries, a sensible manner of proceeding is firstly to establish transparency in respect of the approaches adopted and of any qualifications systems which may exist within the IT sector. Only then will it be possible to move onto determining routes for the mutual recognition and coordination of qualifications.

It is, of course, also the case in France that vocational education and training in general and IT qualifications in particular are of primary significance for the country's prosperity. In 2003, around 3,300 training centres in the information technology area generated an overall turnover of 1,410,000,000 euro, thus making up a 7.5 percent market share of the total IT sector.[4] In 2001, the vocational training sector as a whole represented 1.5 percent of gross domestic product.[5]

The aim is for the main focus of the France country study to be on a series of issues which have also arisen within the framework of German IT training policy during the course of past years. The objective will be to highlight in general terms how France has been able to tackle the urgent shortage of skilled IT workers which set in around the turn of the millennium compared to Germany and to provide a portrayal of the current labour market and qualifications system in our neighbouring country.

2. Thematic areas, issues and comparative aspects of the France country study: structure and process of the study

Before proceeding to a consideration of the specific features of IT skilled worker qualifications in France, a brief overview of the basic characteristics and structures of French initial and continuing vocational education and training will be provided. This will be used as a vehicle for a separate investigation of the peculiarities of the training landscape in the IT sector before moving on to an identification of the most significant parallels and differences in IT qualifications in Germany and France. Since the France country study is being conducted under the particular focus of IT continuing training and of the connectivity of continuing training to

4 Syntec Informatique, www.passinformatique.com
5 Centre INFFO, www.centre-inffo.fr

then higher education system, the main emphasis of the comparative analysis will be placed on this sub-area of vocational education and training.

During the courses of the present study, the main focus will be on the following themes and issues:

Thematic area I: Basic features and structures of initial and continuing vocational education and training in France (Chapter three)

In the same way as the German educational and vocational education and training system, the French system is also closely integrated into the field of public regulation. This chapter will outline the educational system in overall terms, with an additional, more detailed look at VET and continuing VET in particular. The main focus of presentation will thus be placed on:

- an overview of the French educational system;
- the vocational education and training of young people at upper secondary level;
- the institutes of higher education;
- continuing vocational education and training;
- degrees and certifications.

Thematic area II: Provision and structure of IT initial and continuing training in France (Chapters four and five)

The main focus of the investigation of the provision and structure of IT initial and continuing training in our neighbouring country will also address issues which formed, and in some cases still continue to form, subjects of debate within the scope of the development of both the German initial IT training occupations and the new continuing training system:

- Are there IT initial and continuing vocational education and training profiles under public law which are used as the basis for training and certification?
- What significance is accorded to institutes of higher education in IT qualifications?
- Which didactic and methodological principles form the basis of IT initial and continuing vocational education and training? What is the role is played by work process orientation?
- To which extent is IT initial and continuing vocational education and training integrated into regulatory policy?
- What significance may be accorded to the industry's manufacturer certificates (Cisco, SAP, Comptia, Microsoft, Oracle etc.)? Are they integrated into training provision regulated by public law?
- Which institutions, social stakeholders and branches are responsible for the development, realignment and updating of IT initial and continuing vocational education and training provision and the IT occupational profiles?

- Which institutions, social stakeholders and branches are responsible for the awarding of qualifications and certificates?`
- What is the nature of the quantitative distribution of provision under public law and manufacturer certificates? What significance may be accorded to the in-company certificates of private training providers? What is the respective market value of the various qualifications and certificates?

Thematic area III: Approaches towards defining IT fields of activity and IT occupational profiles (Chapter five)

In Germany, the definition of the four IT training occupations and, not least, the classification of 29 IT Specialists and six IT Professionals within the scope of the new IT continuing training system have gone some considerable way to reducing the previously impenetrable jungle of qualifications within the IT sector to a manageable level. The question of the provision of qualifications, at least as far as Germany is concerned, is always closely associated with the definition of occupational and activity profiles, meaning that the following issues need to be addressed in this area:

- Which state and private approaches are there in terms of classifying he IT work progress according to fields of activity and occupational profiles?
- What is the relationship of these profiles to the provision of initial and continuing training in France (some of which is subject to statutory regulation?)

Thematic area IV: Linking of continuing training to the higher education system (Chapters six and seven)

As a consequence of the political concept of lifelong learning, which is being propagated across the EU, an increasingly high level of significance is being accorded to the mutual permeability and connectivity of the individual partial training areas.[6] In dealing with this theme within the scope of the France country study, the aim is to highlight the following aspects:

- How is IT continuing training linked to the higher education system?
- How are training achievements recognised at institutes of higher education?
- How is practical, work related experience recognised by the institute of higher education? What significance is accorded to the formalisation of informal learning at the workplace?

Thematic area V: Situation of the IT branch in France (Chapter eight)

The economic slowdowns experienced by the IT branch in many states in past years have certainly impacted negatively on the vocational education and training in the sector. To this extent, one issue needing to be addressed by the France country

6 EUROPEAN COMMISSION, Directorate General for Education and Culture: Creating a European lifelong learning area, Brussels November 2001.

study is what development the IT labour market in our neighbouring country has undergone over recent years. A second focus of interest is at least to broach the issue of the effect these developments have hitherto exerted on supply and demand of qualifications in the IT sector. Accordingly, the main issues here are:

- What is the nature of the French IT labour market in terms of the relationship between those employed and those seeking employment and the development of turnover and employment during recent years?
- What effects are labour market developments exerting on qualifications provision for the IT branch?

Chapter nine will conclude by portraying the major parallels and differences between the IT qualifications landscapes in Germany and France, with a specific focus on the provision of continuing training. The results of the investigation will then be used as a basis for the identification of a number of opportunities and challenges for both German continuing IT training and European developments.

The present study is based on extensive Internet research, documentary analysis, analysis of primary and secondary sources and the evaluation of statistical data. In order to enhance the insights gained from the Internet research and documentary analyses undertaken, a total of seven expert interviews were conducted at the start of 2005 with persons involved in leading positions in the structuring and design of the IT qualifications landscape in France. The following interview partners made themselves available for detailed interviews within the scope of the study:

- the training delegate from the *Syntec Informatique* (IT employers' association; approximately 500 members, including major companies and SME's);
- the Head of Personnel Development at CIGREF (amalgamation of the major IT user companies)
- the Head of the IT Continuing Training Department at CNAM (national institution for primarily higher education based continuing raining for adults with occupational experience)
- the Head of the IT Continuing Training Department at AFPA (a semi-state controlled continuing training institution, especially for job seekers)
- a person in charge of IT human resources (major company)
- a representative of the Ministry of National Education (Higher Education and Economy department)
- the state commissioners for the implementation of VAE (see Chap. 3.3.4. and 7) within CNAM.

3. Basic features and structures of initial and continuing vocational education and training in France

3.1 An overview of the French education system

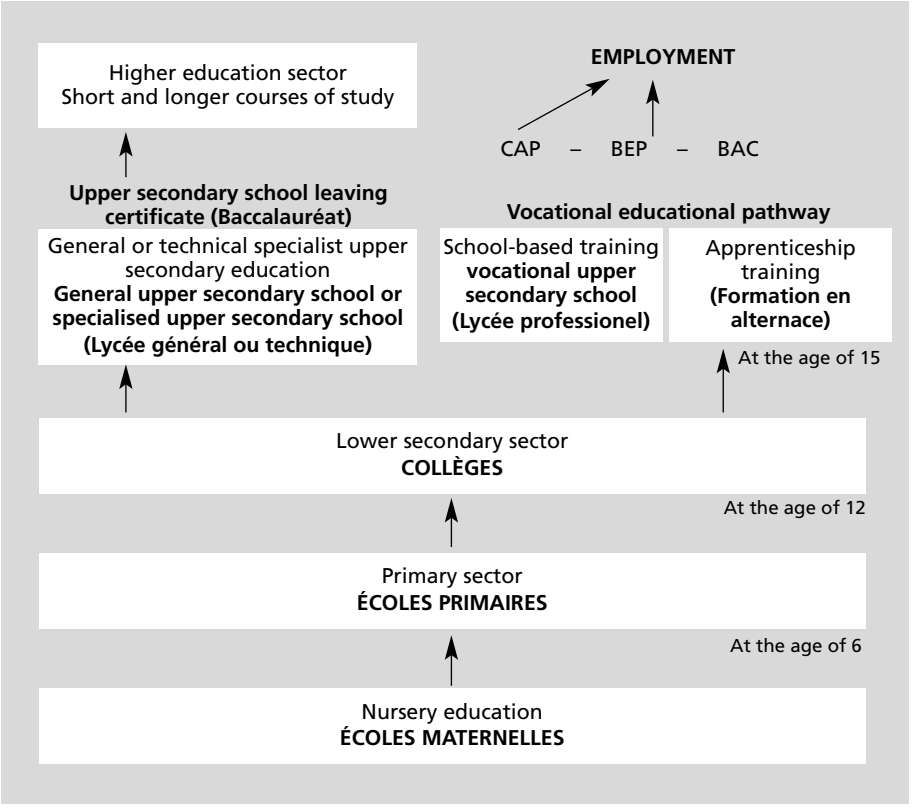
The French state is divided into 22 regions and 96 departements comprising approximately 36,000 local authority areas. In addition, French territory includes four overseas departments (DOM, accorded autonomy at the level of the regions), three overseas regions (TOM, accorded special status) and two territorial bodies with an intermediate status between that of a DOM and a TOM.

The aim of the French educational and VET system is to secure equality of opportunity for all children, young people and adults. The French educational system is a state system, free of charge, largely secular and not connected any specific faith. The state educational system, which is the responsibility of the Ministry of National Education, comprises three levels which are themselves further sub-divided:

- Primary area
  - *École Maternelle:* pre-school education (3 to 6 years)
  - *École Primaire:* primary school teaching (6 to 11 years)
- Secondary area
  - *Collège*: uniform lower secondary level (12 to 15 years)
  - Alternatives for upper secondary level: general, technical specialist or vocational educational pathway (usually of two to three years' duration):
    - *Lycée (géneral ou technique),*
    - *Lycée professionnel*
    - *Formation en alternance* (alternating training)
- Higher education area: *Universités, Grandes Ecoles*

The concept of lifelong learning, which the EU has been propagating with increasing intensity for the past few years, has once again reinforced the impetus and endeavours already underway in this field within French educational policy. Although continuing vocational training curricula and qualifications are not subject to statutory regulation in France, such regulation is in place in respect of the rights and access of individual citizens. Figure 2 depicts the concept of lifelong learning within the French educational system, the aim being for this to be accessible to citizens of all age groups.

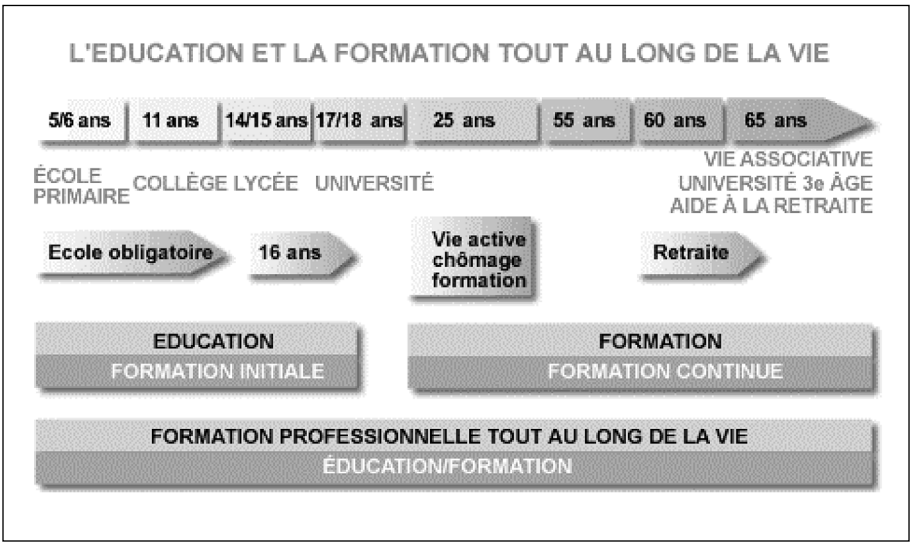
Figure 1: **The educational system in France** (Centre INFFO 2000)



The decentralisation laws of 1982 and 1983 transferred a number of powers which has previously been governed centrally to the regions and local authorities, including part of the responsibilities relating to education and vocational education and training.[7] Whereas the state retained responsibility for the content management of curricula and for quality assurance and personnel within general schools, the regions have obtained a far greater range of decision-making powers in the area of vocational education and training.

7 Cfl. CEDEFOP: Le système de formation professionnelle en France. Thessaloniki 1999, p.12.

Figure 2: **Lifelong education and training** (Centre INFFO 2004)



3.2 "Formation Initiale" – initial vocational training at schools, institutes of higher education and in-company

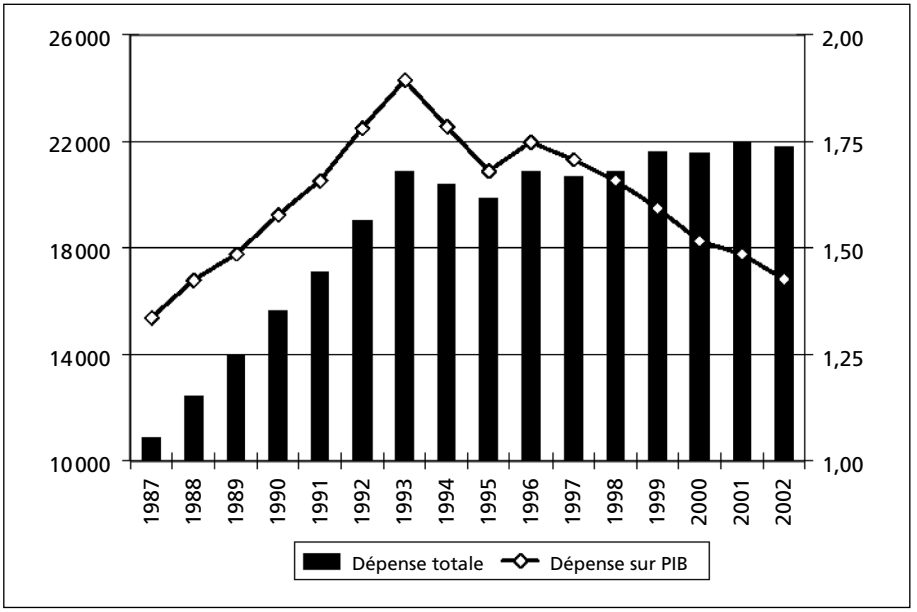
Unlike the German understanding of the term initial vocational education and training, which is frequently applied specifically to vocational training taking place subsequent to general schooling and outside the higher education system, the French term *formation initiale* applies to all vocational provision, whether school-based, within higher education or in the form of an apprenticeship, which takes place immediately subsequent to the general schooling pathway and thus prior to embarking upon the world of employment. Initial vocational education and training usually results in a degree which is issued within the framework of the national educational system and is evidence of training at a school, university or *Grande Ecole*.

Initial vocational education and training constitutes a closed system subject to the monitoring of the state educational authorities, whereas continuing vocational training is structured as an open system in which a number of stakeholders (state authorities, social partners, companies and training providers play a significant role.

3.2.1 State investment in vocational education and training

In 2002, total French expenditure on the area of vocational education and training was around 21.78 billion euro (including state, regional, company and private household spending).[8] As the following graphic depicts, there was a slight decrease in investment compared to the previous year, although this still represented an increase compared to expenditure in the years preceding 2001.

Figure 3: **Development in investment in vocational education and training 1987-2002** (DARES 2005)



3.2.2 Upper secondary level: upper secondary school leaving certificate or vocational education and training

Subsequent to completion of the lower secondary level of education, which is uniform for all school pupils in France, young people may choose between a general, technical specialist or vocational educational route. This involves deciding whether to pursue preparation for the general or technical specialist higher education entrance qualification *(baccalauréat)* or to follow a vocationally oriented educational pathway.

Preparation for a higher education entrance qualification takes place at a general or technical specialist upper secondary school *(lycée général* leading to the quali-

8 DARES: Premières Synthèses Informations. March 2005 N°09.1.

fication of *baccalauréat général* or *lycée technique* leading to the qualification of *baccalauréat technique)*.

