



Statistics and Indicators on the Labour Market in the eEconomy

# Occupational profile

*Proposal for WP7*

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## WP7-Occupational profiles: proposal

### 1. Policy relevance of occupational profiling in ICT sectors

#### 1.1 Background

At the Lisbon Summit, in March 2000, the European Union set itself the target of becoming the world's most competitive and dynamic knowledge-based economy within 10 years. It was stated that this goal strongly depends on making the best possible use of Information and Communication Technologies (ICT).

In order to reach this goal, it is important to underpin the growth and the innovativeness of the ICT sector and to stimulate and underpin the integration of ICT in production or service delivering processes within the other sectors. Ensuring a fine-tuning between the qualification requirements that result from the integration of ICT and the available qualifications, is an important measure. This mismatch can be found in different ways. Occupational profiles, which give an insight into the industry requirements and developments, are one valuable basis to explore them.

The Commission's Action Plan for skills and mobility states that more mobility on the labour market, be it mobility between jobs or between Member states, is an integral part of the Lisbon ambition. A lack of insights into industry qualification requirements seems to be at the basis of an immobile labour market. Here the link between WP6 and WP7 finds an explication. Whereas WP6 tries to make a *quantitative inventory* of the mobility patterns and the gaps, WP7 makes a *qualitative* inventory of the skills requirements, which is a basis for filling up the mismatches on the labour market.

#### 1.2 Policy challenges

In general, the European Commission wants to create a more favourable environment for more open and accessible labour markets. Next to this, the realisation of a European Area of Life Long Learning is a policy priority. Striving for more and better jobs, to stimulate a social cohesion and a dynamic knowledge based economy (Lisbon summit), policy makers are confronted with the need for a skilled and adaptable labour force. This requires efforts to improve skills levels and to remove barriers for mobility.

The most important challenges the Community is confronted with are:

1. Inadequate occupational mobility
2. Low levels of geographic mobility
3. Deficiencies in access to and quality of info on mobility and on sectors

The policy answers can be found in the 'Action plan on skills and mobility', in which three objectives are central.

1. Expanding occupational mobility and skills development. Educational and training systems need to be more responsive to the Labour Market. Investing in competence development for workers (giving special attention to low and medium attainment, and to SME's), career changes, Life Long Learning and on-the-job training, HR-investments in less developed regions.
2. Facilitating geographic mobility. Removing administrative and legal barriers, improving language skills, enabling cross border recognition of qualifications (formally and informally attained, which can be of importance for SME's who aren't able to spend much time and money in formal training), EU-wide immigration policy.
3. Improving information provision tools

Within the framework of the two first goals an occupational profile is very important.

## **2. Challenges for Workpackage 7**

### **2.1 General aim of WP7**

The aim of this work package is twofold. First of all the work package aims to identify and describe occupational profiles of new ICT related jobs and to compare regional and cultural differences in the shaping of these occupations. To do so, the work package applies an occupational profiling methodology that allows the development of occupational definitions including required qualifications and likely future developments.

Secondly, the work in the work package will lead to an innovation (improvement) of the methodology, in order to make an international benchmark of the occupational profiles. This will be based on an assessment of strengths and the weaknesses of the existing occupational profiling methodology to monitor the labour market in the new economy. In that assessment attention will also be given to the accuracy of the well known concepts 'occupation, tasks, job and skills'.

### **2.2 Developing an occupational profile**

#### **2.2.1 What is an occupational profile?**

An occupational profile is a collection of characteristics that are at the core of an occupation. It gives an overview of the tasks (task profile) and the required qualifications (qualification profile). In addition, an occupational profile sketches the broader labour market conditions such as collective bargaining, working circumstances, training opportunities, recruitment policies and difficulties, career paths etc. As the new economy is a rapidly evolving economy, the occupational profile tries to make some future prospects concerning the future qualification requirements, taking into account contemporary technical, institutional, labour market and economic tendencies.

#### **2.2.2 How can it be the basis for future policy makers?**

The above described occupational profile is an in depth study of one specific occupation. The information collected can serve different policy makers with different goals. The overview of the tasks and the related qualification requirements can be translated into training profiles. This is an overview of qualifications that have to be acquired during a training or an educational process. The information collected can also be a valuable basis for Human Resource management to develop career paths, assessment procedures, on-the-job training etc.

Next to these, an occupational profile can also reveal inequalities and shortcomings with respect to quality of work aspects etc. These can be an interesting basis for different kinds of policy measures ranging from targeted measures to collective bargaining and legislative initiatives.

The occupational profiles that will be developed by the international STILE consortium offers an added value. The work will be carried out in a consortium of Central European (Hungary), Southern European (Italy) and North European (Belgium and the Netherlands) countries. Thanks to this composition of the consortium, the Information Society can be compared and benchmarked within European borders. But this 'international' approach also allows to deduce Human Resource related conclusions which have to be drawn up in answer to the growing internationalisation and globalisation (EMERGENCE). As the focus of the STILE project is on ICT jobs, the work has to pay special attention to important challenges that characterize the ICT sector. The sector is relatively new and collective bargaining in this new, global and highly competitive sector calls for new approaches resulting in new working conditions and new working environments, the image of the sector is not yet mature etc. It is a

challenge to STILE to make a qualitative analysis of these challenges, in order to develop a profile that offers insights into the challenges, developments, opportunities and maybe best practices within each country. As benchmarking is an important way of improving measures at a supra-national level, the work within STILE will be able to serve a targeted audience.

