

QUALIFICATION STRATEGIES IN ICT FOR EUROPE AND ROMANIA

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Abstract: *In the international comparison significant differences regarding the future demand come into view. In Romania and Portugal, where the ICT qualification is dominated by universities degrees, the companies correspondingly see the biggest demand on qualification level 5M (masters' degree). For Portugal this is the only group where companies see a significantly higher demand in the near future. For the Czech Republic and Germany only one fifth of the companies say there will be a higher demand on university based level 5M and in the Netherlands, it is even less, with only 10% of the companies. In these three countries - and particularly in the Czech Republic - almost half of the companies foresee a higher demand on level 5B.*

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Jel Classification: *I - Health, Education, and Welfare, I2 – Education, I23 - Higher Education Research Institutions*

General demand of ICT practitioners in Europe

The expectations of the companies indicate an increasing and higher demand of ICT practitioners (see Figure 1) especially for level 5B which are short higher education degrees on the “bachelor” level. Almost 40% of the companies say that the demand will increase on this qualification level. About one third of the companies expect an increasing demand of ICT professionals on level 5M and level 4. For level 3 it is still 30% of the companies and on level 2 only 20% altogether.

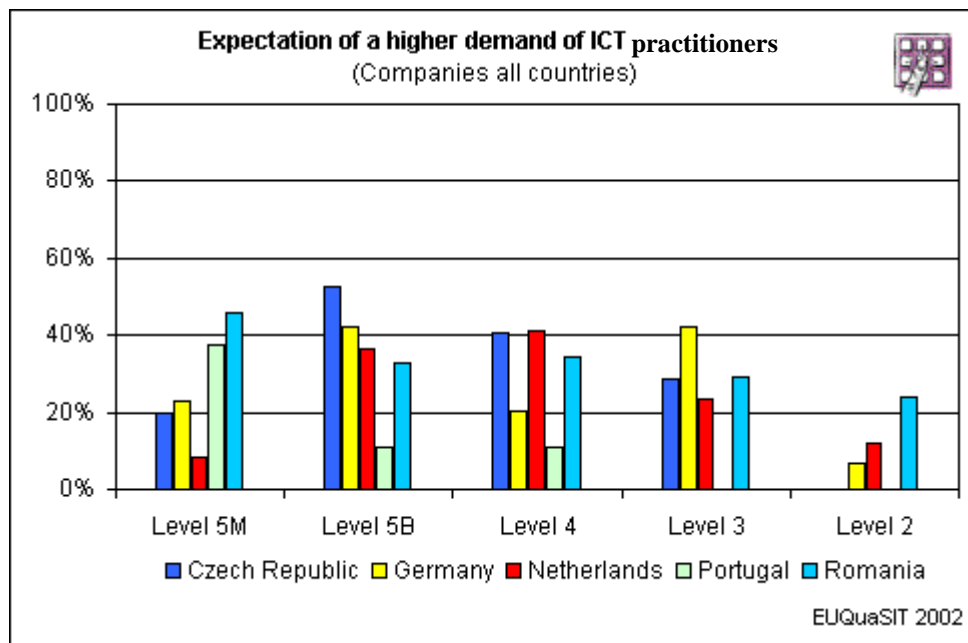


Figure 1: The expectation of the demand of ICT practitioners in companies

In the international comparison significant differences regarding the future demand come into view. In Romania and Portugal, where the ICT qualification is dominated by universities degrees, the companies correspondingly see the biggest demand on qualification level 5M (masters' degree). For Portugal this is the only group where companies see a significantly higher demand in the near future. For the Czech Republic and Germany only one fifth of the companies say there will be a higher demand on university based level 5M and in the Netherlands, it is even less, with only 10% of the companies. In these three countries - and particularly in the Czech Republic - almost half of the companies foresee a higher demand on level 5B.

The outcomes for qualification level 4 differ considerably and the Dutch companies see the highest demand. The analysis of the ICT qualification structure in the Netherlands indicates correspondingly the quantitative importance of the qualification level, meaning that supply and demand fit altogether. Furthermore the comparison illustrates that the Czech and Romanian companies assume that the future demand of ICT professionals on qualification level 4 will be higher than today. Unexpectedly low is the proportion of only 20% of the companies in Germany saying that the demand will be higher on level 4. On the contrary, qualification level 3 - where new ICT profiles were launched in Germany in 1997 - is of crucial importance and almost 50% of the German companies say that the

demand will still increase in a short and mid term view. The proportion for the other countries is significantly lower for level 3 whereas Portuguese companies do not see a higher demand than today.

