An Analysis of ICT Policy and Strategies in Romania in European Context

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Abstract

This paper describes and analyses the Romanian Qualifications and Strategies in ICT field in European context. This work is part of EUQuaSIT (www.euquqsit.net) - a European project that aims at contributing to the transparency of ICT work and qualification. It also intends to analyze the specific demands of companies within their ICT workforce and to what extend different vocational training strategies in partner countries fulfill their needs. Objectives: Identifying, structure and classification of ICT working areas in companies; Outcomes of current and future demand of ICT work and qualification and the related ICT professions, occupations and qualification profiles; Identifying companies' ICT business and working processes and the corresponding participation of ICT specialists, focusing on the delimitation and collaboration of academic and non-academic ICT fields of activity; Investigation of the main qualification strategies in companies and ICT training institutions considering the relation to enterprises' ICT work and qualification areas; Detailed analysis on special aspects of the demand of ICT occupations and qualification strategies. Fields of study: Big, medium and small sized companies in various areas of business and trade and various regions.

1. The role of ICT in developing the Informational Society

The term ***Informational Society*** describes an economy and a society in which the access, acquisition, storage, processing, transmission, spreading and using knowledge and information plays a decisive role.

The advance towards the *Informational Society*, based on knowledge, is worldwide considered, as a necessary evolution to ensure the *durable development* in the context of "new economy", mainly based on products and intellectual-intensive activities, as well as for achieving an *advanced socio-human civilization*.

The Informational Society based on knowledge is the *progress of technology and of communication and computer applications*, but also the integration of the *economic, cultural, ambient and social* dimensions.

A structure of the Informational Society is shown in Figure 1[1]. The *Informational* Society is made of five layers: the users layer, the applications layer, the informational infrastructure layer, the institutional layer and the legislative layer. The applications layer also accentuate groups of distinctive applications: e-Business, e-Learning și e-Governance, including enterprise services and integrated systems. They have in common platforms based on advanced databases and Internet. The informational infrastructure layer constitutes the support on which the informational society is build: Internet, the core of informational coherence (lists of general interest, base registers *), specific databases of general interest and the ITC industry.

In developing the **Informational Society** the state has a triple role:

a. Acting as a **catalyst**, he must be aware of the business environment and the citizens regarding the importance and opportunities offered by the Informational Society;

b. As **settlement organism**, the State must ensure the obedience of the rules and the economic growth;

c. As **major element on the market**, the State must modernize and update its own operations and improve the interaction between the public and the private sector.

On an international level, the benefits of implementing the informational society forces the governments to pursue with priority the following **fields**:

a. Developing the informatics culture, training all citizens to ensure their access to the new technology;

b. Democratizing the use of information, for the purpose of enforcing and ensuring the right of the citizen to have direct access to information;

c. Developing the informational systems of the Public Administration with the main goal to improve the services for the citizens;

d. Developing the communication infrastructure, by reaching standards of quality, response time, coverage and availability, cost reduction (minimizing);

