



Statistics and Indicators on the Labour Market in the eEconomy

# Understanding occupations in the Information Age

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## Introduction

This report forms part of the work of the Statistics and Indicators on the Labour market in the eEconomy (STILE) project. With funding from the European Commission's Information Society Technology (IST) programme in collaboration with Eurostat, the STILE project was set up to provide innovative methodologies and content for the (statistical) monitoring of the European labour market in the eEconomy.

As part of this work, we did an international exercise on profiling ICT occupations within the eEconomy. Occupational profiles give an overview of tasks and related competence requirements of a certain occupation. These overviews can be used for several applications at several levels. The general aim of occupational profiles is to be a basis for improving the match between competence needs and available competences on the labour market.

The development of these profiles contributes to the realisation of the eEurope Action Plan, giving information on characteristics of employment in the Information, Communication and Technology sector. The work also contributes to the realisation of European Commission's Action Plans on skills and mobility. Offering an overview of tasks and related competence requirements in various countries, the profiles can be used for various initiatives stimulating occupational and geographical mobility on the labour market.

### 1.1 Objectives of the work

The objectives of the work are threefold. First of all the project wants to develop profiles that can be used by a broad group of users aiming at improving the match on the labour market at various levels:

- at the macro level, the supranational level, the profiles can be used to bring into picture international differences or to get insight into new occupations;
- at the meso level, the national or sectoral level, the profiles can be used to get insight into competence requirements. A comparison of these requirements with the available competences can lead to the identification of a 'competence gap'. Various measures to improve the match between supply and demand on the labour market can be developed at the meso level;
- at the micro level, the organisational or workplace level, the profiles can be used to define various jobs. It can also be used as a basis for developing assessment tools, evolving gaps between required and available competences.

Second, the work makes an assessment of existing occupational profiling methods. This way the work contributes to the general aim of the STILE project, that is to 'improve existing measures for monitoring tendencies in the labour market of the eEconomy'. The international dimension of the research project and the focus on new ICT occupations has made it possible to identify opportunities and limitations of existing profiling methods for getting insight in occupations in the international labour market of the eEconomy.

Third, the work wants to give an initial impetus to international comparable research. It is out of the research's scope to explain international differences. Nevertheless, it is possible to put forward some research questions that can be subject of other research.

## **1.2 Structure of the final report**

Chapter 2 focuses on the method used for the development of the final profiles. In addition to this, it also throws light on the structure of the profiles. Chapter 3 presents the profile of customer technical support. Chapter 4 describes the profile of web development and -maintenance. Chapter 5 is a concluding chapter, illustrating how the profiles can be used and putting forward some questions on the occupational profiling methodologies for the future.

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## Methods and outcomes

### 2.1 Method of work

For the development of the occupational profiles we relied on a method that has been developed by HIVA and that has been applied successfully to a lot of occupations already. The method is inspired by the internationally known DACUM method.<sup>1</sup> In general the method that is used in the STILE project is to be subdivided in three major steps:<sup>2</sup>

- 1) collect information on the sector of employment and the occupation, in preparation of a provisional profile;
- 2) develop a provisional concept profile interviewing experts (job occupants and supervisors/managers);
- 3) submit the provisional profile to the assessment by a group of possible users of the profile (training centres, educational institutes, interest organisations of employers/employees, etc.).

We were to apply this method to new occupations and in an internationally comparative context. One of the project's objectives was to assess the feasibility of existing profiling methodologies for studying new occupations and for putting them in an international comparative perspective. Therefore we decided not to apply the method rigidly, but adjust it if necessary.

Instead of developing a common provisional profile that was to be submitted to the assessment of experts and users in all countries, we decided to develop different national profiles. On the basis of a comparison of the profiles, we would be able to decide whether it is relevant or not to have different profiles or one common profile.

#### 2.1.1 Develop national profiles

##### 2.1.1.1 Exploration of the sector of employment

The occupational profiling exercise started with an *extended study of the socio-economic situation* of the sector that employs the occupation that is at the centre of research. On the basis of an extended literature study, we got familiar with the products and services, the technologies, market and labour market challenges, etc. Getting familiar with the sector is a *conditio sine qua non* for being able to prepare interviews on the profile.

In the STILE project this stage has allowed us to define the clusters of activities that were subject of further research.

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<sup>1</sup> Develop A CUrriculUM. This method is characterised by the conferences in which experts (job occupants and supervisors/managers) are asked to discuss competences that are essential to the occupation.

<sup>2</sup> For more information on the method and the various steps, see Bollen & Ramioul, 2004.

### 2.1.1.2 Development of concept profiles

In a second stage, we went into the field to develop a concept profile. In this stage a lot of energy is spent collecting concrete information on the tasks and related requirements on knowledge, skills and attitudes. Researchers went into the field, interviewing job occupants, supervisors and HR responsables. In these interviews focus has been on the composition of various functions, organisation of work within various companies, training initiatives, labour market challenges, etc.

The result of this stage is a provisional concept profile giving an overview of all tasks and competence requirements. The list of tasks and related requirements depends on organisation of work and seniority of employees. The concept profiles pay attention to these differences if relevant and necessary. In addition to tasks, concept profiles also give a general description of possible career paths for occupants and they deal with some future prospectives.

### 2.1.1.3 Validation of concept profiles

In a last stage experts validated the concept profiles. Dependent on the national opportunities, profiles were validated in conferences or bilaterally. In the stage of validation two questions were central:

- Is the profile (overview of tasks, related competence requirements and additional information on organisation of work, etc.) accurate?
- Which tasks will change, or become more/less important in the near future?

## 2.1.2 Comparing national profiles

### 2.1.2.1 Differences and similarities

Collecting the various national profiles, it became clear that it was not easy to compare them. The major reasons for this limited comparability are (cf. Annex 1):

- *different samples* at the basis of the profiles: some partners had contacts within a broad spectrum of organisations, while others focused on a subgroup or companies. In some countries the profile of web development and -maintenance is based on interviews with self-employed, employees in web development organisations and employees in touristic organisations exploiting an eCommerce website. Other profiles are based on interviews with experts from the last group;
- *different structure* of the profiles: some profiles make a detailed list of tasks, subdividing general tasks into subtasks at three levels. Other profiles give a general overview of tasks and they specify these by giving background information or by enlisting competence requirements related to these tasks;
- *different concepts*: one profile notices 'communicate systematically on experiences'. Taking a closer look at the other profiles shows that 'participation in the development of common knowledge base' or 'Study and exchange experiences with colleagues' all refer to the same task.

Taking a closer look at the profiles however has shown that there are more similarities than one would suggest at first sight.<sup>3</sup> Differences between profiles seemed to be due to structural differences, rather than to profound socio-economic differences.

### 2.1.2.2 Methodological conclusion

The experience with the development of the national profiles has lead to the conclusion that international comparisons can only be made on the basis of a common reference framework. Therefore, we decided to develop such a framework profile that gives a clear overview of tasks and related competence requirements and that is applicable to all (participating) coun-

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<sup>3</sup> For an elaborated report on this, the reader is referred to Bollen, Huys & Ramioul, 2004.

tries. The framework profiles are conceived as a tool that is to be used in the same way by all countries (cf. *infra*). Only this way it is possible to make valuable international comparisons.

This does not mean that the development of the various national profiles has been a wrong research step. On the contrary it has added value to the work. The various national profiles put emphasis on different aspects. Putting them together has generated a synergetic effect. Aspects that are kept out of sight in one profile have been dealt with in other profiles. What is more, the different national profiles illustrate various ways of structuring and formulating. An assessment of them enables a well-concerned option for a certain structure.

### 2.1.3 Towards common framework profiles

In a last stage we analysed all national profiles on differences and similarities, searching for a relevant common denominator. This resulted in a framework profile that offers a common reference for international comparison. The framework profile is based on various national profiles that have been validated by experts (cf. *supra*). The framework profile as such is not validated yet. It is conceived as a tool or standard for developing comparable profiles.

The framework profile is a list of tasks and related competence requirements that is to be submitted to the same assessment of comparable groups of experts and users. Dependent on the final goal of getting insight into the occupations, the composition of the group of experts and the questions that are to be at the core of the discussion vary. If the profile is used as a basis for educational programmes, the group of experts will be composed of representatives of employers, of employees and of educational institutions. Questions that are important to get insight into the tasks and the related competence requirements are:

- Which tasks, in your view, belong to the occupation?
- How important are these tasks? How difficult<sup>4</sup> are these tasks?
- Which tasks will become more/less important in the near future? Which implications for competence requirements?
- Which competence requirements are linked to the tasks?

## 2.2 The framework profiles as a final result

The framework profiles start with *a demarcation* of the occupations. We locate the occupations that are subject of the study within the whole of 'ICT-related activities'.

In a next paragraph we present *the profiles*. The profiles are structured in a two-axis matrix. The vertical axis is a detailed list of tasks. The horizontal axis is a three-level continuum of competence requirements.

In addition to the list of tasks and related competence requirements, the profile describes general characteristics of the occupations. Making these elaborations, we want to give some *background information* on the occupations and illustrate how the framework can be used. In a last paragraph we give an *initial impetus to international comparisons*.

### 2.2.1 Demarcation of the occupations

#### 2.2.1.1 Occupation is a problematic concept

For the selection of two ICT occupations that are typical to the eEconomy we were confronted with the problem of defining occupations. Traditionally an occupation is 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. (SERV, 2001; translated by HIVA)*

<sup>4</sup> Difficulty refers to the complexity of tasks. Complex tasks are tasks for which there is no standardised method.

There are some problems with applying this definition to activities in the eEconomy:

- the *organisational diversity* is very high, causing problems to *abstract from the concrete organisational context*. In one organisation people involved in development are also involved in sales or strategic management, while another organisation employs someone developing one specific technology. In addition to this variety in work organisation, there is the technological diversity. Very often descriptions of new jobs refer to technologies (e.g. JAVA script programmer, CISCO installer). It is not easy to decide which jobs are to put under the same denominator of 'a certain occupation';
- there is *no social consensus* yet on the definition of new occupations. This is very well illustrated in discussions on call centre employees. Are they to be conceived as a separate occupational group or is it more relevant to divide employees of a call centre over the groups of sales representatives and clerical staff? Also discussions emerging when talking about a web master or a web developer show the problematic lack of consensus on a definition. Talking about these 'occupations' there are as much definitions as there are parties involved in the discussion.

Taking into account these challenges, we decided to follow the example of existing research on skills and qualifications in the eEconomy (Career Space, SFIA and Biat). We defined a 'logically coherent cluster of activities' that would be the subject of our research.

#### 2.2.1.2 'Clusters of activities' are more practicable

The table below gives an overview of the 'clusters of activities' as they were defined in relevant other European researches on occupational profiles. Taking a closer look at these lists of activities, it becomes clear that they are based on the value chain of 'developing and delivering ICT services'.

The respective researches have developed profiles giving an overview of tasks<sup>5</sup> and related competence requirements of work areas, rather than of clearly defined occupations. In these clusters of activities the respective researches place existing job titles/occupations or business roles.<sup>6</sup>

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<sup>5</sup> Some profiles start from an analysis of tasks, other prefer to analyse 'business roles' or 'skills'. A discussion on the relevance of analysing tasks is going on. The abstract characteristics of knowledge based work, the diversity in work organisation and the growing interest of HR responsables in competences rather than tasks have given shape to this discussion.

<sup>6</sup> The Career Space consortium refers to job titles, the SFIA uses business roles and the GAHFA model refers to occupations.

**Table 2.1** Overview of clusters of activities in existing European research

GAHFA	Career Space	SFIA
ICT marketing, consulting and sales ICT business and project management	Cross sector	Sales & marketing Management & administration
ICT systems and application development ICT integration and administration	Software & services <i>Technical support</i> <i>Multimedia design</i>	Strategy & planning
ICT infrastructure and installation	Products & systems	Development & implementation <i>Systems development</i> <i>Human factors</i> <i>Installation and integration</i> <i>System integration</i> <i>System installation</i>
ICT support and systems service	Telecommunications <i>Digital design</i> <i>Radio frequency engineering</i>	Service delivery <i>Education and training</i> <i>Infrastructure</i> <i>Network control</i> <i>Operation</i> <i>User support</i> <i>User support</i> <i>Network administration</i>

Source: Petersen et al., 2004 (adjusted by HIVA)

For the STILE project we decided to analyse a subcategory of tasks within the cluster of Service delivery and within the cluster of Development and Implementation. Within the first cluster we focus on support of customers having technical problems with access to telecommunications networks (ranging from ‘mobile phone’, over ‘Internet access’ to ‘integrated systems’). In the second cluster the focus is on the development, the implementation and the maintenance of websites. The following table visualises the clusters of activities that are at the centre of this report. It starts from the SFIA overview of work areas because this ‘Skills Framework for the Information Age’ is the most generally applicable (and applied) from all three overviews.