ICT training

The approach of the EUQuaSIT project on the skill aspect refers to the training level obtained for a given ICT qualification. The training level is considered on a scale from level 2 (skilled worker) to level 5B (bachelor) and 5M (master).

ICT involves high technology, therefore ICT qualifications require deep knowledge and keen understanding of subtle phenomena, also some creativity and intensive training of the people involved. Investigations in companies performed by the project team (in respective countries) revealed a great concern for higher education graduates as qualified personnel for the jobs in ICT; that means the training level of those involved in ICT is raising for the years to come.

ICT training providers

As far as the delimitation of vocational education and training (VET) and continuing vocational education and training (CVT) is concerned, the EUQuaSIT project partners agreed on two main criteria. First of all, VET qualification are defined as qualification with which participants reach a new level, whereas CVT takes place on a certain level focusing on specific content. In accordance with this definition the group decided secondly that VET is also characterized by a certain period of time typically longer than 12 months. In addition, CVT courses were also supposed to be considered longer than 3 days of training.

ICT qualification may be obtained in various types of training institutions in the countries around Europe. With regard to the “Provider of Training” the project partners agreed on a common list of ICT training providers presented in Figure 2, where the international (English) name (in the first column) refers to the national names of the training provider in the EUQuaSIT countries, and gives a general idea on ICT education institutions in Europe.

International	Czech Republic	Germany	Netherlands	Portugal	Romania
Public Vocational School / College	Střední odborná škola	Staatliche Berufsschule	Regionaal opleidingscentrum (ROC)	Ensino Vocacional Público	De stat: 1. Liceu/Colegiu tehnologic (de specialitate/profil); 2. Școală de ucenici; 3. Școală Profesională;
Private Vocational School / College	Soukromá Střední odborná škola	Private Berufsschule	Particulier opleidingsinstituut (voor middelbaar beroepsonderwijs)	Ensino Vocacional Privado	Particulare: 1. Liceu/Colegiu tehnologic (de specialitate/profil); 2. Institutie de calificare;
Company and Vocational School / College	Střední odborné učiliště	Betrieb und Berufsschule	Bedrijf en regionaal opleidingscentrum (ROC)	Empresa/ Instituição e Ensino Vocacional	Școală de maiștri.
Public College / Institute for Further Vocational Education	Vyšší odborná škola	Staatliche Institution für berufliche Weiterbildung	Organisatie voor bijscholing	Escolas Públicas / Institutos Públicos de Ensino Vocacional Adicional	De stat: 1. Școală postliceală 2. Școală de maiștri.
Company	Společnost, Institut	Betrieb / Firma / Unternehmen	Bedrijf	Empresa / Instituição	Firma/Companie

Company and College for Higher Vocational Education	Akademie	Betrieb und Berufsakademie	Bedrijf en school voor hoger beroepsonderwijs	Empresa / Instituição e Escola de Ensino Vocacional Superior	Colegiu Universitar: 1. de stat; 2. particular
Public University of Applied Science / Higher Vocational Education	Vysoká škola	Staatliche Fachhochschule	School voor hoger beroepsonderwijs	Universidade Pública / Ensino Vocacional Superior	De stat: Universitate (tehnică)/ Institut/Academie
Private University of Applied Science / Higher Vocational Education	Soukromá vysoká škola	Private Fachhochschule	Particulier instituut voor hoger beroepsonderwijs	Universidade Privada / Ensino Vocacional Superior	Particulara: Universitate (tehnică)/ Institut/Academie
Public University	Univerzita	Staatliche Universität	Universiteit	Universidade Pública	De stat: Universitate (tehnică) /Institut/ Academie
Private University	Soukromá univerzita	Private Universität	<u>Particuliere universiteit</u>	Universidade Privada	Particulară: Universitate (tehnică) /Institut/ Academie

Figure 2: List with “Provider of Trainings” to be chosen for the ICT qualification skills and profiles.

Focusing on VET, in the view of the companies, on the external training providers (see Figure 3), the most important are the “suppliers and producers of ICT products and service”.