Vocational education and training takes place either at a vocational upper secondary school *(lycée professionnel)* or in the form of alternating training *(formation en alternance)* with the aim of providing the necessary preparation for a direct transition into the world of employment. The course of vocational training is usually of two to three years' duration, leading to a state vocational certificate which enjoys labour market recognition. Three different qualifications are possible within this process. The CAP (*certificat d'aptitude professionnelle*, qualification level V[9]) provides evidence of occupational competence, whereas the BEP (*brevet d'études professionnelles*, qualification level V) involves the awarding of a VET certificate. The vocationally oriented upper secondary school leaving certificate (*bac professionnel*, qualification level IV) enjoys the greatest prestige of the three qualifications.[10]

Although vocational education and training in France was for many years viewed as a lesser quality alternative to the general educational pathway, it has been more highly valued since the nineteen eighties.[11] The qualifications within the technical specialist and vocational school systems were reorganised, training contents being aligned to technical change. Training courses at vocational upper secondary schools nowadays contain work experience as a matter of course. Alternating forms of training with practical work placements within companies have gained considerably in significance at all educational levels, including in higher education.[12]

The vocationally oriented upper secondary school leaving certificate *(baccalauréat professionnel)* provides direct preparation for an occupation. The qualification is normally obtained within two years, 16 to 20 weeks of this time being taken up by in-company work placements. When new educational pathways are made available, the economic nature of the respective location of the *lycée professionnel* is of crucial importance. Schools wishing to offer VET oriented towards a particular occupation need to demonstrate that there is a genuine need for workers in the region and have their teaching provision recognised by the appropri-

9 Training levels within the French VET system are stipulated by means of a nomenclature dating back to 1969. This serves as a guidance framework for the multitude of possible qualifications within the French educational and vocational education and training system, these being allocated to a total of five levels:
Level I and II: degrees on the bac+3 level (upper secondary school leaving certificate + 3 years' study) or more
Level III: degrees on the bac+2 level (upper secondary school leaving certificate + 2 years' study)
Level IV: upper secondary school leaving certificate or equivalent (upper secondary education)
Level V: CAP, BEP or equivalent (upper secondary education)
Level VI: no state recognised degree.

10 Cfl. PERKER, Henriette: Das Berufsbildungssystem in Frankreich *("The vocational education and training system in France")*, Centre INFFO, June 2000, p.13

11 Ibid.

12 Cf. PERKER, Henriette: Das Berufsbildungssystem in Frankreich ("The vocational education and training system in France"), Centre INFFO, June 2000, p.14

ate professional associations. Introduced in 1985 as a means of combating youth unemployment, the *baccalauréat professionnel* can today be viewed as a success. Studies carried out by the national research institute INSEE showed that, in the year 2000, only 7.5% of those passing the examination had failed to find employment within five years. (As a comparison, the parallel unemployment rate of young people with a qualification at level V, meaning BEP or CAP, was 32 percent).[13]

In the area of alternating training *(formation en alternance)*, four types of contract were offered up until autumn 2004.

- The *Contrat d'Apprentissage* involves the conclusion of an apprenticeship contract and is most directly comparable with the dual VET system in Germany. 239,810 contracts were signed in 2001 (representing an increase of one percent compared to the previous year). 81 percent of the young people had reached the maximum level of training within CAP and BEP. Within the past six years, however, it has proved possible to raise the numbers in possession of an upper secondary school leaving certificate by seven percentage points, these now accounting for 25 percent of all contracts concluded.
- The *Contrat d'Orientation*, a training contract relating to vocational orientation, was of comparatively little significance (7,800 contracts signed in 2001, representing a decease of two percent compared to the previous year).
- Until 2004, the *Contrat de Qualification* constituted a qualifications contract between the company and the young person. In 2001, 132,000 such contracts were concluded, representing a decrease of two percent compared to the previous year.
- There were 61,730 newly concluded *Contrat d'adaptation* (training adaptation contracts) in 2001, a fall of five percent compared to the previous year.[14]

With effect from 1 October 2004, this contract system was reduced to two possible types of contract. Within the field of alternating initial vocational education and training, apprenticeship contracts (contrat d'apprentissage) continue to be concluded, the contrat de professionalisation being introduced in the area of alternating continuing training.[15]

In both cases, initial or continuing vocational education and training combines general, occupationally specific and technical teaching at a teaching location (vocational school, university, state or private training institution) with a practical component held in-company, where the trainee experiences activities in line with the qualifications goal sought. The *contrat de professionalisation* pursues the objective of facilitating the entry into working life for young people and young

13 CEDEFOP.

14 Centre INFFO: Inffo flash – l'information sur la formation. Numéro spécial chiffres. May 2003 pp.15-16.

15 www.travail.gouv.fr/informations-pratiques/fiches-pratiques/formation-professionnelle/les-contrats-formation-alternance-1077.html

adults (aged between 16 and 26) who have not obtained a school-based vocational qualification as well as aiming to make it possible for adults aged over 26 to return to employment via a qualification sought on the labour market in the short or medium term.

The *contrat de professionalisation* enables the acquisition of training recorded in the RNCP (*répertoire national de la certification professionnelle*, see Chap. 4.4.6.), such as the CQP of the branches (see Chap. 4.4.4.), and the qualifications included on the list of a branch's *commission paritaire nationale de l'emploi.* All employers, including temping agencies, are entitled to issue such a contract, exceptions being the state, the regions and public administrative institutions. According to the qualifications aim, the law stipulates a minimum contract term of 6 to 12 months.[16]

Training is implemented by the company, insofar as there is provision for an internal training service, or is carried out by an external training provider. Total teaching time needs to be at least 150 hours, this also needing to constitute between 15 and 25 percent of the contractually stipulated training time as a whole. Further details are to be regulated via branch agreements.[17]

In contrast to dual vocational education and training in Germany, which enjoys a particular reputation across such a wide range of employment fields such as industry, craft trades, finance, trade, the media, IT and telecommunications, the French equivalent of *formation en alternance* is more closely reserved to the craft trades sector. It is hitherto been accorded very little significance in areas where there is a higher threshold of qualifications requirements, such as in the IT branch. In 2001, a total of 441,530 contracts for formation en alternance were signed. The introduction of the *Contrat de professionalisation* also aims to raise the level and prestige of alternating training in overall terms.[18]

Responsibility for the funding of alternating training rests with private sector employers as a whole (not including the liberal professions and agricultural occupations), the state and the regional councils. Companies receive a grant for the duration of the apprenticeship training. Depending on their age and qualifications, the trainees receive a training allowance constituting a certain percentage of the index-linked minimum wage guaranteed by collective wage agreement (*SMIC*). This is currently 1,154.18 euro gross.[19]

16 Ibid.

17 Ibid.

18 Centre INFFO: Inffo flash – l'information sur la formation. Numéro spécial chiffres. May 2003 pp.15-16.

19 Status May 2005, last adjustment 1 July 2004. Within the scope of the *Contrat de professionalisation,* trainees aged under 21 without a recognised qualification receive 55 percent of the SMIC, a 70 percent payment being made for those between 21 and 25. For trainees with a starting level at qualifications level IV (such as baccalauréat professionnel), the amount rises to 65 or 80 percent of the statutorily stipulated minimum wage. Those concluding a contract and aged over 26 must not receive remuneration either under the SMIC or under 85 percent of the minimum wage in the company as agreed via collective wage agreement. Source: www.cfdt.fr/pratique/droits_travail/questions_droits/smic.htm

Similar to in Germany, for young people who are difficult to integrate there is a series of state financed special programmes in the form of supported contracts and work placements, which mostly offer preparation for vocational education and training.

3.2.3 The French higher education system

In France, higher education training is provided by the universities, the upper secondary schools (within the scope of preparatory classes for the Grandes Ecoles and the specialist classes for the acquisition of the *Brevet de technicien supérieur* - BTS), the renowned *Grandes Ecoles* and a series of Universities of Applied Sciences. Whereas the universities, in principle, are open to all those who have obtained their baccalauréat, the other branches of the higher education system operate a selective process in respect of applicants. The *Grandes Ecoles* in particular are well known for their stringent pre-selection criteria, lending their courses and degrees a correspondingly high level of prestige on the labour market.

The French higher education system comprises three cycles, in contrast to the German system already providing tiered qualifications prior to the introduction of Bachelor and Masers courses. This means that university courses of study can be completed in two, three, four, five or more years with different degrees. One of the criteria for determining the level of training is the number of years a course of study comprises, two years of higher education training after the upper secondary school leaving certificate, BAC+2, leading to initial vocational qualification.

The alignment of the higher education system in accordance with the objectives of the Bologna Process began in 1999, being concluded with a series of statutory regulations published in April 2002.[20] Initial measures dealt with the establishment of a *mastaire* academic degree in August 1999, this being renamed *Master* in April 2002 in line with the pan-European designation (being referred to *Master Professionnel*/*Master Recherche* for vocational or research oriented courses). This Masters course comes after the licence and before the *doctorat*. November 1999 also saw the introduction of the *licence professionnelle*, representing the vocational qualification at Bachelor level which formed part of the objectives of the Bologna Process.[21]

Since the 2002/03 academic year, institutes of higher education have begun a wholesale restructuring of their study provision in line with the requirements of the ECTS. The degree supplement, which aims to promote transparency of competences and skills acquired within the framework of international mobility, was also launched.[22] When introducing the LMD system in France, existing qualifications were retained and equivalences created within the system in the form of national

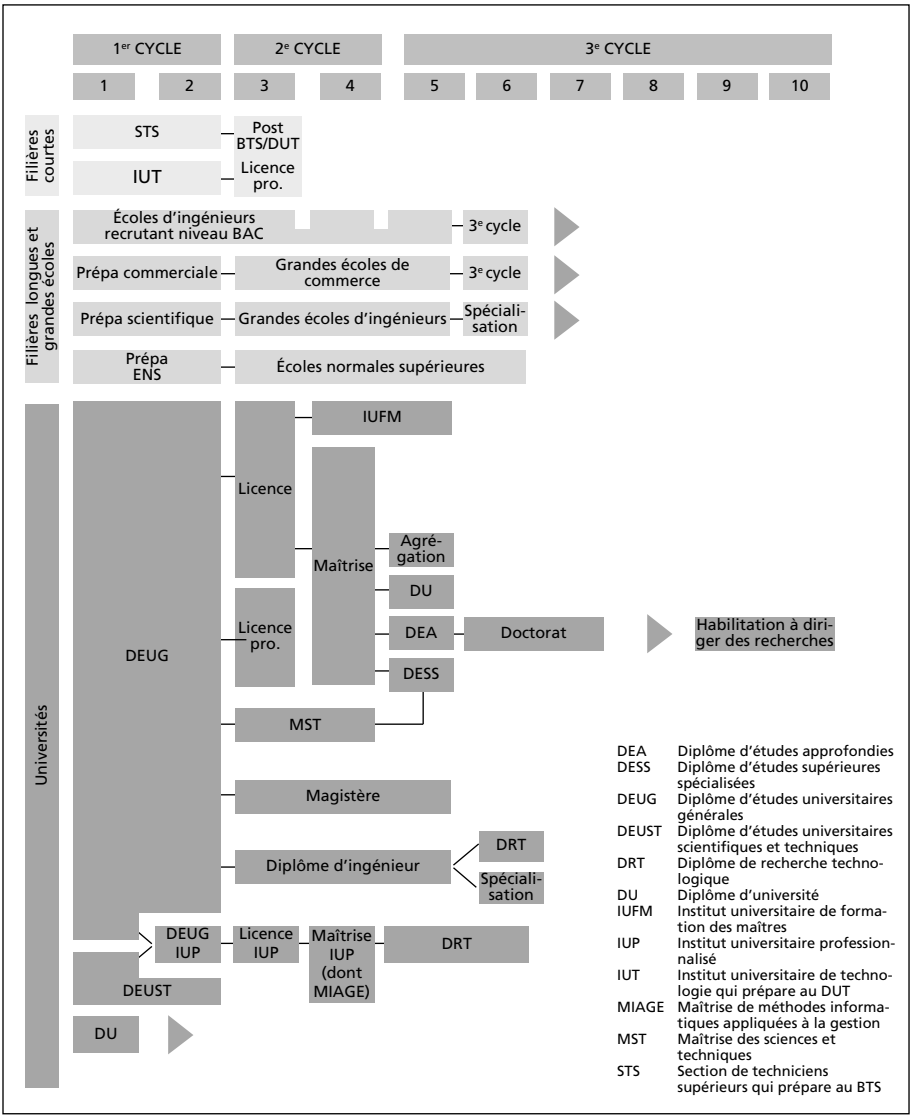
20 The new, European oriented qualifications are referred to in France under the abbreviation LMD, denoting the tired qualifications Licence (the equivalent of Bachelor), Master and Doctorat (Ph.D).

21 Cf. EURYDICE: Focus on the structure of higher education in Europe 2003/04: National developments within the framework of the Bologna Process, September 2003, p. 30.

22 Ibid.

qualifications in line with the pan-European comparable standard. Figure 4 depicts an overview of the French higher education system in terms of institutes of higher education, courses of study and qualifications.[23]

Figure 4: **The French higher education system: institutes of higher education, courses of study and qualifications** (Syntec Informatique)



23 The LMD qualifications (Bologna Process) are not yet included in this graphic.

Although there is a wide range of qualifications, a decisive factor is the fact that an initial vocational qualification may be obtained after only two years. All qualifications are state recognised degrees and, in principle, enjoy prestige on the labour market. Despite the fact that the entry level is usually relatively low at BAC+2, or two years' study, the opportunities to take on more responsibility and operate at higher levels of content in a first job immediately after completion of initial training rise with every further year of study. As already mentioned elsewhere, the Grandes Ecoles enjoy the highest reputation. Employers have faith both in the first-rate quality of the courses of study and in the stringent pre-selection of candidates undertaken by the *Grandes Ecoles*. In the information technology branch, therefore, those holding IT engineering degrees from the *Grandes Ecoles d'Ingénieurs* have, according to information provided by the employers' association *Syntec Informatique* and other experts interviewed, the best chance of finding an attractive job with a high potential for development.

Since the mid-eighties, there has been ongoing expansion of technical-specialist and vocationally related courses of study. This has resulted in a strong increase in the number of students registered for specialist, vocationally oriented courses of study.[24] Dual courses of study provide a conceptual approach to enable more practical relevance to be integrated into higher education. According to the experts interviewed, the number of dual courses of study, designed in cooperation with companies from the relevant regions and professional associations, is constantly on the rise.

During the past two decades, the number of students has been constantly rising and has now practically doubled. Whereas France had just under 1.2 million students in the academic year 1980/81, in 2000/01 French institutes of higher education counted more than 2.1 million, the figure reaching a record high of 2.25 million matriculated students in 2003/4.[25]

3.3 "Formation Continue" – continuing vocational training in France

Continuing vocational training encompasses all provision, measures and structures aimed at persons in employment. The French system of continuing vocational training is mainly structured along the lines of the various categories of users of continuing training provision. Three main groups are discernable: employees in the private sector, employees and civil servants in the public sector and job seekers.[26]

23 The LMD qualifications (Bologna Process) are not yet included in this graphic.

24 Cf. PERKER, Henriette: Das Berufsbildungssystem in Frankreich *("The vocational education and training system in France")*, Paris-la-Défense, Centre INFFO, June 2000. p.17. The expert from the National Ministry of Education interviewed in May 2005 also reconfirmed this tendency.

25 See Ministère de l'Éducation nationale, de l'enseignement supérieur et de la Recherche : RERS – Repères et références statistiques sur les enseignements, la formation et la recherche. Paris, Édition 2004, p.153.

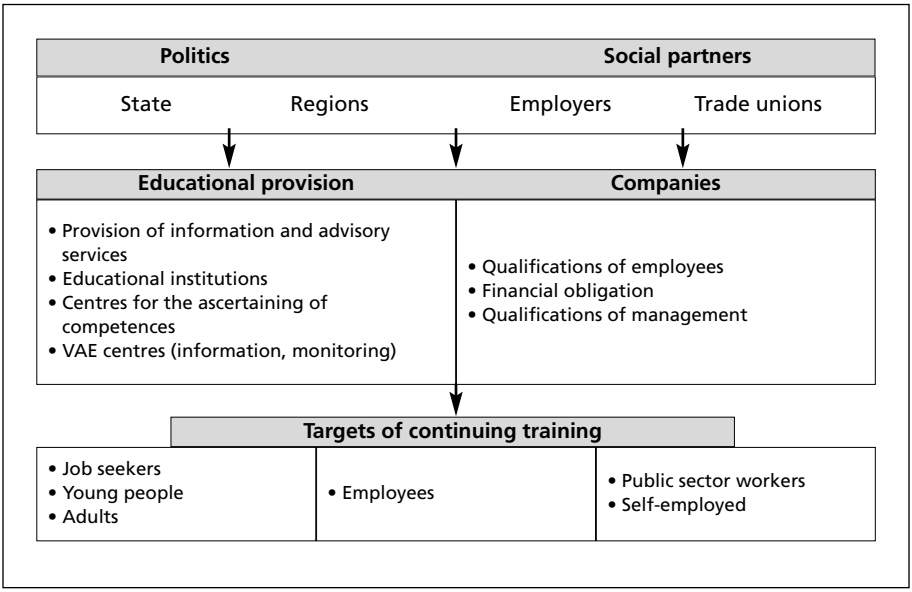
26 vgl. CEDEFOP – Centre européen pour le développement de la formation professionnelle : Das Berufsbildungssystem in Frankreich ("The vocational education and training system in France"), Luxemburg 2000, p. 68

The origins of the current French system of continuing vocational training go back to a comprehensive Continuing Training Act of 16 July 1971. This law, the provisions of which include an obligation for companies with more than ten employees to pay a statutory deduction in the amount of a certain percentage of its total gross wage bill for the funding of employee continuing vocational training, has been modified and expanded many times over the course of the decades and has played a crucial part in driving forward the development of continuing vocational training in France.[27] The law and the permanent practice of dialogue which has ensued on the part of the state, the regions and the social partners forms an exception in terms of educational policy such as is not found in a comparable form in any other European Union country.