**Table 2.2** Clusters of activity that are at the centre of the STILE project

		Customer technical support	Web development and -maintenance
Development & implementation	Systems development Installation & integration Human factors		
Service delivery	Education & training Infrastructure Operation User support		

Starting from this demarcation, we can link our results to existing classifications of ICT competences and offer an added value to these initiatives. Making a detailed analysis of tasks and competence requirements of one certain ‘logically coherent cluster’, we can contribute to knowledge of important trends, competence requirements, etc. Giving more detailed informa-

tion on the clusters also allows making the relationships between various related job titles clear. On the basis of a detailed overview of the cluster of activities it will be for instance possible to structure discussions on the difference between a script writer, a HTML developer, a web designer, a web developer, a web master, etc.

## 2.2.2 The profiles

### 2.2.2.1 List of tasks

The list of tasks is an overview of tasks/activity domains that are to be performed within the selected clusters of activities. The overview distinguishes four levels of tasks: preparatory tasks, executive tasks, organisational tasks and supportive tasks.

#### Vertical axis

- *Executive tasks*: these tasks form the core of an occupation. Without executive tasks the occupation would not exist. Usually the title or the description of the occupation itself refers to executive tasks. As an example: executive tasks for a web developer are making a website, making a final version of the website and maintaining the website.
- *Preparatory tasks*: these are tasks that must be carried out in preparation of the executive tasks. The most important preparatory tasks usually concern the planning of work sequence, the preparation of working material, the determination of working method, etc. 'Preparatory' must always be interpreted as a preparation of one's own executive tasks, not as a preparation of the task of someone else. As an example: preparatory tasks in web development are defining the demand of the customer or planning the work that must be done.
- *Supportive tasks*: these are tasks that allow performing the executive tasks in a good and undisturbed way. The most important supportive tasks usually concern maintenance, administration, quality control, etc. Again, 'supportive' must be understood as related to one's own executive task, not as support to the task of someone else. E.g. maintaining a machine is a supportive task for a machine operator as his main task is to operate the machine. But it is an executive task for a mechanic as his main task is to maintain machines. In the case of web development, supportive tasks are quality control and keeping up competences.
- *Organisational tasks*: these are tasks that refer to the organisation of work in as much as this supersedes one's own workplace. Organisational tasks are performed when the executive tasks require contacts with other people in the organisation, be it through functional contacts, consultation, participation in work groups, etc. In the case of web development, the co-ordination of one's own work with the work of others in the organisation is such an organisational task.

### 2.2.2.2 Competence requirements

The competence requirements are linked directly to the tasks, giving an overview of the knowledge and skills that are most essential to perform the various tasks. We developed a three level continuum that allows us to catch some important differences within the profiles.

For the definition of the levels, we relied on the SFIA example. The Skills Framework for the Information Age distinguishes seven levels on the basis of four indicators: autonomy, influence, complexity and business skills:

- *autonomy*: level of autonomy depends on the degree of supervision and the degree to which the task performer is expected to determine the method of work, the planning, etc. autonomously;
- *influence*: level of influence depends on the scope of decisions and relationships;

- complexity: level of complexity depends on the variety of tasks, degree of standardisation of tasks, creativity in applying knowledge needed to perform tasks;
- business skills: level of business skills depends on the extent to what the task performer is expected to contribute to the well functioning of the organisation. This refers to leadership, take learning initiatives, internal communication, etc.

In the STILE project we revised the seven level model, reducing the number of levels to three and keeping only autonomy and complexity as criteria to distinguish the levels. The autonomy variable is simplified to the degree to what the job performer needs to determine the method of work.<sup>7</sup> Therefore, the main criterion for determining the competence level is the extent to which the work method is determined by organisational rules, existing systems or programmes.

Reducing the number of levels makes it easier to show differences between levels. The influence indicator refers to competences that are related to managerial jobs, which are out of this research's scope. The business skills refer to competences that are linked to organisational tasks. In our profile the organisational tasks are dealt with separately.

Therefore, we developed a three level continuum. At the first level tasks require a low level of autonomy and a low level of complexity. At the third level task performers are expected to be able to perform complex tasks autonomously. The second level is to be situated somewhere between both extremes. As describing competences at the second level is rather arbitrary, we only made an overview of competence requirements at the first and the third level.

#### Horizontal axis

- Level 1: work can be carried out according to standardised procedures. The performer can rely on basic knowledge.
- Level 2: work can partly be carried out according to standardised procedures. Some tasks require a creative and rather specialist approach.
- Level 3: work requires creative approach of 'problems'. The performer often needs to rely on specialist knowledge.

#### 2.2.2.3 Background information

The framework profiles give a general overview of tasks and related competence requirements. The specific composition of tasks depends on various factors. In the occupational profiles we pay special attention to some general trends in giving shape to concrete jobs in concrete organisations. We pay attention to differences that are due to the work organisation and due to seniority of the employees.

Taking a closer look at the profile of an experienced and an inexperienced occupant shows career paths and ways to pass through various career steps. We elaborate on these career paths in the presentations of the profiles. To conclude we make some rough projections on the future expectations concerning the occupations. We focus on the expectations with respect to the composition of tasks and consequences for related competence requirements.

#### 2.2.2.4 Towards international comparisons

The main objective of the STILE consortium was to develop a tool that can be used for inter-organisational, inter-temporal as well as inter-national comparisons of occupational profiles. It is based on national profiles and case study material from five countries representing relevant EU regions<sup>8</sup> and a US representative. It has not been possible to make valuable<sup>9</sup> international

<sup>7</sup> Planning of work is a separate task.

<sup>8</sup> Belgium and the Netherlands represent western European countries, Italy represents Southern European countries, Hungary is a representative of Eastern Newly Associating countries. The involvement of a US partner makes it possible to make some comparisons with the US.

comparison. Nevertheless, on the basis of existing (validated) national profiles it is possible to see some important trends and to put forward interesting questions that need attention in other research.

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<sup>9</sup> In order to be able to draw up valuable conclusions it is important to submit the framework to the assessment of experts.

## Chapter 3

# Customer technical support

## 3.1 Demarcation of the cluster

Customer technical support	
Development & implementation	Systems development Installation & integration Human factors
Service delivery	Education & training Infrastructure Operation User support

Within this cluster of activities it is possible to place various related jobs/occupations. Frequently emerging ones are:

### Related job/occupation titles

Helpdesk employee, problem solver, customer technical support engineer, analyst operations.

The profile specifies the activities. Use of the profile makes it possible to define the various job/occupation titles.

## 3.2 Description of the cluster

### 3.2.1 Tasks

#### 3.2.1.1 General overview

##### *Preparatory tasks*

- Filter out routine/administrative problems.

##### *Executive tasks*

- Troubleshoot technical problems.
- Link customer and technical specialists.

*Organisational tasks*

- Contribute to adjustments of systems and procedures.
- Support colleagues.

*Supporting tasks*

- Keep up administration.
- Learn on a continuous basis.

## 3.2.1.2 Tasks specified

On the basis of the national case studies (Bollen & Ramioul, 2004) it is possible to specify the tasks further.

Tasks	Specifications of tasks
<b>Preparatory tasks</b>	
Filter out routine/administrative problems	<ul style="list-style-type: none"> <li>▪ Make first inventory of problem</li> <li>▪ Solve routine technical problems and administrative problems</li> </ul>
<b>Executive tasks</b>	
Troubleshoot technical problems	<ul style="list-style-type: none"> <li>▪ Make a technical analysis of the problem</li> <li>▪ Solve problem or assist customer to do so</li> <li>▪ Escalate problems that call for specialist intervention</li> <li>▪ Follow troubleshooting process</li> </ul>
Link customer and technical specialists	<ul style="list-style-type: none"> <li>▪ Receive customer in a professional and friendly way</li> <li>▪ Keep customer informed</li> <li>▪ Finish off intervention with customer</li> </ul>
<b>Organisational tasks</b>	
Contribute to adjustments of systems and procedures	<ul style="list-style-type: none"> <li>▪ Communicate systematically on problems experienced</li> <li>▪ Carry out experiments with products and services</li> <li>▪ Translate experiences/in depth knowledge into (suggestions for) adjustments of systems and procedures</li> </ul>
Support colleagues	<ul style="list-style-type: none"> <li>▪ Assist starting colleagues</li> <li>▪ Assist colleagues handling problems</li> </ul>
<b>Supportive tasks</b>	
Keep up administration	<ul style="list-style-type: none"> <li>▪ Report in interventions according to internal rules</li> </ul>
Learn on a continuous basis	<ul style="list-style-type: none"> <li>▪ Participate in training</li> <li>▪ Contact internal/external specialists</li> <li>▪ Search for information in internal/external sources</li> </ul>

## 3.2.2 Competence requirements

## 3.2.2.1 General overview

In order to be able to catch the broad variety within the cluster of activities, we make use of the three-level model that we deduced from existing frameworks (cf. supra). For the profile of customer technical support, the degree of standardisation of tasks is the main criterion to distinguish the levels.

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Level 1	Performer can solve problems making use of standardised procedures in most of the cases
Level 2	Performer can solve problems using standardised procedures in about 50% of the cases
Level 3	Performer must rely on a specialist/creative approach to solve problems in most of the cases

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In the case studies it has become clear how organisations can standardise the various tasks.

*The first inventory of a problem* is standardised most often by checklists, based on a well elaborated flow chart. The job tenants fill in drop down menus, leading them to the next question. In a lot of cases the system leads them to a diagnosis and a solution to the problem.

For *making a technical analysis and solving the problem*, job tenants can also rely on standardised procedures. More and more organisations have stepwise plans for solving frequently emerging technical problems.

A lot of companies have a 'trouble ticketing system' allowing them to standardise some tasks. When a customer reports a problem, he gets a ticket in which every intervention concerning his problem will be reported. Employees must report on their intervention within this system. Some systems standardise tasks to a large extent, which means that the employees only have to select one field in a pre-categorised list of interventions. Other companies expect their employees to make an elaborated technical report on their intervention, determining only the structure of this report in the ticketing system.

The ticketing system is usually computerised so that the case details are available to other members of the work group. This way the ticketing systems are often used as a tool for 'sharing knowledge'.

### 3.2.2.2 Framework for determining competence requirements

It is relevant to distinguish these three levels for those tasks that are specific to customer technical support. The profile also includes some transversal tasks. These tasks are not unique to the occupation; they are also part of other occupations. Assist starting colleagues, participate to trainings, search for information are examples of tasks that are not exclusively related to customer technical support. For these tasks it is not relevant to distinguish the three competence levels.

Tasks	Competence levels		
	1	2	3
<b>Filter out routine technical/administrative problems</b>			
Make first inventory of problem			
Solve routine technical problems and administrative problems			
<b>Troubleshoot technical problems</b>			
Make a technical analysis of the problem			
Solve problem or assist customer to do so			
Escalate problems that call for specialist intervention			
Monitor progress of troubleshooting process			
<b>Link customer with specialists</b>			
Receive customer in a professional and friendly way			
Keep customer informed			
Finish off intervention with customer			
<b>Contribute to adjustments of systems and procedures</b>			
Communicate systematically on problems experienced			
Carry out experiments with products and services			
Translate experiences/in depth knowledge into (suggestions for) adjustments of systems and procedures			
<b>Support colleagues</b>			
Assist starting colleagues			
Assist colleagues handling problems			
<b>Keep up administration</b>			
Report in interventions according to internal rules			
<b>Learn on a continuous basis</b>			
Participate in training			
Contact internal/external specialists			
Search for information in internal/external sources			

### 3.3 Competence requirements specified

For the description of the competence requirements, we distinguish knowledge and skills requirements on the one hand and attitudes on the other. Attitudes are personal characteristics, that can only be described generally. For the knowledge and skills requirements we distinguish various levels where relevant. The competence levels are not mutually exclusive, they are additive. This means that the competence requirements at level 1 also apply at level 3.