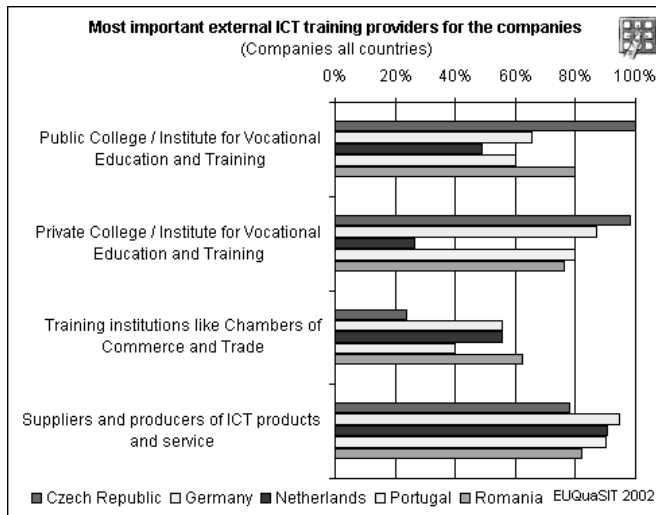


Figure 3: Most important external ICT training providers from the companies.

Training institutions like the chambers of commerce and trade seem to have “just” an additional function in all the countries especially in the Czech Republic.

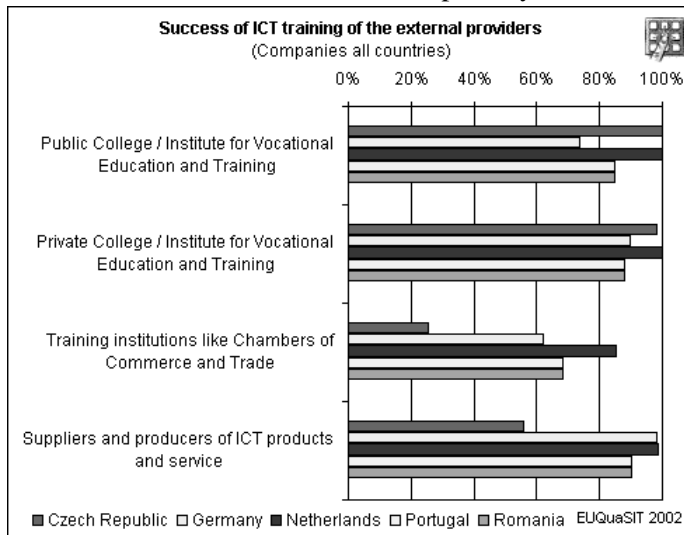


Figure 4: Most important external ICT training providers for the companies.

The public colleges are most frequently used in Romania and the Czech Republic, whereas the public colleges, for vocational education and training, are still more frequently used in the Netherlands than the private ones the situation in Germany and Portugal is the other way round.

Companies answered that the success of the ICT training is best insured at the public and private colleges as well as at the suppliers and producers of ICT products and service, apart from the suppliers of ICT products in the Czech Republic. The Czech companies are also not really convinced of training institutions like the chambers of commerce etc.

Organization of ICT education and training

The structure and organization of ICT education and training in the training institutions is quite different for some of the EUQuaSIT partner countries (see Figure 5). Especially in the Netherlands and Romania the majority of training providers say that they offer ICT qualification taking place only in their own institution. In Portugal this proportion is still about 50% of the training institutions, whereas in the Czech Republic and Germany just a quarter organizes their ICT qualification only in their own institution. In the Netherlands the training providers also have often ICT training in the institution plus practical work experience, but also in the institution and a company as a systematic dual concept of vocational training. This was practiced in half of the training institutions in Germany as well.