That occupational profiles are an important basis for different policy makers at different levels is illustrated by the work of the Flemish SERV (Flemish Social Economic Council) in Belgium. This organisation systematically builds out a set of different occupational profiles, which are available to a broad public on the website. The profiles cover different sectors. An important characteristic of these profiles is that they result of a consultation process in which representatives of employers and employees as well as representatives of educational and training institutions are involved. This way, the profiles can be adjusted to the needs of different target groups.

The challenge of the work carried out within the STILE consortium is to serve as much policy makers at the micro-, meso and the macro- (supranational) level as possible by filling up a gap in the occupational profiling research.

### **3. On which occupation should we focus?**

A first task of the consortium is to select two occupations that are to be investigated in depth. This requires an overview of occupations for a specific sector. For the traditional labour market standardised lists exist, often based on the technologies used by the workers concerned. In the new economy it is however very difficult to compose a list of occupations, because much of the machinery which gave the workers their distinctive skills and identities, is replaced by a single generic and rapidly evolving new technology (Huws, 2001).

In the final report of 'the skills monitoring group of eEurope (Go digital, 2002)' it was stated as follows: 'There is no common definition in existence of the type of skills covered under the banner ICT and e-business skills.' The spectrum of the existing studies reveals significant variations in the definitions of ICT professions, according to the scope of each study and the motivations of its authors. For instance, studies oriented to the ICT industry, will give greater importance to dominant professions in the supply-side of ICT, studies oriented to the skills shortages will focus on the high-level professions, whereas studies oriented to recruitment and career management will focus on jobs rather than on occupations.

Before being able to choose two occupations that are worth to be scrutinised in depth, 3 steps have to be taken:

1. The definition of an occupation has to be revised.
2. An overview of occupations has to be made.
3. A set of selection criteria has to be proposed, taking into account existing research and gaps.

#### **3.1 Defining an occupation**

An occupation is at best defined as 'a *coherent cluster of tasks* that is *not directly related to the task performer* nor to the concrete organisation where it is performed and on which a *social consensus* exists'. Based on this definition, it is possible to put forward some criterions allowing us to make an overview of different occupations (clusters of activities).

### 3.2 Towards an overview of occupations

#### 3.2.1 A three layer model

For the overview of the occupations, a three layer skills model is taken as the starting point. The model is agreed on in institutional as well as in academic literature and it distinguishes ICT professional skills, eSkills and basic digital literacy.

*ICT professional skills*<sup>1</sup> are needed in the ICT industry and in related jobs in the user industries, in order to create, develop, implement, repair or manage ICT tools.

*e-skills* are a basis for using or applying ICT tools in the general workplace settings that are not related to the ICT sector, and for upgrading these skills when business processes and industry structures change.

*Basic digital literacy* is needed for basic tasks, as a tool for learning and as a tool for modern life outside the workplace.

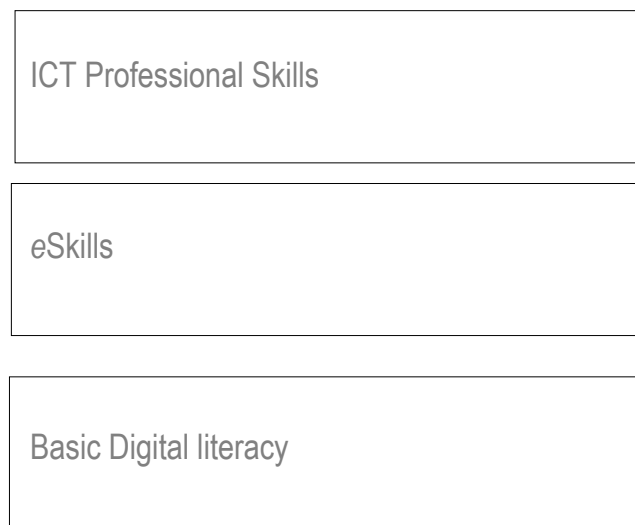


Figure 1 3 layer model of ICT skills

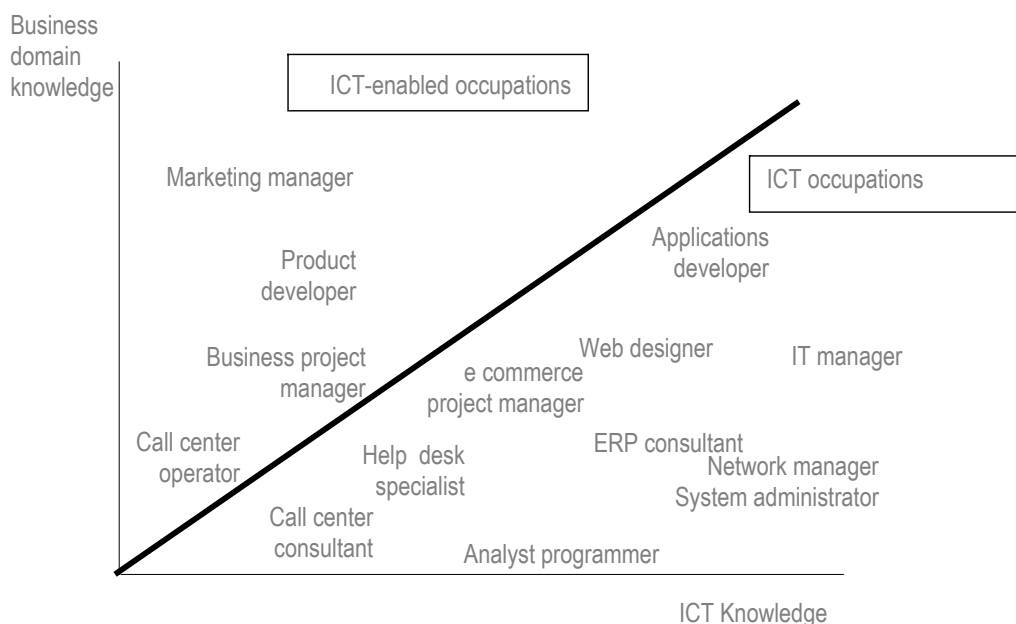
#### 3.2.2 Focus on ICT professions

For the work carried out in work package 7 it is relevant to focus on the ICT-professions. These are occupations that are specific to the ICT sector and in which ICT professional skills are needed. This choice can be justified for several reasons.