3.3.1 Stakeholders in continuing vocational training

Political measures relating to continuing vocational training are jointly developed by the state, the regions, companies and the social partners, the regions taking the leading role. Continuing vocational training is mainly financed by the state, the regions and the companies, the latter being statutorily required to participate in the funding of training. Information, vocational guidance and support or the various target groups are provided by a varied range of training, guidance and information bodies.

Figure 5: **Stakeholders in continuing vocational training in France** (Centre INFFO)



27 cf. DREXEL, Ingrid: Das System der Finanzierung beruflicher Weiterbildung in Frankreich : Analyse und Schlussfolgerungen *("The system of funding continuing vocational training in France: analysis and conclusions")*, Berlin 2003, p. 13

Whereas responsibility for continuing vocational raining of young people and adults is generally a matter for the regions, the state is responsible for the vocational qualification of target groups which are difficult to integrate. The central government also provides support for branches and companies assessing their qualifications requirements in advance and submitting an appropriate application for financial aid.

3.3.2 Funding

In 1971, the French state laid the statutory foundations for the funding of continuing vocational training in the form of a comprehensive system for the provision of resources, something which has been continually further developed in the last thirty years in a constant dialogue between the state and the social partners.[28] This process saw alternate use being made of innovatively regulated collective wage agreements and so-called "negotiated laws".[29] Since continuing vocational training is, in legal terms, performance of work, all companies are legally obliged to make a financial contribution to the continuing training of their employees. The amount of the financial commitment is on a scale according to the size of the company. Companies with more than ten employees are currently obliged to pay a deduction in the amount of 1.6 percent of their wage and salary roll. Some companies make contributions far in excess of this, the average deduction being around 3 percent.[30] Companies with fewer than ten employees are statutorily required to pay 0.4 percent of their annual wage and salary bill for the funding of vocational training, company owners and the self-employed being obliged to make a contribution of 0.15 percent.

Companies may either meet this commitment by paying the relevant contributions into a specially set up fund (OPCA – *organisme paritaire collecteur agréé*) operating in accordance with the principle of adjustable contributions or else by providing continuing training activities themselves, which they either conduct internally or under the supervision of an external training provider. The jointly managed regional or branch funds use the funds collected and grants from the state to refinance the continuing training measures initiated at a company level or by the employees.

The law of 1971 and the statutory and wage agreement regulations for which it has provided a basis have brought about deep-seated change in the French continuing vocational training landscape.[31] In her analysis of the opportunities and limitations of an imitation of the French funding system in a German context, DREXLER emphasises the positive effects the system in France has generated in overall terms.

28 Insofar as no indication to the contrary is provided, the following presentation of the French system of funding of continuing training follows the analysis of Ingrid DREXLER (2003).

29 In France, this is understood to mean laws where the content has been negotiated in advance with the social partners.

30 Centre INFFO, www.centre-inffo.fr.

31 Cf. LICHTENBERGER/MÉHAUT (2000).

At the quantitative level, there has been a strong increase in the direct and indirect participation of companies in the funding of continuing training. The same applies to participation in continuing training on the part of the employees. Comparative data shows that, alongside the statutory obligation of companies to provide a certain amount for the funding of continuing training, there is evidence of the development of considerable willingness to put additional, voluntary provision in place.[32] The increase in expenditure on continuing training corresponds with the development of continuing training activities undertaken by French employees. From the mid-seventies to 1999, there was a constant rise in participation in training measures, from 17.6 percent in 1975 to 37.4 percent in 1999.[33]

A particularly high level of significance needs to be accorded to the increase in value of continuing training which has resulted from the system in terms of society as a whole. Over the course of the decades, it has been possible to develop an ongoing political and academic debate focussing on continuing training and the differentiated continuing training policies of the stakeholders involved, as DREXLER makes clear: "The continuing training system (...) has resulted in a successive learning process on the part of all stakeholders. In a country which is traditionally characterised by the primacy of school-based general education, all of this means a marked revaluation of (continuing) vocational training."[34] In overall terms, the system today meets with the broad acceptance of all trade and industry and societal stakeholders.

Funding of continuing training via the state and the regions takes place via a distribution of areas of responsibility.

The state finances:
- qualifications provision for job seekers,
- qualifications provision for the disadvantaged,
- special training initiatives, such as new engineering courses of study,
- information actions on the topic of training,
- financial grants to the regions,
- grants for the drawing up and implementation of training programmes in companies.

The regions finance special qualifications provision for young people and adults according to criteria they have stipulated on an individual basis (such as the vocational preparation at the *lycée professionnel,* cf. Chap. 3.2.1)

32 Cf. DREXLER (2003), p.26.
33 Cf. DREXLER (2003), p.54.
34 Ibid.

Overall investment in French education (both general and vocational) was divided up as follows amongst the participating stakeholders in the years from 2000 to 2002:

Table 1: **Development in educational expenditure in France 2000-2002 in bn. €** (Céreq).

	2000	2001	2002
Ministry of Education	54,048	55,397	56,971
Other ministries	5,563	5,826	5,916
Regions + Départ.	22,017	22,283	23,075
Other public	605	625	634
Companies	6,021	6,466	6,666
Private households	9,994	10,129	10,333
% of GNP	7.0	6.9	6.9

Whilst the funding structure strongly underlines the significant role played by the central state, it also makes clear the significance of the regions, *départements (collectivités territoriales)*, the companies and private households. The reason for the rise in the level of endeavours being undertaken at a regional level is the current efforts within the national education system to transfer personnel development of staff not involved in the training company to the responsibility of the regions.[35]

The following table presents the development in expenditure on vocational education and training according to funding body. After a further rise in 1999, total VET spending has since remained relatively stable.

35 Cf. BOUDER, Annie / KIRSCH, Jean-Louis: Achieving the Lisbon Goal: The Contribution of Vocational Education and Training Systems. Country Report: France. Céreq Centre d'études et de recherches sur les qualifications. Marseille 2004, p.18.

Figure 6: **Development in global expenditure on vocational education and training according to funding body 1997-2002** (DARES 2005)

Tableau 3
Structure de la dépense globale par financeur final (y compris investissement)
(En million d'euros)

	1997	1998	1999	2000	2001	2002	Structure 2002 (en %)	Évolution 2002/2001 (en %)
État	4 706	4 831	4 934	4 830	4 786	4 415	20,3	-7,7
Régions	1 900	2 084	2 105	2 071	2 066	2 084	9,6	0,8
Autres collektivités territoriales	21,2	22,1	22,9	23,5	23,6	23,9	0,1	1,3
Autres administrations publiques et Unédic	2 134	1 747	1 702	1 531	1 542	1 719	7,9	11,5
dont								
Autres administrations publiques	-	*1 318*	*1 306*	*1 146*	*1 028*	*677*	*3,1*	*-34,1*
Unédic	-	*429*	*396*	*390*	*514*	*1 042*	*4,8*	*102,8*
Entreprises	8 266	8 533	8 934	9 289	9 605	9 621	44,2	0,2
Ménages	436	498	535	531	599	629	2,9	5,0
Total (hors fonction publique pour ses propres agents)	**17 553**	**17 715**	**18 233**	**18 276**	**18 622**	**18 492**	**84,9**	**-0,7**
Total (y compris publique pour ses propres agents)	**20 642**	**20 841**	**21 602**	**21 539**	**21 921**	**21 775**	**100,0**	**-0,7**

(*): Agents civils et militaires, La Poste et France Telecom.
Source: Dares, données provisoires pour 2002.

3.3.3 DIF and educational leave

On 7 May 2004, a new law relating to the individual right to continuing training, DIF (droit individuel à la formation), came into effect. This new law accords every employee the statutory right to at least 20 hours of continuing training per year. The implementation of this law represents a new challenge for employers, the practical realisation of which is still being awaited as the present study went to press. Prior to this legislative amendment, employees had a legal right to three different types of educational leave, and this right will remain:

- individual educational leave (congé individuel de formation, CIF), which can be freely structured in terms of content;
- leave for the ascertaining of competences (congé de bilan de compétences, CBC);
- leave for the recognition of occupational experience (congé de validation des acquis, CVAE).[36]

3.3.4 The bilan de compétences

The right to educational leave for the ascertaining of competences *(bilan des compétences)* was introduced by law on 31 December 1991, pursuant to which every employee has the right to a free day where the process of ascertaining compe-

36 Cf. CEDEFOP – Centre européen pour le développement de la formation professionnelle : Das Berufsbildungssystem in Frankreich *("The vocational education and training system in France")*, Luxemburg 2000, p. 69 and www.passinformatique.fr.

tences may be undertaken after five years of employment, one year of which needs to be in the current company. Although both employees and the self-employed take advantage of this, even greater use is made of the service by job seekers (approximately 70 percent).[37]

The aim of ascertaining competences is the recognition of personal development potential and qualifications deficits, whilst also representing a procedure which takes into account that the actual competences of each individual cannot entirely be covered by certificates. GUTSCHOW (2003) views the adoption of the competence concept in France as an attempt to relativise the distance between the vocational education and training system and in-company reality. According to GUTSCHOW, however, the search for a solution to this conflict has focussed far more on the establishment of practice related training courses and qualifications, both within the state educational system and via certificates issued by the chambers and branches, than on the *bilan de compétences.*[38]

The bilan de compétences remains an important career planning instrument, although it is only able to map part of the process for the recognition of informally acquired competences. The ongoing development of the opportunity for the recognition of occupational experience within the framework of state recognised validation procedures (VAE), which was introduced in 2002, currently represents a much more promising method for the ascertaining of competences acquired at the workplace, and this will be addressed in more detail in the following chapter.

3.3.5 From the training to the certification culture[39]: Validation des Acquis

The vocational education and training decree of 17 January 2002 introduced the recognition of occupational experience (*validation des acquis*, VAE), the application decree of 24 April 2002 transferring the system to institutes of higher education. This instrument allows for the evaluation of occupational experience as a whole, rather than merely focussing on professional knowledge, thus enabling those who have worked in a field for three years (as an employee, in a self-employed capacity or even on a voluntary basis) to have their occupational experience taken into account during the acquisition of a degree or work qualification.

Accreditation can take place in respect of all degrees listed in the National Register of Professional Certification *(Répertoire National de la Certification*

37 Centre INFFO.

38 Cf. Erfassen, Beurteilen und Zertifizieren non-formell und informell erworbener beruflicher Kompetenzen in Frankreich: Die Rolle des bilan de compétences *("Recording, assessing and certifying non-formally and informally acquired vocational competences: the role of the bilan de compétences")*. In: STRAKA, Gerald A.: Zertifizierung non-formell und informell erworbener beruflicher Kompetenzen *("Certification of non-formally and informally acquired vocational competences")*, Münster 2003, p. 137.

39 This was the fashion in which an expert interviewed from the National Ministry of Education summarised the current educational policy tendencies and strategies, particularly encompassing the implementation of the VAE.

Professionnelle, see Chap. 4.4.6.), including all university qualifications. According to occupational experience (some of the criteria used for the measurement of this being duration and the degree of responsibility assumed and of specialist level) the recognition procedure via the *validation des acquis* can replace the whole of a degree course in engineering. The decision as to whether an application is to be granted is made by an independent jury, which may award full and unreserved recognition with the issuing of a degree or decide on partial validation. In the latter case, the jury determines the additional achievements and knowledge for which evidence still needs to be provided.

Each degree may only be applied for once per calendar year, a maximum of three applications annually being permitted in respect of different qualifications.[40]

This change in the law represents a considerable step towards formal recognition of informal learning at the workplace and a veritable revolution in terms of traditional ideas concerning training. It supports the mutual connectivity of various learning venues, such as companies, institutes of higher education and of continuing training and, from a German point of view, engenders the aspiration of achieving where possible an astoundingly practical economic effect. A further aim of the *Validation des Acquis* is to contribute towards bringing about a shortening of training durations and an attendant reduction in costs, creating in overall terms broad-based access to education for a wider body of the public.[41]

Within the scope of the following IT-specific section of the present study, a particularly interesting object of consideration will be whether and to which extent this instrument for the recognition of learning at the workplace is being used in the IT manufacturer and user branches. The issue of the extent to which the institutes of higher education practice this form of recognition also needs to form the object of closer examination. Notwithstanding the fact that statutory stipulations in respect of the individual steps within the VAE procedure establishes overall independence from the branch and degree sought, some features arise with regard to the IT branch and the engineering field in particular, and these form the reason behind addressing the procedure in more detail in the following, IT-specific section (see Chap. 6).

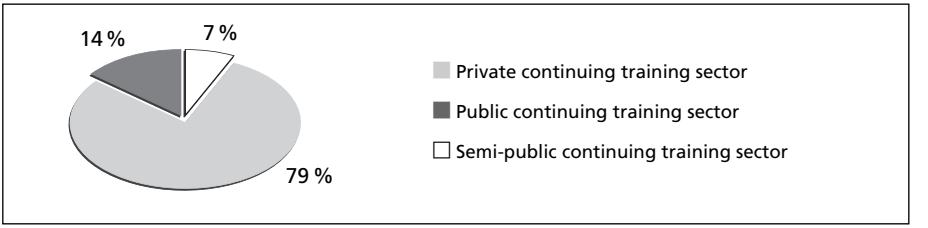
3.3.6 The French continuing training market

The French continuing training market is freely accessible to all stakeholders. It comprises all educational institutions which have submitted a *bilan pédagogique et financier* to the state, a form of pedagogical and financial report which needs to be presented on an annual basis. More than 45,000 institutions are currently involved in continuing vocational training.[42] The large diversity of educational insti-

40 The whole of the legal text may be viewed at http://eduscol.education.fr/D0077/2002_615.htm.
41 This is one of the arguments used by the accreditation body LUREVA, www.lureva.org.
42 Centre INFFO.

tutions characterising the market may be divided into three major groups. As shown in Figure 7, privately operated continuing training institutions make up the largest part of the market with 79 percent, followed by the public continuing training sector (14 percent) and the semi-public continuing training institutions (seven percent).

Figure 7: **The French continuing training market** (CIEP)



3.3.6.1 The public continuing training sector

Most public continuing training institutions are subject to the Ministry for National Education, Higher Education and Research *(Ministère de l'éducation nationale, de l'enseignement supérieur et de la recherche)*. They are active in virtually all fields of vocational education and training and present in all regions.

- Institutes of higher education: within the scope of its autonomy, each institute of higher education is afforded the opportunity of managing its own continuing training provision. The continuing training content depends on the specialist areas of the individual institute of higher education, the level being pitched at a point beyond higher education entrance qualification.
- The Greta: the Greta Network *(Groupement d'Établissement)* comprises groups of geographically adjacent public school institutions (both *collèges* and *lycées* involved in preparation for the general, technical or vocationally oriented upper secondary school leaving certificate) which amalgamate for the provision of continuing training for adults. The Greta primarily provides continuing training for employees, skilled workers and technicians.
- The CNAM *(Conservatoire National des Arts et Métiers)*, the origins of which go back to the era of the French Revolution, primarily offers in-service training at a higher education level to around 80,000 students annually, most of whom (78 percent) have occupational experience and aspire to a degree, title or certificate at between level Bac+2 to Bac+8.[43] Information technology comprises one of the four specialist areas, and a considerable proportion of the VAE procedures carried out thus far were conducted at the CNAM in the course of 2003 and 2004, constituting two reasons for subjecting this state

43 Le Cnam en chiffres l 2003 > 2004. Paris 2004, p. 5.

continuing training institution to further separate investigation within the IT-specific section of the present study (see Chap. 4.2.2., 4.3.2., Chap.7).

- There are, in addition, vocational education and training centres *(centres de formation professionnelle)* under the auspices of other ministries (such as the Ministry of Agriculture).

3.3.6.2 The semi-public continuing training sector

Within the semi-public sector *(secteur parapublic)*, two types of continuing training institutions need to be differentiated:

- The branches of the AFPA *(Association française pour la formation des adultes)*. Founded in 1949, the AFPA is under the supervision of the French Ministry of Social Affairs and receives a series of subsidies enabling it to provide continuing training in a large number of occupational fields, especially for those seeking employment.
- The continuing training providers of the chambers of industry and commerce, chambers of crafts and trades and chambers of agriculture.

3.3.6.3 The private continuing training sector

This third group of continuing training institutions, which operates independently of state control, comprises the major proportion of the French continuing training market:

- non- profit making continuing training institutions;
- commercially oriented companies of greatly varying size;
- companies with their own continuing training service with statutory permission for the provision of their own requirements based continuing training to their employees.