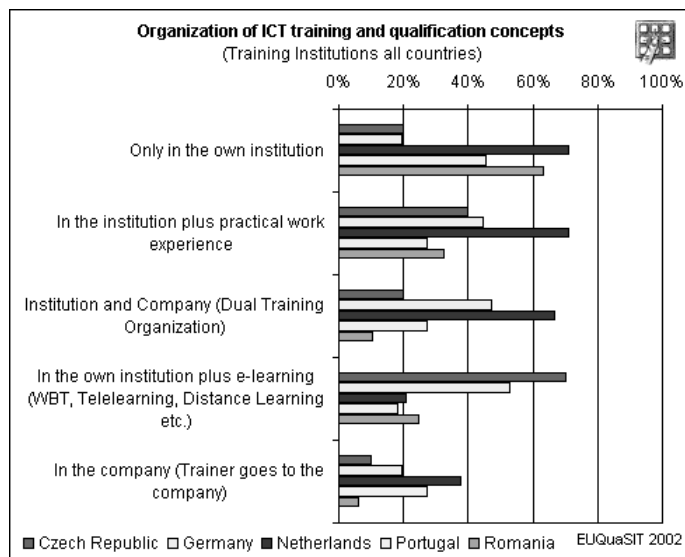


Figure 5: Organization of ICT training and qualification concepts.

Concepts focusing on training in the institution along with e-learning like WBT, long distance learning etc. are mainly practiced in the Czech Republic and Germany. In the Netherlands in general it looks as if organization varies a lot, whereas in Romania organization is almost always limited to “the own organization” sometimes with practical work experience.

Focusing on qualification concepts and methods in further vocational ICT training in companies, in all the partner countries own company’s training is often practiced and also successful (see both Figure 6 and Figure 7).

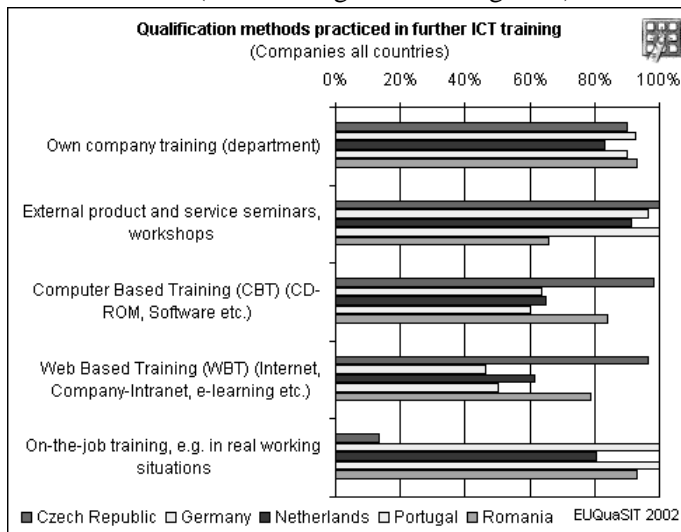


Figure 6: Qualification methods practiced in companies for further ICT training.

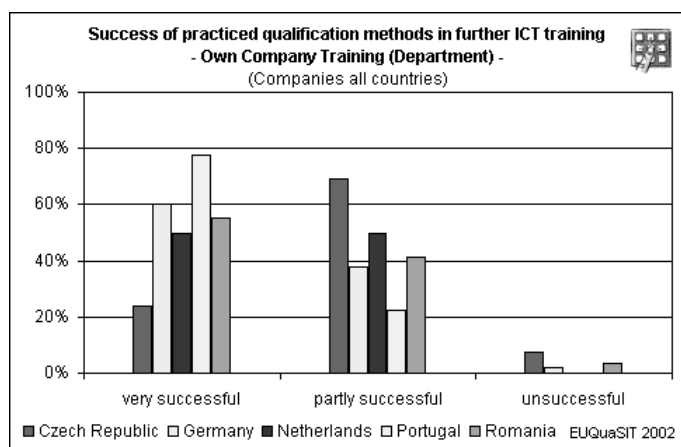


Figure 7: Qualification methods practiced in companies for further ICT training.

External product and service seminars are of equal importance and success apart from Romania. Furthermore it is a very interesting result that concepts like computer based training (CBT) and web based training (WBT) are in particular wide spread in the Eastern European countries Czech Republic and Romania. In Germany, the Netherlands and Portugal the proportion of companies using CBT and WBT in further ICT training is about 60% and therefore significantly lower. However the majority of companies think these concepts are successful. Finally it is noticeable that on-the-job training is obviously rarely practiced in the Czech Republic, and companies in this country correspondingly state that this is not successful in further ICT training.

ICT profiles

ICT profiles should address the specificity of a target domain. While it is impractical to deal with too many domains, EUQuaSIT promoter proposed a total of 6 Generic Work Areas focused by the ICT education – see Figure 8, while first results regarding the structure and the contents of the ICT business processes (work flow) have been leading to the assumption that ICT business processes can in general consist of distinguishable types of ICT work processes.