### 3.3.1 Knowledge and skills

#### 3.3.1.1 Filter out routine/administrative problems

**Table 3.1** Knowledge and skills requirements related to 'Filtering out routine/administrative problems'

Specifications of task	Competence requirements	
	Level 1	Level 3
Make first inventory of problem	<ul style="list-style-type: none"> <li>▪ General knowledge of products and services; possible applications and formulas, existing service agreements, etc.</li> <li>▪ Ability to run through a checklist fluently and flexibly</li> <li>▪ Ability to estimate the (technical) knowledge level of the customer, on the basis of customer's story (communicated by telephone or e-mail)</li> <li>▪ Ability to make a realistic assessment of the priority of a complaint</li> </ul>	<ul style="list-style-type: none"> <li>▪ Knowledge of technical aspects of products and services; possible applications and formulas, user problems and frequently emerging technical problems, interactions between services, etc.</li> <li>▪ Knowledge of organisational rules on prioritising claims</li> <li>▪ Ability to ask purposive questions to get the problem clear, taking into account customer's (technical) knowledge level</li> <li>▪ Ability to give the customer clear instructions to test various applications, taking into account customer's (technical) knowledge level (by telephone or e-mail)</li> </ul>
Solve routine technical problems and administrative problems	<ul style="list-style-type: none"> <li>▪ Knowledge of products and services: basic features (rules for subscription, contractual formulas, general operation of products and services)</li> <li>▪ Knowledge of infrastructures at the customer's (e.g. What is a router/modem? How does a router look like? Which icons does the customer have on his screen? etc.)</li> <li>▪ Knowledge of customer service procedures</li> <li>▪ Knowledge of frequently asked questions/frequently emerging problems</li> <li>▪ Ability to carry out standardised solutions for administrative and routine technical problems (introduce changes in customer database, small changes in configurations)</li> <li>▪ Ability to assist customer to carry out standardised solutions</li> <li>▪ Ability to escalate technical problems for further scrutiny, taking into account internal/external rules for escalation</li> </ul>	<ul style="list-style-type: none"> <li>▪ Knowledge of products and services: operational (what do various configurations mean, how do they work in general, etc.)</li> <li>▪ Ability to distinguish administrative, user and technical problems</li> <li>▪ Ability to work out an ad hoc strategy to solve administrative problems and simple technical problems efficiently</li> </ul>

### 3.3.1.2 Troubleshoot technical problems

**Table 3.2** Knowledge and skills requirements related to 'Troubleshooting technical problems'

Specifications of task	Competence requirements	
	Level 1	Level 3
Make a technical diagnosis of the problem	<ul style="list-style-type: none"> <li>▪ Knowledge of products and services and possible technical problems</li> <li>▪ Knowledge of problems and consequences for related applications and infrastructures (how various technologies interact)</li> <li>▪ Knowledge of hardware at the customer's (e.g. which type of modem/router, computer, etc.)</li> <li>▪ Ability to make use of diagnostic tools for carrying out routine diagnosing</li> </ul>	<ul style="list-style-type: none"> <li>▪ Knowledge of networks and infrastructures in the organisation (e.g.: How are various platforms composed? What do various servers do? etc.)</li> <li>▪ Knowledge of technical backgrounds of products and services (e.g.: general principles of TCP/IP, security, frame relay – dependent from products and services delivered)</li> <li>▪ Specialist technical knowledge of some products – technologies</li> <li>▪ Knowledge of hardware at the customer's (e.g. which type of modem/router, computer, etc.)</li> <li>▪ Ability to develop a strategy for eliminating possible causes of unknown problems (asking the customer, dialing up to the customer's modem/router, searching internal databases, etc.)</li> <li>▪ Ability to reproduce customer problem on company equipment if necessary to diagnose the problem</li> </ul>
Solve the problem or assist the customer to do so	<ul style="list-style-type: none"> <li>▪ Knowledge of existing procedures for troubleshooting problems</li> <li>▪ General knowledge of software configurations at the basis of services</li> <li>▪ Knowledge of hardware composition (at the customer's and in the organisation)</li> <li>▪ Ability to select the most appropriate troubleshooting procedure</li> <li>▪ Ability to introduce small changes in software configurations as specified in procedures</li> <li>▪ Ability to reset or change hardware components as specified in procedures</li> <li>▪ Ability to assist the customer to run through existing stepwise procedures, taking into account customer's (technical) knowledge level (by telephone or e-mail)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Knowledge of software configurations and how they steer the services</li> <li>▪ Knowledge of hardware and links between various hardware components (how they interact)</li> <li>▪ Specialist technical knowledge of some products – technologies</li> <li>▪ Ability to work out a plan for troubleshooting technical problems</li> <li>▪ Ability to work out a clear stepwise plan for the customer to run through the troubleshooting process, taking into account customer's (technical) knowledge level (by telephone or e-mail)</li> </ul>

**Table 3.2** Knowledge and skills requirements related to 'Troubleshooting technical problems'. Continued

Specifications of task	Competence requirements	
	Level 1	Level 3
Escalate problems that call for specialist intervention	<ul style="list-style-type: none"> <li>▪ Knowledge of the organisational structure</li> <li>▪ Ability to make a technical description of the problem, making use of standardised checklists (drop down menus)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Knowledge of the organisational structure – internal specialists' competences</li> <li>▪ Knowledge of external specialists' competences</li> <li>▪ Knowledge of own competences</li> <li>▪ Ability to take into account rules/unwritten expectations concerning technical information on problem, preferable way of communicating, etc. when escalating problems to internal/external experts</li> <li>▪ Ability to reproduce customer problem on company equipment if necessary to solve the problem</li> </ul>
Monitor progress of troubleshooting process	<ul style="list-style-type: none"> <li>▪ Knowledge of internal rules for process monitoring</li> <li>▪ Knowledge of troubleshooting procedures</li> <li>▪ Ability to interpret information on interventions collected in databases/systems</li> <li>▪ Ability to ask and understand technical information on the troubleshooting process</li> </ul>	<ul style="list-style-type: none"> <li>▪ Ability to prod technical specialists to take into account deadlines</li> <li>▪ Ability to guard customers' interests in problem solving process</li> <li>▪ Ability to make sure that various experts involved gear activities to one another</li> </ul>

### 3.3.1.3 Link customer and technical specialists

**Table 3.3** Knowledge and skills requirements related to 'Linking customer and technical specialists'

Specifications of task	Competence requirements	
	Level 1	Level 3
Receive customer in a professional and friendly way	<ul style="list-style-type: none"> <li>▪ Knowledge of foreign languages (esp. English)</li> <li>▪ Ability to receive phone calls in a friendly way, also in stressful situations (various calls at the same time)</li> <li>▪ Ability to reply to e-mails in an acceptable time span, making use of standardised answers</li> <li>▪ Ability to run through a standardised list of questions flexibly</li> </ul>	<ul style="list-style-type: none"> <li>▪ Ability to reply to e-mails in an acceptable time span</li> <li>▪ Ability to listen actively to the customer</li> <li>▪ Ability to give the customer confidence that the problem will be dealt with professionally</li> </ul>
Keep customer informed	<ul style="list-style-type: none"> <li>▪ General knowledge of troubleshooting procedures for frequently emerging problems</li> <li>▪ Knowledge of contractual agreements on terms for troubleshooting</li> <li>▪ Ability to categorise intervention into a predetermined list of actions</li> </ul>	<ul style="list-style-type: none"> <li>▪ Knowledge of troubleshooting procedures for most technical problems</li> <li>▪ Knowledge of internal/external reporting practices (How do various specialists report on their interventions?)</li> <li>▪ Knowledge of eventual practical discomforts of interventions for the customer</li> <li>▪ Ability to find an acceptable compromise between customer's expectations on getting informed and organisational opportunities (e.g. organisation has a website on which the customer can consult his 'ticket' – customer wants to be kept informed personally)</li> <li>▪ Ability to translate technical information towards the customer, taking into account customer's (technical) knowledge level and the interest in technical information</li> </ul>
Finish off intervention with customer	<ul style="list-style-type: none"> <li>▪ Knowledge of general troubleshooting procedures</li> <li>▪ Ability to select the appropriate predetermined closing formula</li> <li>▪ Ability to use closing formulas flexibly</li> </ul>	<ul style="list-style-type: none"> <li>▪ Knowledge of hard- and software at the basis of services; possible problems, solutions, interactions between services</li> <li>▪ Ability to test with customer all services that can be influenced by the troubleshooting intervention</li> <li>▪ Ability to translate technical information into customer's language, taking into account customer's (technical) knowledge level and interest in technical information</li> <li>▪ Ability to inform customer on possible measures of prevention</li> </ul>

## 3.3.1.4 Contribute to adjustments of systems and procedures

**Table 3.4** Knowledge and skills requirements related to 'Contributing to adjustments of systems and procedures'

Specification of task	Competence requirements
Communicate systematically on problems experienced	<ul style="list-style-type: none"> <li>▪ Ability to assess the relevance of own experiences for the organisation</li> <li>▪ Ability to select the most appropriate channel for communicating experiences (informally, e-mail, formal team meeting, database accessible to team members or to the whole organisation, intranet, etc.)</li> <li>▪ Ability to communicate on experiences in a structured way, taking into account the interests of the 'users' of this information</li> <li>▪ Ability to participate actively to team meetings</li> <li>▪ Ability to communicate criticism constructively</li> </ul>
Carry out experiments with products and services	<ul style="list-style-type: none"> <li>▪ Knowledge of frequently emerging customer problems</li> <li>▪ Knowledge of basic principles of technologies at the basis of products and services (e.g. What is TCP/IP? How does a router work? etc.)</li> <li>▪ Ability to simulate technical problems with products and services</li> <li>▪ Ability to find user-friendly and simple solutions to simulated problems</li> </ul>
Translate experiences/in depth knowledge into (suggestions for) adjustments of systems and procedures	<ul style="list-style-type: none"> <li>▪ Ability to assess existing systems and procedures on efficiency, usefulness and customer friendliness</li> <li>▪ Ability to formulate user-friendly guidelines on prevention and/or troubleshooting (e.g. manuals)</li> <li>▪ Ability to formulate suggestions for improvement of existing systems and procedures</li> <li>▪ Ability to develop possible new systems and procedures</li> <li>▪ Ability to contact right people with the appropriate sense of persuasion to get adjustments realised</li> <li>▪ Ability to document solutions to recurring problems for posting on the Internet or in manuals</li> </ul>

## 3.3.1.5 Support colleagues

**Table 3.5** Knowledge and skills requirements related to 'Supporting colleagues'

Specification of task	Competence requirements
Assist starting colleagues	<ul style="list-style-type: none"> <li>▪ Ability to introduce people in the usage of systems and procedures (how to use checklists – how to register customers, etc.)</li> <li>▪ Ability to give general trainings on products and services</li> <li>▪ Ability to give a clear overview of the organisation</li> </ul>
Assist colleagues handling problems	<ul style="list-style-type: none"> <li>▪ Ability to ask purposive questions to get problem clear</li> <li>▪ Ability to give clear, ready-to-use answers to colleagues (by telephone, e-mail or chat), taking into account the colleague's knowledge level</li> <li>▪ Ability to maintain constructive relationships with internal/external colleagues</li> <li>▪ Ability to train colleagues (giving presentations, writing manuals or discussing problems less formally)</li> </ul>

### 3.3.1.6 Keep up administration

**Table 3.6** Knowledge and skills requirements related to 'Keeping up administration'

Specification of task	Competence requirements
Report on interventions according to internal rules	<ul style="list-style-type: none"> <li>▪ Knowledge of general technical backgrounds at the basis of products and services</li> <li>▪ Ability to report on interventions, selecting predetermined categories</li> <li>▪ Ability to make an extended technical report if necessary</li> <li>▪ Ability to assess the relevance of information on interventions</li> <li>▪ Ability to report orally on interventions: to customers as well as to technical specialists</li> </ul>

### 3.3.1.7 Learn on a continuous basis

**Table 3.7** Knowledge and skills requirements related to 'Learning on a continuous basis'

Specification of task	Competence requirements
Participate in training	<ul style="list-style-type: none"> <li>▪ Knowledge of general technical backgrounds at the basis of products and services</li> <li>▪ Ability to assess relevance of training programmes for the daily work</li> <li>▪ Ability to assess personal needs for training</li> <li>▪ Ability to internalise/operationalise information</li> </ul>
Contact internal/external specialists	<ul style="list-style-type: none"> <li>▪ Knowledge of general technical backgrounds at the basis of products and services</li> <li>▪ Knowledge of organisational chart – competences available in the organisation</li> <li>▪ Knowledge of important business partners' competences</li> <li>▪ Knowledge of internal/external (written and unwritten) rules for communication</li> <li>▪ Ability to maintain constructive relationships with colleagues</li> <li>▪ Ability to discuss technical issues with specialists</li> </ul>
Search for information in internal/external sources	<ul style="list-style-type: none"> <li>▪ Knowledge of relevant sources of information</li> <li>▪ Ability to search various sources purposively</li> <li>▪ Ability to internalise/operationalise information</li> </ul>

## 3.3.2 Attitudes

### 3.3.2.1 General description of attitudes

- *Autonomous*: try to deal with problem situations on one's own.
- *Proficient in contacts*: mix with other people, get and keep in touch with people easily.
- *Flexible*: ability to adjust quickly to changing circumstances, procedures and visions.
- *Immune to stress*: immune to situations implying a high work load because they require sustained concentration, combine various tasks or put forward deadlines.
- *Eager to learn*: actively look for opportunities to extend or deepen existing competences.
- *Customer-oriented*: examine or recognise customer's wishes, needs and interests and strive to satisfy these needs (within the borders of practical and organisational opportunities).

### 3.3.2.2 Attitudes specified

#### *Autonomous*

Customer technical support employees must work very autonomously. This does not mean however that they are left on their own devices. It means that they must decide autonomously how they deal with a certain problem and which resources they will consult.

#### *Proficient in contacts*

Customer technical support employees are confronted with a broad variety of customer problems. As it is impossible for them to solve every incoming problem autonomously, they regularly call upon the experience of their direct colleagues. People interact over and on at the work floor of the customer technical support department.

Employees need to go beyond the borders of the technical supporting team. Customer technical support employees are the bridge between customers and (various) technical specialists. Searching for a quick solution to customers' problems, they escalate problems to specialists. As they stay responsible for the problem until it is solved, they regularly take contact with specialists involved in the troubleshooting process. A huge part of their working time they get in touch with specialists within and outside the company.

Given these characteristics of the work, they may not experience any hesitation in contacting people.