Taken together, the continuing training market represents an important branch of the national economy, producing around 1.5 percent of French domestic product in 2001.[44] Taking their organisational and business form as a starting point, the training institutions may be differentiated according to two sorts of service provision: institutions which ascertain competences (*bilan de compétences)* and providers of qualifications measures.

Every continuing training institution and every individual person providing continuing training can register this state of affairs with a state body for the supervision of vocational education and training, thus acquiring recognition as a training institution. Registration brings with it the obligation to deliver an annual report *(bilan pédagogique et financier)*. Evaluation of documentation enables the state to conduct an ongoing observation of the VET market.[45]

44 Cf. Centre INFFO: Inffo flash – l'information sur la formation. Numéro spécial chiffres. May 2003.
45 Ibid.

3.4 Degrees and certifications

Degrees issued in France, whether state degrees, state recognised degrees or branch related degrees, may be divided into three major groups.

- Degree *(diplôme)*: the first group represents degrees awarded by the Ministry of National Education (national degrees from both the upper secondary and higher education sector), some degrees jointly awarded with other ministries and degrees awarded by the Ministry of Agriculture.
- The second group comprises degrees and titles (tître à finalité professionnelle) awarded under the auspices of other ministries, public or private training institutions under their own names.
- The third group consists of qualifications certificates *(certificat de qualification des branches professionnelles CQP)* created and awarded under the leadership of the appropriate professional branches.[46]

All three cases involve issuing evidence of a "qualification", in other words the ability to fulfil occupational tasks within several work contexts. The respective responsibilities are defined in a reference document (*réferentiel*). The three groups currently represent approximately 15,000 different degrees, titles and certificates (11,000 of which are allocated to the higher education sector).[47]

The Social Modernisation Act of 17 January 2002 established the National Commission for Vocational Qualifications (Commission Nationale de la Certification Professionelle), which monitors, supplements and updates the National Register of Professional Certification *(Répertoire Nationale de la Certification Professionnelle)*, whilst at the same time formulating recommendations to educational institutions in respect of degrees, occupational titles and qualifications certificates. The Commission comprises representatives of ministries, social partners, the chambers, the regions and also contains experts.[48]

Central to the remarks contained within the following chapter and to the interpretation of these remarks is the fact that national certificates and degrees which are awarded within the context of the French system certify knowledge which has been acquired on an individual basis rather then the educational pathway. According to French law, the value of a degree or certification is equal, irrespective of whether candidates have pursued a course of initial or continuing vocational education and training, have received funding from their employers or have financed their studies themselves or acquired their knowledge within an occupational context or via experience at the workplace. To guard against discrimination which may arise from such sources as titles acquired via the VAE *Validation des Acquis*, the certificate or degree issued may only certify the qualification and not the educa-

46 www.passinformatique.com/60-formationcontinue/30-20-10_quechoisir.asp
47 National Commission for Vocational Qualifications *(Commission Nationale de la Certification Professionelle)* www.cncp.gouv.fr.
48 ibid.; for further remarks in respect of this, see Chap. 4.3.6.

tional pathway. The fact that this regulation is in conflict with the pan-European introduction of the Degree Supplement, which also records, amongst other things, the educational pathway, may lead to problems in this area.

4. Provision and structure of IT initial and continuing training in France

4.1 "Formation Initiale" in the IT sector

In the information technology sector, the scale of vocational degrees relating to initial vocational education and training stretches from level IV (vocational upper secondary school leaving certificate as a final qualification within the upper secondary sector) to level I (degree in engineering, Masters etc.). IT initial vocational education and training in France taking place almost exclusively at a higher education level in France, vocational qualifications provision at an upper secondary level is correspondingly scarce.

4.1.1 Initial vocational education and training in information technology within the upper secondary sector

Preparation for the vocationally oriented upper secondary school leaving certificate *(bac professionnel)* takes place in a state or private grammar school. Although there is provision within the IT sector for a bac professionnel relating to networks technology *(Micro-Informatique réseaux: installation et maintenance)*,[49] the level of demand for this as a stand-alone qualification on the part of employers is low, rendering it far more preparation for ongoing specialist training.[50]

4.1.2 Higher education initial vocational education and training

The French higher education system offers a wide range of different degrees, which are currently being aligned within a three-tier higher education qualifications model as a result of European harmonisation (see Chap.3.2.3.). Within the framework of higher education training, recent years have seen the development

49 Unless indications to the contrary are provided, the presentation of training provision within the information technology sector is based on information from the semi-state continuing training organisation AFPA *Association pour la formation professionnelle des adultes* and from the IT employers' association *Syntec Informatique*, the latter representing around 500 SME's and major companies from within the French manufacturing sector. In cooperation with the AFPA, the Ministry of National Education, the IT user amalgamation CIGREF and a series of further institutions and associations relevant to the branch, Syntec Informatique has established www.passinformatique.com, a detailed Internet portal relating to qualifications in the IT sector. To supplement the Internet based research forming the basis of the present study, expert interviews were conducted with the Syntec Informatique Association Head of Initial and Continuing VET, an executive management representative from the Higher Education and Labour Market section of the Ministry of National Education, the Head of Department for Information Technology Continuing Training from CNAM, the Head of Department for Information Technology Continuing Training at AFPA and the Commissioner for Personnel Development at CIGREF.

50 Especially the experts interviewed within the scope of the present study testified equally to the validity of such anecdotal evidence.

of a large amount of provision relating to various levels of specialisation and encompassing widely differing durations of study. The current number of courses of study available within the IT sector is approximately 1,000, including the schools of engineering.[51]

4.1.2.1 Schools of engineering at the Grandes Ecoles

The schools of engineering *(Ecoles d'Ingénieurs Généralistes or Spécialisés)* at the *Grandes Ecoles* provide a range of information technology courses of study of first class repute for scientifically oriented upper secondary school leavers. There are two routes for obtaining a place at such an institute of higher education: either via a special selection procedure directly following the upper secondary school leaving certificate or, more commonly, via higher education *classes préparatoires* in *lycées* specifically designated for the purpose. Around 40 of the French engineering schools offer pure information technology courses of study, a further 30 or so providing specialisation options in the second and third years of study. In both the information technology sector and other disciplines, training at a Grande École in France is still considered to be the most prestigious route and is seen as providing the most promising career perspectives.

4.1.2.2 Universities

Notwithstanding the fact that those experts interviewed adopt the view that a university course of study is not quite so impressive in the eyes of employers as training competed at a school of engineering, the universities still provide a wide range of IT study opportunities offering interesting perspectives on the labour market. Even prior to the introduction of the European oriented LMD System, study provision was strongly tiered (Cf. Chap. 3.2.2.), in the IT sector ranging from the minimum duration of study Bac+2 (upper secondary school leaving certificate + two years of study), extending to include Bac+3 (Licence), Bac+4 (Master M1), Bac+5 (Master M2, degree) and culminating in the Doctorat (Bac+8). Within the individual specialist areas, the universities offer courses of study which are more general in nature or which provide a greater degree of specialisation. Chapter 4.3.1. will provide a more detailed depiction of those higher education qualifications relevant to the IT sector, including the opportunities they offer for making the transition to the labour market.

4.1.3 Alternating training: Contrat d'apprentissage

Alongside the reorientation towards comparable study structures within an inner-European context, the more closely practical orientation of initial vocational education and training both inside and outside the higher education sector represents a second central theme of French VET and higher education policy.[52] The aim of

51 This figure is based on estimates of the AFPA experts interviewed.

52 Several interview statements, especially those emanating from experts from the Ministry of National Education, serve to underline this generally observable tendency.

initial vocational education and training which takes place via an apprenticeship contract (contrat d'apprentissage) may be all degrees relating to initial VET both within and outside higher education, thus also rendering it an appropriate legal framework for a dual course of study. Such courses are being established by institutes of higher education in conjunction with trade and industry (one of the vehicles for establishing this in the IT sector being, according to the employer experts interviewed, the CIGREF amalgamation of employers CIGREF).

4.2 Provision of continuing vocational training in the IT sector

Continuing vocational training is aimed at adults who are in work or seeking employment. As described in Chap. 3.3.5., the French continuing training market is freely accessible to all interested stakeholders. Providers of continuing vocational training relevant to the IT sector may be divided into four groups: public continuing training institutions (CNAM and GRETA), semi-public continuing training institutions (AFPA and the chambers), institutes of higher education (the universities and the *Grandes Ecoles*) and private providers of continuing vocational training.

4.2.1 The GRETA

The branches of the GRETA operate as public continuing training institutions, affording adults the opportunity to acquire national degrees at levels V (CAP) to III (BTS) via continuing training. The GRETA also offers modular qualifications in most areas.

In the field of information technology, the GRETA offers a wide range of training, covering such main areas of focus as the basics of information technology, local networks, systems administration, industrial IT and applications programming.[53]

4.2.2 CNAM – Centre National des Arts et Métiers

The Conservatoire National des Arts et Métiers (CNAM), a national institution for higher education and research, operates under the auspices of the Ministry of National Education. CNAM training courses are aimed at both employees or self-employed persons and job seekers and graduates entering the world of employment. Training courses at higher education level either lead to a degree (1st, 2nd and 3rd cycle degrees, degrees in engineering offered by CNAM, DEA, DESS, Ph. D. courses of study) or else are purely qualificational in nature, enabling them to be accessed on an individual basis or via a company. The CNAM awards over 7,000 degrees a year, including 1,000 degrees in engineering.[54]

Alongside these national degrees, the CNAM also awards around 30 certificates of competence *(certificats de compétences),* conceived in conjunction with the respective occupational sectors. These represent somewhat shorter courses of continuing

53 For a selection of the GRETA provision relating to the IT sector, see www.greta-viva5.org/site/formation.html inter alia

54 Le Cnam en chiffres | 2003 > 2004. Paris 2004

training, stipulating between 300 and 350 hours of study, and are strongly aligned to occupational practice.

Since mid-2004, a new department for continuing training in the field of information technology has been under construction which, in contrast to the principles which otherwise form the basis of the work carried out by the CNAM, will operate in a commercially oriented manner. The idea is to combine the qualifications of teaching staff with the traditional, vocationally oriented route pursued by the CNAM to provide individual training courses tailored to companies' respective requirements. In line with this aim, this department chooses to draw up its provision on an individual basis with the relevant clients rather than issuing a conventional catalogue of training courses and seminars.

In the field of information technology, continuing training courses offered by the CNAM include systems and network architecture, database administration, economic IT, industrial IT, systems integration, artificial intelligence and IT systems.[55]

4.2.3 AFPA and the chambers

The AFPA (Association française pour la formation des adultes), founded in 1949, operates under the supervision of the French Ministry of Social Affairs, receiving a series of subsidies enabling it to provide continuing training in a large number of occupational fields, especially for those seeking employment.

AGPA continuing training courses in the field of information technology provide preparation for the Ministry of Social Affairs titres professionnels (see Chap. 4.3.3.). These comprise three certificates of occupational competence (CCP *certificat de compétence professionnelle*), which may also be acquired individually. In light of the fact that funding bodies, predominantly the Committees of the Regions, are increasingly approving only shorter courses of continuing training comprising something of the order of between 400 and 500 hours for job seekers, these courses of continuing training are expanding to cover about a third of titres professionnels.[56]

A total of 140 centres provide preparation for the IT related *titres professionnels*[57], placing the AFPA in competition with a further 250 private training centres also recognised as preparation providers for the *titres professionnels*.[58]

The continuing training centres of the chambers of industry and commerce train around 370,000 participants annually (employed or job seekers) in 214 centres.[59]

55 Ibid.

56 Expert interview with a representative of AFPA.

57 These include Technical Assistance for Information Technology (level IV), Network Technician (level IV), Higher Network Technician (level III), Software Developer (level III), IT Project Manager (level II).

58 Expert interview with a representative of AFPA.

59 Cf. AFPA association pour la formation professionnelle des adultes: Dossier sectoriel et professionnel – Informatique et télécommunications. Working document of the Département Sectoriel Tertiaire de la DEAT. l.c. 2001, p. 53.

Provision is wide-ranging, also covering the information technology area. One example of the longer vocational training courses is the *Technicien de maintenance en micro-informatique*, although many shorter courses are also included within the range of provision.

The training courses of the chambers of industry and commerce lead to in-house certificates. Parallel to this, the chamber related *Association pour la Certification des Compétences Professionnelles* awards a certificate covering in-company competence *(Certificat de Compétences en entreprises)*. This certificate represents a kind of competence portfolio and does not provide any statement in respect of a completed course of training.[60]

4.2.4 Institutes of higher education

Higher education continuing training is organised within a national competence network (comprising 82 universities, 94 technical university institutes – *insititut universitaire techniques* IUT – and 114 schools of engineering), coordination of which is the responsibility of the Conference of Directors of University Continuing Training Departments *(Conférence des directeurs de services universitaires de formation continue)*. More than 100 higher education continuing training institutions are involved in the information technology area and face the challenge of lending their continuing training provision with its base in logical, academically oriented disciplines a practical structure which encompasses the requirements arising from occupational activity. In terms of content, the continuing training provision offered by institutes of higher education is primarily oriented towards the regional needs of their respective locations.

In the information technology field, the *Grandes Ecoles* provide a series of specialised, Masters continuation courses of study (mastères spécialisés), the aim being for these to retain their titles after the LMD reform (see Chap.4.3.5.1.).[61]

4.2.5 Private providers of continuing vocational training

Alongside the public and semi-public continuing training institutions (GRETA, AFPA, CNAM, institutes of higher education etc.), France also has a large number of private training companies specialising in IT continuing training. These may be divided into two major groups:

- the more or less independently operating continuing training sections of major IT companies, such as HP, IBM, Cap Gemini Institute, Atos Centre de Formation, Unilog formation and so on;
- private organisations specialising in continuing training, such as Learning Tree International, Global Knowledge Network.

60 www.passinformatique.com/60-formationcontinue/30-20-51_CCE.asp

61 A certain risk of confusion with the masters awarded by universities in line with the pan-European model is inherent here.

4.2.6 Alternating training: Contrat de professionalisation

Whereas the contrat d'apprentissage provides the legal framework for a practically oriented initial course of vocational education and training (see Chap.4.1.3.), the aim of the *contrat de professionalisation* is to establish an enhanced level of practical orientation within measures relating to continuing VET. The framework of a *contrat de professionalisation* also enables a title awarded by the Ministry of Social Affairs or a branch certificate (CQP) to be acquired or allows for the completion of a continuing training dual course of study.

4.3 Degrees, titles and certificates relevant to the IT sector

Over the course of the past twenty-five years, various procedures for the recognition of occupational experience and competences have been developed in France. This process has left its mark on the role of the social partners, leading to the according of a greater level of consideration to individual qualifications in collective wage and general agreements. Conferment of the right of recognition of qualifications on the social partners and companies resulted in the breaking of the long exercised monopoly of the French state with regard to the awarding of titles and qualifications both in general schooling and VET.[62]

As far as the IT sector is concerned, four types of recognition or evidencing of qualifications are of relevance.

- National degrees (e.g. BTS, Masters and degree in engineering)
- The titles of the Ministry of Social Affairs, *titres professionnels*
- Branch certificates (CQP)
- Private certifications and qualifications (such as in-house certificates awarded by institutes of higher education and providers of continuing training, product and manufacturer certificates)

As previously mentioned, statutory expansion of the recognition of occupational experience via VAE in 2002 (cf. Chap. 3.3.5. and Chap. 7) has provided explicit freedom of choice on the part of persons undergoing initial or continuing vocational education and training in respect of the pathway they wish to pursue towards the acquisition of a degree, a title or a certificate. Within the scope of the endeavours to implement lifelong learning, all educational pathways, whether these relate to initial or continuing VET or VAE, lead to identical qualifications with no external visibility as to which educational pathway was taken. For this reason, the following division into initial and continuing vocational education and training should not be viewed in absolute terms, the categorisation of the sector of "initial VET" in particular having been made for reasons of clarity, in accordance with conventio-

62 Cf. CEDEFOP – Centre européen pour le développement de la formation professionnelle: Das Berufsbildungssystem in Frankreich *("The vocational education and training system in France")*, Luxemburg 2000, p. 109.

nal structures and with a view to the overall quantitative distribution of the qualifications across the individual educational pathways.

4.3.1 Initial vocational education and training: national degrees

Although the multitude of possible qualifications may initially appear confusing to the external observer, the degrees of the national educational system are very familiar to French employers. Each qualification (BTS, DEUST, licence pro etc.) indicates a certain number of years of training or study, rendering each respective level of training identifiable within a national stipulated graded scale. National qualifications and degrees currently correspond to a scale comprising levels I to V.[63]

4.3.1.1 Degrees of the national educational system

Vocational qualifications within the national education system may be sub-divided into two categories. One area comprises degrees awarded within the technological/specialist school based training system (CAP, BTS), the other being represented by degrees awarded by universities, which constitute evidence of higher education study.

Higher education continuing training is traditionally divided up according to cycles (cycles). The first two cycles each extend over a period of two years, the third cycle covering subsequent years of study and extending to include Ph. D. studies (doctorat, Bac+8).