In this view, an ICT profile addresses one of the work areas in Figure 8, where the code colour of the work area indicates the nature of specific work processes the practitioner performs, as follows:

- yellow colour for ICT work processes with more economic technical oriented phases of activity and work tasks, like ICT marketing, sales etc.;
- blue colour for ICT work processes with more informatics technical oriented phases of activity and work tasks, like ICT system development, software development, administration etc.;
- red colour for ICT work processes with more technical informatics and hardware oriented phases of activity and work tasks, like ICT system integration, installation etc.;
- green colour for ICT work processes with more ICT service oriented phases of activity and work tasks, like ICT service, troubleshooting, maintenance etc.

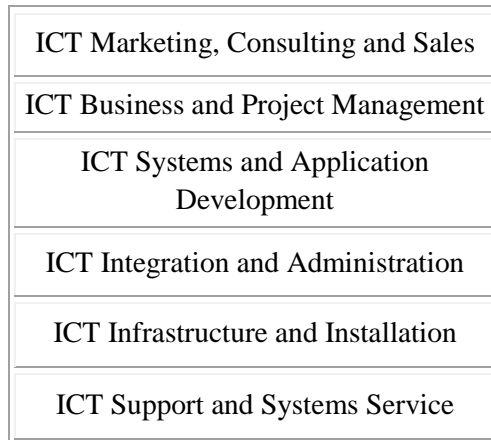


Figure 8: Six Generic Work Areas for ICT qualification profiles.

ICT education observes specific methods and instruments that the work area requires, education should refer to theoretical and working details necessary to complete tasks meant for skill level and area.

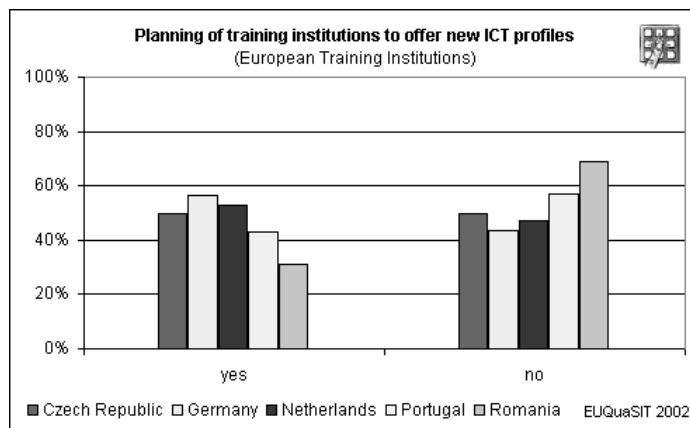


Figure 9: Planning of training institutions to offer new ICT profiles.

To the expectation in change of the demand of ICT professionals, the outcomes illustrated pointed out that about half of the training providers plan to offer new ICT profiles (see Figure 9), with the highest proportion in Germany and the lowest of about 30% in Romania. The focus of new profiles is in business and management areas of ICT as well as new application orientated ICT profiles. In

Germany for instance some of the training institutions plan to offer the new ICT professional and specialist profiles like IT Key Account Manager, IT Trainer etc.

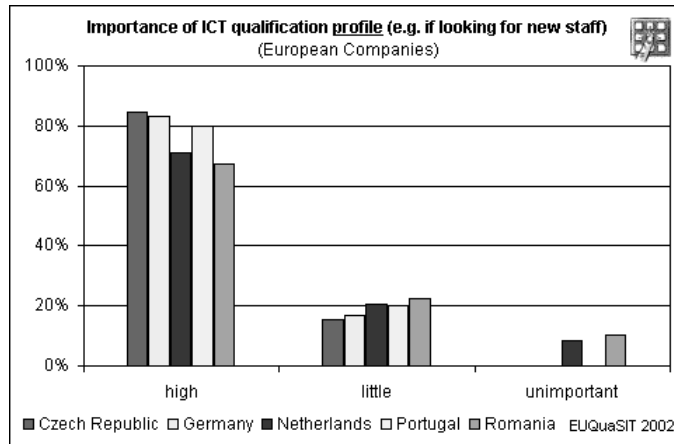


Figure 10: Importance given by companies to ICT qualification profile of the employed staff.