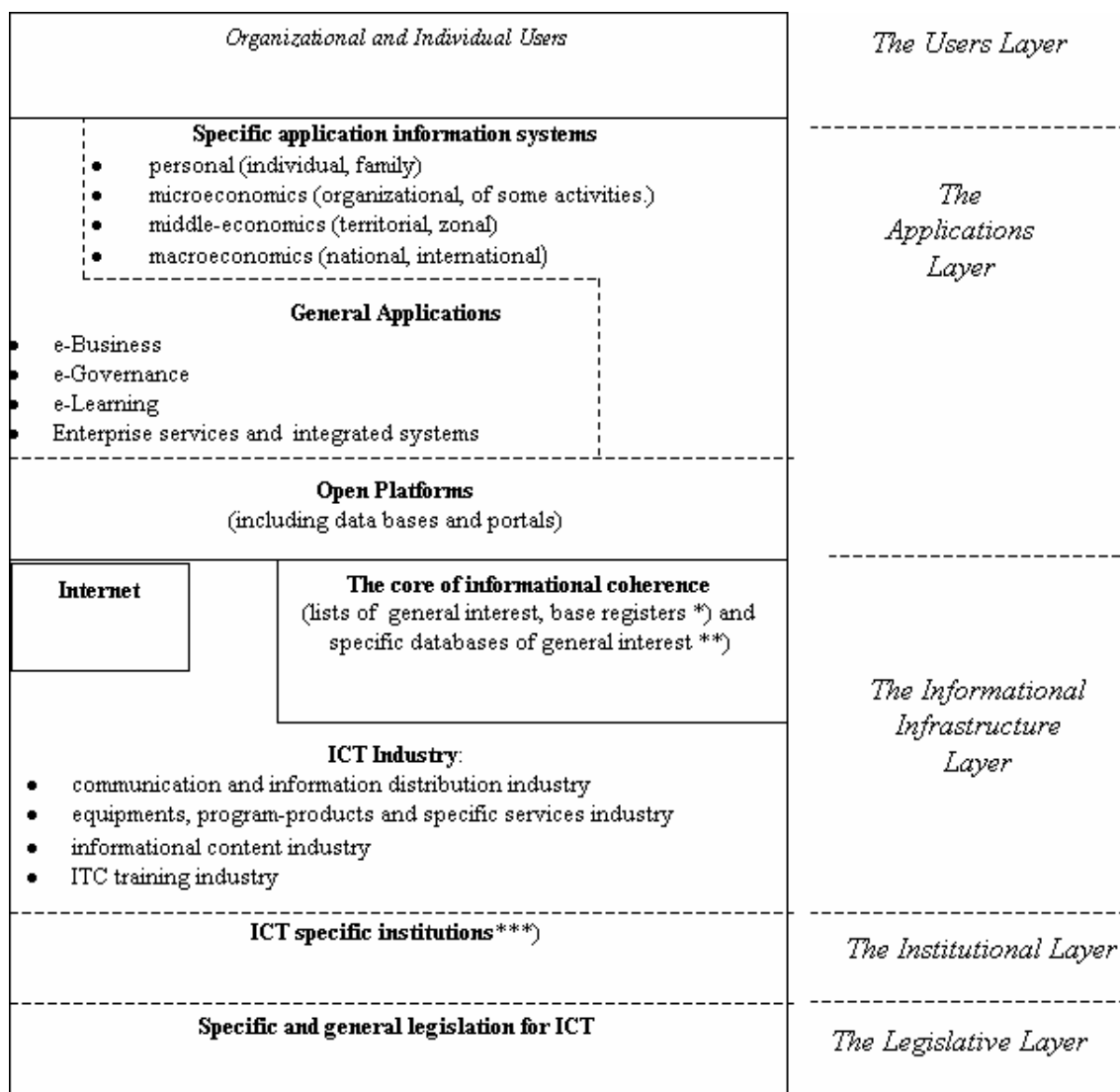[1] source: http://www.academiaromana.ro

Figure 1. A structure of the Informational Society

d. Developing the trust in the informatics systems, ensuring their security and protection of personal data;

e. Developing the electronic commerce for the purpose of profitable participation in the global economy;

f. Creating a transparent economic environment for the development and sustenance of businesses, as well as ensuring the administration of public funds and the transparence of their use;

g. Developing of a stable and safe society by using ICT in the management of crises, environment protection, and last but not least, by ensuring the social security of the citizens.

The politic will for promoting the Informational Society in Romania is dignified by the **specific ICT legislation in force**:

a. HG 271/2001 – establishing GPTI with the role of integrator and coordinator of trans-zonal solutions from the IT field;

b. Law 332/2001 regarding the promotion of direct investments with significant impact in economy;

c. Law 133/1999 concerning the stimulation of private entrepreneurs for establishing and development of Small and Medium Enterprises;

d. OUG 65/2001 regarding the constitute and functioning of the industrial parks;

e. OUG 94/2001, OG 7/2001 and the orders of application – concerning the tax exemption of programmers;

f. Packet of laws for creating the frame that ensures the functioning and the development on good terms of the IT sector: the Law of the electronic signature (Law 455/ 2001); The Law of personal (private) data protection (Law

677/November 2001); Law of the electronic commerce (in debate in Parliament); Law regarding free access to public interest information (Law no. 455/2001); Law 8/1996 regarding the copyright; OUG 124/2000 concerning the establishment of the Computer Programs Registry;

g. OG 24/2002 concerning the collect through electronic means of local taxes and tolls;

h. OG 20/2002 regarding public acquisitions;

i. HG 182/28 February 2002.