1st cycle (BAC+2)

- Upon completion of the second year of study, an initial vocational education and training qualification is provided in the form of the DEUST *(Diplôme d'Études Universitaires Scientifiques et Techniques)*. Around ten different DEUST programmes are currently available for the information technology sector.[64]
- Although the DEUG *(Diplôme d'Études Universitaires Générales)* does not represent a vocational education and training qualification, it opens up the way for a wide range of IT specialisation opportunities in the second study cycle.
- The aim of the DUT *(Diplôme Universitaire de Technologie)* is to provide training for higher level technicians in a relatively short period of study and to enable direct transition to the labour market. A total of ten DUT is available for the information technology sector.
- Although the training aim of the BTS *(Brevet de Technicien Supérieur)* closely resembles that of the DUT, even greater emphasis is placed on technical specialisation. Three BTS are available for the information techno-

63 For an explanation of the scale, see note 10 in Chap. 3.2.1.

64 Both these and subsequent figures are the result of data research conducted in May 2005 on www.passinformatique.com.

logy sector. In contrast to other degrees within the first cycle, the BTS is acquired in a specially established area at lycées or at private schools rather than at an institution of higher education.[65]

As an alternative to direct transition to employment, BTS and DUT both offer a range of connective opportunities to universities as well as, via a selective procedure (concours), access to the schools of engineering.

Alongside the introduction of the qualifications accorded pan-European recognition, the established degrees within the second and third cycles have also been thus far retained in a parallel system. There is a series of specialisations tailored to the IT branch for each possible qualification.

2nd cycle (Bac+3/+4)

- *Licence professionnelle:* corresponds to the Bachelor to be introduced across Europe (ten specialisations for the information technology sector)
- *Master professionnel* (M1): first stage of the European Master of Engineering (four years of study)
- *Master recherche* (M1): first stage of the European Master of Science (four years of study)

3rd cycle (Bac+5/+6/+7/+8 ...)

- *Diplôme:* conventional higher education qualification after five years of study
- *Master professionnel* (M2) : second stage of the European Master of Engineering (five years of study)
- *Master recherche* (M2): second stage of the European Master of Science (five years of study)[66]

The alignment of the French higher education landscape to the qualifications of Licence (Bac+3), Master (Bac+5) und Doctorat (Bac+8), which enjoy pan-European comparability, currently provides an indication of an enhanced trend for a requirement on the part of Bac+2 graduates to undertake at least one further year of study if they wish to be competitive in international terms. In 2003, 33 percent of the BTS and 64 percent of the DUT decided to undertake continuing studies.[67]

4.3.1.2 Engineering titles

The right to award an engineering title is conferred on the *Grandes Ecoles d'Ingénieurs* by the *Commission des titres d'ingénieurs* – a national commission comprising representatives of trade and industry and the institute of higher education.

65 www.passinformatique.com
66 www.passinformatique.com.
67 Ibid.

Universities (including Paris 6, Grenoble, Valenciennes, Bordeaux) also provide courses of study leading to an engineering qualification homologised via the Commission. In addition to this, There is also the opportunity at the CNAM to acquire a *diplôme d'ingénieur du CNAM*, the quality of this course of study also being monitored by the Commission.

Initial vocational education and training leading to the acquisition of an engineering title usually lasts five years (Bac+5). In order to acquire the title via a course of continuing training, at least three years of occupational experience are required. In this case, the duration of the course of study can comprise between 24 months (full-time) and four to five years (in-service). The pre-requisite for access is generally a study starting point of Bac+2.[68]

4.3.2 Continuing training: CNAM courses of study leading to a degree

As described in more detail in Chap. 4.2.2., in its capacity as an institution for higher education and research under the auspices of the Ministry of National Education, the CNAM *(Conservatoire Nationale des Arts et Métiers)* enjoys a special status within the French higher education landscape. This status entitles the CNAM to provide preparation for and to award national degrees which carry parallel reference to the institution (such as *Diplôme d'ingénieur Cnam (HTT) Informatique*).

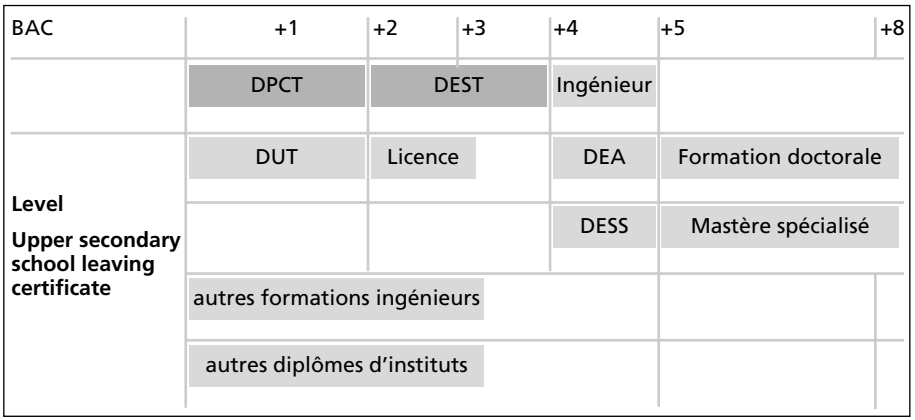
A significant feature of the courses of study leading to a degree is the fact that they are designed specifically for adults who already have occupational experience, as well as being in possession of a higher education entrance qualification. There are two possibilities for the evidencing of occupational experience.

- If the occupational activity exercised is equivalent to the qualification sought in terms of content and level, the requirement is normally set at a minimum of two years' occupational experience, one year being sufficient preparation for a DUT.
- If the occupational activity exercised is not equivalent to the qualification sought in terms of content and level, both two to three years' occupational activity and a content relevant practical placement of at least three months' duration are required, or else evidence must be provided of the specific prospect of a job within the specialist higher education field forming the object of the qualification.[69]

All courses of study are modularly structured, enabling them to be organised in accordance with individual requirements as well as to be pursued in-service. As Figure 8 shows, the CNAM provision in the field of information technology covers all levels of the French higher education system.

68 Ibid.
69 Ibid.

Figure 8: **CNAM courses of study leading to a degree – qualifications levels in the field of information technology** (CNAM)[70]



4.3.3 Continuing training: titles of the Ministry of Social Affairs, titres professionnels

The titres professionnels, issued on behalf of the Ministry of Social Affairs and Employment *(Ministère national des affaires sociales, du travail et de la solidarité)* provide evidence of the fact that the respective persons have at their disposal the entirety of competences, skills and knowledge required or the exercise of a qualified, occupational activity. Seven profiles out of the total number of around 300 are tailored to the IT branch, ranging from national levels II to V in terms of their respective entry conditions and complexity of profile:

- *développeur informatique* (level III)
- *responsable de projets en systèmes d'information* (level II)
- *technicien d'assistance en informatique* (level IV)
- *technicien réseaux et télécommunications d'entreprise* (level IV)
- *technicien supérieur de support en informatique* (level III)
- *technicien supérieur en réseaux informatiques et télécommunications d'entreprises* (level III)
- *technicien supérieur gestionnaire de ressources informatiques* (level III).

Continuing training leading to the acquisition of a t*itre professionnel* is primarily conceived for job seekers and candidates with occupational experience, frequently receiving funding via the regions as a labour market policy measure. Although a practical component within classically seminar oriented continuing training is required, the length of the practical phase can vary according to the educational provider. The requirement for each title is three so-called certificates of compe-

70 http://deptinfo.cnam.fr/index.php?content=DIP.

tence *(CCP certificat de compétences professionnels)*, jointly covering the competences allocated to the respective profile and which can either be acquired individually or within a course of continuing training covering the whole of the profile. The individual CCP's are each valid for a period of five years.

According to the statements of the experts interviewed, recent years have seen a sharp decline in willingness to provide funding, particularly on the part of the regions. Whereas funding was previously usually provided for the whole of the course of continuing training, there is now a rising tendency to approve shorter measures comprising 400 to 500 hours, which cover the acquisition of one CCP.[71]

4.3.4 Continuing training: certificates of the branches (CQP)

CQP's *(certificat de qualification professionnelle)* are conceived within a process of ongoing dialogue between employers and trade unions within a branch and issued by the branch in question. The definition of a CQP takes place via the precise determination of the competences, knowledge and skills required for a particular activity. A CQP may be acquired via a course of continuing training or by the evidencing of occupational experience. The examining body is an internal branch commission with equal representation.[72]

4.3.4.1 The Métallurgie branch association

The CQPM *(certificats de qualification paritaire de la métallurgie)* branch certificates developed by the social partners of the French metal industry provide evidence of the "acquisition of occupational abilities necessary for the exercising of an activity".[73] Of the 180 profiles developed thus far, 13 certificates are allocated to the field of information technology. These range between levels IV and II on the national qualifications scale.

- *Administrateur (trice) de réseaux d entreprise* (level IV)
- *Assistant(e) de projet en systèmes industriels informatisés* (level IV)
- *Assistant(e) de projet informatique* (level IV)
- *Chargé de projet informatique et réseaux* (level IV)
- *Correspondant(e) pour les technologies de l information et de la communication* (level IV)
- *Opérateur en installation et maintenance de réseaux de transmission par fibres optiques* (level II)
- *Technicien de maintenance réseaux* (level IV)
- *Technicien de télécommunication, réseaux informatiques et domotiques* (level III)
- *Technicien en équipements de télésurveillance, vidéocommunication et téléphonie privée* (level III)

71 Expert interview with a representative of the AFPA
72 www.passinformatique.com/60-formationcontinue/30-20-30_CQP.asp
73 www.cqpm.com.

- *Technicien en installation et en développement micro-informatique* (level IV)
- *Technicien en instrumentation intelligente et en transmissions de données* (level IV)
- *Technicien micro-informatique* (level III)
- *Technicien pour le développement de l informatique industrielle dans le secteur de la mécanique (TEDIM)* (level IV).

4.3.4.2 The Syntec Informatique branch association

On 8 March 2001, the IT manufacturer employers' association *Syntec Informatique* signed a branch agreement planning the creation of its own IT specific qualifications profiles. The branch's first CQP is currently at a preparatory stage, the main focus of the profile lying in the area of network administration *(administrateur de réseau d'entreprise)*. The association expert interviewed stated the motivation behind the creation of the profile was the assessment that no certification was currently available to meet the requirements of companies in this area. It is noticeable here that the competing metal industry has already prepared and is now offering such a certificate. It may be that the difference lies in the level allocated. According to *Syntec Informatique*, the major difficulty in drawing up the profile lay in the definition of the level, the social partners finally being able to agree on level III in respect of the profile of Network Administrator.[74]

4.3.5 Continuing training: private certifications and qualifications

4.3.5.1 In-house qualifications and degrees of national educational institutions

In contrast to national degrees, the in-house degrees and qualifications of the national educational institutions do not enjoy state recognition. Their labour market value thus varies with the level of awareness and the reputation of the respective institution. The following qualifications are of relevance to the field of information technology.

- *Diplômes d'université* (DU): created as a result of an initiative of the universities, DU's mostly react to regional VET requirements.
- Certificates of the CNAM: the CNAM offers a large number of shorter, in-service qualifications, leading to a *certificat professionnel* or a *certificat de compétence*.
- Specialised Masters courses offered by the *Grandes Ecoles (Mastère spécialisé* MS): the MS are drawn up in relation to concrete trade and industry requirements, come with the seal of quality of the *Conférence des Grandes Ecoles* and are mostly acquired via continuing training at a state recognised Grande Ecole. As a rule, the postgraduate study lasts at least two semesters, comprising a theoretical component, a research project conducted within the industry and a final dissertation. The entry requirement is a degree of level Bac+4 or Bac+5 adequate in terms of content. In 2004/05, the 107 members of the Con-

74 This agreement between the social partners was reached on 17 March 2005 after two years of negotiations.

férence des Grandes Ecoles offered 358 specialised masters programmes, 21 being within the field of information technology.[75]

4.3.5.2 Manufacturer certificates

According to the information provided and the assessment made by the experts interviewed, product and manufacturer certificates within the IT branch from such companies as Microsoft and SAP also play a not inconsiderable role on the French IT labour market. In job advertisements, these specialisations are frequently explicitly required as additional qualifications, mostly to supplement more extensive, state recognised training. No formal integration of the manufacturer certificates into the public law qualifications system has thus far ensued in France and, according to the experts interviewed, no such step is planned.

4.3.5.3 Private training providers

The in-house certificates of private training providers are not subject to any qualitative standards. The market here is similar to Germany in that there is a major lack of clarity, the importance of the certificates on the labour market declining sharply as the branch crisis began to bite. Branch associations and advisory institutions provide clarification by exhorting those wishing to pursue continuing training to obtain detailed information wherever possible in respect of the reputation, quality and labour market value of the certificate sought and its underlying qualification before embarking upon a continuing training course.

4.3.6 National Register of Professional Certification RNCP

Establishment and maintenance of the National Register of Professional Certification *(répertoire nationale de la certification professionnelle)* are the responsibility of the National Commission for Vocational Qualifications *(commission nationale de la certification professionnelle)*, which officially came into being with the promulgation of the Social Modernisation Act (n°2002-73) on 17 January 2002.[76]

Alongside the management of the Register, the Commission, which reports directly to the Prime Minister, has also been accorded the ambitious task of monitoring the regular updating and realignment of the degrees and titles on an ongoing basis against the background of VET and employment developments. In addition to this, the Commission may submit recommendations to educational institutions awarding degrees and certificates and has the duty to provide both individuals and companies with information regarding partial or complete equivalences between qualifications within the Register or in respect of the alignment of these in terms of certifications issued elsewhere in Europe. The Commission comprises ten representatives each from the national ministries and the social partners.[77]

75 Conférence des Grandes Ecoles, www.cge.asso.fr.
76 www.cncp.gouv.fr/index.php?page=23.
77 Ibid.

The National Register of Professional Certification represents a first ever attempt to record all state degrees, titles and certificates in a common database. As well as an indication of state recognition, the entries also provide information regarding classification on the national scale of levels (I-V), access pathways to the respective qualifications and recognition modalities with respect to other qualifications. A significant aspect covered by the entries is a description of the knowledge to be imparted in terms of competences to be acquired.

The competence orientation of the descriptions of the qualifications forms the bridge to recognition of occupational experience via VAE. All degrees, titles and certificates listed in the RNCP and homologised, i.e. accorded state recognition, must be achievable via recognition of occupational experience as well as by the initial or continuing VET route. This represents a concrete legislative exhortation to educational institutions to become active in the field of VAE if they wish their VET qualifications to be accorded official recognition.

The RNCP has officially been publicly available since May 2004 and is still under development. Experts from trade and industry interviewed were not as yet aware of it, and the entry of existing qualifications is far from complete. Research into the field of information technology conducted in June 2005 revealed only 89 entries.[78]

4.3.7 Statements on labour market value and quantitative significance of the qualifications

In terms of the framework stipulated for the present study, the scope for making reliable and statistically founded statements regarding the value and quantitative significance of initial and continuing vocational education and training certificates achievable in the IT area is extremely limited.

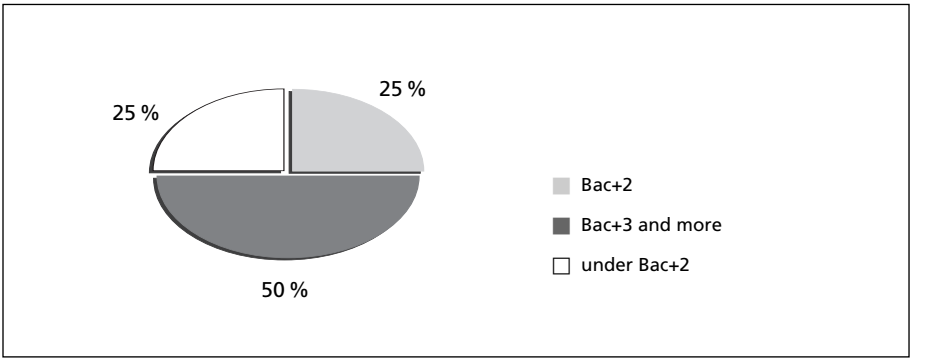
The underlying results of all the interviews conducted with the experts was that the national degrees relating to initial VET in the higher education sector all enjoy a good reputation amongst employers. Depending on the level of complexity and autonomy attached to the activities to be performed, the requirements of IT employers vary between Bac+2 (such as DUT, BTS, corresponding to level III on the national scale) and Bac+5/6/7/8. As previously mentioned, in terms of the competition between the universities and the *Grandes Ecoles d'Ingénieurs* graduates of the latter undoubtedly enjoy the better reputation, the acquisition of a *Mastère Spécialisé* at a *Grande Ecole* raising the chances of obtaining a highly qualified job yet further.

According to the IT employers' association *Syntec Informatique*, more than 50 percent of skilled workers in the information technology branch have a minimum qualification of Bac+3 (three years' study), which places them at levels II and I on the national scale, and a further 25 percent of employees have achieved Bac+2 (two years' study), putting them at level III. Two thirds of IT employees in France are in

78 As a comparison: there are around 1,000 IT related degrees at a national level alone (source: AFPA).

possession of a professional qualification at higher education level linked with a national degree.[79]

Figure 9: **Qualification levels of skilled IT workers in France** (Syntec Informatique)



Outside the degrees of the national educational system, any fundamental assessment of the value of qualifications within the area of IT continuing training is far more difficult.