In the context of the ICT qualification demand in companies, for instance when looking for new staff, the profile is of essential importance for most of the companies (see Figure 10). In the Czech Republic, Germany and Portugal the proportion of companies who stress the significance of “the exact” profile of new ICT specialists is between 80 and 85%. In the Netherlands and Romania the percentage is significantly lower. Moreover in these two countries there are almost 10% of the companies that say that an exact ICT profile is unimportant when it comes to look for or even employ new ICT professionals.

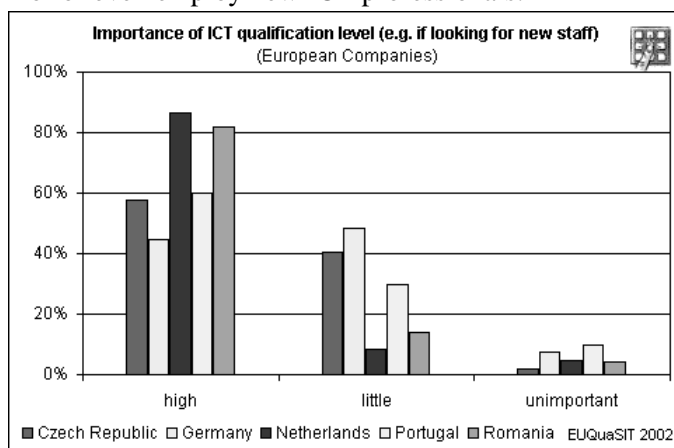


Figure 11: Importance given by companies to ICT qualification level of the employed staff.

In addition to the exact ICT profile, the companies were asked about the weight of the degree and level respectively achieved by the ICT professionals (see Figure 11). The outcomes differ considerably regarding this question. In the Netherlands and Romania, where exact ICT profile is less important compared to the other countries, the level is more important following the assessment of more than 80% of the companies. On the contrary “only” 60% of the companies in the Czech Republic and Portugal say the level of qualification is fundamental when looking for new ICT staff. In Germany the proportion of companies is even under 50% and the majority says that the level of ICT professionals is of little importance. Nevertheless only a small amount of companies say the level is unimportant.

Comparison of ICT profiles structure around Europe

The comparison below uses the information collected from the EUQuaSIT partner countries, and reflects the quantitative and the qualitative situations existing now in Europe in the field of qualifications in the ICT for the six work areas in Figure 8.

While the total numbers on HE ICT profiles are similar in the investigated countries there are distinct differentiations in the number of ICT profiles for each work area. Moreover, the titles of the training profile and the content are different. Similar numbers do not indicate similarities in ICT profiles, hence the comparison is conducted on the analysis of the profiles depending on the areas they belong. On the other hand, the number of specializations does not always indicate a diversity of profiles; for example, the offer of HE profiles for ICT in Romania is comparable with other countries’ offer, but its diversity is small, while some specialization overlaps. The forms of HE are chiefly based on university and university of applied science studies, with some differences regarding the lengths of studies (see Fachhochschule and Berufsakademie in Germany), also regarding private versus state institutions (a significant growth in Portugal and Romania, and it is weak in Germany and Czech Republic).

VET is most developed in Germany, where a wide range of ICT profiles exist. Netherlands and Czech Republic have also strong VET in ICT, oriented to the job market needs.

The diversity of ICT courses for CVT is large in all countries, and there are many narrow qualifications prepared by the ICT companies for their products or just prepared by the training institutions for various purposes (as education in ICT, CAD, software development). So, big ICT companies as Microsoft, Oracle, AutoDesk, CISCO have a wide offer of courses, each to a specialization - in CAD, system

engineering, ICT maintenance, networking and so on. Additionally, there are courses for narrow specializations – e.g. ICT software for accounting, office IT, computer or robots operation.

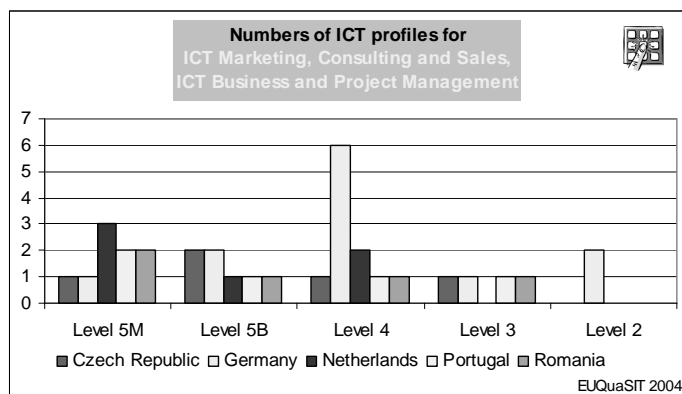


Figure 12: Number of ICT profiles on levels for the economic oriented areas.

