CWA Part II

User guidelines for the application of the European e-Competence Framework 2.0

These guidelines are provided to support understanding, adoption and use of the European e-Competence Framework (e-CF) 2.0.

The guide helps:

- ***To explain the overall context, background and aims of the European e-Competence Framework.***
- ***To explain the main principles and methodological choices underpinning the European e-Competence Framework.***
- ***To enable ICT stakeholders – ICT user and supply companies, the public sector, ICT managers and practitioners, HR developers, ICT job seekers, educational institutions and social partners – across Europe, to adopt, apply and use the framework in their environment.***

A methodology document, addressing scientific and research orientated personnel, is also available.

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1. Executive overview

1.1. Short presentation and background of the framework

The European e-Competence Framework (**e-CF**) is a reference framework of ICT competences that can be used and understood by ICT user and supply companies, ICT practitioners, managers and HR departments, the public sector, educational and social partners across Europe.

The framework has been developed by a large number of European ICT and HR experts in the context of the CEN Workshop on ICT Skills. The workshop provides a discussion and working platform for both national and international representatives from the ICT industry, public and private vocational training organisations, social partners and other institutions. It aims to create long-term human resources (HR) and competence development solutions for the European Information and Communication Technology (ICT) community.

In 2005, further to the recommendations of the European e-Skills Forum, the ICT Skills workshop members agreed that national ICT framework stakeholders as well as European ICT industry representatives - both human resources and ICT experts – should consider developing a European e-Competence Framework. With the encouragement of the European Commission, ICT framework stakeholders, representatives from several European larger companies and an applied research foundation met for a kick-off early 2006 in order to put this intention into practice. During an intensive follow-up, they designed a programme for the work towards a European e-Competence Framework under the umbrella of the CEN/ISSS workshop on ICT Skills. These efforts were welcomed and recognised in the Communication of the European Commission on “e-Skills for the 21st Century: Fostering Competitiveness, Growth and Jobs” of September 2007 and the Competitiveness Council Conclusions of November 2007.

In order to achieve a European agreement and useful results at an international and national level, the Europe-wide involvement of further ICT sector players and stakeholders from business, politics and education has been crucial to the framework development philosophy and strategy. Whilst at the political level it was important to get the larger multistakeholder public of the European ICT sector engaged; at the expert working level focus was placed upon HR and IT management know-how from the European ICT industry.

The European e-Competence Framework version 1.0 was published in 2008 from the outcome of two-years e-Skills multistakeholder, ICT and human resources experts' work from multiple organisation levels (CWA 15893-1 and CWA 15893-2).

The European e-Competence Framework 2.0 and the user guidelines presented in this CWA build upon the e-CF version 1.0, and take into account the first e-CF application experience and feedback from ICT stakeholders across Europe.

In addition to competence description updates across the entire framework, four new competences have been added. Furthermore, dimension 4 has been fully populated: samples of knowledge and skills relate to each e-Competence in dimension 2. These knowledge and skills samples are provided to add value and context and are not intended to be exhaustive.

However, care has been taken to ensure that existing users of version 1 are able to adopt version 2 without excessive effort. For instance no competences have been deleted and wording changes have been made to add clarity without changing the original meaning.

The European e-Competence Framework 2.0 (CWA Part I), these user guidelines (CWA Part II) and a methodological documentation of how the e-CF was developed (CWA Part III) are the outcome of the "European e-Competence Framework in action" project which took place from 2009 to 2010 in the European ICT multistakeholder context of the CEN Workshop ICT Skills.

1.2. European e-Competence Framework focus and purposes

The European e-Competence Framework (**e-CF**) is a reference framework of ICT competences that can be used and understood by ICT user and supply companies, the public sector, educational and social partners across Europe.

The framework provides an international tool for:

- **ICT practitioners and managers**, with clear guidelines for their competence development
- **HR managers**, enabling the anticipation and planning of competence requirements
- **Education and Training**, enabling effective planning and design of ICT curricula

- **Market researchers and policy makers,** providing a clear and Europe-wide agreed reference for evaluating and anticipating ICT skills and competence needs in a long-term perspective.

The European e-Competence Framework focuses on competences needed

- to **develop, operate and manage ICT projects and processes**
- to **exploit and use ICT**
- to **make decisions, develop strategies**, and
- to **foresee new scenarios**.

Recognising that Information and Communication Technology is a crosscutting issue, the European e-CF addresses target groups involved in ICT business processes.

Thus the European e-Competence Framework considers:

- the **suppliers and customers (the ICT industry and end-user companies including services and the public sector)**; and
- **the ICT practitioners and managers** whatever their function, role or job may be in the ICT business process.

Accordingly, the e-Competence Framework does not consider competences related to basic/scientific ICT research.

Furthermore, the e-Competence Framework purpose is to provide general and comprehensive e-Competences that can then be adapted and customised into different business contexts such as e-commerce, e-health, e-banking, etc. These e-Competence sets are not exhaustive, e.g. some e-Competences directly related to the technology areas of “Business Applications”, “Microelectronics” and “Industrial Control Systems” could still be added in the future.

The European e-Competence Framework 2.0 provides a basic, clear and sound orientation for companies needing to take decisions about recruitment, career paths, training, assessment, etc. The e-CF is also useful for promoting clearer understanding of company competence needs.

1.3. Main principles of the European e-Competence Framework

The European e-Competence Framework has been produced from an employer viewpoint to serve the needs of the European ICT practitioner and manager community. It is a Competence Framework based on the following definition.

> *Competence is a demonstrated ability to apply knowledge, skills and attitudes to achieving observable results.*

The e-CF addresses the need for ICT competence translation across European national borders by

- Providing a structure which can be utilised by nations without an existing ICT competence model.
- Providing a structure which can be linked to existing national ICT competence models to support common European translation.

The primary focus of the European e-Competence Framework is to relate to employer career path structures. As a direct consequence it reflects 'flatter' organisational structures now commonly deployed by industry. This trend towards simplification of career paths is reflected in the European e-Competence Framework by the adoption of a two dimensional framework comprising of five proficiency levels, the e-Competence levels e-1 to e-5.