Since the economic collapse in 2000, there has been a sharp decline in the job placement rate in respect of *titres professionnels*. Whereas the AFPA put the figure at the end of the nineties at between 70 and 90 percent, depending on the specialisation of the course participants, today only just under half of those completing AFPA courses find new employment. In light of the employment crisis within the IT branch, which took hold at the end of 2001 and is only showing gradual signs of amelioration, these placement rates may still be viewed positively.

It has not proved possible to identify any reliable statements in respect of the labour market value of the branch certificates within the scope of the present study. Given the fact that most of the certificates issued by the metal industry are at level IV, the assumption may be drawn that these bridge a gap between higher education training (levels I-III) and the vocational qualifications at upper secondary level (level V). As presented in Chap. 4.3.4.2., the branch certificates of the Syntec Informatique association are still under development and, according to an association spokeswoman, still completely unknown to employers.

All experts interviewed are in agreement on the labour market value of certificates issued by well-known manufacturers such as Microsoft and SAP, although these certificates tend to be viewed as a sensible additional qualification to a more broadly based course of training within the national education system and as being of potential value to companies in terms of presenting a qualitative argument to

79 www.passinformatique.com

their customers. There is plenty of evidence of endeavours on the part of the politicians and the associations to create competition in the form of neutral and product independent certifications, this being reflected in both the titres professionnel and the branch certificates.

The onset of the crisis in 2001, which particularly affected the IT manufacturer branch[80], brought a rapid decline in the labour market value of in-house certificates issued by private training companies. According to Syntec Informatique, it also proved to be the case in France that the first victims of the wave of redundancies were mostly lateral entrants, who had acquired their IT know-how via a continuing training course of a few months' duration at a IT training company and had not been able to gather sufficient occupational experience by the time of being made redundant.

5. Approaches towards defining IT fields of activity and IT occupational profiles

Over the course of the last 15 years in France, various institutions and lobby groups have developed a series of reference works covering the task fields and activity profiles within the IT branch to a greater or lesser degree of completion. An interesting difference to the approach adopted in Germany is that the manufacturer and user branches approach their work separately. CIGREF in particular argues that user requirements are structured in a different way to those of the manufacturer companies. Although the necessity of drawing such a differentiation is dubious, it is certain that the roots of this phenomenon are also connected with the history of the association organisations and the ensuing parallel interests.

As well as the branch associations, the AFPA has also developed a reference work. The register of occupations operated by the national employment agency ANPE also has its own profile descriptions. To these should be added the curricula of the CQP, although these cover only a small part of the IT work areas.

Within the scope of the present study, the aim is to examine the nomenclatures of both CIGREF and Syntec Informatique by way of example. It should be stated at the outset, in the same way as in the German IT continuing training system, that these are oriented towards the description of the profiles within the IT process and that the main focus is on competence orientation. In contrast to the German system, they describe career relevant aspects such as potential training routes, required occupational experience and career perspectives rather than being integrated into an accreditation system.

80 Cf. Chap. 8. According to CIGREF, IT workers at the major user companies were less seriously affected.

5.1 The user branch perspective: nomenclature of CIGREF

Since 1970, CIGREF *(Club informatique des grandes entreprises françaises)* has unified the major French companies in the IT user sector under a single umbrella. Its members include many well-known companies from a wide range of sectors, including banking, insurance, energy, industry, services and so forth. CIGREF's member companies account for one third of the total budget of the French ICT branch, 120,000 IT experts managing the systems and networks for a total of more than four million end users. The association's stated aim is continuously to drive forward the deployment of modern IT strategies to create an added value factor within companies. According to the association, decision makers from 118 French and European user companies are currently using it as a meeting platform to exchange views on IT practice and new strategies. The institution conducts studies on themes of general interest to companies on an annual basis.[81]

Work on occupational nomenclature in the field of IT, *Les emplois-métiers du système d'information dans les grandes entreprises utilisatrices*, was last updated in February 2005 and began in 1991. Over a period of five years, heads of personnel from IT departments from CIGREF member companies drew up an initial joint framework reference work (first published in 1995) which has been updated on a total of four occasions up to February this year in the light of the respective current developments within the IT branch. The nomenclature thus represents a contemporary mirror of current employment fields and profiles within the IT branch as well as providing parallel documentation of the development of occupations. In the years 2000, 2001, 2002 and 2005, both adjustments and more precise focussing of profiles took place alongside the redefinition and removal of a series of profiles. The shortest duration of any profile was Multimedia Developer *(Concepteur / développeur internet et multimédia)*, which was a new entry in 2001, only to disappear from the nomenclature one year later. Others, by contrast, such as Project Manager or Applications Developer, were included from the very start, until today merely being adapted in line with the current status of the development of profiles and in accordance with the overall concept of the nomenclature.[82]

The nomenclature currently comprises 31 occupational profiles classified according to six fields of activity:

- *Conseil en système d'information et maîtrise d'ouvrage*
  - *Consultant en systèmes d'information*
  - *Urbaniste des systèmes d'information*
  - *Chef de projet Maîtrise d'ouvrage*
  - *Responsable du SI « métier »*
  - *Gestionnaire d'applications*
  - *Responsable de projet « métier »*

81 www.cigref.fr

82 CIGREF: Nomenclature 2005 – Les emplois-métiers du système d'information dans les grandes entreprises. Paris, February 2005.

- *Support et assistance aux utilisateurs*
  – *Assistant fonctionnel*
  – *Technicien Support SVP*
  – *Chargé d'affaires internes*
- *Production et exploitation*
  – *Technicien d'exploitation*
  – *Technicien poste de travail*
  – *Technicien réseaux ou télécoms*
  – *Administrateur d'outils / systèmes / réseaux et télécoms*
  – *Administrateurs de bases de données*
  – *Intégrateur d'exploitation*
  – *Pilote d'exploitation*
- *Études, développement et intégration*
  – *Chef de projet maîtrise d'?uvre*
  – *Développeur*
  – *Intégrateur d'applications*
  – *Paramétreur d'ERP*
- *Support et assistance technique interne*
  – *Expert système d'exploitation*
  – *Expert réseaux / télécoms*
  – *Expert méthode et outils / qualité / sécurité*
  – *Expert en technologie internet / intranet et multimédia*
  – *Responsable sécurité des systèmes d'information (RSSI)*
  – *Architecte Technique*
- *Administration et gestion de la DSI*
  – *Responsable du management de la DSI*
  – *Responsable d'exploitation informatique*
  – *Responsable d'une entité informatique*
  – *Responsable de(s) service(s) administratifs et financier(s) de la DSI*
  – *Responsable Télécoms*

The individual occupational profiles are classified and described according to four criteria fields:

- *Principales missions* (central function)
- *Activités et tâches* (activities and tasks)
- *Savoirs mobilisés* (knowledge and competences)
- *Parcours professionnels types* (typical occupational pathways; profile and preceding experience).

The definition of profiles within the *Savoirs mobilisés* is expressly competence oriented. Within the field of competences, the nomenclature differentiates three groups.

- technological-specialist competences *(savoirs faire technologiques bzw. savoirs faire système d'information)*: 64 core competences (*compétences élémentaires)* in twelve main groups;
- general competences *(savoirs généraux):* 100 core competences in 14 main groups;
- soft skills *(aptitudes comportementales)*: 33 core competences in six main groups.

The description of each profile lists only the respective competences required. A differentiation into four competence levels provides information as to the depth to which competences need to be mastered:

- *Notion*: basic knowledge
- *Application*: basic knowledge and the ability to apply this knowledge within a stipulated framework
- *Maîtrise*: application and the ability to process exceptional cases and, if necessary, to deploy new trouble shooting approaches outside the previous scope in respect of such cases
- *Expert*: the level covered *Maîtrise* plus the capability to take decisive action in respect of existing processes with the objective of process optimisation.

In the same way as the German IT continuing training system, the CIGREF nomenclature does not stipulate any company organisational structure. The system was created by major companies (and is thus primarily aimed at such). Like the German system, this approach emphasises that the individual profiles need to be viewed more in the nature of roles, meaning that it is possible for one employee to assume several roles at the same time, depending on the size of the company.

As mentioned in the introduction to this chapter, the nomenclature is not tied into any accreditation system. According to the experts interviewed, the association is currently considering developing a parallel instrument aimed at the certification of IT skilled workers.

5.2 *The manufacturer branch perspective: the Référentiel of Syntec Informatique*

In November 2004, the *Référentiel* of the IT manufacturer association, represented by the branch association *Syntec Informatique*, differentiated 28 occupational profiles in the following nine functional fields listed below: [83]

- *Études et Conseils*
- *Progiciel*
- *Ingénierie de Systèmes*
- *Intégration de Systèmes*
- *Assistance Technique*
- *Services et Réseaux à Valeur Ajoutée*
- *Infogérance ou Facilities Management*
- *Distribution, maintenance et évolution des matériels et des réseaux*
- *Formation*

According to the association, development of the *Référentiels* is still ongoing, having risen to around 40 profiles by the conclusion of the present study. These are essentially descriptions of activities, and are also not tied in with any accreditation system.

5.3 *Effect of nomenclatures on national qualifications provision, provision by the branches and companies' human resources policies*

No reliable statement can be made within the scope of the present study in respect of the effect of nomenclatures on national qualifications provision, provision by the branches and companies' human resources policies. In any case, there is no move comparable with that in the German IT continuing training system towards developing a binding and certifiable qualifications profile for all profiles.

According to the CIGREF association spokesman, member companies in particular avail themselves of the nomenclature both for the precise definition and structuring of in-company IT work processes and for the formulation of job advertisements. One internationally operating company, for example, also a member of CIGREF, has used the nomenclature to integrate the profiles into an in-company personnel development instrument for the classification of its French IT skilled workers. The profiles of the IT continuing training system have been integrated into the structuring of the German IT department. *Syntec Informatique* plans the development of branch certificates (CQP) for some profile descriptions (cf. Chap. 4.3.4.2.).

83 www.passinformatique.fr

6. Linking of continuing training to the higher education system

I would like to begin this chapter with a fundamental reminder that French VET policy is currently strongly shaped by the endeavour to make all national degrees and qualifications equally achievable via three pathways, initial vocational education and training, continuing vocational education and training and recognition of occupational experience via VAE (cf. Chap. 4.3.).

6.1 Non-higher education continuing training

Non-higher education continuing training, which may conclude with the *titres professionnels* of the Ministry of Social Affairs, the branch certificates (CQP), the in-house certificates of state and private educational providers and the product and manufacturer certificates, is not linked to the higher education degrees awarded by the universities and the Grandes Ecoles.

Although the entry prerequisite to a course of continuing training may be a certain higher education training level[84], non-higher education continuing training is not primarily used as a labour market policy instrument to facilitate the subsequent acquisition of qualifications by those qualified at a lower level. This is a case of two qualifications systems operating independently from each other. The following illustration once again clarifies the parallel existence of the certification systems of non-higher education continuing training alongside higher education initial and continuing vocational education and training.

Figure 10: **Degrees, titles and certificates in the field of initial IT vocational education and training and IT continuing training** (own representation)

Nationale DiplomeInitial training national degrees

- Bac pro Informatique
- 1st cycle Bac+2 (DUT, BTS, DEUG, DEUST)
- 2nd cycle Bac+3/4 (licence pro, M1 Master pro, Master recherche)
- 3rd cycle Bac+5/6/7/8 (diplôme, M2)
- Engineering titles awarded by the Grandes Ecoles

→ Around 1,000 different qualifications in the information technology sector
→ 25,000 IT related degrees/year
→ Collective wage agreements

Continuing training: titles and certificates

- Titles awarded by the Ministry of Social Affairs (titres professionels)
  - – A total of 7 information technology titles levels V-II (out of a total of 300)
  - – Primarily aimed at job seekers, objective: qualification of low skilled
- Branch certificates
  - – Under development
- Private certifications
  - – In-house certificates (universities, CNAM, MS of the Grandes Ecoles, private educational providers)
  - – Product and manufacturer certificates

Separate systems → continuing training titles and certificates (outside VAE) are not linked to higher education degrees

84 The first CQP for Network Administrator awarded by the Syntec Informatique association stipulates entry level III, for example.

6.2 Higher education continuing training

In the area of higher education continuing training, entry prerequisites are firmly defined. The requirement is a qualifications level under that of the respective continuing training goal sought. The amendment to the law relating to the recognition of occupational experience which came into force on 17 February 2002 has, however, brought about a fundamental change in the modalities by which a qualifications level can be reached and certified.

The aim of the following chapter is to address the instrument of VAE, which has already been mentioned several times within the scope of the resent study, in more detail and to consider its initial observable effects on the information technology branch.

7. Formal recognition of occupational experience: *Validation des ACQUIS* (VAE)

The introduction of VAE via the law of 17 February 2002 represents an educational policy measure with considerable potential for debate and innovation, the instrument also displaying a number of interesting parallels with the German IT continuing training system. Against this background, it seems worthwhile to take a closer look at the specific process of the recognition procedure, the role of the VAE advisor, initial experiences with VAE in the information technology branch and assessments on the part of the experts interviewed as to the sustainability of VAE, including with specific reference to the IT field.

7.1 The VAE process

In order to provide information and advice on the recognition of occupational experience via VAE, the period since the passing of the law at the start of 2002 has seen the establishment of a comprehensive, nationwide advisory network (VAE Centres), which act as initial contact points for candidates to identify their existing qualifications and experience levels and use these as the basis for stipulating a VAE goal.

Once an appropriate VAE goal has been defined, contact may be established with the educational institution offering the qualification leading to the desired final qualification, whether this be a national (engineering) degree, a branch certificate, a title awarded by the Ministry of Social Affairs or any other homologised certification with an entry in the national RNCP Register (cf. Chap. 4.4.6.). Every educational institution is required by law to provide in-house VAE procedures for all qualifications and to ensure that "regular" pathways contained within the RNCP, meaning qualification via initial VET or continuing training, are also registered in the institution.

85 www.cncp.gouv.fr/index.php?page=23

Once candidates have been registered for a VAE procedure leading to the desired qualification, a dossier which documents and monitors the candidate is set up at the educational institute. The main requirement candidates need to fulfil is extensive documentation, in which they present and reflect upon occupational experience relevant to the qualification in detail. The most important element here is to put work processes carried out into a current context via a description of the workplace, the position occupied, responsibility assumed, tasks conducted etc. The main focus of the presentation as a whole needs to re-examine the core issue of which experiences have led to which knowledge and competences listed in the *Référentiel* of the training goal sought.[86] Once the documentation has been submitted, the VAE application is examined by a jury comprising representatives of trade and industry and charged with the theoretical aspect of the qualifications profile.

The final procedure depends on the outcome of the decision of the examination board. If the VAE procedure has resulted in partial recognition of the vocational qualification sought, the candidate receives the right to an oral examination with the examination board. Partial recognition means that the desired qualification certification may be issued after the successful completion of a complementary course of continuing training. If, on the basis of the VAE documentation, the examination board issues full recognition of the qualification sought, there follows a compulsory oral examination with the commission, during the course of which candidates must provide further oral evidence of the competences, knowledge and experience set out in the documentation. In this case, if candidates are successful in the oral examination, the desired qualification certification is issued in full.

7.1.1 Achievable qualifications

As stated elsewhere, all qualifications listed in the RNCP National Register of Professional Qualification are, in principle, achievable via the VAE procedure, whether this be a national (engineering) degree, a branch certificate, a title awarded by the Ministry of Social Affairs or any other homologised certification with an entry in the national RNCP Register.

7.1.2 The role of the VAE advisor

The role of the VAE advisors should be briefly mentioned at this point, assuming as they do a similar task to the learning process monitor within the German IT continuing training system. The main emphasis of their advisory tasks is also much more centred on the focussing of learning processes and reflective methodology and on supporting candidates with the documentation of the experience they have gathered relevant to the qualification sought rather than on in-depth specialisation within the respective qualification profile.

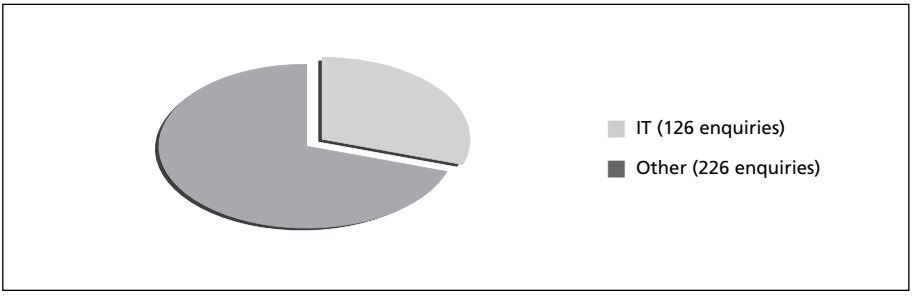
86 For reasons of data protection, it was not possible to consult an actual dossier in the course of the present research. According to CNAM, 100 pages can represent an appropriate scope for VAE documentation.