- The ICT sector is the pillar of the current information society. If one wants to guarantee economic growth, equal access to information, innovativeness, it is important to support the growth and the innovativeness of the ICT sector. As is stated above, the development of an occupational profile for an ICT-occupation can offer a lot of useful information for policymakers at different levels and of different disciplines. Therefore, an occupational profile of ICT professions is a (necessary but insufficient) prerequisite for growth supporting and stimulating initiatives.
- The whole economy is soaked with ICT, which means that eSkills and basic literacy are part of the qualification profile of nearly every occupation. They can be dealt with in different occupational profiles. What is more, research in the ICT sector (career space, Bollen & Ramioul 2002) has learnt that these skills are also included in occupational profiles of ICT

<sup>1</sup> Skills are conceived here as 'jobs'.

professions. Practically the difference between a professional and a user is difficult to make in many emerging occupations in the information society, as technical ICT skills and business skills are more and more intertwined. According to an American study, the distinction between professionals and users can be subdivided further. Professions can be mapped in a two-axes diagram: ICT knowledge and the business domain. The diagonal line separates the ICT related occupations in two classes, depending on whether ICT knowledge or business domain knowledge are more important. ICT professions can be situated in the segment that is characterised by a predominance of ICT knowledge on the business domain knowledge, whereas the e-skills can be situated at best above-left.



Source: Valenduc, 2002

**Figure 2** ICT occupations and 'ICT-enabled' occupations, examples

Therefore, the choice of a profession that is situated in the right part of the figure, near the diagonal line will allow us to explore in depth all three skills layers.

### 3.2.3 An overview of ICT-professions

The existing occupational classification (SOC2000) distinguishes the following occupations:

Table 1. Overview of ICT-professions following the SOC-classification

Code	Occupations SOC2000
1136	Information and communication technology managers
2123	Electrical engineers
2124	Electronics engineers
2126	Design and development engineers
2131	IT strategy and planning professionals
2132	Software professionals
3112	Electrical / electronics technicians
3113	Engineering technicians
3131	IT operations technicians
3132	IT user support technicians

Table 1. (continued): Overview of ICT-professions following the SOC-classification

Code	Occupations SOC2000
3421	Graphic designers
5242	Telecommunications engineers
5243	Line repairers and cable jointers
5244	TV video and audio engineers
5245	Computer engineers, installation and maintenance
7113	Telephone salespersons
7211	Call center operators
7212	Customer care operations

Source: Standard Occupational Classification, 2000 volume 1

This overview of occupations can not give a valuable overview of ICT-professions. Some categories are too broadly defined. For instance, the group of Customer Care operations not only includes ICT specialists. Work Package 3 will focus on the improvement of this occupational classification.

In the context of Work Package 7 a rather pragmatic approach is preferable, as it is more likely to start from a more differentiated overview. Based on existing research it is possible to put forward some important variables that allow to define some relevant clusters of coherent tasks (occupations). These are: technical or business knowledge (cf. above), the role that is taken up in the production-service delivering process and the technical domain. The exercise is done below. This work could be very useful for the WP3-colleagues.

#### *Place in the service delivering process*

Based on the role in the service delivering process, different clusters of tasks can be distinguished within ICT organisations. The following table gives an overview.

Designers	Developers
Those who conceive, design and sketch out objectives and architecture of an information and communication system <i>e.g. Research engineer, analyst, system architect, network engineer</i>	Those who specify, construct, implement and test either hardware, network or software components or an information and communication system <i>e.g. system designer, software engineer, programmer, web designer, multimedia integrator, on-line service designer</i>
Modifiers – extenders	Supporters – tenders
Those who customise, modify, upgrade and-or extend applications in an information and communication system <i>e.g. analyst-programmer, database administrator, web manager</i>	Those who deliver, install, operate, maintain, repair the hardware, network or software components of ICT applications. <i>e.g. system consultant, customer support specialist, maintenance engineer, trainer, network installer and administrator</i>

Source: Valenduc, 2002

#### *Technical domain*

In order to be able to choose an occupation it may be useful to select a technical domain. Valenduc (2002) distinguishes the following types of ICT specialists based on different domains:

- Core specialists
- Internet and multimedia specialists

- Applicative occupations
- Advanced specialised users

*Core specialists* operate in the domain of networks, software and services, products and systems. Within the Career Space project this group is further split up based on the place in the production or service delivering cycle of ICT services: telecommunications, software and services, products and systems, management and research.

*Internet and multimedia specialists* combine graphic, artistic or publishing skills while they are involved in design, implementation and maintenance of on-line or multimedia products

*Applicative occupations* are ICT professionals combining applied business skills, for instance in enterprise resource planning, customer relationship management, electronic commerce

*Advanced specialised users* such as help desk consultants, information brokers, desktop publishers. They should be considered as qualified 'information workers' or 'symbolic analysts'.