Competence and qualifications are distinct entities and no perfect relationship can be established between them. However, the e-CF has related proficiency levels to the learning outcomes of the EQF. This association of e-Competence levels e-1 to e-5 with EQF levels 3 to 8 is knowingly imprecise but facilitates necessary orientation between employer centric competences and education centric learning outcomes.

To illustrate level difference we can use the example of a person with a Ph.D.; this equates to EQF level 8. However, the Ph.D. holder is not automatically able to apply knowledge, skills and attitudes in the workplace at e-Competence level e-5. The competence requirements for a particular job role demand more than qualification achievement. Experience, proven capability to act in complex situations etc. must also be considered.

However, the language structure adopted in the e-CF can be related to learning outcomes. Thus, possible linkages between competences (European e-CF) and learning outcomes (EQF) are made transparent and objective.

1.4. The user guidelines: purposes and target groups

A European reference set of ICT competence definitions is unlikely to match a company or institution's needs perfectly. The European e-Competence Framework is intended for guidance and is designed to provide a common shared reference tool which may be implemented, adapted or used in accordance with ICT player requirements.

These guidelines provide some basic guidance for understanding, adopting and using the European e-Competence Framework version 2.0 according to individual need. The main purposes are:

- to **present the overall context**, background and aims of the European e-Competence Framework (Part 1),
- to **explain the main concepts**, methodological choices, underpinning structure and concrete components of the European e-Competence Framework (Part 2 + 3),
- to **enable ICT players** – ICT user and supply companies, the public sector, ICT managers and practitioners and those who want to start a career in the ICT, educational and social partners – across Europe to apply and use the framework in specific environments and to adopt it according to specific needs (Part 4).

2. Some Definitions

2.1. The "e-" from a European perspective

The European e-Skills Forum, building on the activities of the Career Space initiative, adopted a definition of the term "e-skills" covering three main categories:

- **ICT practitioner skills**: the capabilities required for researching, developing, designing, strategic planning, managing, producing, consulting, marketing, selling, integrating, installing, administering, maintaining, supporting and servicing ICT systems.
- **e-business skills**: the capabilities needed to exploit opportunities provided by ICT, notably the Internet; to ensure more efficient and effective performance of different types of organisations; to explore possibilities for new ways of conducting business/administrative and organisational processes; and/or to establish new businesses.
- **ICT user skills:** the capabilities required for the effective application of ICT systems and devices by the individual. ICT users apply systems as tools in support of their own work. User skills cover the use of common software tools and of specialised tools supporting business functions within industry. At the general level, they cover "digital literacy".

Following the "e-"definitions as adopted by the European e-Skills Forum, the European e-Competence Framework focuses on competences which are needed and applied in the ICT business related workplace including both ICT practitioners and e-business managers.

The ICT user perspective (users of IT applications such as word processing, spreadsheets, etc.) and related competences have not been included.

2.2. Competence, knowledge, skill, attitude

The European e-Competence Framework makes reference to some common concepts also defined and used within the European Qualifications Framework (EQF); namely knowledge (K), skill (S) and competence (C).[1]

- **Knowledge** and **skill** express the same meanings in both frameworks.
- **Competence** is described in terms of "responsibility" and "autonomy" in the EQF, but "responsibility" and "autonomy" are not explicitly emphasised in the e-CF definition. The e-CF definition does not make these concepts explicit because they can be difficult to interpret by organisations when applied to individuals competences.

In the EQF, a **competence** is *"the proven ability to use knowledge, skills and personal, social and/or methodological abilities in work or study situations and in professional and personal development"*[2]. In the e-CF, a competence is *"a demonstrated ability to apply knowledge, skills and attitudes for achieving observable results"*. If we compare these two definitions, we realise that the expression "*abilities"* mentioned in the EQF is close to "*attitudes*" indicated in the e-CF.

If the meaning of the two definitions is similar then why has the e-CF competence definition been created? There are three reasons:

1. Definitions provided in the e-CF are **aligned to company needs and views** and are expressed in their language.
2. The e-CF reflects **company requirements and expectations for workplace capability** which is different from the EQF, even though it can be compared.
3. The e-CF is designed **to relate to specific skills and job profiles frameworks** (e.g. AITTS, Cigref, Eucip, SFIA, etc) coming from different cultures and experiences across Europe. It must provide a translation of these approaches as well as provide a European identity.

Consequently, the definitions for knowledge, skill and competence have been developed within a European ICT business environment.

The definition of attitude is also supplied. It is close to the concepts of "manner" and "demeanour", it is the French "savoir etre". In business environments, it is most relevant when used in context, i.e. when integrating specific abilities to perform.

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[1] add reference to e-CF in action methodological documentation.

In summary, the European e-Competence Framework uses the following definitions:

- **Competence** is defined as **"a demonstrated ability to apply knowledge, skills and attitudes for achieving observable results"**.
  Consequently, the related e-Competence descriptions embed and integrate knowledge, skills and attitudes.

- **Skill** is defined as **"ability to carry out managerial or technical tasks"**.
  Managerial and technical skills are the components of competences and specify some core abilities which form a competence.

- **Attitude** means in this context the **"cognitive and relational capacity"** (e.g. analysis capacity, synthesis capacity, flexibility, pragmatism...). If skills and knowledge are the components, attitudes are the glue, which keeps them together.

- **Knowledge** represents the **"set of know-what"** (e.g. programming languages, design tools...) and can be described by operational descriptions.

2.3. The basic concept of e-Competence proficiency levels

"Level" is another basic concept used within the European e-Competence Framework. It is identified in the e-CF Dimension 3.

In the e-CF this concept refers to "proficiency" levels instead of "learning" levels in the EQF. This is another reason why e-CF levels are different from the EQF levels, even though some relationships can be found.

A proficiency level integrates three facets, as shown in the e-Competence level table in the Annex: context complexity, autonomy[3] and behaviour. Hence, the proficiency levels described in Dimension 3 embed these three components.

All these dimensions are also present and easily identifiable within the EQF definitions and descriptions. This maintains a uniform relationship between the two frameworks.

In particular, in the e-CF, these three dimensions can be summarised as following:

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[2] The European Qualifications Framework for Lifelong Learning, April 2008

[3] "personal autonomy", i.e., the capacity to perform without needing directions, is a necessary component to define proficiency levels, hence, it must be embedded in definitions of Dimension 3. On the contrary, "Responsibility", if meant as the "personal sense of responsibility", is not related to proficiency levels, in fact even a very young employee at level 1 of the e-CF could/should have a high sense of personal responsibility. Accordingly, "responsibility" is not a component of proficiency level concept.