The above show the gradual removal of the legislative obstacles legislative and, more importantly, the involvement of executive management of the state in the matter of the informational society.

2. Clasification of Specific ICT Activities - CAEN Codes

Through HG 656/1987 published in the Romanian Official Monitor, Part I no. 301 of 5 November 1997 the Classification of Activities in the National Economy – CAEN was approved.

The Classification of Activities in the National Economy – CAEN ensures the identification of all activities and their encoding in a unitary system. This allows the organization, rationalizing and information of the social-economical informational fluxes, creating the processing facilities for the integration in the international and national systems of presentation and analysis of information.

The CAEN contents ensures the compatibility with other systems of information circulation (flow); similar classifications developed by ONU and CEE, as well as other classifications of goods and products, services and foreign trade with large transparency.

The activities in the **field of ICT** are situated in the following categories of **CAEN codes[2]**:

a. 300   Production of means for computing and office technique

b. 321   Production of electronic tubes and of other electronic components

c. 322   Production of radio-television transmitters, telephony and telegraphy equipments and apparatus

d. 323   Production of radio and TV receptors; apparatus for recording and reproduction of audio and video

e. 642   Telephony, telegraphy, data transmissions

f. 643   Radio communications

g. 644   Other telecommunication activities unclassified elsewhere

h. 721   Consultancies in the field of computing equipment

i. 722   Development and providing of programs

j. 723   Data processing

k. 724   Data banks related activities

l. 725   Maintenance and repairing office and accounting machines, and of computers

m. 726   Other informatics related activities

At the end of 2000, a number of 4257 companies and firms have lay down the balance sheet and audit according to the above CAEN codes. Their distribution in CAEN codes is shown in the graph from **Figure 2.[3]**.
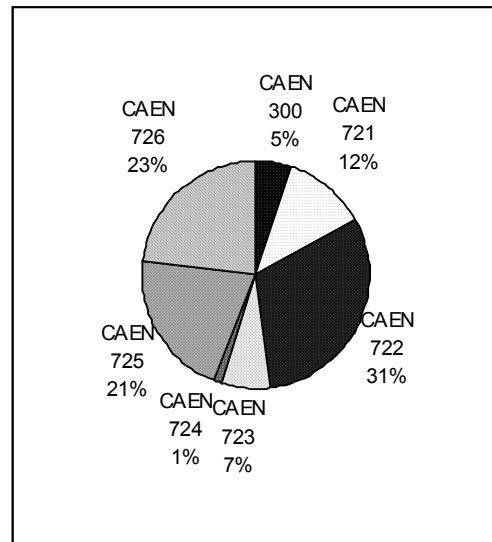
Figure 2. Distribution of companies from the ICT fields in CAEN codes

These companies total a number of 14.843 employees. The distribution of these figures in CAEN codes is presented in the following.
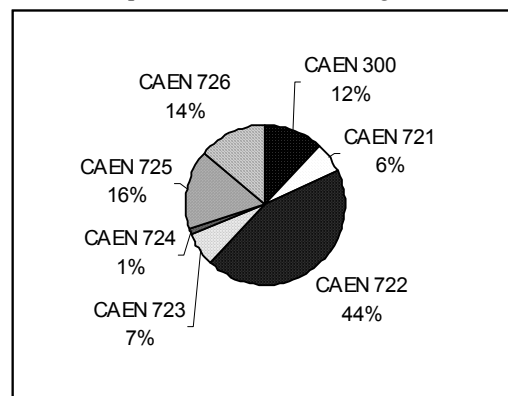
Figure 3. Distribution of number of employees in CAEN codes

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[2] source: Romanian Government Decision (HG) no. 656/1997 concerning the approval of the Classification of Activities from National Economy – CAEN

[3] source: http://www.mdp.ro/

The above highlighted companies are those companies that have as **main** object of activity one of the previous enumerated CAEN categories. Activities in the field of Information Technology are also se deploying in companies that don't have as **main** area development of activities according to the previous mentioned CAEN codes.

Of the companies with the above mentioned CAEN codes, 38% are situated in Bucharest, 7,4% in Cluj county, 4,5% in Braşov county, 4,1% in Timiş county, 2,9% in Iaşi county, 2,9% in Sibiu county, 2,6% in Constantza county, 2,6% in Bihor county, 2,3% in Dolj county, the rest of the counties having a percentage below 2%.