### 3.3 Choosing occupations

The choice of two occupations that are to be explored further in the WP 7 work, will be led by insights into the challenges the ICT sector (and other businesses) is confronted with. Taking into account the work already done in other research, new selection criterions will be chosen to fill up the research gaps. These selection criterions will steer the final choice.

#### 3.3.1 Challenges

Some of the challenges mainly refer to ICT organisations, whereas other challenges mentioned are an economy-wide concern.

- The ICT sector is a very heterogeneous sector consisting of small local organisations as well as very large multinationals. Competition is strong and based on the ability to find an ideal combination between technical infrastructure and customer service and to adapt flexibly to the rapidly changing technologies and customer needs. This has led to flattened organisational structures and human resource policies encouraging flexibility and teamwork. Next to the internal structures, also the external policies have been adapted. Setting up and maintaining efficient innovation networks has become the challenge for organisations that have to operate in a turbulent environment. These changes have an impact on the qualifications requirements.
- Organisations experience labour market shortages that have a quantitative as well as a qualitative aspect. Notwithstanding the contemporary economic turbulence, ICT organisations experience a shortage of highly skilled technical graduates who enter the labour market. Next to this quantitative shortage, organisations experience a growing gap between the qualifications offered on the labour market and the requirements that evolve from the organisational answers to the turbulent market circumstances. Employers seek a combination of ICT and other skills (competencies and business knowledge) sets which may not be currently available in job-seekers or in the existing workforce (Go digital, 2002). What is important about this, is the dynamic and experience-based way in which the competencies are acquired.
- Society as a whole is still confronted with a labour market paradox. Companies' recruitment difficulties stand across a relatively high unemployment rate of low skilled and women. Focussing on the situation in the ICT sector, this paradox is very clear as this sector is characterized by a low representation of women (Webster, 2002) and low skilled and by huge recruitment difficulties. There is an increasing importance of skills acquisition through life long learning (vocational training, selfstudy etc.).
- In a heterogeneously composed and turbulent sector, which experiences recruitment difficulties, especially SME's find themselves placed for huge challenges of competing

large organisations on the labour market. Due to the rise in wages, many SME's are being priced out of the market for bringing ICT and eBusiness skilled workers on board. Through the lack of support SME's risk missing out on some of the advantages that IT solutions bring into business processes which would help them to remain competitive (Go digital, 2002).

- Institutionalisation of the Information Society is not complete yet. Collective bargaining procedures need to be revised and adjusted to new market circumstances; centralised (sectoral) collective bargaining seems not to be the best choice in the Information based network society. As a result legislation (and security) on working conditions and working circumstances call for new initiatives. In a European context, benchmarking different practices and different circumstances is an important basis for this process of institutionalisation.

### 3.3.2 Work already done

#### *Career space<sup>2</sup>*

The Career Space consortium has proposed an extended definition of job profiles, including 16 generic skills profiles in four families (cf. supra). The focus in this work was on high skilled jobs, focussing on the needs of the largest players on the market.

The profiles give a description of the role of the job in enterprises, the vision of the job, the lifestyle associated with the job. As the conclusions are based on experiences within large organisations, a lot of the conclusions are not to generalize to SME's. Compositions of tasks in SME's and the accompanying Human Resource management strategies, which have their impact on the skills requirements, indeed are totally different from those in large organisations.

The Career Space project focused on skills related to the classical hardware and software, but also on skills related to network design, communications protocols, data transmission, hybrid software integration etc. In this project the increasing importance of non-technical skills has been emphasized (Career space, 2001).

#### *Widening Women's Work in Information and Communication Technology<sup>3</sup>*

In this project the focus is on the problem of a gender imbalance and a skills shortage on the ICT labour market. The consortium wants to overcome the gaps in existing research on the gender gap. This means that:

- The focus is not only on classical computer professions, but also on professions that are linked to new information and communication technologies.
- The gender bias is not only situated in the initial education, but also in vocational training.
- The study of the labour market is not only focused on demand and supply, but also taking into account the role of professional models and trajectoires as a factor of integration or exclusion.

The gender gap in ICT occupations is investigated in order to develop pathways:

- To improve equal opportunities
- Stimulate women's participation in ICT occupation (motivation strategies, adaptations in work organisation and legislative initiatives)

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<sup>2</sup> Career Space is a consortium of major ICT companies-BT, Cisco Systems, IBM Europe, Intel, Microsoft Europe, Nokia, Nortel Networks, Philips Semiconductors, Siemens, Telefónica and Thales- EICTA, the European Information and Communications Technology Industry Association. It worked in partnership with the European Commission and CEDEFOP (<http://www.career-space.com>)

<sup>3</sup> The Widening Women's Work consortium is composed of Fondazione Regionale Pietro Seveso (Italy), Agence Nationale pour l' Amelioration des Conditions de Travail (France), Institute for Technology Design and Assessment, Technological University of Vienna (Austria), Research and Consultancy on Work and Employment (UK) and is co-ordinated by Fondation Travail-Université.

- Improve Quality of work in ICT professions

This will be based on qualitative research, for which the conceptual framework is already available. In this work the gender gap is situated and put into a broader framework of psychological, cultural, educational and working and employment conditions. This framework is translated into a structural model of explicative variables which is to be tested in the qualitative research stage. This qualitative research is built on 2 axes:

- The professional trajectories
- Work organisation (in the ICT producing and the ICT using sector)

#### *ICT skills monitoring group*

The objective of this project is to identify, analyse and monitor the demand of ICT and eBusiness skills and actions aimed at improving the availability of these skills in different member states. The focus is on professional skills, as available data on digital literacy and eSkills are rare. The methodology is rather quantitative.