#### *Flexible*

Offering technical support to customers, employees are confronted with various products and services and related technologies. This requires from them a certain degree of cognitive flexibility. As it is impossible for organisations to work out systems and procedures that anticipate all possible problems of customers, customer supporting employees need to use the systems flexibly. Creativity in finding solutions allows them to deal with the unusual problems.

In addition to this cognitive flexibility, technical support of customers also requires a practical flexibility. Most organisations have a continuously available customer service. This means that employees need to be prepared to work in shifts, during nights and during weekends. Some organisations offer 24-hour service by positioning teams around the globe. In this case flexibility is required to work with virtual team members.

#### *Immune to stress*

Problems come in continuously. Customer technical supporting employees are having to deal with various problems at the same time.

Another stressor is the fact that customer technical support employees bring together (often difficult reconcilable) customer demands and technical opportunities to meet those requirements. Employees must offer the customer a satisfactory solution to his problem. Nevertheless, they often have no control over the solutions offered by the technical specialists. This leads to stressful situations.

Immunity to stress mainly refers to abilities to control work in stressful situations. People who can put into perspective the often high demands of customers, who have a clear and realistic idea of what is possible within the organisation, who can put the customer's mind to rest and who can communicate in a self-assured way can mitigate the stress situation.

#### *Eager to learn*

The technologies evolve rapidly and the supply of services and products becomes more varied and sophisticated. If people want to perform in a customer technical supporting job optimally, they must be prepared to learn on a continuous basis. The preparedness is one requirement, being able to do so is another important requirement.

### *Customer-oriented*

Customer technical support employees bridge the gap between customers and technical specialists. They are the mouthpiece of the organisation. The requirement of customer orientation refers to friendliness and preparedness to listen to the customer's questions and grievances. This friendliness should however not turn into total compliance to the customer's needs. Customer technical support employees must have an idea of the extent to which it is possible to meet the customer's demands. It is important not to give shape to false expectations. Therefore, customer orientation is closely related to 'assertiveness'.

Customer orientation not only refers to the 'concern about the customer's demands'. People offering customer technical support also need to understand the practical problem of the customer. Employees are also the voice of the customer. They must be prepared to represent the customer with his practical needs in discussions with technical specialists.

## **3.4 Background information**

### **3.4.1 Organisation of work**

In general we see that there is a significant difference of work organisation between large (+50 employees) and small (-50 employees) organisations. As this difference influences the tasks to be performed and the competence requirements, we will focus on the way large and small organisations design the customer technical supporting jobs.

In larger organisations first line support filters out administrative and general questions from technical questions (often the first line support is organised as a call centre). In a second step second-line employees solve ordinary problems and escalate the technically more complicated problems to technical specialists. For smaller organisations it is relevant to distinguish companies with a separate customer supporting role and those without. In the first people taking care of the first inventory of the problem also try to solve simple technical problems. In this case, they mainly focus on problems that can be solved with standardised procedures, escalating technical problems more rapidly to specialists within the organisation. In companies without a customer supporting job, specialists involved in development and implementation take care of the customer technical support. In this last case, tasks related to internal escalation are less important. The following scheme illustrates this organisational variety.

**Table 3.8** Organisational variances on the customer technical support profile

Tasks	Large organisation (+50 employees)		SME (-50 employees)	
	1 <sup>st</sup> line	2 <sup>nd</sup> line	CS*	No CS
<b>Filter out routine technical/administrative problems</b>				
Make first inventory of problem	1-2		1-3	1-3
Solve routine technical problems and administrative problems	1-2		1-3	1-3
<b>Troubleshoot technical problems</b>				
Make a technical analysis of the problem		1-3	1-2	1-3
Solve problem or assist customer to do so		1-3	1-2	1-3
Escalate problems that call for specialist intervention		1-3	1-2	
Monitor progress of troubleshooting process		1-3	1-2	
<b>Link customer with specialists</b>				
Receive customer in a professional and friendly way	1-3		1-3	1-3
Keep customer informed	1-2	2-3	1-2	1-3
Finish off intervention with customer	1-2	2-3	1-2	1-3
<b>Contribute to adjustments of systems and procedures</b>				
Communicate systematically on problems experienced	X	X	X	X
Carry out experiments with products and services		X		X
Translate experiences/in depth knowledge into (suggestions for) adjustments of systems and procedures	X	X	X	X
<b>Support colleagues</b>				
Assist starting colleagues	X	X	X	X
Assist colleagues handling problems	X	X	X	X
<b>Keep up administration</b>				
Report in interventions according to internal rules	X	X	X	X
<b>Learn on a continuous basis</b>				
Participate in training	X	X		X
Contact internal/external specialists	X	X	X	X
Search for information in internal/external sources	X	X	X	X

\* CS refers to companies having a separate customer service department. 'No CS' are companies having no separate customer service department.

The table is based on the case studies, it is not validated.

The table indicates whether the various tasks are to be performed or not. An 'X' indicates that the task is to be performed. In some cases it is relevant to differentiate various competence levels that are required to perform the task (cf. supra for a description of the competence levels).

### 3.4.2 Experience - seniority

The composition of tasks and related competences also varies with the experience of employees. In the following scheme we compare an inexperienced with an experienced employee. An inexperienced employee is someone who has no experience with customer technical support. For this comparison we make abstraction from organisational characteristics.

**Table 3.9** Experience-based variances on the customer technical support profile

Tasks	Inexperienced	Experienced
<b>Filter out routine technical/administrative problems</b>		
Make first inventory of problem	1-2	1-3
Solve routine technical problems and administrative problems	1-2	1-3
<b>Troubleshoot technical problems</b>		
Make a technical analysis of the problem	1-2	1-3
Solve problem or assist customer to do so	1-2	1-3
Escalate problems that need specialist intervention	1-2	1-3
Monitor progress of troubleshooting process	1-2	1-3
<b>Link customer with specialists</b>		
Receive customer in a professional and friendly way	1-3	1-3
Keep customer informed	1-3	1-3
Finish off intervention with customer	1-3	1-3
<b>Contribute to adjustments of systems and procedures</b>		
Communicate systematically on problems experienced		X
Carry out experiments with products and services		X
Translate experiences/in depth knowledge into (suggestions for) adjustments of systems and procedures		X
<b>Support colleagues</b>		
Assist starting colleagues		X
Assist colleagues handling problems		X
<b>Keep up administration</b>		
Report in interventions according to internal rules	X	X
<b>Learn on a continuous basis</b>		
Participate in training (internal – external – online)	X	X
Contact internal/external specialists	X	X
Search for information in internal/external sources	X	X

The table is based on the case studies, it is not validated.

The table indicates whether the various tasks are to be performed or not. An 'X' indicates that the task is to be performed. In some cases it is relevant to differentiate various competence levels that are required to perform the task (cf. supra for a description of the competence levels).

The above scheme shows that inexperienced customer technical supporting employees are expected to deal with frequently emerging technical problems. In their work they rely to a large extent on standardised procedures. If they are confronted with a problem for which there is no procedure to rely on, they are expected to search for relevant information in order to cope with the problem. This means they contact colleagues and they search for information in internal and external sources.

More experienced employees are expected to deal with all (routine as well as non-routine) technical problems rather autonomously. Nevertheless, the emphasis of their work is on technical problems that need a creative (non-routine) solution. In addition to this core task, experienced employees are also involved in the development and the adjustment of systems and procedures. In order to support these tasks, experienced employees invest in learning initiatives within one specific domain.

### 3.4.3 Career paths

Comparing the tasks and the related competence requirements of inexperienced occupants with those of experienced ones, shows career paths and allows to identify training needs. The above scheme shows how the work prepares inexperienced employees for technically more complex work. The work of inexperienced people is centered around customer support and requires a minimal technical knowledge. Being confronted with a lot of technical problems and

solutions, inexperienced employees learn to understand the technical aspects of the products and services.

Employees learn a lot taking contact with colleagues and asking for support when they have questions on technologies and solutions. Formal training initiatives (internal and external) are mainly focused on organisation specific products and services.

### 3.4.4 Future projections

The profile can be used to bring into picture relevant future projections. Asking experts to indicate which tasks will become more and which will become less important in the future, the discussion should give insights into future trends. On the basis of the available case study material it is possible to make the following prospectives.

**Table 3.10** Future projections of the customer technical support profile

Tasks	Tasks that become more important (take a larger amount of time)
<b>Filter out routine technical/administrative problems</b>	
Make first inventory of problem	
Solve routine technical problems and administrative problems	
<b>Troubleshoot technical problems</b>	
Make a technical analysis of the problem	2-3
Solve problem or assist customer to do so	2-3
Escalate problems the need specialist intervention	2-3
Monitor progress of troubleshooting process	2-3
<b>Link customer with specialists</b>	
Receive customer in a professional and friendly way	
Keep customer informed	
Finish off intervention with customer	
<b>Contribute to adjustments of systems and procedures</b>	
Communicate systematically on problems experienced	
Carry out experiments with products and services	X
Translate experiences/in depth knowledge into (suggestions for) adjustments of systems and procedures	X
<b>Support colleagues</b>	
Assist starting colleagues	
Assist colleagues handling problems	
<b>Keep up administration</b>	
Report in interventions according to internal rules	
<b>Learn on a continuous basis</b>	
Participate in training (internal – external – online)	
Contact internal/external specialists	
Search for information in internal/external sources	

The table is based on the case studies, it is not validated.

The table indicates whether the various tasks are to be performed or not. An 'X' indicates that the task is to be performed. In some cases it is relevant to differentiate various competence levels that are required to perform the task (cf. supra for a description of the competence levels).

Customer technical support is getting more and more consolidated within the organisations. On the basis of experiences with problems and with troubleshooting them, organisations have developed a lot of standardised procedures. A lot of stepwise procedures are written in a customer friendly way. These customer friendly guidelines are made available online. This has some important consequences for customer technical support.

The simple technical questions are filtered out to a large extent because customers can find the answer on the website. This implies that customer technical supporting employees are

mainly confronted with complex technical problems. It also means that the technical supporting team of the near future needs to pay special attention to assessment, adjustment and updating of the standardised answers. A further implication is that the number of customer-support jobs may decrease as customers learn to solve their problems by themselves.

Another interesting trend is the trend of globalisation. In some companies customer technical support is centralised in one country. Other companies let the customer support 'go with the clock'. These companies have various support centres over the world, operating between e.g. 8:00 and 18:00 local time. In addition to a profound standardisation of tasks, this trend implies that employees must be able to work together in virtual teams that are composed of people with a different background and a different culture. Moreover, they must be able to deal with customers with a different language, culture and experience with ICT. International comparative research should focus on the question whether the tasks and competence requirements are the same for employees of one company that has supporting centres in various countries.

### 3.5 Towards international comparisons

It is out of this research's scope to explain international differences. Nevertheless, on the basis of the insights into the general trends in customer technical support, we can put forward some interesting questions for international comparative research.

- Is there a difference between countries due to differences in the labour market? It can be assumed that in countries with a shortage of technical graduates on the labour market, tasks related to customer support are more standardised, requiring less technical knowledge than in countries with a huge supply of technically educated graduates.
- Is there a difference between countries due to differences in 'technological development' of organisations? It can be assumed that in countries where organisations apply advanced technologies and innovate regularly, tasks are more standardised and informatised than in countries with a less 'innovative organisational culture'.
- Are there international differences in the profile of customer technical support of multinational companies that have customer technical support centres in different locations?

It is not possible to answer these questions on the basis of the various national profiles that were developed within the STILE project.<sup>10</sup> Nevertheless, it is possible to use the framework profile and assess it on the basis of the various case studies. Taking the profile as a basis, we investigated whether the various tasks are mentioned in the different national profiles or not. Doing this exercise, it becomes clear (see Table 3.11) that the differences are due more to methodological choices than to national socio-economic characteristics. The Italian case is based on experiences within a software company. Employees involved in software development also support customers having technical problems. In this case tasks related to problem escalation are less important.

In order to make a more reliable comparison it is important to use the framework profile as a basis for discussions in comparable groups of experts. In various countries experts<sup>11</sup> can be asked to discuss for instance:

- importance of the various tasks (in terms of time spent on the tasks);
- level of competence requirements attached to the various tasks;
- tasks that will become more/less important in the future.

<sup>10</sup> The various national profiles are too different to make international comparisons. They have different structures, they include a lot of unstructured background information, they are based on interviews with different kinds of experts in different kinds of companies and they are assessed by groups of users that are differently composed. In answer to this problem, we have developed the framework profile. This profile is conceived as a common basis for discussions on the content of the occupations and the competence requirements. International comparisons are only possible if this framework profile is submitted to the same assessment of comparable groups of experts/users.

<sup>11</sup> Job occupants, supervisors, representatives of employers and employees, schools, vocational training organisations etc.