- **Autonomy** ranges between “Responding to instructions” and “Making personal choices”
- **Context complexity** ranges between “Structured – Predictable” situations and “Unpredictable – Unstructured” situations
- **Behaviour** here represents an observable outcome of attitude and ranges between “the ability to apply” and “the ability to conceive”.

2.4. Embedding skills, knowledge and attitudes into the competence descriptions

The e-CF competence definitions of skills, knowledge and attitudes are embedded into the competence descriptions in Dimension 2 and in Dimension 3. They are combined to present a holistic perspective.

This can be illustrated by using the example ***C.3. Service Delivery.*** In **Dimension 2**, the competence is described as follows: ”*Takes proactive steps to ensure a stable and secure application and ICT infrastructure. Updates operational document library and logs all operational events. Maintains monitoring and management tools (i.e. Scripts, Procedures...).*”

This description embeds:

1. **Knowledge** about IT service delivery requirements, standards in IT service delivery, monitoring service delivery etc
2. **Skills** related to applying service delivery processes, filling and completing documentation etc.
3. **Attitudes** such as foresight, analysis, professionalism etc.

In **Dimension 3**, competence descriptions are specified at each appropriate proficiency level. Descriptions still embed knowledge, skills and attitudes as in Dimension 2.

Dimension 4 gives some explicit examples of knowledge and skills that may be relevant for competence performance as described in Dimension 2 and 3.

Attitudes are still embedded because if separated they would lose their relevance and meaning. Owing to the “soft” nature of attitudes, meaning is only relevant when used in context.

3. The European e-Competence Framework – look and basic principles

3.1. Framework purposes

In the first instance the European e-Competence Framework (e-CF) establishes a European common language for ICT competences. It supports the definition of jobs, training courses, qualifications, career paths, formal and non-formal learning paths, certifications etc. in the ICT sector. In this way, local, national, European and global ICT vendor and user companies as well as qualification and certification providers have access to a shared reference.

The application of the European e-Competence Framework is centred upon workplace competence articulation, profiling, assessment and measurement. Although the e-CF can be related to other types of framework such as qualification, certification or knowledge structures its core purpose is to provide a 'European ICT Competence Reference'.

Within this context, level linkage can be provided between the European e-CF and the EQF. Although the frameworks are designed for different purposes they share some characteristics which have been exploited to establish the reference chart in section 3.5.

Primary purposes of the European e-Competence Framework are highlighted below:

1. The European e-CF **describes competence and can be used in a variety of applications where consistency of competence language** is required. These include job descriptions, role profiles, competence specifications and articulation of professional development needs.
2. It **identifies proficiency at 5 e-competence levels and can be used to provide detailed profiling** where various competence combinations are involved. Career path association supports workforce development for roles with defined competences.
3. Assessment of competence from a job role perspective **enables targeted and efficient recruitment, contracting, sourcing and hiring**.
4. Measurement of competence gaps at the individual, team or organisational level **enables short and long term planning by HR management** or by individuals to assess and budget for education and training needs.

As the framework becomes more universally applied then further applications can be envisaged. These include curriculum and ICT qualification and certification development. The European e-Competence Framework is a tool which will facilitate new national and

especially European offers of education/qualification. It will provide a link between jobs, competences and qualification. In addition it may support the development of employer focused certification.

The opportunities for improving the efficiency and effectiveness of recruitment processes by adopting the European e-CF are significant. The Framework is also an enabler, making it possible for National and European students to better understand the possibilities offered by the ICT jobs and to identify future career opportunities.

3.2. The competence focus of the framework

The European e-CF is not based on job profiles but rather on competences as this approach is more flexible. Between companies it is common to find identical job titles that correspond to different job descriptions and vice-versa. Moreover, both job titles and job descriptions are often inadequate when expressing capabilities required in the workplace. ICT business environments are complex and change continuously; complexity and constant change make job related structures too fixed and rigid and therefore ineffective for describing tasks and activities within an international environment.

Competences are in contrast general yet sufficiently comprehensive to represent complexity and to fit variable organisation structures. Competence identification helps to fine-tune changes and to plan for the future. Moreover, disparate competence combinations can produce various job profiles to meet organisation needs, providing flexibility and fostering customisation.

The European e-Competence Framework purpose is to provide general and comprehensive e-Competences that can then be adapted and customised into different ICT business contexts.

3.3. A framework structured from 4 dimensions

The European e-Competence Framework is structured from four dimensions. These dimensions reflect different levels of business and human resource planning requirements in addition to job/ work proficiency guidelines and are specified as follows:

- Dimension 1: **5 e-Competence areas**, derived from the ICT business processes PLAN – BUILD – RUN – ENABLE – MANAGE
- Dimension 2: A set of **reference e-Competences for each area**, with a generic description for each competence.

36 competences identified in total provide the European generic reference definitions of the framework.

- Dimension 3: **Proficiency levels of each e-Competence** provide European reference level specifications on **e-Competence levels e-1 to e-5**.

- Dimension 4: Samples of **knowledge and skills related to the e-Competences** are indicated as optional framework components for inspiration. They are not intended to be exhaustive.

While competence definitions are explicitly assigned to dimension 2 and 3 and the references about knowledge and skills appear in dimension 4 of the framework, attitude is embedded in all three dimensions. Attitudes are the glue which bind skills, knowledge and experience together to form competence. They provide the motivation for effective and competent performance.

3.4. 36 ICT (e-) related competences in 5 e-Competence areas

The 36 e-Competences described in Dimension 2 and Dimension 3 of the European e-Competence Framework arise from the 5 e-Competence areas shown in Dimension 1.

The 5 e-Competence areas that were identified are:

A. PLAN
B. BUILD
C. RUN
D. ENABLE
E. MANAGE

These e-Competence areas reflect the ICT Business process and its main sub-processes, from a very general perspective.

PLAN, BUILD and RUN are core areas whilst ENABLE and MANAGE are cross-cutting issues referred and related to the former.