According to data provided by the **National Institute of Statistics** 77% of the total companies presented above are companies with mostly private capital (fund), these making **97% of total exports** in this field. 57% of the total number of employees of these companies work in the private sector, those having a 23% greater average rate of salary expenses for an employee then the companies in the field that have mostly state capital.

3. Clasification of specific ICT Occupations in Romania - COR Codes

In commercialism **standard classification systems** are used, which constitute the base components of the **economic informational system.** These constitute themselves in indispensable instruments for ensuring in a unitary manner the gathering, storing, processing and data analysis.

Their ensemble represents the **unitary system of classifications and lists,** which functions at macroeconomic level.

The elaboration of the new classifications of occupations in Romania (COR) had as a main goal the alignment with the international standards developed by the European Community (ISCO-88-COM) and UN (ISCO-88), thus ensuring the transparence of the social-economic information in the field of resources and using the labor force.

The Classification of occupations is the operation of systematization of occupations (and jobs) of active population, in which an occupation is classified one time only.

Based on **HG no. 575 bis/1992,** regarding the "Implementing unitary lists of general interest provisioned in the general conception of information in Romania", the Ministry of Work and Social Solidarity – together with the National Commission for Statistics, the Ministry of Research and Education and the Ministry of Resources and Industries – has the responsibility of developing and "up to date" maintenance of classification of occupations and jobs from Romania.

In Romania, the **ICT training** is done on different *grades of preparation*, for the formation of personnel in occupations with the following in **COR codes**:

Long-term university studies, with or without a master's degree:
a. Computers   213101, 213102, 213103, 213104
b. Automatics and industrial informatics 214402
c. Applied Informatics
213101, 213102, 213103, 213104
d. Mecatronics   214406
e. Industrial robots   214402
f. Applied electronics and communications
214406
g. Economical informatics
213101, 213102, 213103, 213104
h. Bookkeeping (Accountancy) and business (commercial) data processing
244109
i. Mathematics + Informatics
232101, 213101, 213102, 213103, 213104
j. Audio-Visual Communications   214406
Short-term university studies:
a. Information Technology
213101, 213102, 213103, 213104
b. Computer assisted technologies
213101, 213102, 213103, 213104
c. Office computing   343101
d. Electronic processing of economical data
213101, 213102, 213103, 213104
e. Audio-video, multimedia   214406
f. Technical Informatics
213101, 213102, 213103, 213104
Continuous forming / schools of masters (foreman) – with/without higher (superior) studies in other domains:
a. Computer Consultant   213104
b. System Engineer   213901
c. Databases Administrator   213903
d. Network Administrator   213902
e. Chief-operator in industrial robots   312301
f. Shift leader in computing centers or offices
312202
Post-high school course, refresher course:
a. Computing equipments and networks technician   312203
b. Computing systems maintenance technician
312203
c. Technician-operator in industrial robots
312302
d. Analyst-programmer assistant   312102
e. Electronic computer and networks operator
312201
High school – technological or informatics course, vocational school:
a. Programmer assistant   312101
b. Computing equipments electrician-serviceman
724201
c. Electro mechanic networks cables   724404
d. Telecommunications electrician   724407
e. Telecommunications fitter, adjustor; signaling, centralization and blocking installations 724410

4. ICT Preparation

As the real evolution of national economy, on a long, medium and short term evaluation, is clenched in the ties of a „vicious circle" of perpetuation and even deepen the gaps (postponements) of productivity and life standard compared to the European Union, „The medium term National Strategy for economic development of Romania", proposes itself to ensure the attenuation and the gradual removal of the gaps towards the advanced countries*, the* modernization of our country keeping pace to the exigencies of transition towards an international-cultural economy *where the* educational chapter *represents the keystone of our social and economic development.*

The main purpose in this domain is promoting the educational reform, both at the base level, as well as to the superior level, through modernization of the education system placing the stress on:

a. Decentralization of the national education system;

b. Promoting the contractual relationship between the education units and local communities;

c. Organization of the national system of forming the managers from the education system;

d. Developing and encouraging the use of information technology and communication in the educational process;

e. Expanding of the national system of distance education;

f. Applying the national program of adult education and the „*second chance in education*" program;

g. Continuous professional forming, in respect with similar policies from EU, creating equal chances of access to information, research, technological-development, education and continuous forming;

h. Restructuring of financing in education.