**Table 3.11** International comparison of the customer technical support profile

Tasks	BE	HU	IT	NL	US
<b>Filter out routine technical/administrative problems</b>					
Make first inventory of problem					
Solve routine technical problems and administrative problems					
<b>Troubleshoot technical problems</b>					
Make a technical analysis of the problem					
Solve problem or assist customer to do so					
Escalate problems the need specialist intervention					
Monitor progress of troubleshooting process					
<b>Link customer with specialists</b>					
Receive customer in a professional and friendly way					
Keep customer informed					
Finish off intervention with customer					
<b>Contribute to adjustments of systems and procedures</b>					
Communicate systematically on problems experienced					
Carry out experiments with products and services					
Translate experiences/in depth knowledge into (suggestions for) adjustments of systems and procedures					
<b>Support colleagues</b>					
Assist starting colleagues					
Assist colleagues handling problems					
<b>Keep up administration</b>					
Report in interventions according to internal rules					
<b>Learn on a continuous basis</b>					
Participate in training (internal - external – online)					
Contact internal/external specialists					
Search for information in internal/external sources					

The table is based on the national reports. If tasks are mentioned in the national list of tasks, or referred to in elaborations giving 'background information', they are shaded in this table.



## Web development and -maintenance

### 4.1 Demarcation of the cluster

Web development and -maintenance		
Sales & marketing		
Strategy & planning		
Development & implementation	Systems development Installation & integration Human factors	
Service delivery	Education & training Infrastructure Operation User support	

Within this cluster of activities it is possible to place various related jobs/occupations. Frequently emerging ones are:

#### Related job/occupation titles

Web developer, web master, web designer, multimedia architect, script writer, JAVA-programmer, database administrator, system specialist.

The profile specifies the activities. Use of the profile makes it possible to define the various job/occupation titles.

### 4.2 Description of the cluster

#### 4.2.1 Tasks

##### 4.2.1.1 General overview

#### *Preparatory tasks*

- Make functional analysis
- Plan work

*Executive tasks*

- Develop website
- Produce website
- Implement website
- Maintain website

*Organisational tasks*

- Co-operate in project team

*Supportive tasks*

- Control quality continuously
- Learn on a continuous basis

## 4.2.1.2 Tasks specified

Tasks	Specifications of tasks
<b>Preparatory tasks</b>	
Make functional analysis	<ul style="list-style-type: none"> <li>▪ Define customer's needs</li> <li>▪ Inform customer on opportunities and limitations of website</li> </ul>
Plan work	<ul style="list-style-type: none"> <li>▪ Plan time schedule</li> <li>▪ Make technical planning</li> <li>▪ Make financial planning</li> </ul>
<b>Executive tasks</b>	
Develop website	<ul style="list-style-type: none"> <li>▪ Develop website structure</li> <li>▪ Develop navigation paths</li> <li>▪ Work out functionalities</li> </ul>
Produce website	<ul style="list-style-type: none"> <li>▪ Produce web pages</li> <li>▪ Insert content</li> <li>▪ Integrate databases</li> <li>▪ Attach functionalities to website</li> <li>▪ Develop graphic design</li> </ul>
Implement website	<ul style="list-style-type: none"> <li>▪ Put website online</li> <li>▪ Promote website</li> <li>▪ Train customer</li> </ul>
Maintain website	<ul style="list-style-type: none"> <li>▪ Make inventory/recommendations of updates</li> <li>▪ Introduce updates of the website</li> <li>▪ Give technical support to customer</li> </ul>
<b>Organisational tasks</b>	
Co-operate in project team	<ul style="list-style-type: none"> <li>▪ Fine-tune own work to other specialists' work</li> <li>▪ Monitor progress of project</li> </ul>
<b>Supportive tasks</b>	
Control quality continuously	<ul style="list-style-type: none"> <li>▪ Submit work to customer's assessment</li> <li>▪ Test work iteratively</li> </ul>
Learn on a continuous basis	<ul style="list-style-type: none"> <li>▪ Participate in training</li> <li>▪ Contact internal/external specialists</li> <li>▪ Search for information in internal/external sources</li> </ul>

## 4.2.2 Competence requirements

### 4.2.2.1 General overview

In order to be able to catch the broad variety within the cluster of activities, we make use of the three-level model that we deduced from existing frameworks (cf. supra). For the development and maintenance of websites, the various levels contrast with each other mainly on the basis of the complexity of the website.

The basic competences with respect to development and maintenance of websites are the competences that are necessary to develop a simple website. The more complex a website, the more advanced the competence requirements are.

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Level 1	Performer can apply basic competences for web development and -maintenance of standard websites
Level 2	Performer can apply basic competences for web development and -maintenance in order to make attractive and customer-specific websites
Level 3	Performer can apply specialist knowledge and other relevant competences in order to contribute to the realisation of advanced – interactive websites

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### 4.2.2.2 Framework for determining competence level

It is relevant to distinguish these three levels for those tasks that are specific to web development and -maintenance. The profile also includes some transversal tasks. These tasks are not unique to the occupation; they are also part of other occupations. Plan work, fine-tune own work to other specialists' work, monitor progress of project, participate in training, etc. are examples of tasks that are not exclusively related to web development and -maintenance. For these tasks it is not relevant to distinguish the three competence levels.

Tasks	Competence levels		
	1	2	3
<b>Make functional analysis</b>			
Define customer's needs			
Inform customer of opportunities and limitations of website			
<b>Plan work</b>			
Make time planning			
Make technical planning			
Make financial planning			
<b>Develop website</b>			
Develop website structure			
Develop navigation paths			
Work out functionalities			
<b>Produce website</b>			
Produce web pages			
Insert content			
Integrate databases			
Attach functionalities to website			
Develop graphic design			
<b>Implement website</b>			
Put website online			
Promote website			
Train customer			
<b>Maintain website</b>			
Make inventory/recommendations of updates			
Introduce updates of the website			
Give technical support to customer			
<b>Co-operate in project team</b>			
Fine-tune own work to other specialist's work			
Monitor progress of project			
<b>Control quality continuously</b>			
Submit work to customer's assessment			
Test work iteratively			
<b>Learn on a continuous basis</b>			
Participate in training (internal – external – online)			
Contact internal/external specialists			
Search for information in internal/external sources			

### 4.3 Competence requirements specified

For the description of the competence requirements, we distinguish knowledge and skills requirements on the one hand and attitudes on the other. Attitudes are personal characteristics, that can only be described generally. For the knowledge and skills requirements we distinguish various levels where relevant. The competence levels are not mutually exclusive, they are additive. This means that the competence requirements at level 1 also apply at level 3.

### 4.3.1 Knowledge and skills

#### 4.3.1.1 Make functional analysis

**Table 4.1** Knowledge and skills requirements related to 'Making a functional analysis'

Specifications of task	Competence requirements	
	Level 1	Level 3
Define customer's needs	<ul style="list-style-type: none"> <li>▪ Ability to understand customer's services, products, market, etc.</li> <li>▪ Ability to ask purposive questions assisting customer to clarify website requirements</li> <li>▪ Ability to collect technical information from customers with a limited technical knowledge</li> </ul>	<ul style="list-style-type: none"> <li>▪ Ability to interpret web statistics</li> <li>▪ Ability to get insight into customer's business processes and goals</li> </ul>
Inform customer on opportunities and limitations of website	<ul style="list-style-type: none"> <li>▪ Knowledge of various website structures</li> <li>▪ Knowledge of technical requirements, opportunities and limitations for running websites</li> <li>▪ Ability to inform customer on opportunities and limitations of options, making use of existing websites</li> </ul>	<ul style="list-style-type: none"> <li>▪ Knowledge of organisational consequences (opportunities and limitations) of running a website</li> <li>▪ Knowledge of legal regulation on e-commerce</li> <li>▪ Knowledge of business opportunities and limitations of websites</li> <li>▪ Ability to give technical information to customers with a limited technical background</li> </ul>

## 4.3.1.2 Plan work

**Table 4.2** Knowledge and skills requirements related to 'Planning work'

Specifications of task	Competence requirements
Make time planning	<ul style="list-style-type: none"> <li>▪ Knowledge of various stages of web development</li> <li>▪ Ability to find a compromise between the customer's expectations and the practical feasibility</li> </ul>
Make technical planning	<ul style="list-style-type: none"> <li>▪ Knowledge of various technologies (programmes) that can be used for the development of websites</li> <li>▪ Knowledge of feasibility of technologies for browsers, PC memory, etc.</li> <li>▪ Knowledge of organisational chart and competences of external business partners</li> <li>▪ Ability to assess own (technical) competences</li> <li>▪ Ability to select the appropriate specialists</li> <li>▪ Ability to analyse which technologies and infrastructures the customer needs</li> <li>▪ Ability to find a compromise between available time, budget and technical options</li> </ul>
Make financial planning	<ul style="list-style-type: none"> <li>▪ Ability to estimate the costs of the time and technical planning</li> <li>▪ Ability to take into account customer's budget restrictions</li> <li>▪ Ability to establish priorities and negotiate prices</li> </ul>

#### 4.3.1.3 Develop website

**Table 4.3** Knowledge and skills requirements related to 'Developing website'

Specifications of task	Competence requirements	
	Level 1	Level 3
Develop website structure	<ul style="list-style-type: none"> <li>▪ Knowledge of various ways of structuring websites</li> <li>▪ Knowledge of advantages and disadvantages of various structures</li> <li>▪ Ability to make use of existing web structures</li> <li>▪ Ability to take into account customer's demands when developing the web structure</li> </ul>	<ul style="list-style-type: none"> <li>▪ Knowledge of technical requirements (e.g. browser, PC memory, server) of various web structures</li> <li>▪ Knowledge of most typical user scenarios</li> <li>▪ Ability to give shape to the homepage and other web pages, taking into account customer's needs</li> <li>▪ Ability to take into account user scenarios when developing structure</li> </ul>
Develop navigation paths	<ul style="list-style-type: none"> <li>▪ Knowledge of various ways for navigating the website</li> <li>▪ Knowledge of various graphical tools for navigation</li> <li>▪ Ability to make a schematic overview of linkages between web pages and links to other website</li> </ul>	<ul style="list-style-type: none"> <li>▪ Knowledge of most typical user scenarios</li> <li>▪ Knowledge of technical requirements (e.g. browser, PC memory, server) of various options for navigation</li> <li>▪ Ability to make a complex hierarchical flowchart of the website</li> <li>▪ Ability to take into account various user scenarios when developing the flowchart</li> </ul>
Work out functionalities	<ul style="list-style-type: none"> <li>▪ Knowledge of possible functionalities of a website</li> <li>▪ Ability to translate customer's needs into terms of frequently applied functionalities</li> <li>▪ Ability to escalate the programming of functionalities to specialists</li> </ul>	<ul style="list-style-type: none"> <li>▪ Knowledge of technical requirements for inserting functionalities</li> <li>▪ Ability to translate specific business needs into terms of tailor-made functionalities</li> </ul>

#### 4.3.1.4 Produce website

**Table 4.4** Knowledge and skills requirements related to 'Producing website'

Specifications of task	Competence requirements	
	Level 1	Level 3
Produce web pages	<ul style="list-style-type: none"> <li>▪ Knowledge of HTML</li> <li>▪ Ability to use existing templates to produce website</li> </ul>	<ul style="list-style-type: none"> <li>▪ Knowledge construction of HTML documents for producing websites</li> <li>▪ Knowledge of compatibility of HTML codes for various browsers, PC's</li> <li>▪ Ability to code HTML-DHTML manually/using an editor (e.g. Dreamweaver – FrontPage)</li> <li>▪ Ability to code layout/use existing templates and profiles</li> </ul>
Insert content	<ul style="list-style-type: none"> <li>▪ Knowledge of content management systems</li> <li>▪ Ability to sort and split available content in order to fit it within the web structure</li> <li>▪ Ability to paste content in existing templates, making use of content management system</li> </ul>	<ul style="list-style-type: none"> <li>▪ Knowledge of rules for writing on the internet</li> <li>▪ Knowledge of general rules for marketing (e.g. importance of consistency, oriented to target groups, etc.)</li> <li>▪ Ability to write texts/rewrite existing texts that fit within the web structure</li> </ul>
Integrate databases	<ul style="list-style-type: none"> <li>▪ Knowledge of possible applications of a database</li> <li>▪ Knowledge of possible transactions in databases (e.g.: search, sort, etc.)</li> <li>▪ Knowledge of technical requirements of integrating a database into a website</li> <li>▪ Knowledge of programmes for integrating databases in the website (e.g. ASP, PHP)</li> <li>▪ Ability to assess databases (on feasibility to website, on compliance to customer's needs/opportunities)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Knowledge of platforms and programming languages for databases (e.g. My SQL)</li> <li>▪ Ability to determine the structure of databases, taking into account customer's opportunities to collect and maintain information</li> </ul>
Attach functionalities to website	<ul style="list-style-type: none"> <li>▪ Ability to assess scripts (standard scripts or developed by analysts) (on feasibility to website, on compliance to customer's needs/opportunities)</li> <li>▪ Ability to integrate existing scripts into the website</li> </ul>	<ul style="list-style-type: none"> <li>▪ Knowledge of scripting languages to programme simple functionalities (e.g. JAVA-script)</li> <li>▪ Ability to translate functionalities into scriptings, taking into account relevant user scenarios</li> <li>▪ Ability to integrate scripts into the website</li> </ul>