PLAN and ENABLE represent strategic areas, within companies that conceive, decide, design and set up products, services, actions and policies. BUILD and RUN on the other hand provide operative sub-processes where companies act and do things. Finally, MANAGE represents companies' daily business administration and improvement.

The ICT Business Processes were essentially used for developing the structure of the e-Competence Framework. They were very useful for identifying, distinguishing and assigning the first competence examples. However, the concept of "business processes" is very generic. Therefore in practice assigning a competence to a specific process, like PLAN or MANAGE is not an exact science and it plays a less important role in the completed and applied e-CF than during its development.

Accordingly, Dimension 2 identifies and describes a set of key e-Competences for each defined e-Competence area. These e-Competence sets are not exhaustive; nonetheless they provide a basic, clear and sound orientation for companies who need to take decisions about recruitment, career paths, training, assessment, etc.; and also for people to understand companies' competence needs.

Furthermore, descriptions in Dimension 2 provide general and comprehensive explanations of the reference e-Competences. These explanations are detailed in Dimension 3 through e-Competence proficiency level specifications. e-Competence level specifications cover only relevant proficiency levels for each competence descriptor in dimension 2. For example, e-Competence level specifications within the areas PLAN and ENABLE are positioned on higher levels than those inside the other e-Competence Areas.

3.5. The 5 e-Competence levels e-1 to e-5 and their relationship to EQF levels 3 to 8

The European e-Competence Framework aligns to EQF (European Qualifications Framework) categories for reference purposes. However, as an industry-addressed competence framework the e-CF uses descriptors for ICT professional competence and not for qualifications. In consequence the level descriptors differ between the EQF and European e-CF.

The European e-Competence Framework relates to competences as needed and applied at the workplace. It has 5 e-Competence levels defined. These competence proficiency levels e-1 to e-5 are related to the EQF qualification levels 3 to 8; EQF Level 1 and 2 are in this context not relevant. The EQF and e-CF levels are not identical as the perspectives are different. While the EQF reflects a qualifications perspective, the e-CF adopts a workplace competence perspective. However, both perspectives are interrelated as qualifications contribute to competence development. The table below provides a level relationship between the two frameworks.

e-CF Level	*related to* EQF Level
e-5	8
e-4	7
e-3	6
e-2	4 and 5
e-1	3

Table 1 – The 5 e-Competence levels of the European e-CF and their relationship to EQF levels 3-8

As previously mentioned, the difference between the two types of levels can be illustrated by using an example of a person with a Ph.D., this would be EQF level 8. However he or she is not automatically able to apply knowledge, skills and attitudes in a working situation at e-Competence level 5. The competence for a particular job implies more than having achieved a qualification. It also requires experience and proven level of ability to act in complex situations.

3.6. Role of dimension 4 (knowledge and skills) and connection to the e-skills qualification side

Dimension 4 provides samples of knowledge and skills included in each e-Competence identified and defined in dimensions 2 and 3. Accordingly, dimension 4 details examples of core elements / components related to the contents of the e-Competences. From this perspective, the depth of analysis in this dimension could be considered too detailed for company needs. Nonetheless, such in-depth descriptions can for example be useful to define specific and precise outcomes to be assessed within companies' competence assessment sessions.

On the other hand, dimension 4 is critical for training and certification institutions because they need to specify qualifications in terms of learning outcomes. In this context, skills and knowledge can represent both e-competences and the learning outcomes to be reached through learning / training paths. Consequently, skills and knowledge represent a bridge between organisation competences and vocational training and qualifications.

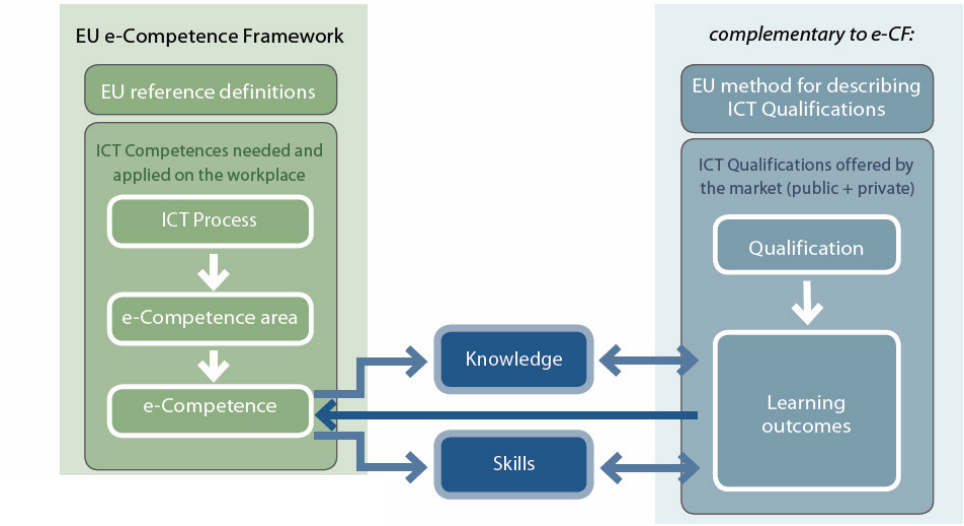


Figure 1 – Links between e-CF competences and ICT qualification offers can be easily established by the framework dimension 4, making explicit knowledge and skills. Source: www.ict-lane.eu

In general, ways of detailing e-competences and making them applicable to specific environments are choices based upon an organisations vision and strategy. The same can be said for training institutions. The choices made in delineating qualifications into skills and knowledge and thus into learning outcomes establishes differentiation between one education and training programme and another. Organisational choices related to skills and knowledge developments provide a competitive key to address business success. Thus the European e-CF cannot and should not replace an organisations decision making process but can provide a foundation to work from.

4. Framework use by ICT sector players as a shared European reference: How to adapt it to specific needs

4.1. Plan, develop and manage competences in a broader environment: companies and public sector, in particular ICT HR and competence managers

Competence management, people development and HR planning are valuable components of employee management within companies and the public sector.

At a minimum each employee should have:

- *In an existing role*, a clear description of the position to which he/ she is assigned, including a mission statement, responsibilities, activities, outcomes, performance indicators and resources/ experience/ certifications required to perform the job correctly.
- *In a new role*, a competence assessment to measure the gap between his/her knowledge, skills and experience and those required by the position. When necessary, an individual development plan is established to fill the gaps.