Starting from the fact that there is no domain or field of activity where no processing and no information transmitting is done both inside and outside that particular field, education must be concerned with the gaining of knowledge and skills in using Information Technology and Communications (ICT) by scholars and students. Introduction of ICT in education leads to the development of abilities of using ICT resources, to using these resources in learning other disciplines, to the development of skills related to accessing, interpreting and presenting information, to modeling and event control, to understanding the implications of ITC in society.

In Romania, the **ITC training** is done in **state and private institutions**.

Institutions accredited by the Ministry of Research and Education to achieve training in ITC field are part of the Pre-University and University Education System.

There are private institutions, accredited by the Ministry of Research and Education, by the Center for Training in Informatics or unaccredited, which have in their object of activity ITC training and preparation.

Regardless of the type of institution, state or private, accredited or not, in the perspective of **standardization at European level**, the ITC training (preparation) is done according to the following levels:

a. Long term university studies, with or without a master degree

b. Short term university studies

c. Continuous forming / schools of foremen (masters) – with/without higher (superior) studies in other fields

d. Post-high school course, refresher course

e. High-school – technological or informatics course, vocational school

The professional forming programs ensures the gaining of **professional qualifications** according to the nation-wide acknowledged occupational standards approved by the **Council for Occupational Standards and Certification (COSA), HG 779/1999, act of establishment. COSA**, national organism for certification of professional qualifications ensures the quality of the system by authorizing the evaluation centers, by monitoring their activity, by evaluating and certification of evaluators.

According to the proceedings of the Law 151/1999, **qualification certificates** come as complement of the graduation degrees, which certify the fact that one person followed a training (forming) course and confirms the qualifications gained (obtained).

Professional qualifications are gained through initiation, qualification, specialization, re-qualifications (art. 5), and after sustaining and promoting the evaluation tests (set of practical and/or theoretical tasks) for professional qualifications, certificates are issued as follows: (art.30, 31)

a. certificates of professional qualification for initiation strategies and courses;

b. certificates of professional qualification for qualification or re-qualification courses;

c. certificates of professional qualification for perfection or specialization strategies and courses;

d. certificates of professional qualification for apprenticeship courses at place of employment;

The Decree provides (art.31, pct.3), that in case of professional forming programs structured on modules, at the completeness of each module, after sustaining the evaluation test, a certificate of professional qualification is issued.

The occupations of the – **high school course – technological or informatics, vocational school** level and of the – **post-high school course, refresher course** level are found in the educational offerings of the Pre-academic Education theoretical and technological ways.

The Level – Continuous Forming/ foremen (masters) school – with/without higher studies in other fields is accomplished mainly in private education institutions.

The above-mentioned levels are mainly achieved from institutions from the pre-academic education: high schools, vocational schools and foreman schools. It is observed that the most seek schools are those that have in their educational offer occupations din ITC field and are followed by the best students.

Creation of a policy and of a legislative frame for technical and professional forming and education face great hardness's in this moment in Romania. **MEC is facing with an extremely changeable market** from the viewpoint of the skills necessary to graduates in the regard of hiring; în parallel great pressures are made at political and economical level for the resolving of the problems generated by unemployment and the current recession. For example, in this moment, there are no policies or legal provisions that allow the continuous development (in next place) of the professional forming and education in Romania. **The offering is spontaneous**, coming as a response to the immediate needs and to the available resources in that particular moment, especially financier resources provided by external sponsors and donors. Following the adoption of *Law no. 76/2002 - Law regarding the insurance system for unemployment and the stimulation of labor force occupation"*, published in The Official Monitor, Part I, no. 103, the *Ministry of Work and Social Solidarity* through *County Agencies of Labor Force Occupations* took the responsibility for the organization of the training courses for unemployed or other courses solicited on the labor force market. Training courses are organized by:

a. Centers of the Ministry of Work and Social Solidarity (MWSS).

b. Training centers established with foreign financial aid and now partially in responsibility of MWSS.

c. Education institutions (vocational schools, universities etc.).

d. State centers, private training institutions, consulting and training companies and NGOs.