**Table 4.4** Knowledge and skills requirements related to 'Producing website'. Continued

Specifications of task	Competence requirements	
	Level 1	Level 3
Develop graphic design	<ul style="list-style-type: none"> <li>▪ Knowledge of sources for graphical tools</li> <li>▪ Knowledge of technical requirements for putting graphical material on a website</li> <li>▪ Ability to find graphical material that meets the customer's external communication needs</li> <li>▪ Ability to give clear directions to graphical specialist</li> <li>▪ Ability to assess graphic material (on attractiveness, feasibility to website, etc.)</li> <li>▪ Ability to integrate graphical material into the website</li> </ul>	<ul style="list-style-type: none"> <li>▪ Knowledge of programmes for developing and integrating graphical material (e.g. Photoshop, Flash, etc.)</li> <li>▪ Knowledge of using colours on the computer</li> <li>▪ Knowledge of using and developing backgrounds for websites</li> <li>▪ Knowledge of image mapping</li> <li>▪ Knowledge of attracting target groups</li> <li>▪ Ability to develop graphic elements, taking into account technical opportunities and limitations</li> </ul>

#### 4.3.1.5 Implement website

**Table 4.5** Knowledge and skills requirements related to 'Implementing website'

Specifications of task	Competence requirements	
	Level 1	Level 3
Put website online	<ul style="list-style-type: none"> <li>▪ Knowledge of procedure for putting a website online</li> <li>▪ Knowledge of programme for putting website online (FTP)</li> <li>▪ Ability to upload the website to servers (e.g. Windows or Unix)</li> <li>▪ Ability to follow guidelines of service provider (e.g. hosting company)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Knowledge of domain registration</li> <li>▪ Ability to register a domain, taking into account the consequences of opting for a certain domain</li> <li>▪ Ability to make recommendations on a domain, taking into account user scenarios, target group characteristics, etc.</li> </ul>
Promote website	<ul style="list-style-type: none"> <li>▪ Knowledge of various search engines</li> <li>▪ Ability to make website ready to be promoted via search engines</li> </ul>	<ul style="list-style-type: none"> <li>▪ Knowledge of various channels for promotion of a website</li> <li>▪ Knowledge of technical characteristics and requirements of various channels, taking into account possible user scenarios</li> <li>▪ Ability to consult customers on the promotion of the website</li> <li>▪ Ability to make the website ready to be promoted</li> <li>▪ Ability to programme specific applications (e.g. mailing system, automatic coupling from databases with forms, etc.)</li> </ul>
Train customer	<ul style="list-style-type: none"> <li>▪ Knowledge of various content management systems</li> <li>▪ Knowledge of principles for maintaining customer relationships with a website</li> <li>▪ Ability to provide customer with methods and tools for updating content and adding new web pages</li> </ul>	<ul style="list-style-type: none"> <li>▪ Knowledge of web technologies (TCP/IP, modem, server, browser, etc.)</li> <li>▪ Ability to give technical information taking into account customer's (technical) knowledge level</li> <li>▪ Ability to show customer how to make use of functionalities (e.g. how to update databases, how to use automatic mailing, etc.)</li> <li>▪ Ability to provide customer with methods and tools for updating and troubleshooting the website (e.g. reloading website, server related problems, making e-mail addresses, etc.)</li> </ul>

#### 4.3.1.6 Maintain website

**Table 4.6** Knowledge and skills requirements related to 'Maintaining website'

Specifications of task	Competence requirements	
	Level 1	Level 3
Make inventory/recommendations of updates	<ul style="list-style-type: none"> <li>▪ Ability to make suggestions for content/structural updates of the website</li> <li>▪ Ability to understand customer's demands for updates of the website</li> </ul>	<ul style="list-style-type: none"> <li>▪ Knowledge of new technologies/business opportunities of websites</li> <li>▪ Ability to assess experiences with the website</li> <li>▪ Ability to assess technical dysfunctions of the website</li> <li>▪ Ability to assess the relevance of visitors' remarks</li> <li>▪ Ability to interpret web statistics</li> <li>▪ Translate shortcomings into (recommendations for) adjustments of content, structure or functionalities</li> <li>▪ Ability to discuss opportunities and limitations of adjustments with customer</li> </ul>
Introduce updates of website	<ul style="list-style-type: none"> <li>▪ Ability to introduce content changes as suggested by the customer, while minimising the impact on the general website</li> </ul>	<ul style="list-style-type: none"> <li>▪ Ability to introduce content, structural or functional changes, while minimising the impact on the general website</li> <li>▪ Ability to develop tools that assist customer to update website (e.g. databases that make it easier to update content)</li> <li>▪ Ability to rewrite scripts</li> <li>▪ Ability to adjust structure, navigation paths, functionalities, etc. in order to cope with experienced (technical or user-related) deficiencies</li> </ul>
Give technical support to customer	<ul style="list-style-type: none"> <li>▪ Knowledge of technical aspects of running websites</li> <li>▪ Ability to give technical information, taking into account customer's (technical) knowledge level</li> <li>▪ Ability to answer simple technical questions such as; 'How to make an e-mail address? How to reset a server that is down? etc.</li> <li>▪ Ability to refer customer to the appropriate specialist constructively</li> </ul>	<ul style="list-style-type: none"> <li>▪ Knowledge of web technologies (TCP/IP, modem, server, browser, etc.)</li> <li>▪ Ability to identify location/cause of technical problems</li> <li>▪ Ability to solve simple technical problems (e.g. changing configurations or troubleshooting hardware problems)</li> </ul>

## 4.3.1.7 Co-operate in project team

**Table 4.7** Knowledge and skills requirements related to 'Co-operating in project team'

Specifications of task	Competence requirements
Fine-tune own work to other specialists' work	<ul style="list-style-type: none"> <li>▪ Knowledge of programmes for integrating graphic material and scripts in the website</li> <li>▪ Ability to assess own competences</li> <li>▪ Ability to translate customer's needs into technical orders for the specialists</li> <li>▪ Ability to assess specialists' work, taking into account customer's needs and the general structure of the website</li> <li>▪ Ability to integrate specialists' work in the website</li> </ul>
Monitor progress of project	<ul style="list-style-type: none"> <li>▪ Ability to prod people to finish off work within the agreed financial and technical limitations</li> <li>▪ Ability to guard customer's interests in the whole process</li> <li>▪ Ability to establish and maintain constructive relationships</li> </ul>

## 4.3.1.8 Control quality continuously

**Table 4.8** Knowledge and skills requirements related to 'controlling quality continuously'

Specifications of task	Competence requirements
Submit work to customer's assessment	<ul style="list-style-type: none"> <li>▪ Ability to make web structure and navigation paths visible to the customer</li> <li>▪ Ability to justify choices made, using business-related as well as technical arguments</li> <li>▪ Ability to anticipate possible difficulties and discuss them with the customer</li> <li>▪ Ability to take into account customer's remarks when adjusting the proposal</li> </ul>
Test work iteratively	<ul style="list-style-type: none"> <li>▪ Knowledge of characteristic user scenarios</li> <li>▪ Knowledge of technical opportunities and limitations for downloading and reading websites (various browsers, PC-memories)</li> <li>▪ Knowledge of frequently emerging problems</li> <li>▪ Ability to test customer usability of site</li> <li>▪ Ability to test the website for various user profiles</li> <li>▪ Ability to test the website for various technical environments</li> <li>▪ Ability to test the website for frequently emerging dysfunctions</li> <li>▪ Ability to assess test results and translate into changes</li> <li>▪ Ability to read through scripts in a very detailed way</li> </ul>

## 4.3.1.9 Learn on a continuous basis

**Table 4.9** Knowledge and skills requirements related to 'Learning on a continuous basis'

Specifications of task	Competence requirements
Participate in training	<ul style="list-style-type: none"> <li>▪ Knowledge of web technologies</li> <li>▪ Ability to assess relevance of training programmes for the daily work</li> <li>▪ Ability to assess personal needs for training</li> <li>▪ Ability to internalise/operationalise information</li> </ul>
Contact internal/external specialists	<ul style="list-style-type: none"> <li>▪ Knowledge of web technologies</li> <li>▪ Knowledge of organisational chart – competences available in the organisation</li> <li>▪ Knowledge of important business partners' competences</li> <li>▪ Knowledge of internal/external (written and unwritten) rules for communication</li> <li>▪ Ability to maintain constructive relationships with colleagues</li> <li>▪ Ability to discuss technical issues with specialists</li> </ul>
Search for information in internal/external sources	<ul style="list-style-type: none"> <li>▪ Knowledge of relevant sources of information</li> <li>▪ Ability to search various sources purposively</li> <li>▪ Ability to internalise/operationalise information</li> </ul>

## 4.3.2 Attitudes

## 4.3.2.1 General description of attitudes

- *Proficient in contacts*: mix with other people, get and keep in touch with people easily.
- *Eager to learn*: actively look for opportunities to extend or deepen existing competences
- *Customer-oriented*: examine or recognise customer's wishes, needs and interests and strive to satisfy these needs (within the borders of practical and organisational opportunities)
- *Accurate*: complete an order with the necessary precision, giving special attention to details

## 4.3.2.2 Attitudes specified

A website often is the result of a close co-operation between various people. People involved in the development and maintenance of websites must get and keep in touch with each other easily. They do not experience any hesitation in getting in contact with people with other specialities. Equally important is the contact with customers. Customers must feel at ease having contacts with the web specialists.

*Eager to learn*

Technologies for development and maintenance of websites are very diverse and they are changing continuously. Web specialists must be prepared and able to invest (time and money) in learning activities.

*Customer-oriented*

The customer and his needs are central to the development and maintenance of websites. Web specialists must be prepared to take into account customer's needs and remarks when developing and maintaining the website. This implies that the customer with his wishes has a priority for the 'technical ambitions and interests' of the web specialist.

In addition to this, customer orientation also refers to the need to be able to take into account final users' needs and interests. Websites are a tool for communication with a very

broad public. Web specialists must be able to understand their interests, their opportunities and limitations to use the website, etc.

#### *Accurate*

Websites are getting more complicated. It is important that people who develop and maintain the websites work very accurately. They need to take care for esthetical as well as for technical details. The website must look attractive. In more and more cases, websites also must be able to underpin the business process. Advanced websites are based on databases which often contain a lot of information. Developing and maintaining them is a conscientious work.

## **4.4 Background information**

### **4.4.1 Organisation of work**

The composition of tasks for development and maintenance of websites varies from organisation to organisation. It is however possible to discern three types of work organisation. Making use of the profile, it is possible to see how the composition of tasks varies over the three types of work organisation. People involved in development and maintenance of websites can be either self-employed (self), employee of a web development company (web) or employed by another company that exploits a website (other).

The following table shows how self-employed are responsible for tasks that are directly related to web development as well as for customer contacts and the co-ordination of the work. For the production of the website, they most often rely on specialists' work. Web specialists in a web organisation are mainly responsible for (parts of) the development, production and implementation of the website. In 'other' organisations web specialists are mainly responsible for tasks related to implementation and maintenance of websites.

**Table 4.10** Organisational variances on web development and -maintenance profile

Tasks	Self	Web	Other
<b>Make functional analysis</b>			
Define customer's needs	1-3		
Inform customer on opportunities and limitations of website	1-3		
<b>Plan work</b>			
Make time planning	X		
Make technical planning	X		
Make financial planning	X		
<b>Develop website</b>			
Develop website structure	1-3	1-3	
Develop navigation paths	1-3	1-3	
Work out functionalities	1-2	1-3	
<b>Produce website</b>			
Produce web pages	1-2	1-3	
Insert content	1-2	1-3	
Integrate databases	1-2	1-2	
Attach functionalities to website	1-2	1-2	
Develop graphic design	1-2	1-2	
<b>Implement website</b>			
Put website online	1-3	1-3	1-2
Promote website	1-3	1-3	1-3
Train customer	1-3		
<b>Maintain website</b>			
Make inventory/recommendations of updates	1-3	1-3	1-3
Introduce updates of the website	1-2	1-3	1-3
Give technical support to customer	1-2	1-2	1-3
<b>Co-operate in project team</b>			
Fine-tune own work to other specialist's work	X	X	X
Monitor progress of project	X		X
<b>Control quality continuously</b>			
Submit work to customer's assessment	X	X	X
Test work iteratively	X	X	X
<b>Learn on a continuous basis</b>			
Participate in training (internal – external – online)	X	X	X
Contact internal/external specialists	X	X	X
Search for information in internal/external sources	X	X	X

The table is based on the case studies, it is not validated.

The table indicates whether the various tasks are to be performed or not. An 'X' indicates that the task is to be performed. In some cases it is relevant to differentiate various competence levels that are required to perform the task (cf. supra for a description of the competence levels).

#### 4.4.2 Experience - seniority

The tasks and related competence requirements are also related to the experience of the performers. The profile can be used to compare experienced with inexperienced web specialists. For the comparison of experienced and inexperienced<sup>12</sup> occupants the focus is on employees of 'web organisations'. The following scheme gives an overview.

<sup>12</sup> Inexperienced web specialists are people who have no (formal or informal) experience in web development.