At a more intensive level of people management, the following points are relevant:

- Position descriptions derive from part of one or several job profile structures; each job profile including the levels of required competence.
- Each job profile is part of a career path, allowing employees to understand progression routes.
- HR strategy and annual individual objectives derived from company needs (or ambitions).
- Individual development plans taking into consideration annual individual objectives.
- Using training catalogues, a training plan is created from consolidation of combined individual development plans.

The 4 dimensions of the European e-Competence Framework support the employee and the competence management process on multiple levels. As the figure shows, it provides a consistent level of granularity and continuity.

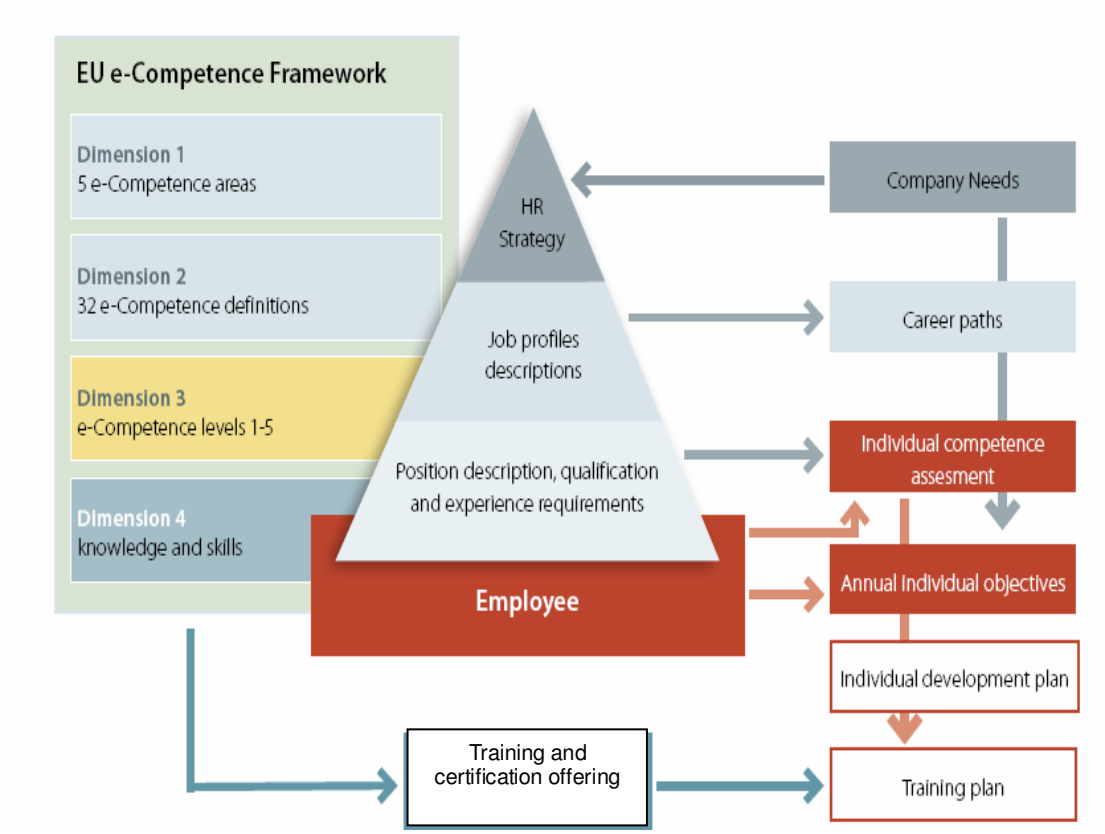


Figure 2 – The use of the European e-Competence Framework is multiple within ICT organisations

4.1.1. Framework benefits for small and medium sized enterprises (SMEs)

There are differences between SMEs and larger organisations when considering the application of competence. However the principles of competence identification and application within the workplace apply regardless of organisation size. It may be that some competences are too difficult to develop or acquire in an SME environment and in this case the e-Competence Framework can support articulation of buy in service requirements.

Typically, SME staff carry out many different roles. However, the e-CF can still be used for

- constructing job descriptions by picking elements from different areas,
- checking for skills gaps, and creating training plans,

- encouraging skills development,
- encouraging professional approach to ICT work,
- identifying areas for applying external expertise.

4.2. A European dimension of competence description

In the first instance the European e-Competence Framework establishes a European common language for ICT competences. It also supports the definition of jobs, training courses, qualifications, career paths, formal and non-formal learning paths, certifications etc. in the ICT related business areas. In this way, local, national, European and global ICT vendor and user companies have access to a shared reference. In addition, national ICT frameworks can be linked to the e-Competence Framework and gain a European dimension:

- National **ICT competence frameworks, qualification systems, job profiles etc become comparable** to competence frameworks, qualification systems, job profiles from other countries;
- National ICT competence frameworks, qualification systems, job profiles etc **receive guidance on how to link, to implement the EQF into a specific business area**, being linked by the EQF-levels to the e-Competence levels;
- **ICT competences and proficiency levels become comparable** to competences of other business areas and sectors in Europe.

Before comparing the European e-Competence Framework to other ICT frameworks, ICT qualification systems or anything else that might be like a framework (referred below as a frame), it may be useful to answer a few questions:

- What is the focus and the target of the frame?
- What are the main principles? What is the context of the frame?
- What is the subject-matter of the frame? Which elements are used and classified? Is it competence, qualifications, job profiles, learning outcomes, higher education or something else?
    - Which level is used for describing the elements? Which level of abstraction is used?
    - What about the granularity of the elements?

- Is there more than one level of description? (for example: titles, short descriptions, long descriptions)

- How to build the structure of the frame? Which dimensions are used for classifying the elements?
  - What are the references for the dimensions? (for example: content, levels of proficiency, benchmarks)
  - For every dimension: Is it uni- or multidimensional?
  - How about the relationship between the dimensions? Are they independent?
- Are there further application or guiding documents (for example: instructions, how to categorise elements)?

The answers can be compared with the characteristics of the European e-Competence Framework, as explained in this document, thus enabling linkage.