With respect to the skills gap the most important conclusion is that it has a quantitative as well as a qualitative aspect. For the measurement of the skills gap, this research relies on figures on the demand and the supply of people with educational backgrounds preparing students to occupy an ICT profession. It is recognised in the study that 'the current roles of ICT require not just technical skills across converging technologies, but also commercial and interpersonal skills to match services and products to the customers' needs.' Therefore soft skills are becoming increasingly relevant.

Concerning the actions aimed at improving the availability, different 'types' of measures can be distinguished:

- Awareness/improving attractiveness
- Broadening the skills base
- Upskilling the workforce
- Outsourcing and immigration
- Partnership industry-government and educational system
- Forecasting and tracking skills needs

What is remarkable here, is that adaptations in work organisation are not conceived as a possible measure here. Further it will become clear that this measure is not proposed because this aspect is not taken into account in the quantitative approach of this research.

#### *Higher Institute for Labour Studies*

At the Higher Institute of Labour studies, the occupations of PC-engineer, Internet developer and Customer Support Engineer have been analysed. These studies are discussed here to illustrate how a well structured and in depth scrutiny of an occupation can serve several users with various purposes.

The profiles are the result of a standardised methodology which has already proved its worth for different occupations in various sectors. The methodology is characterized by an in depth exploration of the sector at hand, thereby making a picture of the occupations exploited in the sector. Next to this, an analysis of social and economic challenges and specific recruitment problems is central in this scouting stage.

In a next step one occupation is analysed in depth, based on qualitative interviews with HR responsables and practioners of the occupation at hand. In this part of the research the focus is on tasks and related qualifications requirements, on future developments and challenges, on HR management, on training and career development, on working circumstances and working conditions etc. The profile that results from this research is assessed by representatives of organisations, training institutes, social partners etc.

The result of the work is a structured and detailed overview of tasks and skills requirements, followed by a discussion of the related management challenges, opportunities and limitations.

In the occupational profiles of the ICT sector, the combination of technical and customer oriented qualifications has been emphasized. In the profile of the Customer Technical Support Engineer, special attention has been given to the opportunities the task cluster offers to develop internal labour markets. In this profile it also has become clear how Life Long Learning within a learning organisation translates into new qualifications requirements, but also into career opportunities for the lower skilled.

### *Indic@tor*

In this research employability is conceived as one of the possible measures in answer to the current flexibility needs the ICT-organisations and especially SME's are confronted. Employability involves the enhancement (both at individual level as well as at the organisational level) of job-related expertise and professional growth. The objective is to identify factors (individual, job related and organisational) that determine employability in different career paths. This research provides a psychometrically sound survey and interview data on software engineers in SME's in the ICT-sector. The results of data analysis will find their translation into recommendations on how to improve employability in different career stages, which will be communicated to SME's.

### 3.3.3 Gaps in contemporary research: new selection criterions

There are different gaps in the current research. The STILE work wants to fill up some of these, in order to develop an occupational profile that can offer an added value to researchers and policy makers. Therefore, the list of selection criterions for choosing two occupations is inspired by the challenges the sector is confronted with and the gaps that are visible within the research efforts.

1. One important field that is worth to analyse is that of occupations that can be occupied (in principle) by *low(er) skilled*.<sup>4</sup> Research experience has shown that ICT organisations, confronted with recruitment difficulties, have adapted their requirements. Some organisations have set up internal labour markets. These are characterized by limited ports of entry for recruitment and regulated job ladders for each group of workers, internal training and job security policies. In the occupational profile of the Customer Technical Support Engineer (Bollen & Ramioul, 2002) it has become clear how experience within one job can be a valuable basis for taking up more responsibilities within an occupation and for moving to other related subclusters of activities. It has been illustrated that organisational learning processes are a prerequisite for the well functioning of internal labour markets. The introduction of internal labour markets allows organisations to reduce requirements for external recruitment. But it also results in additional requirements as life long learning is an integral part of internal labour markets. The *indic@tor*-project suggests the same measures in answer to the flexibility needs. As the focus is on organisations that are confronted with labour market shortages (quantitative and qualitative, in a society that is challenged with a labour market paradox), STILE is challenged to choose a cluster of activities that gives insights into different possibilities for internal labour markets. This means it must include some activities that can be carried out by lower skilled, but also some subclusters of activities that require specific knowledge.
2. Another important criterion that can guarantee an added value concerns the '*availability of the occupation in SME's*'. The organisation of work, the recruitment problems and the human resource policies of SME's differ from those in large international operating organisations. This has its implications for the qualifications requirements and the opportunities to close the gap

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<sup>4</sup> Lower skilled people are at best defined here as people with at least a general educational background. The specific definition is however country-specific.

between demand and supply of qualifications. By focussing on the organisation of work in SME's, specific needs and opportunities in these organisations can be identified. As the composition of the ICT sector is characterised by a high presence of small and medium scale organisations, supporting the growth and the innovativeness of these organisations is of social and economic importance. Paying special attention to requirements within SME's is very important, as contemporary figures illustrate that SME's need special guidance in order to stimulate further penetration of ICT and eCommerce in business.

For this objective (in combination with the former), the experience within the INDIC@TOR-project can be very useful. In addition to this project, the STILE project starts from interviews with experience experts, thereby focussing on the tasks and the qualification requirements that are related to the employability-improving policies, thus being a basis for finding new (alternative) ways to improve qualifications (employability).