**Table 4.11** Experience-based variances on web development and -maintenance profile

Tasks	Inexperienced	Experienced
<b>Make functional analysis</b>		
Define customer's needs		
Inform customer on opportunities and limitations of website		
<b>Plan work</b>		
Make time planning		
Make technical planning		
Make financial planning		
<b>Develop website</b>		
Develop website structure	1-2	2-3
Develop navigation paths	1-2	2-3
Work out functionalities	1-2	2-3
<b>Produce website</b>		
Produce web pages	1-2	2-3
Insert content	1-2	2-3
Integrate databases	1-2	2-3
Attach functionalities to website	1-2	2-3
Develop graphic design	1-2	2-3
<b>Implement website</b>		
Put website online	1-2	2-3
Promote website	1-2	2-3
Train customer		
<b>Maintain website</b>		
Make inventory/recommendations of updates	1-2	2-3
Introduce updates of the website	1-2	2-3
Give technical support to customer		
<b>Co-operate in project team</b>		
Fine-tune own work to other specialist's work	X	X
Monitor progress of project		
<b>Control quality continuously</b>		
Submit work to customer's assessment	X	X
Test work iteratively	X	X
<b>Learn on a continuous basis</b>		
Participate in training (internal – external – online)	X	X
Contact internal/external specialists	X	X
Search for information in internal/external sources	X	X

The table is based on the case studies, it is not validated.

The table indicates whether the various tasks are to be performed or not. An 'X' indicates that the task is to be performed. In some cases it is relevant to differentiate various competence levels that are required to perform the task (cf. supra for a description of the competence levels).

The scheme illustrates that experienced people contribute to the realisation and maintenance of the website, applying their specialist competences. Most experienced web specialists take responsibilities in one domain of activities and they fine-tune their work with other specialists.

#### 4.4.3 Career paths

Comparing the profile of inexperienced and experienced web specialists makes it possible to gain insight into career opportunities. It becomes clear that the career of web specialists is not a vertical one. People who develop and maintain websites most often opt to specialise in one domain and even in one technology. Typical fields of specialisation are graphic design,

scripting of functionalities and database development. The choice of technology depends on the technologies used in the specific organisation.

#### 4.4.4 Future projections

The time of web designers being self-taught is passing as the Internet matures. Web development and –maintenance is challenged by three important evolutions. First of all there is the growing penetration of eBusiness and eCommerce. Secondly, there is the technological progress. Third, there is the progress of the European Union, associating new Eastern European countries.

The growing interest of organisations to use their website as a tool for business transactions influences the profile of web development and -maintenance. First of all maintenance of the website will become more important and more advanced. As the website is an important tool in business, organisations will submit their website more frequently to an assessment of content and accessibility by their customers. The website that serves eBusiness is a dynamic tool that is integrated into the total business process. Web specialists will have to search for updates, improvements and extensions continuously. Doing this they will work more closely together with strategic and marketing departments. Secondly, technical support will become more important. As the website becomes the heart of the business process, it is important to keep it online and to make it accessible to various Internet accessing tools (PC, mobile phone, palm, etc.). This implies that web specialists will be required to give more technical support. In addition to these technical issues, web specialists will be confronted with questions concerning legal regulations of eCommerce, SPAM, etc.

The rapid *technological progress* forces web specialists to obtain in depth knowledge in one certain activity domain or even one certain technology. Advanced websites are becoming integrated combinations of various specialised components. Web specialists and web developing organisations are challenged to find a compromise between specialisation and integration. Teamwork and networking are the relevant answers. Web specialists of the future will become specialist team workers.

Another trend that is related to technological progress, is induced by the development of content management systems. This software allows customers to update content autonomously. More and more, companies opt for updating the content of their website themselves. For more profound changes to the functionalities or the structure of the web site, customers rely on the web specialists.

A third trend relates to the integration of the European market. At the moment Hungarian web specialists regularly get orders from other, mainly Western European, countries because of lower costs. The foreign customers can be companies ordering their web site directly. More often however, web specialists from Western European countries outsource part of the web development work to Eastern European countries' specialists. This trend implies that web specialists must be able to work together from a distance, communicating in a common foreign language. An interesting research question for the future relates to the consequences of the association of Eastern European countries to the European Union on the outsourcing behaviour of Western countries.

In terms of tasks and competence levels it can be expected that more attention will be paid to maintenance of the web site and that competence levels for all tasks will shift towards level 2 and 3. Updating the content of the web site will shift towards the customers.

**Table 4.12** Future projections of web development and -maintenance profile

Tasks	Tasks that become more important (take a larger amount of time)
<b>Make functional analysis</b>	
Define customer's needs	
Inform customer on opportunities and limitations of website	
<b>Plan work</b>	
Make time planning	
Make technical planning	
Make financial planning	
<b>Develop website</b>	
Develop website structure	
Develop navigation paths	
Work out functionalities	
<b>Produce website</b>	
Produce web pages	
Insert content	
Integrate databases	
Attach functionalities to website	
Develop graphic design	
<b>Implement website</b>	
Put website online	
Promote website	
Train customer	
<b>Maintain website</b>	
Make inventory/recommendations of updates	2-3
Introduce updates of the website	2-3
Give technical support to customer	2-3
<b>Co-operate in project team</b>	
Fine-tune own work to other specialist's work	X
Monitor progress of project	
<b>Control quality continuously</b>	
Submit work to customer's assessment	
Test work iteratively	
<b>Learn on a continuous basis</b>	
Participate in training (internal – external – online)	
Contact internal/external specialists	
Search for information in internal/external sources	

The table is based on the case studies, it is not validated.

The table indicates whether the various tasks are to be performed or not. An 'X' indicates that the task is to be performed. In some cases it is relevant to differentiate various competence levels that are required to perform the task (cf. supra for a description of the competence levels).

The scheme illustrates which tasks will become more or less important and how competence levels will change. It is not clear however whether the composition of tasks will change over time. If employees or self-employed are becoming more specialised, it can be expected that they will focus on only one part of an activity cluster. It is questionable whether it is relevant to subdivide the cluster of activities into separate clusters indicating specialities such as 'scripts programmer' or 'JAVA programmer' or 'web promoter'. If this is the case, then we would talk about new occupations.

At this moment this is not yet relevant. Self-employed web specialists still try to combine their specialised task with other tasks related to web development and -maintenance. Also in SMEs specialists are expected to contribute to more tasks related to development and maintenance.

## 4.5 Towards international comparisons

The framework profile is conceived as a tool for international comparison. We did the exercise on the basis of the available national profiles (Bollen & Ramioul, 2004), checking which tasks are mentioned in the various profiles and which are not. The following scheme illustrates that there are some important differences between the Italian and the Dutch profile on the one hand and the Belgian, the Hungarian and the US on the other hand. These differences can be mainly explained by methodological options. The Italian and the Dutch profile are based on interviews with web specialists that are employed by tourist organisations. The other countries' profiles are based on contacts with a broader range of web specialists. Therefore, at first sight the differences are due more to the organisational differences than to nation-specific differences.

Taking into account the profile of web development and -maintenance, it is possible to put forward some interesting questions for international comparative research:

- Are competence requirements higher in countries where the eBusiness penetration is higher? Are some tasks becoming more/less important? Are there newly emerging tasks related to the eBusiness penetration?
- Are informal learning initiatives less important in countries with formal training programmes for web specialists?
- At what rate in each country are the self-taught generalists being replaced by specialists trained to develop increasingly sophisticated commercial websites?

**Table 4.13** International comparison of the customer technical support profile

Tasks	BE	HU	IT	NL	USA
<b>Make functional analysis</b>					
Define customer's needs					
Inform customer on opportunities and limitations of website					
<b>Plan work</b>					
Make time planning					
Make technical planning					
Make financial planning					
<b>Develop website</b>					
Develop website structure					
Develop navigation paths					
Work out functionalities					
<b>Produce website</b>					
Produce web pages					
Insert content					
Integrate databases					
Attach functionalities to website					
Take care of graphic design					
<b>Implement website</b>					
Put website online					
Promote website					
Train customer					
<b>Maintain website</b>					
Make inventory/recommendations of updates					
Introduce updates of the website					
Give technical support to customer					
<b>Co-operate in project team</b>					
Fine-tune own work to other specialist's work					
Monitor progress of project					
<b>Control quality continuously</b>					
Submit work to customer's assessment					
Test work iteratively					
<b>Learn on a continuous basis</b>					
Participate in training					
Contact internal/external specialists					
Search for information in internal/external sources					

The table is based on the national reports. If tasks are mentioned in the national list of tasks, or referred to in elaborations giving 'background information', they are shaded in this table.

## Chapter 5

# Conclusions

Working on the occupational profiles we had three goals. First, we wanted to offer profiles that could support a broad group of users in their search for measures to match demand and supply on the labour market. Second, we wanted to develop some methodological recommendations. Third, we wanted to give an initial impetus to future research on the occupations that were subject of this study. In this concluding part we illustrate some applications of the profiles and we summarise the methodological conclusions that we have drawn from the STILE experiences. To conclude we put forward some trends that have emerged in the research and that need special attention in other research.

## 5.1 Applications of occupational profiles

The profiles presented here are framework profiles. They can be used as a common reference framework for discussions on tasks and related competence requirements of the selected clusters of activities. Getting insight into clusters of activities is a means to an end. The profiles can inspire various measures for improving the match between demand and supply on the labour market.

**Figure 5.1** Mismatches between demand and supply on the labour market



The above figure visualises the gaps on the labour market. Gap 1 is a mismatch between the competences that employers ask when they recruit people on the external labour market. It also refers to the difference between the competences employers ask from their employees and the employees' competences. Gap 2 refers to a mismatch emerging when employers ask other competences than the competences that are needed to perform a job. Recruiting candidates, employers may ask more than is necessary to perform the specific job. This way they try to reassure that employees can grow within their company. Gap 3 refers to the difference between competences that are indispensable to perform a job and the competences that are available on the external labour market or within the company. It is for instance possible that a company introduces a technology that is not known by employees and that is not included in existing educational programmes. Gap 3 also refers to the mismatch between the need for soft competences and the supply of these competences by training and educational institutions.

There are various ways to cope with the mismatch. It is possible to intervene on the supply side, adjusting competences possessed by the employee. It is also possible to change the demand side, influencing the competences required by the job or changing the employer's requirements. The profiles can be used as a basis for these initiatives.

## 5.1.1 Adjust competences to requirements

### 5.1.1.1 Profiles inspire educational programmes

Adjusting employees' competences to the employers' needs can be done in various ways. Traditionally schools and training centres have an important role to play in order to fine-tune supply to demand on the labour market (Gap 1). The profiles<sup>13</sup> can form a basis for the educational programmes or they can be used as a basis for the assessment of existing programmes.

Looking at training programmes for web development for instance, it becomes clear that most training programmes focus on the technical aspects, dealing with the use of programmes. A significant problem is that training programmes may lag behind in offering updated content as occupations evolve in response to changing market conditions. In addition to the knowledge of programmes and technologies, the profile reveals additional customer-related tasks such as consultation on the role of the website for business, giving technical information, co-operate in teams, etc. Comparing the training programmes with the competence requirements in the profile reveals this gap.

### 5.1.1.2 Profiles inspire HR measures

It is however no longer possible for training and educational centres to prepare employees to meet employers' needs. The broad organisational variety and the rapid changing nature of technological progress are causing problems in developing programmes that can prepare people for a concrete job. More and more companies have to play an important matching role themselves.

#### *Enhance learning initiatives*

Employers can close the gap between demand and supply by stimulating learning initiatives. The profiles evolve some pathways for learning. The general task 'learn on a continuous basis' is subdivided into three subtasks. Employers can support (on the job) learning by enabling these tasks. The following table illustrates how employers can translate the profile into concrete HR measures.

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<sup>13</sup> Profiles give insight into the competences that are needed to perform a job. Therefore, they allow to identify Gap 3.