4.2.1. Added value to existing frameworks – examples SFIA, CIGREF, AITTS, EUCIP

For existing frameworks the European e-Competence Framework provides added value. The European dimension allows transparency, comparability and the creation of European knowledge areas. It will "facilitate trans-national mobility for workers and learners and contribute to meeting the requirements of supply and demand in the European labour market" [from the EQF-document, 23 April 2008].

Existing national or local ICT frameworks differ from each other and are embedded in specific environments; they can link to the European reference Framework in individual ways. The following four examples give an idea of possible approaches and the potential for application of the common European e-Competence Framework to existing frameworks. The four framework examples are for illustration, they are not exhaustive.

Example 1: The United Kingdom developed "SFIA – Skills framework for the information age"

SFIA provides a common reference model for the identification of the skills needed to develop effective information systems (IS) making use of information and communications technologies (IT). It is a simple and logical two dimensional framework consisting of areas of work on one axis and levels of responsibility on the other. The overall purpose of SFIA is to assist organisations employing IT professionals to ensure that the right skills are developed and deployed to best effect to

- reduce IT project risk,
- retain staff,
- make recruitment effective,
- enhance the effectiveness and efficiency of the IT function and
- provide appropriate development and career paths for IT professionals.

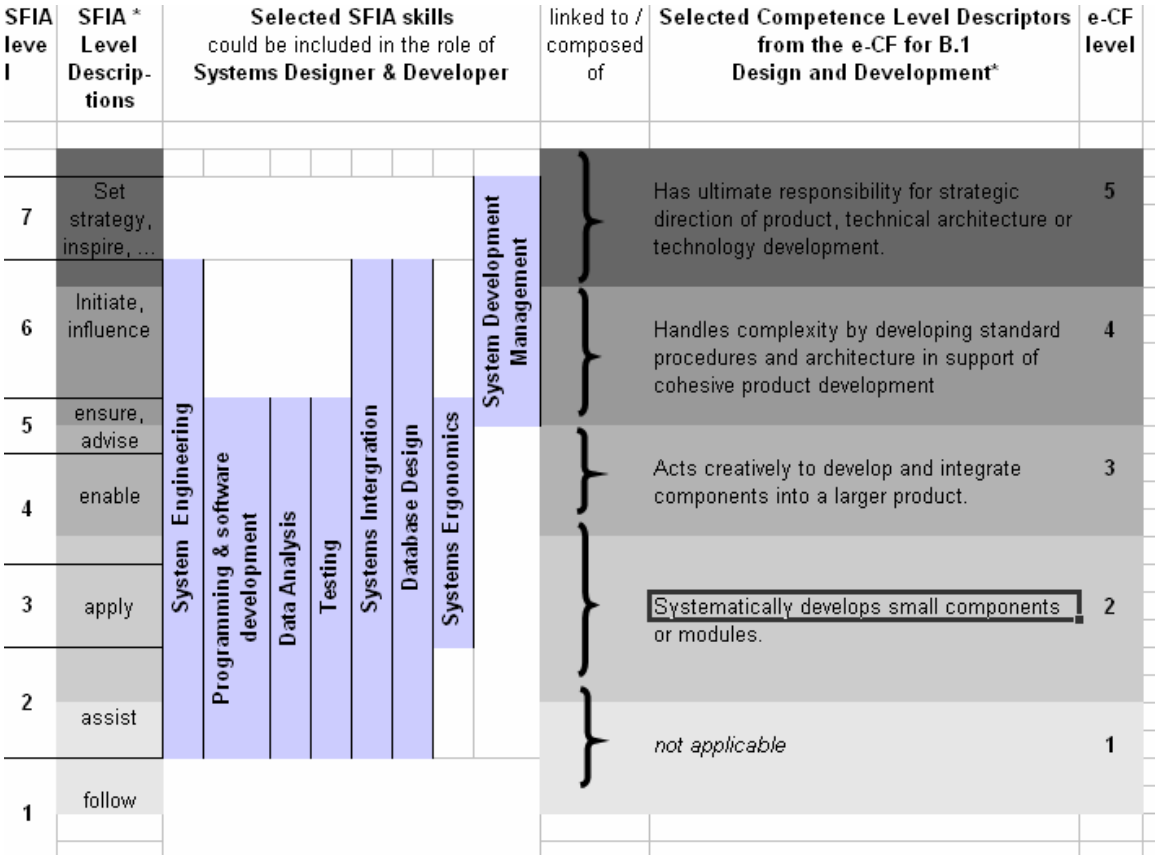
SFIA uses a common language and a sensible, logical structure that can be used to facilitate the processes of skills development in all businesses using or providing Information Technology. It is easily understood by IT practitioners, managers, HR professionals, employers, education and training providers and government personnel.

There are 91 skills described in SFIA version 4G and these can be deployed at a range of up to 7 levels (1= follow, 2 = assist, 3 = apply, 4= enable, 5= ensure, advise, 6= initiate, influence, 7 = set strategy, inspire, mobilise). Each level is defined by the autonomy, influence, complexity and amount of business skill deployed. The SFIA descriptions are reviewed periodically to ensure that they are up to date and meet the needs of the IT Industry. [4]

Linking SFIA skills to the European e-Competence Framework is straightforward. It is possible to link the 7 levels of the SFIA Framework to the 5 e-competence levels of the e-CF. The more detailed SFIA skills can be related to the higher granularity level-specific competences of the e-CF competences.

See the example below:

[4] Text adapted from the SFIA website www.sfia.org.uk



* For detailed descriptions of skills deployed at each level s. SFIA website www.sfia.org.uk

** e-Competence B.1: *Designs and engineers software and/or hardware components to meet required specifications, including energy efficiency issues. Follows a systematic methodology to analyse and build the required components and interfaces. Performs unit and system testing to ensure requirements are met.*

Figure 3 – Linking SFIA skills to the European e-Competence Framework

Example 2: The French "CIGREF framework on job profiles"

The CIGREF nomenclature presents a set of IT occupations grouped into families that are used in most information system departments of major French companies. It is a tool that was built by consensus among HR professionals. Companies use it as template to build their own repository by adding their own specifications.

The template includes:

- a title and other common names used in organizations,
- a mission describing the purpose of the job,
- a description of significant activities and tasks,
- the skills needed classified into three distinct categories: IT skills, general skills and attitudes.