3. A third criterion concerns the applicability of the occupational profile. It is the challenge to find a task cluster that is *performed in a broad range of sectors*. Handling this criterion in the selection of an occupation, will ensure that the occupational profile can serve a broadly defined targeted audience.
4. A fourth criterion that will ensure an accurate and future oriented occupational profile, finds its origins in the increasing consciousness of the importance of a *combination of technical and business knowledge*. The new economy is typically a network economy which has to cope with individualistic, autonomous and demanding customers. It can be expected that this combination will become even more important in the future, in particular in SME's.
5. A fifth criterion is *deduced from the future prospects on skills demand*. The occupations studied should be situated in a cluster of activities which is expected to generate high demands in the future. In a rapidly changing environment this criterion is very important in order to prevent the research results from being surpassed before the research is concluded.

#### 3.3.4 Forecasts of future demand

The choice of an occupation also has to take into account the future prospects of skills demand. There are some organisations that made future prospects, based on quantitative as well as on qualitative sources.

The EITO (European Information Technology Observatory) 2001 report states that the skills shortage will be particularly acute in the world of eBusiness. The 2002-report gives a description of the overall demand within the three major domains (ICT skills, eBusiness skills and call center skills<sup>5</sup>). With respect to the ICT skills, a growing demand is expected in the field of *internetworking, implementation of software applications, management and support of the existing mainframe infrastructure*. The growing need for eBusiness skills is situated in the field of *developing e-business strategies and of the development of internet content*. Next to these, customer services in a call centre environment is expected to remain one of the major investments of companies.

IDC (International Data Corporation) (Milroy & Rajah, 2000) concludes that the locus of the problem will be a labour market mismatch due to the growing demand for eBusiness employees. IDC also predicts that the demand on skills centered on the *internetworking environment* will grow very rapidly. Other skill shortages that are mentioned are the *Applications environment* which are skills in software applications. This demand is suggested to be mainly driven by ERM, customer relationship management and electronic commerce applications.

#### 3.3.5 Towards a selection

Taking into account the proposed selection criterions, the selection of an occupation within the group of the *developers* seems interesting as this group contains certain occupations that can be occupied by non-high skilled candidates on the labour market, while the link with the higher skilled designing activities is clear. This link is important if the occupation is to offer also a

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<sup>5</sup> The definitions of the first two domains converge to the definitions of ICT skills and eskills. Call center skills are separated here, and digital literacy is not taken into account explicitly.

basis for the design of internal labour markets (cf. supra). We propose to choose a cluster of developing activities within the technical domain of 'applicative occupations', more specific e-business applications. In this subgroup we can be sure that a combination of technical and business oriented qualifications is required and that the developed profile is useful in the future. (examples of occupations: online service designer or eBusiness developer)

Another interesting cluster of activities is situated in the '*supporters and tenders*' part of the scheme. In this cluster of activities technical and customer oriented qualifications are combined. As the technical domain of Internet and multimedia is expected to be the fastest growing one in the future, it seems advisable to choose a cluster of Internet supporting activities. (examples of occupations: system consultant or customer support specialist)

By choosing these two clusters of activities, one can also be sure to be able to capture SME's qualifications needs. In SME's different clusters of activities are often put into one job. The chosen fields overshadow 3 main clusters of activities and are therefore able to be a valuable basis for analysis in SME's. In other words, the profiles developed take into account skills that are needed to develop, integrate and maintain and troubleshoot eBusiness applications.

## 4. Methodology

For the methodology of developing the occupational profile within the STILE-project, we propose to combine two methodologies with which the Higher Institute for Labour Studies has experience: the job competence model and the conference model. For an elaborated description of both methodologies, the reader is referred to the document 'Occupational profiling methodology'. In this document (proposal for WP7) both are presented in general, and the pros and the cons are weighed up.

### 4.1 The job competence model

The job competence model is characterised by a functional analysis which results in a functional map. This is a broad representation of an occupational sector and it is the key outcome of a decision-making process. It starts with the definition of the key-purpose, the unique contribution of the sector to the whole economy. From this very broad statement (key purpose), a number of substatements (key areas, key roles, functional units) are generated by a *process of analysis (disaggregation)*. The different statements represent *outcomes* that *should* be achieved to fully account for the key purpose. The process of analysis is mainly based on the information of practitioners, and the main question that runs through the interviews is 'In order to achieve the key purpose of the occupational sector – key areas, what are people expected to be able to do?'