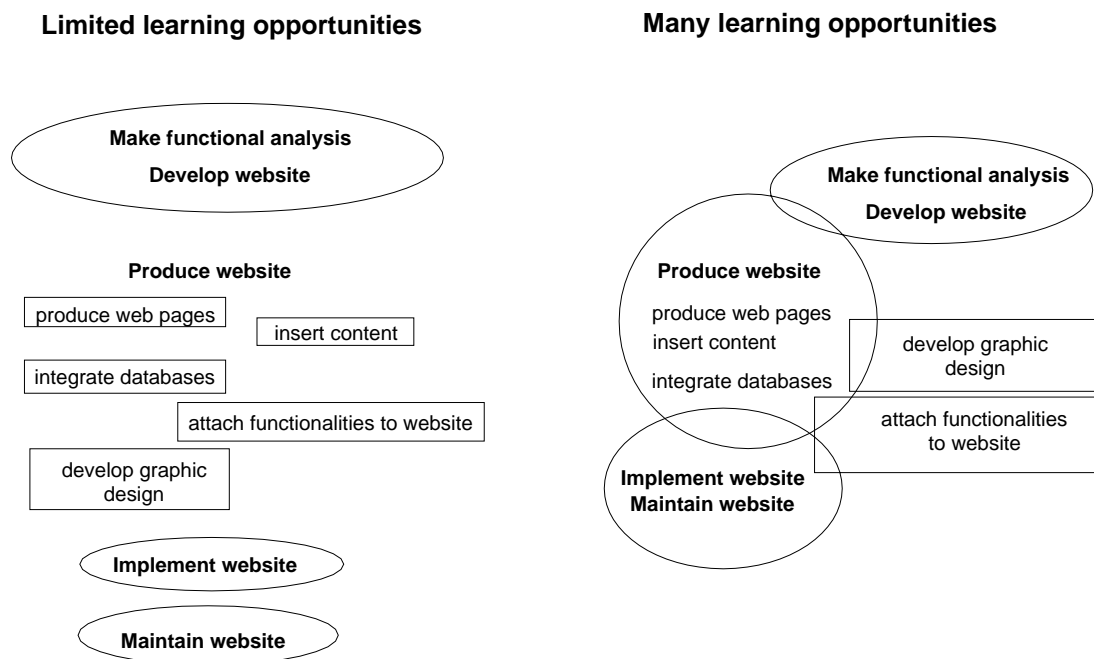
Tasks	Examples of possible HR-measures
Participate in training	<ul style="list-style-type: none"> <li>▪ Develop in depth assessment procedures to evolve needs</li> <li>▪ Set up competence-related payment</li> <li>▪ Give information on training opportunities</li> <li>▪ Offer clear career paths, linked to training schemes</li> </ul>
Contact internal/external specialists	<ul style="list-style-type: none"> <li>▪ Use open offices</li> <li>▪ Develop databases for sharing knowledge and stimulate employees to work with/contribute to it</li> <li>▪ Make available clear organisational chart</li> <li>▪ Make available information for external contacts (address, phone, e-mail, specific rules for contacts, etc.)</li> <li>▪ Stimulate informal contacts</li> <li>▪ Make employees responsible for dealing with problems autonomously</li> <li>▪ Encourage employees to use one another as internal consultants</li> </ul>
Search for information	<ul style="list-style-type: none"> <li>▪ Give access to intranet/internet</li> <li>▪ Give time to spend on searching for information</li> <li>▪ Develop databases for sharing knowledge and stimulate employees to work with/contribute to it</li> <li>▪ Make employees responsible for dealing with problems autonomously</li> </ul>

#### *Create jobs with learning opportunities*

In addition to HR measures supporting learning initiatives, employers can enhance learning on the job by adjusting the job design. Important criteria for jobs containing learning opportunities are (De Sitter, 2000):

- broad composition: broadly composed jobs are composed of preparatory, executive, organisational and supportive tasks;
- autonomy: a job can be performed autonomously if the occupants can determine the methods, the order, and the rhythm of work. Standardised jobs neither stimulate employees to search for creative solutions, nor to take the above mentioned learning initiatives;
- mutual co-ordination: jobs that are designed in such a way that they require mutual co-operation between employees.

The profiles can be used as a basis to (re)design jobs in such a way that they can create learning opportunities. As the profiles contain a logically coherent cluster of activities, related to a continuum of competence requirements, they allow composing various combinations of tasks. The following figure gives an example of a job with 'limited learning opportunities' and one that meets the criteria for a job with 'many learning opportunities'. Both are variations on the profile.

**Figure 5.2** Learning opportunities in various job designs

The figure could be an example of a choice that is to be made by a web development organisation. The employer can choose to make some people responsible for the functional analysis and the development of the web structure. The production of the websites is the responsibility of people working each on one part of the website; content, databases, functionalities, graphic design. Their work is to a great extent determined by the people who developed the web structure. The people who are responsible for the implementation and the maintenance of the websites work separately from the other people.

Employers can also opt for a more 'integrated' approach, involving employees in more activities related to web development and -maintenance. The figure on the right shows that people involved in the production of the website (content, databases) work closely together with people who make a functional analysis and develop the web structure and with people who implement and maintain the website. Here specialists carry out graphic design and programming of applications. They are also involved in the other parts of the development and maintenance process.

Learning opportunities in the last example are higher than in the first example. Co-operating with colleagues, employees get a deeper knowledge of their work, they can learn from others, etc. What is more, employees learn to take into account the consequences of their work for their colleagues' work. As a result not only employees benefit from this form of work organisation. Employers have interest in the resulting higher quality, which also benefits customers.

### 5.1.2 Adjust requirements to available competences

Fine-tuning demand and supply on the labour market is often limited to adjusting employees' competences to the employers' needs. It is also possible, however, to adjust demand to supply by outlining a 'labour market-conscious HR policy'. Employers can adjust the job design in order to be able to change competences required to perform the job (Gap 3). Employers can also adjust recruitment requirements (Gap 1). In some cases this requires adjustments of jobs. Nevertheless, as employers sometimes ask too much<sup>14</sup> in some cases it is sufficient to change the 'recruitment culture'.

<sup>14</sup> More than is necessary to perform the specific job well. Employers often overcharge recruitment requirements as a way of reassurance that employees will be employable in the longer term, in other jobs within the company.

Developing well-structured internal labour markets allows companies adjusting job design to the competences available on the (internal and external) labour market. Jobs composing internal labour markets are designed in such a way that experience in one job is a good preparation for growing towards a 'higher order' job. Therefore, this labour market-conscious policy is not only relevant for improving the match with the external labour market. It also allows companies to fine-tune job designs and employer's expectations<sup>15</sup> to the competences that incumbent employees can achieve on the job. These measures are essential within a policy of retention.

As the profiles give an overview of tasks and related competence requirements, they can be used as a basis for reshaping jobs within the organisation in order to bring them in line with the competences available on the (internal or external) labour market. We illustrate this with the example of customer technical support.

In the last decades employers were confronted with a lack of technically educated applicants who were able and willing to support customers. In answer to this shortage some companies have changed the job design in order to be able to reduce recruitment requirements. They designed jobs in such a way that experiences in one job were a valuable basis for achieving competences that are needed for other jobs within the company. This way they could reduce competence requirements for entry jobs to the competences available on the external labour market. Enhancing 'learning on the job' (cf. supra) companies could prepare employees to perform more technical specialist jobs, for which it was difficult to find people on the external labour market.

In most companies this resulted in first-line supporting tasks, taking care of a first reception and inventory of technical problems. In order to reduce the complexity of the job, tasks were standardised to a large extent. Nevertheless, employees had learning opportunities. They were expected to deal with every incoming problem. Some of the problems could be solved making use of standardised procedures, others needed special attention. In this last case, employees could rely on more experienced colleagues, on internal information (e.g. manuals) or they could escalate the problem to specialists. As they were responsible for the customer contacts, first-line employees saw a lot of solutions to problems and they were motivated to ask information on the solutions. This experience in entry jobs stimulated the employees' interest in technical aspects of the products and services. They learnt how to troubleshoot problems. Moreover, they knew very well the customers' grievances. This experience was a good preparation for entering second-line jobs, which were technically more complex. As a result companies developed their own labour market for these second-line jobs. At the same time they were able to keep employees motivated offering them interesting career paths.

At this time companies are confronted with another problem. Due to the socio-economic stabilisation, mobility on the labour market has slowed down. Job creation has slowed down and companies no longer offer the same employment conditions as they did in times of a very tight labour market. As a result people stay where they are. Whereas customer technical supporting employees could move up to specialist jobs in the past, employers can no longer offer these career paths. Employees get more and more technically specialised and it is difficult for employers to keep them motivated in a customer-support job. In order to keep employees motivated, they can broaden task composition. Companies can for instance ask experienced employees to make use of their experience in order to contribute to the adjustment of existing procedures and systems.

## 5.2 Occupational profiling methods

It is beyond this report's scope to develop new occupational profiling methods. Nevertheless, a critical reflection on our experiences with applying an existing occupational profiling method allows us to put forward some recommendations on profiling a new occupation in the eEconomy.

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<sup>15</sup> E.g. assessment criteria

### 5.2.1 Challenges for existing profiling methods

Working on the occupational profiles we were confronted with the following problems:

- the occupations on which we wanted to focus were '*new emerging occupations*'. The lack of a consensus on a clear definition of these occupations has been a first challenge;
- the *technologies* used in the occupations are very diverse and they change rapidly. This diversity caused problems for defining the occupations as well as for describing the knowledge requirements. We were challenged to decide which level of detail we wanted to reach in the profile;
- the shape of the occupations is *organisation specific*. This caused problems discussing the profiles in a diverse group of experts. Each expert looks at the profiles from his/her own experience. We had to decide to what extent the organisation specific differences were relevant to be taken into account;
- the *international comparative character* of the profile has challenged us to find a common language.

In answer to these problems we found the following solutions:

- instead of selecting a clearly defined occupation, we decided to focus on a '*logically coherent cluster of activities*'. This option allowed us to develop a profile that is broadly applicable. Dependent on the user's goals various combinations of activities can be made and the related competence requirements can be derived from them;
- it was not possible to make a detailed and exhaustive overview of the technologies occupants must be familiar with. Therefore we decided to describe the *competence requirements in general terms*;
- the framework profile abstracts from every concrete organisational context. Exploring the clusters of activities we saw however some common patterns in the way the activities are clustered into concrete jobs. We decided to *discuss the most common forms of work organisation*. In order to be able to catch the organisational differences it was necessary to distinguish various levels of competence requirements;
- in order to enable international comparability we developed a *common reference framework*. The occupational profile is conceived as a framework that can be used as a tool for discussion of the activities and the related (generally defined) competence requirements.

### 5.2.2 Recommendations for profiling occupations in the eEconomy

On the basis of the STILE experiences it is possible to put forward some recommendations for developing occupational profiles of occupations in the eEconomy, exceeding national borders. Important lessons are:

- start determining the usergroup and the goals the profiles are to serve. The objectives determine which structure is best;
- clearly define the occupation that is subject of the research, situating it in a broader field of related occupations;
- develop a common reference framework if international comparisons are part of the research goals. These frameworks are to be submitted to the same questions in comparable groups of experts in all countries;
- start with an overview of tasks at four levels; preparatory, executive, organisational and supportive tasks. Only this way the completeness of the profile can be assured;
- distinguish various competence levels if the profiles must catch a broad and diverse reality;
- give information on important differences (esp. related to organisation and seniority) in the content of the profile. This enables discussions between various experts who all look at the profiles from their own point of view;
- focus discussions on future projections on the impact of socio-economic trends on tasks and competence requirements;
- if the framework is to serve international comparisons, make sure it is assessed in the same way (asking the same questions) by comparable groups of experts.

These recommendations are based on the STILE experiences with applying existing methods for putting new occupations in an international comparative perspective. As the STILE profiles have not proved yet to be useful, these recommendations need to be put into perspective. Other research should assess the value the profiles as they are developed here. Questions that need special attention are:

- Is the definition of a 'logically coherent cluster of activities' workable? Does it enlarge the profile's applicability?
- Is it relevant to distinguish various competence levels? What is the most relevant criterion for distinguishing levels?
- Is a framework profile a useful tool for making comparisons (international, inter-organisational, and inter-temporal)?
- Do the elaborations on the organisational differences improve the profile's usefulness? Do they enable discussions in heterogeneous groups of experts?

Answering these questions requires involvement of profile users. Users, such as statistical offices, staffing organisations, employers, trade unions, training organisations, etc. can be asked to assess the STILE profiles on these questions. This exercise can validate the STILE recommendations for eventual adjustments of existing occupational profiling methods.

### 5.3 Emerging trends calling for other research

An outcome of the STILE research was that some emerging long-range trends became apparent during the interviews.

In the cluster of customer technical support we mentioned two important trends. *First of all* the case studies have showed that customer technical support is getting consolidated within companies. Having a lot of experience with troubleshooting of frequently emerging problems, companies can standardise a lot of troubleshooting processes. More and more, standard procedures are made available online, allowing customers to find a solution to their problem autonomously. This trend implies that customer technical supporting jobs are decreasing in number. At the same time the jobs become more difficult because employees are only confronted with technically complex problems, problems for which customers can find no answer themselves. Moreover, it can be expected that customer technical supporting employees of the future must spend more time developing and adjusting standardised procedures that can be used by the customers. *A second trend* that needs special attention relates to the trend of globalisation. In the eEconomy national borders can be bridged by ICT. Some multinationals have only one contact centre in which all technical problems are centralised. Other prefer to have various contact centres. An interesting research question in this respect concerns whether the jobs are the same in various contact centres of the same multinational. Related to this it might be interesting to scrutinise the role of culture and national legal arrangements in giving shape to jobs.

Developing a profile of web development and -maintenance it became clear that the 'web specialist' is evolving from a generalist who handles all steps, to a specialist who works in team with other specialists in order to develop a tailor made website with eBusiness applications. An interesting research question in this respect is whether this trend will give rise to new occupations, such as JAVA programmer, web promotor, graphic designer, eBusiness consultant, etc.

Another interesting trend that emerged with respect to web development and that calls for research attention relates to the extension of the European Union. Relying on specialist's work for some parts of the website, web specialists of Western European countries tend to keep down costs giving orders to the cheaper specialists of Eastern European countries. This has important implications on the way web specialists work together in team. It is interesting to see how this trend will evolve if Eastern European countries are getting integrated in the European Union.

These trends will have an impact on the demand and supply of particular occupations and thus need special attention in labour market studies.



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