MWSS holds a list with institutions "able" to organize training courses and, when are solicited, courses in a field for which its centers do not offer training, a local auction is held. The courses may last up to nine months and are organized by local employment of labor force offices at the express solicitation of companies. **Long or short-term university studies** ensure high qualification in the ITC field. These studies are provided by: Universities, Technical Universities, Institutes, University Colleges and Post-University schools. In addition, individual and private institutions offer **permanent education** courses (up to a year long and focused on certain qualifications required by the labor force market), **advanced studies for university graduates** (master's programs up to two years long), **post-university studies** (up to two or three years log for offering a higher professional specialization) and **doctorate studies** (from four to six years, for those institutions authorized by the National Council for Certification of the Academic Tittles, Diplomas and University Certificates.

High qualifies human resources are worldwide acknowledged – 116 universities with 36 faculties of Computers; in 1999 – 300.000 IT specialists (according to RACTDG).

Referring to the field of Information Technology and Communication, the "Porter's diamond" model, is presented in Figure 4.

5. EUQuaSIT – a European Project in ICT field

EUQuaSIT – European Qualification Strategies in Information and Communications Technology (www.euquasit.net) is a transnational project being carried out since 2001 involving partners of five European countries: The National Institute of Technical and Vocational Education, Weilova, Praha, Czech Republic, http://www.nuov.cz; Berufsbildungsinstitut Arbeit und Technik, University Flensburg, Germany (project coordinator), http://www.biat.uni-flensburg.de; Bundesinstitut für Berufsbildung, Bonn,Germany http://www.bibb.de; VEV International -Nijkerk, Netherlands, http://www.vev.nl; Tecnoforma, S.A. Almada, Portugal, tecnoforma@mail.telepac.pt; Central Systems, Foundation for Promoting ICT, Constantza, Romania, http://www.central-systems.ro, http://fict.ro; Danubius University, Galati, Romania, http://www.uni-danubius.galati.ro.

EUQuaSIT is funded by the European Commission, Leonardo da Vinci II project, 2001-2004. The project is aiming at systematic collections of structural material, statistical data and empirical analysis of various national ICT qualification strategies within the system of initial and continuing vocational education and training (VET, CVT) taking into account possibilities in higher education (HE). Considering the equal opportunity theme as well as special programmes and individual initiatives in ICT for disadvantaged groups. Major objective is finally an international comparison of national qualification strategies within the systems of initial and continuing vocational education and training aiming at the identification of synergies and alternatives from a European point of view.
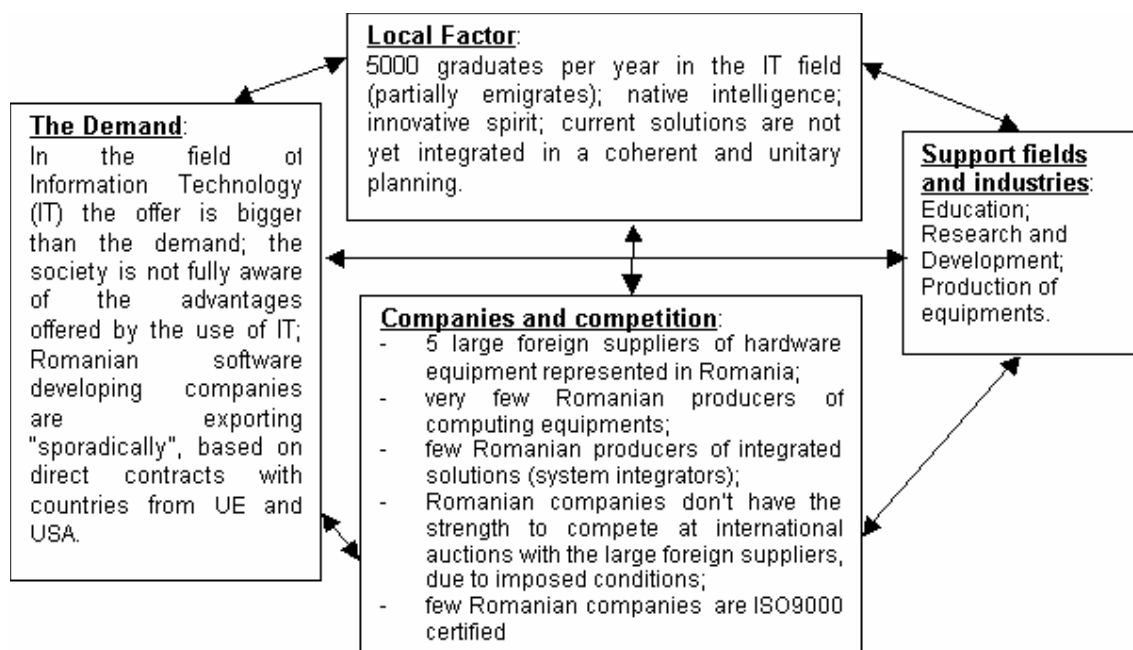
Figure 4. Porter's Diamond for the ICT industry