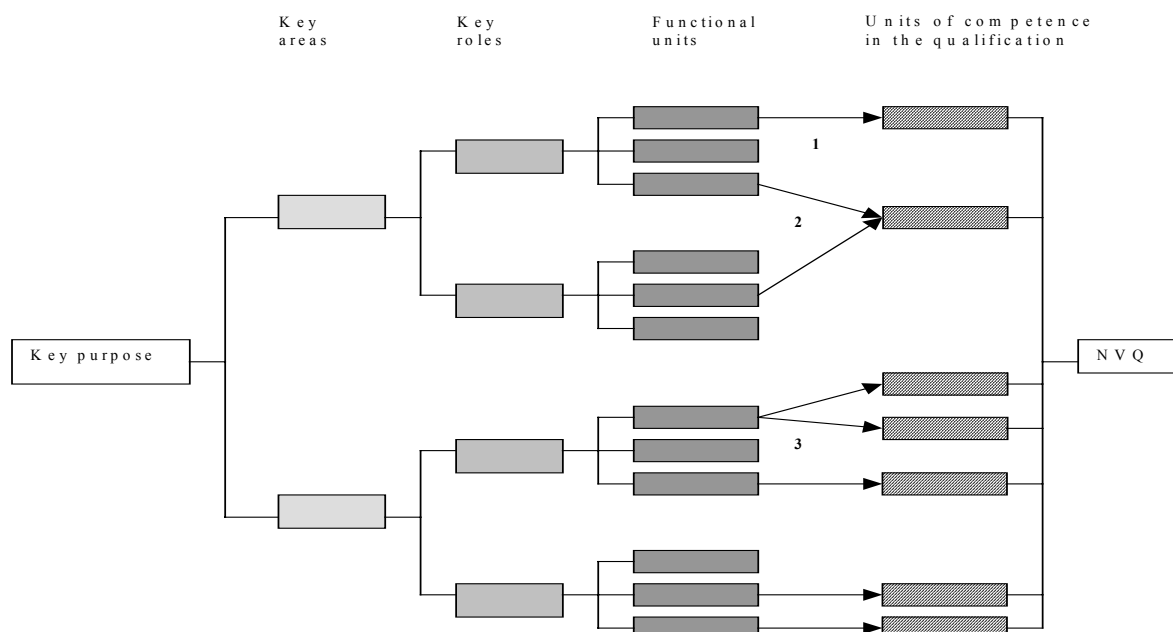
The key purpose, the key areas, the key roles and functional units (substatements) are formulated as outcomes, which does not mean that there is no active verb in the statements. Within this methodology it is very important to analyse *what is done to achieve which result?* This is completed with a performance criterion, indicating the standard of performance.

The process of analysis is conceived as an iterative process, that is based on disaggregation rules. This means that a statement is subdivided in more concrete substatements, following certain patterns (based on the order of activities in a production or service delivering process). One can distinguish for instance the following subtasks; planning, designing and building, or identifying and evaluating information processes. The level of detail of the analysis depends on the research question (the purpose for which the profile is used).

The outcomes which a practitioner *should* be able to achieve (functional units) are translated into qualifications (units of competence), which describe what an individual *can do*. The qualifications can be used as a basis for National Vocational Qualifications (NVQ), which are one of the ways the occupational profile may be used. Functional units are open for organisation specific adaptations, units of competence are not.

Next to the analysis of the outcomes which a practitioner *should be able to achieve*, the profile resulting from this methodology gives a description of future developments with respect to work roles, changes in technologies, social values, economies and markets etc.

The resulting document is based on the following scheme:



Source: Schrijvers E., 2002

**Figure 3** Functional map resulting from the job competence model.

#### 4.2 The conference model

The conference model is a five stage model, which is characterised by a commitment of future users, a profound study of the sector and the future challenges and a detailed analysis of the tasks that are to be performed within an occupation. The five stages and their resulting documents are summarised in the following figure:

Stage	Name	End product
1.	Orientation	Definition of the occupation
2.	Preparation	Concept profile
3.	Conference	Interim profile
4.	Future oriented research	Future profile
5.	Verification	Definitive profile

Source: Malfait & Sels, 1996

**Figure 4** Overview of the conference model stages

In the *orientation stage* the object of analysis is defined. Next to this, the orientation stage is often used as an introduction of the researcher to the sector, and the social-economic and technological challenges it is / was and will be confronted with. Secondary document analysis and contacts with privileged experts are the basis of analysis.

In the *preparation of the concept profile*, practitioners, team leaders, Human resources management etc. are interviewed in order to gain insight into the tasks that are performed. This description of the tasks is translated into required skills. In addition to this, the conference model tries to gain insight into the required knowledge and attitudes. The task analysis and

the translation into qualification requirements is one part of the concept profile. Another important part concerns the description of future developments and specific challenges, contradictions with which the sector is confronted.

The concept profile is *assessed by a group of future users and experience experts*, in order to find a consensus on an occupational profile. This should indeed be the greatest common denominator of all organisation specific practices and it should be a basis for different users ranging from educational experts at the national or supra-national level to human resource managers at enterprise level.

The fourth stage, which is focused on *future oriented research*, is already prepared in the orientation stage and is validated in interviews with experts and in the conference.

In a last stage the resulting profile is submitted to a *final feedback of practitioners and their supervisors*.

The resulting profile consists of a *detailed list of tasks* (preparatory, core, organising, supporting tasks) and the related *qualification requirements*, completed with *background information* on the socio-economic characteristics of the sector, the future challenges, difficulties experienced with recruitment and selection, existing career paths for practitioners of the occupation, working conditions and working circumstances etc. The following table exemplifies the resulting task description and the related qualification requirements that result from the conference model.

**Table 1** Overview of tasks and related qualifications requirements (Customer Technical Support Engineer)

Activity	Special knowledge, skills or attitudes
Answering the telephone professionally	<ul style="list-style-type: none"> <li>▪ Being able to ask purposive questions in order to distinguish hardware from software problems.</li> <li>▪ Being able to rely on the experience with recurring problems</li> <li>▪ Being able to make efficiently use of solution databases</li> </ul>
Making an inventory of the problem	<ul style="list-style-type: none"> <li>▪ Being able to assess the information that is made available by first line colleagues</li> <li>▪ Being able to judge which information can be asked at first line</li> <li>▪ Being able to understand what the problem is for the customer</li> </ul>
Diagnosis of the problem	<ul style="list-style-type: none"> <li>▪ Using search routines, being able to exclude different causes</li> <li>▪ Being able to search and interpret relevant information on various tools (customer documents, technical manuals, information on the network etc.)</li> <li>▪ If necessary, being able to ask purposive support from colleagues</li> <li>▪ If necessary, being able to test telephonically applications, together with the customer</li> <li>▪ General knowledge of network technologies (corenetwork, mobile network, TCP-IP etc.)</li> <li>▪ Knowledge of technical basic principles of products and services offered (i.e. What is the function of a modem and how does it work, how is it installed etc.)</li> <li>▪ Knowledge of hardware</li> </ul>

REMARK: In this profile the required attitudes are discussed separately, but they can also be included in the table

Source: Bollen A. & Ramioul M., 2002

### 4.3 Weighing up pros and cons of both methodologies

Before starting with weighing up the pros and cons, the focus is here on the common positive characteristics of both methodologies.