Of great interest, in the present comparison, is the distribution of ICT profiles for each country and for each level on each generic work area, in Figure 12, Figure 13, Figure 14; each chart refers to the pair of similar work areas (coloured in yellow, blue, red and green – see Figure 8). Those numbers indicate the relative difference between European countries regarding the existing ICT profiles in the given works areas and the discrepancy between existing ICT profiles and the recommended ones (see the dark column in each level group).

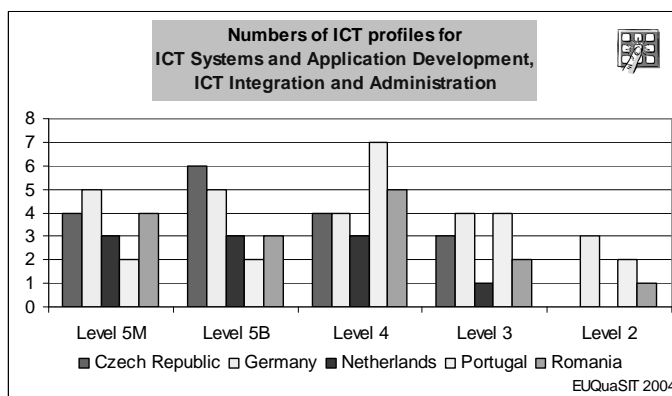


Figure 13: Number of ICT profiles on levels for the Informatics oriented areas.

Many ICT profiles exist in the area of ICT Infrastructure and Integration, which in nowadays ICT is of less importance. Traditional view on ICT – as the

“programmers and programming land”, is reflected in the big number of level 4, 3 and 2 in the area of ICT Systems and Application Development, ICT Integration and Administration. It is obvious that using new design tools in the software development lower level qualifications are less involved in that process; on the contrary, they should be much involved in the ICT Marketing, Consulting and Sales or ICT Business and Project Management.

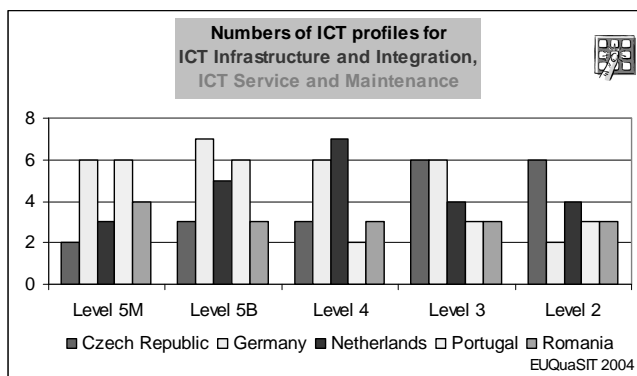


Figure 14: Number of ICT profiles on levels for the Integration and the Service oriented areas.

Interpreting the charts above it helps the issue of the European strategy regarding qualifications in ICT. For example, more and more ICT qualifications migrates from traditional “computer programming” or “computer operating” activities to commercial or service activities. It is a strong demand of ICT qualified persons in application configuration and tuning for distinct target domains – as marketing and sales, biology and medicine, banking and commerce. Investigations in companies revealed that ICT training is not well adapted to the needs of the ICT jobs market. The common European policy should cover the qualifications spectrum by numbers and content also by distribution to each work area as recommended by EUQuaSIT project.

Regarding the duration of ICT training provided for the five training levels, the analysis reveals a large diversity of the training duration in ICT in the European countries for the same level, hence the diverse approach on the extension of the training. So, while HE duration is in almost all countries the same (for level 5M - 60 months and for level 5B - 48 months), VET durations’ diversity are surprising (for levels 2, 3 and 4 durations are 12, 16, 24, 36 and 48 months in various proportions each for each country). Only judging on the training duration it becomes obvious that a common European policy is necessary to assure the compatibility of ICT qualifications in Europe.