Correspondingly there is a need for investigations, evaluation and international comparison on ICT working areas and its interaction with the practical organisation and implementation of qualification strategies and training in companies and training institutions in the field of ICT. The objective of the project is to focus on this interaction in order to allow comparable research outcomes in a European context that sufficiently consider companies' demand of ICT specialists and professionals and acceptance of corresponding ICT qualification profiles. Although, however, used ICT technologies are supposed to be similar in most of the European countries it can be presumed that work processes are organised in more or less different ways, depending on the country, the region, the size of companies etc., probably especially in the field of ICT. Furthermore various results of studies carried out in the past indicated that the systems and therefore qualification strategies in European countries differ considerably. The Work packages of the project are:

a. National analysis of the development of technological development and the qualification possibilities and strategies within the national framework of initial and further vocational education and training in the field of information and communications technology considering special initiatives and programmes for less favoured groups and females. Furthermore taking into account other ICT professional groups (e.g. Higher Education).

b. Empirical analysis of the practical implementation and acceptance of ICT qualification and training based on a written and online examination of companies and training institutions of different size and business also focusing on the demand of skilled workers and considering the great variety ICT professionals.

c. International (European) comparison of collected national material on ICT qualification strategies and training statistics of the VET and CVT system as well as the implementation of training strategies and profiles in companies and training institutions. Transfer of the outcomes including recommendations with regard to common and innovative strategies in order to better meet the demand of ICT professionals in Europe.

d. Case studies on ICT working areas and processes as well as the implementation of vocational training strategies in the field of information and communications technology undergoing expert interviews with ICT professionals, skilled workers, VET professionals (teachers, trainers) in companies of different size and sectors as well as training institutions.

e. International and comparative analysis and evaluation of the case studies with ICT managers, ICT and VET professionals and personnel staff in companies considering the demand of ICT professionals of different qualification levels. Considering aspects like special initiatives for disadvantaged groups and females.

f. Final international co-ordination, dissemination and possible transfer of the project results. Organization of a European workshop and final recommendations on feasible common

international strategies and initiatives as well as the international acknowledgement of degrees and certificates in the field of ICT.

Based on the objectives and the partnership of EUQuaSIT the following target and beneficiary groups are addressed: companies of various sectors and size, especially small and medium sized enterprises (SMEs) vocational schools, colleges and other training institutions committed in ICT qualification and training, ICT professionals and specialists as well as students, trainees and apprentices, institutions and individuals committed in ICT training for disadvantaged groups, European, national and regional policy makers in vocational education and training in the field of ICT, social partners and other organisations related to vocational education and training in the field of ICT, e.g. Chambers of Commerce.

6. Results

Based on companies' demand within the expanding and more international labour market the project wants to work out and offer recommendations and sustainable strategies for tailored employment, occupations and qualifications in the field of ICT.

As a result of the survey in each country during last year the employment and training situation as well as the penetration of applications and the use of ICT was analyzed systematically. Certainly a highly

interesting result is the presentation of all current ICT profiles on four qualification levels (European: Level 2 to level 5B/5M). These outcomes for all partner countries are available in the internet database of the project (http://www.euquasit.net) and can be selected by different criteria like initial and further ICT training, level and/or country.

The second step was the investigation of the existence and demand for ICT professionals and the companies' evaluation of available ICT profiles and the further training requirement in ICT. We worked with a questionnaire of two separate parts (first for the companies and the second for the ICT training institutions) that was sent to app. 6.000 entities in whole.

The final results and conclusions, so far, of these project is available on the Internet at http://www.euquasit.net.

7. References

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