7.1.3 Initial results from experience with VAE in the information technology field at the CNAM Conservatoire Nationale des Arts et des Métiers

As presented in more detail in Chapters 4.2.2. and 4.3.2., CNAM teaching provision traditionally evinces a particularly close connection to the labour market, the institution primarily offering higher education continuing training, frequently in an in-service form for those with occupational experience. The IT area represents one of four main pillars of competence within CNAM's educational provision. In light of the fact that CNAM managed and monitored 13 percent of all VAE dossiers from a total of around 90 universities and 100 Grandes Ecoles in the year 2003, the institution seems to represent the appropriate contact partner in connection with researching initial experiences with VAE within the framework of the present study.[87]

In 2004, VAE applications in the IT sector constituted 36 percent of total VAE applications submitted to CNAM with 126 out of 352 candidates, indicating an above-average need for subsequent formalisation of competences acquired via occupational practice on the part of skilled IT workers compared with other branches.

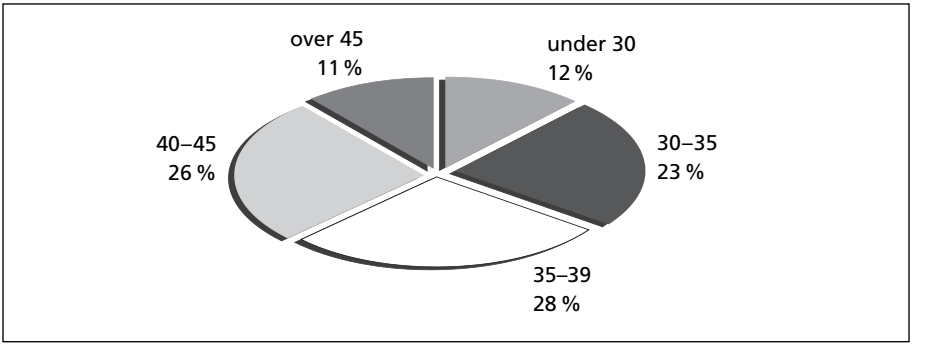
Figure 11: **IT as a proportion of total VAE applications to CNAM** (CNAM 2004)



The largest group of IT candidates was between 35 and 39 years of age (35 percent), followed by the 40-45 age group (33 percent) and the 30-34 age group (29 percent). Candidates aged over 45 and under 30 made up the smallest proportion with 14 and 15 percent respectively.

87 The following remarks and figures are based on the hitherto unpublished working paper by Prigent, Annick : La VAE au CNAM en informatique (pôle STIC Sciences et technologies de la communication et de l'information). Paris, CNAM 2004.

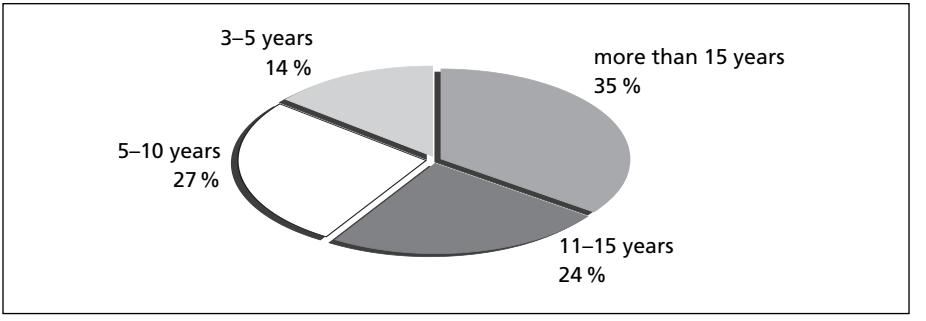
Figure 12: **VAE applications in information technology according to age of the candidates** (CNAM 2004)



The largest group of dossiers submitted documented occupational experience in excess of 15 years (35 percent), around a quarter of all candidates being in possession of occupational experience between five and ten or between 11 and 15 years. The smallest group of candidates (14 percent) was able to demonstrate occupational experience of between three and five years only.

One of the main motivations named by candidates was the general intention of improving their professional perspectives (30 percent), impending promotion or the search for a new job also frequently being mentioned (by a total of 27 percent).

Figure 13: **VAE applications in information technology according to occupational experience of the candidates** (CNAM 2004)



The objective of most applications was a degree at level Bac+4, corresponding to level II on the national scale.

Table 2: **Level targeted by VAE applications in the information technology area** (CNAM 2004)

Level targeted on the national scale	Number of applications
III	47
II	231
I	74

The following table shows the level of qualification targeted against the background of the existing formal starting level of the candidates.

Table 3: **Level targeted by VAE applications in the information technology area against the background of existing qualification** (CNAM 2004)

Starting level	Aim level I	Aim level II	Aim level III
V	1		1
IV		4	2
III	12	43	12
II	22	14	3
I	8	3	1

The aim of 45 percent of applications was a DEST (CNAM degree at level II of the national scale), 29 percent targeting a degree in engineering, 11 percent pursuing a DPCT (CNAM degree at level III) and 8 percent wishing to achieve a *licence professionnelle.*

In overall terms, the results of the VAE applications were extremely positive. Partial applications led to the awarding of 34 recognitions, 25 partial recognitions and three rejections, overall applications resulting in 25 recognitions, 33 partial recognitions and six rejections.

The statistical data confirms the evaluation that a formalisation of informal learning at the workplace can be of particular interest to the information technology branch. According to these initial experiences, the prototypical VAE candidate would be a skilled worker in his or her late thirties with a good 15 years of occupational experience, in possession of a low higher education qualification level (Bac+2) and who is seeking to use the procedure to add value to his or her career perspectives by means of acquisition of a recognised certified qualification.

7.2 Expert prognoses relating to acceptance on the labour market

The assessment of the VAE instrument on the part of the experts interviewed produces a picture displaying a high degree of uniformity in overall terms. One ministerial representative characterised the reintroduction of the instrument as a logi-

cal step within the process of implementing the concept of lifelong learning, the aim of which is to facilitate access to the highest possible educational level for all citizens from all walks of life. The view of this interviewee was that, against the background of the increasing significance of informal learning at the workplace, progress was being made in making the transition from a training culture to a certification culture (cf. Chap. 3.3.5.).

The extent to which VAE can and will become established on the labour market will be revealed in the coming years. Those employer representatives interviewed also viewed the instrument in a positive light, whilst viewing its main relevance as being the partial acquisition of a vocational qualification to be supplemented in the form of complementary continuing training. The National Engineering Commission, which has the task of monitoring the quality of training at the *Grandes Ecoles d'Ingénieurs,* also expressed itself in the same terms: "Theoretically, [VAE] can replace the whole of training. (…) In reality, however, it will mostly replace only a part of training leading to engineering degrees. In no case must it be used to falsify academic initial vocational education and training in such a way that such VET 'should be completed via experience'. The CTI needs to declare its agreement with the VAE procedures used in the schools." [88]

In addition to this, experience which has hitherto far been gathered at CNAM shows that the complexity of the VAE documentation runs the slight risk of being underestimated by candidates. Some further work on the provision of information is required in this area. The figures thus far also represent a considerable challenge for those charged with the implementation of the system. In 2004, CNAM processed 13 percent of all dossiers, representing a considerable proportion of all VAE procedures in the whole of France. Notwithstanding this, the figure of 350 dossiers represents a tiny amount when compared to the 80,000 classical matriculations.[89]

The French government is seeking to use legislative means to prevent discrimination against degrees, titles or qualifications acquired via VAE. As already mentioned elsewhere, certification issued may make no specific reference to the route via which a candidate has achieved his or her qualification, whether this be via initial VET, continuing training or VAE. The reality is, however, that the legislature has very little say in the matter. Choice of personnel ultimately remains in the hands of the employer. This area represents a further challenge for the instrument, however, in terms of establishing credibility of the quality as well as the quantity of procedures carried out.

88 Official statement of the Engineering Commission on VAE at www.commission.cti.fr/site_flash/fr/page1_3.htm.

89 This figure relates to all four CNAM core pillars and may also be of interest in terms of at least beginning to relate the current implementation figures of the German IT continuing training system to comparable educational policy innovations in other countries.

All experts interviewed are of the view that recognition of occupational experience via VAE is particularly appropriate to the IT branch, the proportion of lateral entrants to the profession in France continuing to be very high. Whether the system can actually become established on the labour market only the ensuing years will show.[90]

8. Situation of the IT branch in France: employment and training market data

Within the stipulated scope of the present study, it is not possible to portray a comprehensive picture of the developments on the French IT market in respect of training and employment backed up by appropriate statistical data which has been subjected to detailed interpretation. Notwithstanding this, the intention is to address a number of partial aspects in the interests of at least creating an impression of the economic context forming the background for the major tendencies currently being pursued within French IT qualifications and personnel development policy.

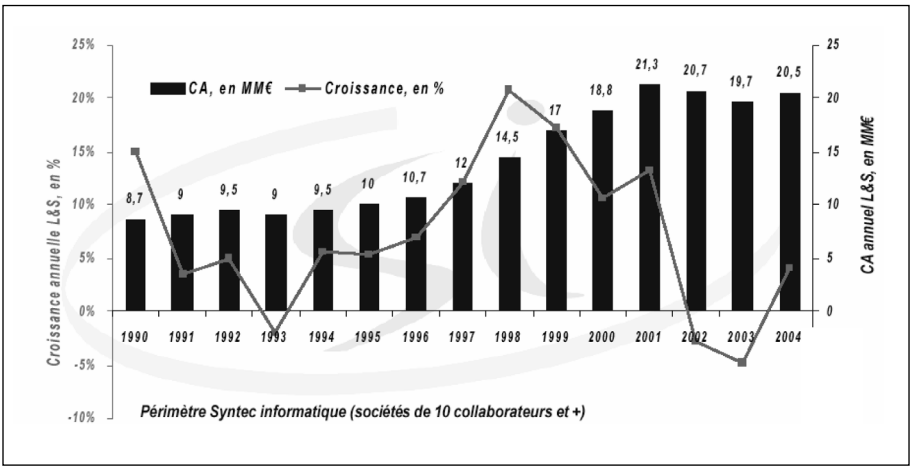
The positive growth within the IT branch partially brought about by the changeover to the euro and the year 2000 problem continued to exercise its influence into the year 2001, although there were signs of weakening by the end of the year. Until the end of 2003, turnover development remained in decline. 2004 saw an upturn again with growth of four percent, a trend which is expected to stabilise in 2005. The French IT manufacturers' association expects around 30,000 new jobs in 2005.[91]

The following illustration documents the development in turnover of the French manufacturing branch up to the year 2004.

90 There are currently no reliable sources of information in respect of the continuing career pathways of graduates of the VAE system.

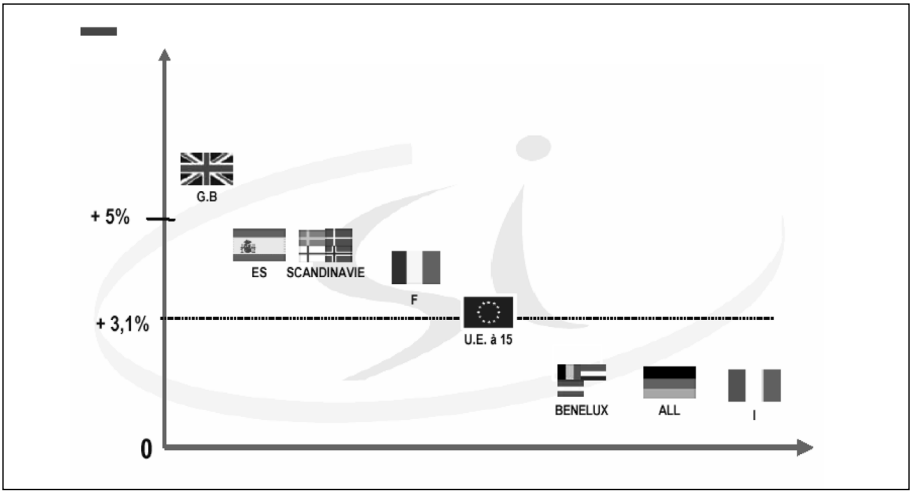
91 Syntec Informatique: Bilan 2004 & Perspectives 2005 – Secteur des Logiciels et Services en France. Communiqué de Presse, Paris April 2005.

Figure 14: **Development of growth in the IT sector (manufacturing branch) 1990-2004** (Syntec Informatique 2005)



In terms of European comparison, development of turnover in the French IT branch in 2004 and 2005 was somewhat above the average, Germany, Italy and the Benelux countries bringing up the rear.

Figure 15: **The French IT branch in terms of inner-European comparison** (Syntec Informatique 2005)



The crisis undergone by the French IT branch in the years 2002 to 2003/04 left its mark on continuing training activities. There was a fall in the willingness on the part of the regions to provide funding for job seekers in the acquisition of a *titre*

professionnel (cf. Chap. 4.4.7.), and, according to the spokesperson for *Syntec Informatique*, there was also a discernable decrease in the preparedness to offer continuing training within companies.

The statistical data provided by *Céreq* in respect of continuing training activities within the French IT manufacturer branch for the year 2002 provides the following picture (the statistics include companies with more than 10 employees).

Table 4: **Continuing training activities of the French IT manufacturer branch in 2002** (Céreq)[92]

	IT branch	All branches
Number of companies	2,275	102,998
Number of employees	229,233	9,676,907
Spending (in 1,000 €)	274,687	7,384,421
Investment quota (%)	3.22	3.02
Number of training participants	73,335	3,265,967
Access quota (%)	32.0	33.8
Number of training hours	2,614,965	103,465,335
Number of training hours per employee	11.41	10.69
Average duration of continuing training in hours	35.66	31.68

Whereas overall average investment on the part of IT companies was 0.2 percent above the cross-branch average and exceeded statutorily prescribed investment by 1.62 percent, the access quota of 32 percent of employees was slightly below the mean of 33.8 percent. This was compensated for by the fact that duration of continuing training courses was approximately 12 percent above the average.

The total number of people employed in the French IT branch is estimated to be approximately 600,000.[93] In the years 2002 to 2004, there was an increase in the number of job seekers, particularly in the manufacturing branch, a slight decrease in unemployment having been recorded within the branch since 2005.

According to the estimates of the AFPA, around 25,000 IT related degrees are awarded annually. This figure refers to all state educational pathways, in other words including initial VET, continuing training and VAE.

92 www.cereq.fr/2483/tab504.htm.
93 Expert interview AFPA.

9. Comparison between prevailing IT qualifications and educational policy tendencies in France and Germany

Drawing a direct comparison between two national educational systems is always problematic, such an endeavour easily falling prey to the adoption of a shortened point of view. Every system reacts to characteristics related to specific historical developments and societal realities, the scope of such a study being insufficient to highlight these. Notwithstanding this, a series of parallels and differences have come to light within the course of the presentation of IT qualifications and VET policy in France which at least lend themselves to a comparative investigation. The aim of the following is to present these once more in summary form so as subsequently to allow a number of possible conclusions to be drawn in respect of the German IT continuing training system within a European context.

9.1 Differences

The following table, which will be commented upon in detail, shows at a glance some of the major differences between German and French tendencies in IT skilled worker qualification.

Figure 16: **Comparative aspects Germany-France: differences** (own representation)

	Germany	**France**
Initial training	• Dual initial training • Institute of higher education	• Dominance of institutes of higher education
IT continuing training qualifications	• Certification and qualifications regulated under public law	• Internal branch qualifications • Title awarded by the Ministry of Social Affairs
Continuing training via recognition of practical, occupational experience: formalisation of informal learning at the workplace	IT continuing training system • Process documentation • Newly established continuing training qualifications • Higher education connection unclarified • Main focus on employed persons • Work and documentation process run in parallel	VAE • Process documentation • Applicable to all degrees, qualifications • Also for job seekers • Candidates with occupational experience at the time when application is made
Link between company oriented and higher education continuing training	• Aim: work process oriented IT: recognition of occupational experience evidenced via IT continuing training as partial higher education achievement (cf. Jäger/Reinisch/ Volkert Variation 2)	• Via recognition of occupational experience possible to obtain degree in engineering; experience the decisive factor rather than continuing training qualification
International connectivity of the IT qualifications	• In Germany, taken into consideration in the case of the Specialist certificate • Attracting interest in France • Yet to prove itself	• No decision taken as yet

Whereas in Germany, since the establishment of the new IT occupations at the end of the nineteen-nineties, dual IT vocational education and training has been continually able to strengthen its position, training outside higher education is virtually non-existent in the French IT branch. In France, non higher education vocational education and training traditionally has a reputation for tending to cover lower level qualified training requirements.