- One important characteristic is that both methods are based on the information of *experience experts* such as practitioners.
- Another interesting communality concerns the *detailed analysis of the sector* and the challenges it is confronted with.
- The *future perspective* of both methodologies is also worth to mention.
- Both methodologies make use of an *iterative process* and make use of *disaggregation rules*.
- What is the most important, is that both methodologies make a *detailed inventory of tasks* that are to be performed within the occupation and that they *link these with qualification requirements*.
- The *broad applicability* of occupational profiles resulting from the methodologies explored above, is a last important communality.

**The conference model** has some characteristics that are very important for the development of an occupational profile. First of all, the procedure that is developed to find a *consensus* on the profile is very important. As one of the objectives of STILE is to benchmark the Information Society in different EU-countries, this consensus is of special importance. Secondly, the *exploration of the sector and its challenges* gets a more central place within the conference model. These insights are very important to enable different interpretations of the profile and to make benchmarks. It has already been noticed that the institutionalisation processes, such as collective bargaining, legislation concerning work in the Information Society deserve special attention in the STILE project. Thirdly, the *exploration of the occupation* is interesting. This analysis is based on the separation of tasks into executive (core), organising, preparatory and supporting tasks. By taking this scheme as a manual, one can be sure that all tasks are taken into account. This exploration of tasks and related requirements is completed with an analysis of working conditions, working circumstances, career paths etc. In the foregoing it has been stated that these insights are important not only within the framework of benchmarking different Information societies, but also as a basis for identifying general gaps and within the framework of the general European interest in Quality of Work in the Information Society. A fourth positive characteristic of the conference model concerns the *elaborated translation of the tasks into skills, attitudes and knowledge requirements*. In the competence model the focus is mainly on skills. The last point that is to mention is that the conference model is based on what practitioners in different organisations actually do, whereas the job competence model is rather based on what practitioners should do. As it is more easy for practitioners to say what they do than to say what they should be able to do in order to realise a certain objective, the conference model is preferred here<sup>6</sup>. By analysing the same functional domain in different organisations, it is possible to gain insights into what a perfect practitioner should be able to do.

What is more attractive and very valuable within **the job competence model**, is that it takes up the key purpose and the different key areas of an occupation in a *final scheme*. This way relations between tasks become more clear. Therefore the exercise of dividing the key purpose into operational roles, strategic roles, creative roles, management roles and the value basis are interesting to structure the information that is gained in the explorational stage of the research. Another interesting characteristic, that is more emphasized within the job competence model concerns the *grammatical composition of the profile*. Paying attention to this, is very important. The description of a task should contain, where possible and relevant, an active verb, the objective and a performance criterion. In the example set out above (table 1) this is done in the second column, where translations are made to the requirements. What is also interesting in the description of the job competence model, is the *elaboration on the way outcomes can be translated into qualification requirements*. The different ways are visualised in figure 3, illustrating that one task can be translated into more than one qualification requirement, that more than one task can converge into only one skill requirement, but that one task can also need just one qualification. Taking into account these

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<sup>6</sup> Experiences with the job competence model have learnt that it is more easy to interviewees to say what they actually do in their work. The scheme of the different objectives to be realised is however an important guideline for the interviewer.

rather structural aspects when developing the occupational profiles is important, as another STILE objective is to improve existing occupational profiling methodologies.

#### 4.4 Conclusion

For the occupational profile that is to be developed within the STILE-project, it is useful to *combine the positive characteristics of both methodologies*. This means that the methodology of *analysis* of the sector, the relevant socio-economic and institutional characteristics, the actually performed tasks and the translation into qualification requirements, that is used within the *conference model* is preferable. In the exploration of the occupation it is of special importance to pay attention to the career paths<sup>7</sup>, the legislation and collective bargaining processes and the related working conditions and the working circumstances<sup>8</sup>. These insights can also be valuable for the work in work package 6, as insights into best practices and gaps can be a valuable basis for mobility promoting policies.

For the definitive profile, some *structural rules* that are emphasized within the *job competence model* need to be the leading principles. This means that the relationships between different tasks and with the 'general purpose' of the occupation is to be visualised more structurally than is usually done within the conference model. What is more, special attention must be paid to the grammatical composition of the profiles (overviews of tasks and the related requirements). Also interesting to take into account is the insight into the different ways in which tasks can be translated into qualifications, as is set out in the job competence model.

### 5. Concrete planning for the WP7-activities

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Orientation stage: choice valuable for all participating countries? specific shortages? Definitive choice	Nation	March 2003
Composition of national concept profiles		June 2003
National Conferences		November 2003
National Reports on profiles, conferences and benchmark		February 2004
International comparison		May 2004
Recommendations on profiling methodology		July 2004
Report on international comparison and benchmarking		May 2004
Final report on the international comparison of the profiles including conclusions on possibilities of certifications of competences		August 2004

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REMARK: More detailed information on the different stages will be spread by HIVA during the working period of the work package.

<sup>7</sup> In order to investigate opportunities to design internal labour markets.

<sup>8</sup> In order to benchmark institutionalisation processes and to identify gaps.

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