In contrast to Germany, where a consensus oriented certification system has been created in the form of the IT continuing training system and where certifications and qualifications at the Professional and Specialist level are subject to uniform regulation at a national level, French continuing training features competition between various nomenclatures, reference works, branch certificates and titles awarded by the Ministry of Social Affairs which display little in the way of mutual interrelation and which are deliberately delineated from one another by the individual branch associations such as CIGREF, *Syntec Informatique* und *Métallurgie*. No reliable statements in respect of the labour market value of the branch certificates were obtainable within the scope of the present study. There has been a decrease in the placement rate for titles awarded by the Ministry of Social Affairs subsequent to the economic decline within the branch from 2001 onwards.

In both Germany and France, educational policy endeavours are ongoing to enable continuing training to take place via recognition of practical, vocational experience, thus facilitating the formalisation of informal learning at the workplace. A core element of this procedure in both countries is documentation, supported by a learning process monitor (Germany) or a VAE advisor (France), recording the work processes forming the basis of the experience and thus reflecting the learning processes associated with the employment function fulfilled in terms of individual work steps. Whereas the German procedure involved the development of a system specifically coordinated to the IT branch defining the Specialist and Professional profiles within the IT process, in France a system was selected which is applicable to all degrees, titles and qualifications homologised via the RNCP National Registry of Professional Certification.

This means that a different approach is adopted towards issues of formalising informal learning, the networking of learning venues and the connectivity of continuing training to higher education. In France, any knowledge which can be acquired at an institution of higher education can, in principle, also be obtained within the practical, occupational working process. Germany is a considerable distance away from crossing such bridges, connectivity of the IT continuing training system to the higher education level in real terms is something for the future.

In terms of target group, the French VAE procedure is also more broadly based and branch independent. The system is directed at candidates with occupational experience at the time at which application for VAE is submitted, enabling job seekers to avail themselves of the process and thus enrich the time spent seeking employ-

ment with the acquisition of a recognised qualification. At least at Specialist level, the German IT continuing training system requires the work and documentation process to run in parallel, meaning the system is explicitly targeted at candidates in employment.

As far as the linking of company oriented and higher education continuing training is concerned, one option within the German IT continuing training system will be to enable recognition of occupational experience certified via IT continuing training as partial fulfilment of higher education study requirements.[94] Alongside the recognition of partial fulfilment of higher education study requirements, the French VAE procedure also, in extreme cases, allows for the replacement of the whole of the course of higher education study by company oriented continuing training via informal learning at the workplace. This process does not, in itself, require any previous continuing training qualification. Occupational experience alone is what counts. If a previously acquired certification documents the competences required for the desired qualification in a different way, this may be used as a supporting argument within the VAE dossier.

Within the framework of research work conducted in respect of the present study, the experts interviewed evinced a considerable level of interest in the consideration accorded to international connectivity in the Specialist certificate within the German IT continuing training system. Within the field of vocational education and training outside higher education, no progress of any note has been forthcoming on this issue in France. The extent to which internationally oriented certification at a Specialist level becomes established outside Germany in the coming years undoubtedly has the potential to represent a further success factor within the scope of implementing the system.

9.2 Parallels

The following table provides an overview of some of the major parallels between the developments in France and Germany which have become apparent within the scope of the present study.

At least as far as the manufacturer branch is concerned, IT development has displayed a number of parallels in recent years, even if France is better positioned than Germany in terms of inner-European comparison (cf. Chap. 8). After a period of continuous growth up to 2000/2001, driven by the need to convert systems to the new millennium and by the euro, 2002 saw a fall in turnover again, a state of affairs which continued to magnify into the year 2004 for the manufacturer branch. This crisis forced many private training companies to shut up shop. During this period, the Syntec Informatique association observed a decrease in continuing training activities in companies, although documentation for this comes only in the form of a small-scale survey undertaken within the association. 2004

94 Cf. JÄGER/REINISCH/VOLKERT (2004) p.23, Variation 2.

Figure 17: **Comparative aspects Germany-France: parallels** (own representation)

Development of the IT manufacturer branch	Similar branch development 1996-2005 (highest point 1999/2000, collapse 2000-2004, slight recovery since 2004/05, particular downturn in the private continuing training market
Companies' personnel policy	Move away from lateral entrants towards experts with evidenced training at a high level → certification requirements for practitioners
Qualifications level of the branch	In overall terms, very high, a higher still higher education proportion in France (due to the nature of the system)
Development of higher education provision	Tendency towards double qualification (dual-competence IT worker), relation to practice (dual course of study, cooperation with trade and industry)
Significance of product and manufacturer certificates	In der Branche anerkannt, parallel (branchen)politisches Streben nach einer "neutralen" Zertifizierung Recognised within the branch, parallel to this (branch) policy is striving for a "neutral" certification
Defined occupational profiles and fields of activity	• Mapping of the IT process (enables parallel deployment of French and German nomenclature in the personnel development of an internationally operating company) • In France, differentiation according to manufacturer and user branches, instrument for qualifications and personnel development not connected to any certification
Continuing training via formalisation of informal learning: work process oriented IT/VAE	Increasing significance of learning within the work process, process documentation, concept of the non-subject bound learning process monitor/VAE advisor

saw the emergence of the first signs of a slight recovery (earlier in France than in Germany), which seems to be continuing to strengthen somewhat in 2005.

Against the background of similar market development, the personnel policy of companies is also exhibiting some parallels. In France, it was also mostly the case that lateral entrants were the first to be affected by redundancy measures. The increasing number of IT experts seeking a job is being used in both countries down to the present day to require higher (and therefore mostly state recognised) qualifications of new applicants.

In general terms, the level of qualifications within the branch is very high in both countries. Because of the way the system operates, the proportion of higher education graduates in France is presumably considerably higher, there being no adequate non higher education course of initial vocational education and training for the IT branch.

As far as the development of higher education provision is concerned, a tendency towards double qualification can be observed in both countries. Many information technology training courses are enriched by a second content focus (*double compétence* / dual competence IT worker). Relation to practice is also being accorded increasing significance, the curricula being formulated in a more competence oriented way and cooperation with trade and industry being sought within the framework of dual courses of study.

In both countries, product and manufacturer certificates are popular with employers as an additional qualification. Parallel to this, the branches in both countries are endeavouring to establish "neutral" certifications for IT skilled workers within the scope of national VET policy. Whereas politicians and the social partners in Germany have moved forwards jointly in this area, the French associations and organisations have, to some extent, gone their separate ways.

Particularly in respect of the nomenclature used by CIGREF, the definition of fields of activity and the aligned occupational profiles contain parallels to the structure of the German IT continuing training profiles. The French definitions also map the profiles within the working process, making it possible for a company operating internationally to use the French CIGREF nomenclature and the German IT continuing training profiles in parallel when drawing up a personnel development instrument. From a German point of view, the differentiation in France according to manufacturer and user branch appears unnecessarily complicated. In addition to this, the French profile definitions simply represent a non-certification linked instrument for the development of qualifications within educational institutions and for personnel development within companies.

The figures listed in Chapter 7.2 relating to the implementation of VAE both cross-branch and within the information technology sector may possibly be suitable for the establishment of a relative value for the implementation figures in respect of German IT continuing training. Both educational policy innovations became enshrined in statutory law during the first half of 2002. In a similar way to the figures relating to the implementation of German IT continuing training, the number of VAE procedures completed down to the present day remains relatively low, considering that this process may be implemented in respect of all branches and all qualifications registered within the RNCP as well as at all educational institutes offering the corresponding qualifications.

By way of conclusion, it should once again be stated that educational policy endeavours are discernable in both Germany and France to enable continuing training to take place via the formalisation of informal learning at the workplace. Differences in the type of approach adopted have already been described in detail in Chap. 9.1.

9.3 Potential conclusions for the German IT continuing training within the European context

9.3.1 Strengths and opportunities for the German IT continuing training system from a German-French perspective

Observing the French vocational education and training activities in respect of the introduction and positioning of VAE, the conception of German IT continuing training as a statutorily fixed instrument for the documentation and formalisation of informal learning at the workplace represents an even more strongly discernable trend within a neighbouring country.

Against the background of the results of the present study, the competence oriented definition of the German profiles within the work process may also be adjudged as ready for market. The fact that Germany has a fully developed certification system enabling international connectivity to provide a crucial competitive edge, especially in respect of the Specialist certificates, definitely needs to be viewed as progress and opportunity. This aspect has the potential for the targeted focussing of the system on companies operating internationally.

In addition to this, the German IT continuing training system pursues the aim of bringing together as many vested interests as possible under the same umbrella. Such an approach seems to avoid, at least initially, a situation such as appertains in France, with several branches competing in the process of achieving recognition for their certificates and occupational nomenclatures to run alongside the product and manufacturer certificates.

The results of the expert survey on the evaluation of the French VAE instrument validate the assessment that the German IT continuing training system is adopting the correct approach in seeking to build bridges with higher education. Such continuing training would lead to partial recognition of study achievements and would be supplemented by further achievements for the acquisition of a Bachelors or Masters degree. As far as the VAE procedure is concerned, the experts interviewed also believe that a model comparable to this process (partial recognition of occupational achievements towards a degree supplemented by a complementary course of continuing training) would have the best chances on the market.

9.3.2 Firmly establishing the IT continuing training system within European vocational education and training policy – challenges

Although a consideration of the neighbouring country of France represents merely a small selection of pan-European educational developments, it seems a possible background for the formulation of some of the challenges with which German IT continuing training will be confronted in the coming years.

In terms of achieving a successful implementation of the German IT continuing training system, a sensible approach is to raise the level of awareness and acceptance both amongst German employers and employees as well as within other European countries. Countries operating on an international basis will certainly form an adequate target group for further work relating to the dissemination of information and to implementation, such companies being in a position to benefit internally from the advantages of international certification at a Specialist level. Evidence as to the actual value of the qualifications on the labour market is still lacking. In terms of a definitive assessment, it is certainly true to say that a greater degree of patience will be required than initially hoped. Before there can be any talk of the acceptance of the IT continuing training system, at least the companies need to be aware of it. This will need sustained and coordinated provision of information requiring optimisation via such aspects as uniform terminology for the

German IT continuing training system used by all stakeholders and increased establishment of continuous information, advice and contact points (cf. VAE centres, for example).

The jury is also still out on the international connectivity of the qualifications and in terms of the actual, specific bridging function they may provide to the institutes of higher education. With a view to developments in France and beyond, it is likely that both aspects will represent critical factors in lending the German IT continuing training system sustained success and recognition, both in Germany and across Europe.

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Abbreviations

AFPA	Association française pour la formation des adultes
BTS	Brevet de technicien supérieur
CAP	Certificat d'aptitude professionnelle
CBC	Congé de bilan de compétences
CCP	Certificat de compétence professionnelle
Céreq	Centre d'études et de recherches sur les qualifications
CIF	Congé individuel de formation
CIGREF	Club informatique des grandes entreprises françaises
CNAM	Conservatoire national des arts et métiers
CQP	Certificat de qualification des branches professionnelles
CVAE	Congé de validation des acquis
DEA	Diplôme d'études approfondies
DESS	Diplôme d'études supérieures spécialisées
DEUG	Diplôme d'études universitaires générales
DEUST	Diplôme d'études universitaires scientifiques et techniques
DIF	Droit individuel à la formation
DOM	Départements d'outre-mer
DUT	Diplôme universitaire de technologie
GRETA	Groupement d'établissements
IT	Information technology
ITK	Information and communication technology
IUT	Institut universitaire de technologie
OPCA	Organisme paritaire collecteur agréé
RNCP	Répertoire national de la certification professionnelle
SME	Small and medium-sized enterprise
SMIC	Salaire minimum interprofessionnel de croissance
TOM	Territoires d'outre-mer
VAE	Validation des acquis de l'expérience professionnelle

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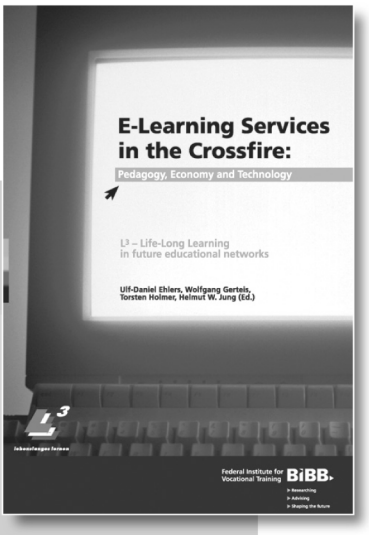
Life-Long Learning and E-Learning



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Ulf-Daniel Ehlers, Wolfgang Gerteis,
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E-Learning Services in the Crossfire: Pedagogy, Economy and Technology

ISBN: 3-7639-1024-7
Bestell-Nr.: 110.442
514 Seiten, Preis 29,90 €

E-learning is undergoing significant changes. Because it is caught in the crossfire of pedagogy, economy and technology sustainable economic concepts have to be developed. This book discusses approaches that are based on experiences derived from the research project "L3 - Life-Long Learning". They are centred around the following statements:
a marketable e-learning offer must consist of comprehensive services..., the learner has a major influence on the quality of e-learning services..., e-learning services require integrated quality systems..., only with a learner-oriented quality strategy can the economic success of e-learning services be achieved..., e-learning standards must give greater consideration to future pedagogic and didactic theories and models..., acceptance by small and medium-sized companies, trades and professionals (SMCs) is indispensable to successful e-learning services..., all available further training competencies and resources can and must be combined in the production of content for integrated e-learning services..., the future sustainability of e-learning services it closely linked to the development of human capital management (HCM) systems..., existing educational establishments must be given the chance to develop into e-learning centres of competence.

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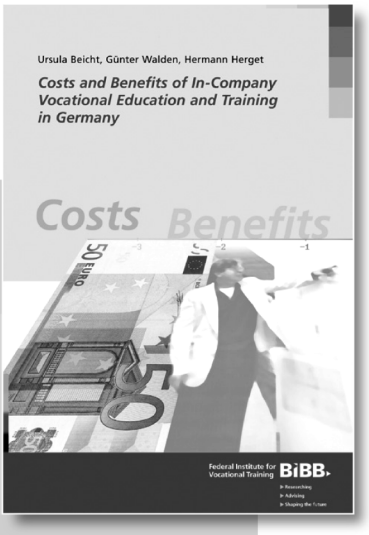

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Ursula Beicht, Hermann Herget, Günter Walden

Costs and Benefits of In-Company Vocational Education and Training in Germany

ISBN: 3-7639-1034-4
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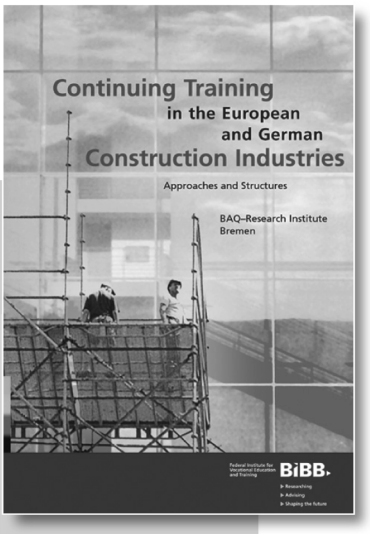
Costs and benefits of in-company vocational education and training have an essential influence on the supply of training places in companies and are thus important indicators for assessing how efficient and future-oriented in-company training is. This publication includes the results of a representative survey in which training companies were asked their opinions about the costs and benefits of training. The publication describes cost structures for a wide range of occupation groups and training constellations and examines important factors of influence. Moreover, it includes a differentiated analysis of the benefit of in-company training. The results show that cost and benefit values vary widely for different occupations and depending on the basic conditions within the companies.

Fit for Europe? The continuing Training in Germany



Continuing Training in the European and German construction industries

Approaches and Structures - BAQ-Research Institute Bremen

ISBN: 3-7639-1045-X
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104 Seiten, Preis 13,90 €

The Federal Institute for Vocational Education and Training (BIBB) is currently working on a project to develop a new continuing training system for the construction industry. The project receives financial support from the Federal Ministry of Education and Research (BMBF). This stocktaking of the situation in the German and European construction industries allows initial conclusions about the future development of continuing training in the German construction industry.
On the basis of best practice examples it is possible to identify potential consequences for Germany, to test whether the German continuing training system is suitable for Europe and to highlight supply and demand for German continuing training programmes. It has emerged that counselling, financial incentives, the staging of continuing training during working hours and the quality of continuing training are all conducive to raising acceptance of continuing training by both employees and employers.

This publication is also available in German (Order no. 110.453, ISBN no. 3-7639-1044-1).

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This volume examines the IT continuing training system, introduced in Germany in 2002, and uses comparisons with the French, Danish and Dutch systems as a vehicle for placing it within a European context. A presentation is provided of the various activities of EU institutions, specialist associations and organisations dealing with IT continuing training at a European level. This results in the identification of pertinent points relating to current vocational policy debate centring on "enhanced competence orientation", "certification of informal learning" and "institutionalisation of lifelong learning". Will the future bring competition between vocational education and training and higher education or will there be a greater level of permeability? What is the value of national qualifications within Europe, and which approaches will foster horizontal and vertical mobility and thus support sustained employment opportunities? These are just some of the issues addressed by the authors, who also highlight areas where further research is required.

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