In 2002, CIGREF had identified the need to simplify and standardise the list of knowledge and skills: The e-Competence Framework and its four dimensions responds to this need.

The links between the European e-Competence Framework and the CIGREF framework can be made by using the dimension 2 for describing activities and by using dimension 3 for describing competences required to perform the job correctly.

The current CIGREF framework will need to be adapted: using e-Competence dimension 2, activities will be described with more consistency and by using the dimension 3, knowledge and skills will be replaced by competences, making it easier to understand.

This approach will provide simplified job profiles and when necessary, it will be possible to obtain more detail by using the link between dimension 3 and 4, i.e. knowledge and skills associated to the corresponding level of competence.

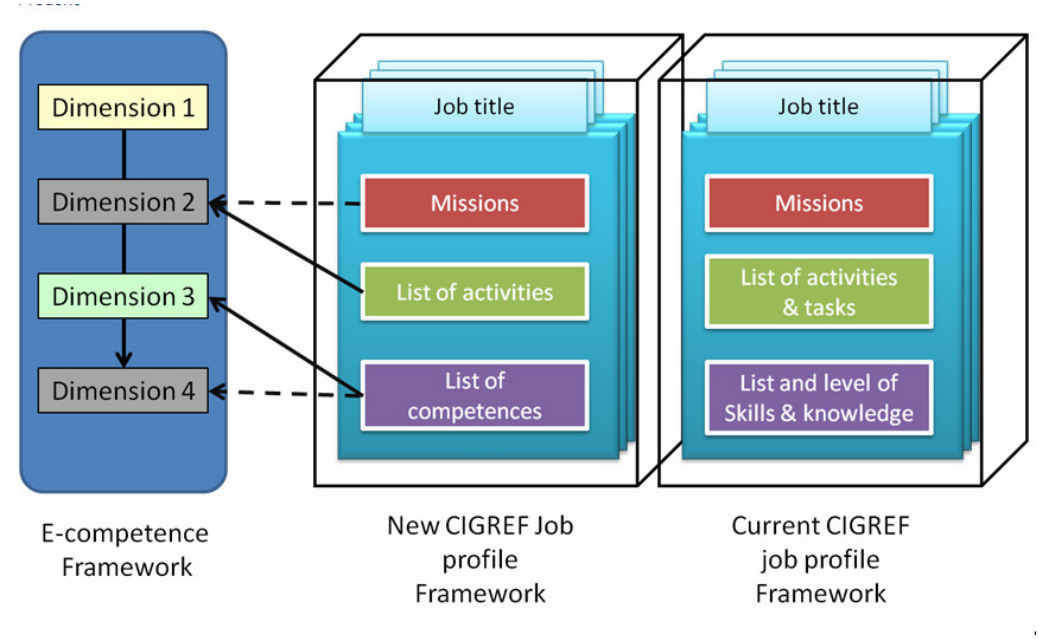


Figure 4 – Linking the CIGREF nomenclature to the European e-Competence Framework

Example 3: The German "AITTS – Advanced IT Training System"

AITTS is a system of career profiles associated to three levels of proficiency (completed by a forth basic level, the IT occupations from the German "dual system"). AITTS provides both, a competence and qualifications framework, as it comes additionally with a methodology for workflow embedded qualification.

The system of profiles and the methodology for qualification are linked by reference processes: described work processes that serve simultaneously as a reference for the particular job role and its curriculum. These reference processes are extensive and detailed curricula for each career profile. They have been worked out in co-operation with more than 60 representatives from the ICT industry and training providers. There, the structure of the learning content is decided not on the basis of a formal organisation of the subject, but rather on the basis of the work process.

Linking AITTS profiles to the European e-Competence Framework is initially easy, as both are structured from business and working processes. Additionally, the main target of AITTS is to advance the capability of ICT employees in the workplace and this is very close to the e-CF definition of competence.

Most AITTS profiles are composed of more than one competence. They are integrated into the German system of occupations and offer a wide range of opportunities to obtain jobs by enhancing qualifications and competences.

See some examples below:

AITTS 'level'	Selected AITTS	linked to /	Selected Competences from the e-CF	e-CF
Operative Professionals	IT Business Manager		A.4 Product or Project Planning	3
			A.6 Application Design	3
			D.5 Sales Proposal Development	3-4
			D.8 Contract Management	3
			D.9 Personnel Development	3-4
			E.2 Project and Portfolio Management	3
			E.3 Risk Management	3
			E.5 Process Improvement	3
			E.6 ICT Quality Management	3
			E.7 Business Change Management	3
			if applicable some other and – of course – some more (not integrated in the e-CF)	
Specialists	IT Project Coordinator		D.5 Sales Proposal Development	2
			E.2 Project and Portfolio Management	2-3
			E.3 Risk Management	2
			E.6 ICT Quality Management	2
			E.8 Information Security Management	2
			(if applicable some other)	
IT Occupations (German Dual System)	Information technology specialist in applications development		A.6 Application Design	1
			B.1 Design and Development	2
			B.2 System Integration	2
			B.3 Testing	1
			B.4Solution Deployment	1-2
			B.5 Documentation Production	1-2
			C.1 User Support	1
			E.2 Project and Portfolio Management	2
			(if applicable some other)	

Figure 5 – Linking German AITTS and IT Occupation profiles to the European e-Competence Framework[5]

[5] For detailed AITTS profile descriptions see "Die deutschen IT Aus- und Weiterbildungsberufe im europäischen e-Competence Framework". IG Metall 2010

Example 4: The European Certification Model for ICT Professionals EUCIP

The current EUCIP model provides for the definition and measurement of ICT skills and is currently used as the basis for the provision of certification and services in seven countries across Europe. The EUCIP certification programme, which was developed by CEPIS[6], is a professional certification and competency development scheme, aimed at informatics professionals and practitioners[7]. EUCIP aims to:

- Establish a sustainable European services network for informatics competence development
- Contribute to closing the ICT professional skills gap in Europe
- Offer a vehicle for life-long learning and competency enhancement for the ICT profession

The EUCIP model includes:

- EUCIP Core that provides a solid foundation for all types of IT related work.
- EUCIP Professional – a professional certification scheme based around 21 elective profiles.
- A range of business services have been development to manage competence analysis and development

EUCIP has been used in some European countries:

- to provide human resource and line managers with a common ICT job taxonomy based on competences and task descriptions
- as a base for professional development and staff retention
- as a benchmark tool for recruiting and skills procurement
- as a reference to compare learning programs in universities and to design lifelong training for practitioners
- to certify individual competences and control training effectiveness

EUCIP and the e-Competence Framework have common features and interesting potential synergies (see figure 6 below). The e-CF, as a common, accepted reference

[6] The Council of European Professional Informatics Societies

[7] www.eucip.org

point for IT practitioner competences, has the potential to be an important input into the future evolution of EUCIP and its associated certification and service offering.

e-CF Dimension 4 (Knowledge and Skills) link to EUCIP Competence Categories and more detailed topics. Referring to granularity of e-CF Dimension 4, EUCIP provides more in depth detail at this level finalized to support activities such as assessment.

e-CF Dimension 3 (Proficiency) articulates analytically levels for each e-Competence that in EUCIP levels are defined as general classes of knowledge and skill depth.

e-CF Dimension 2 (e-Competences) are statements of competence that are linked to EUCIP elective profile Tasks and can offer a more structured and process oriented framework of job tasks definition.

e-CF Dimension 1 (e-Competence areas) coincide with EUCIP knowledge areas and outline additional supporting processes (Enable and Manage) embedded in EUCIP core areas.

EUCIP's high level of granularity is useful for training departments to design and develop curricula and learning initiatives. It can provide detailed guidelines to identify knowledge and skill topics.

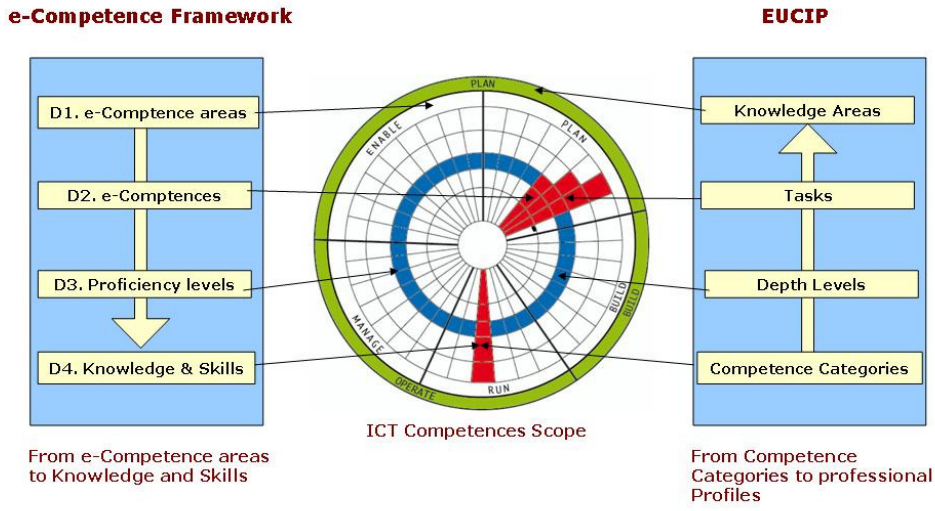


Figure 6 – Linking EUCIP components to the European e-Competence Framework

The four examples from national environments of the United Kingdom, France and Germany as well as from Europe show that it is possible to link different kinds of frameworks to the European e-Competence Framework.

The European e-Competence Framework therefore establishes **a European standard which is sufficiently generic** to be adaptable:

- to the requirements of the different countries,
- to the requirements of the various companies and organisations,
- to technological evolutions for the next few years,
- to future services.

4.2.2. A European inspiration for forthcoming national/ local ICT frameworks

Encouraging examples from Estonia and Canada show that for new national or local ICT frameworks the European e-Competence Framework can provide a standard directly adopted or adapted to meet specific cultural context and need.

Before using the European e-Competence Framework as a standard for developing a local ICT framework it might be useful to address a few questions. The first step is to clarify intended targets and purposes of the local framework (for helpful suggestions and questions look at 4.2). The second is to decide about adopting or adapting the European Framework or parts of it. For this purpose it might be useful to consider the following:

- Is it possible to compare the typical processes from local ICT companies to the processes used in the e-CF (in the categories plan, build, run, enable, manage)?

  To answer this question it might be helpful to look at the (typical) business processes of local ICT companies and at the adopted national or international standards for ICT product and/or service development and maintenance (e.g. CMMI, ITIL)

- In which ICT areas (look at dimension 1 of the e-CF) do local ICT companies operate?
  The focus of the e-CF Version 1.0 is on processes and competences in the areas of *Software Infrastructure*, *System Integration*, *Communication equipment and services*. For other areas such as *Microelectronics/ Components/ Semiconductors*, *Computing hardware or Industrial Control Systems* it may be necessary to modify or amend competences.

- What national, local, economic, social or cultural characteristics exist that make it necessary to modify the competence descriptions or the level descriptions from the e-CF?

- Are relationships from the modified European e-Competence Framework to existing qualifications, training or national/local educational system possible and helpful?
  If learning outcomes are orientated on competences, linking to e-CF might be straightforward.

Using the European e-Competence Framework to link to formal and informal acquired qualifications is straightforward if they are orientated towards competence. From a competence perspective it is unimportant when and where a qualification is awarded or how many study hours are involved. Competence demands demonstrable capability obtained through a combination of experience, formal or informal acquired abilities/skills and knowledge.

The European e-Competence Framework can be used as a reference model for recognising competence informally acquired by ICT practitioners and professionals through their career.

4.3. Input for qualifications, training courses and certification descriptions and promotion

The European e-Competence Framework also provides an input for educational and vocational training and certification institutions.

The Bologna process (1999) expressed its programmatic intention of generating “a new enhanced European co-operation” especially focused on higher education and employability. In addition, the Bruges-Copenhagen Process (2001-2002) promoted transparency, mobility and inter-institutional co-operation to strengthen vocational education and training as well as the recognition of competences and qualifications.

Accordingly, the European e-CF is a consistent way of connecting companies to schools, universities and training institutions: thus promoting Europe-wide inter-institutional co-operation. The European e-CF demonstrates industry competence needs and educational and training institutions can take this into account to conceive and design training programmes.

Moreover, the European e-Competence Framework provides a consistent link to the European Qualifications Framework (EQF) because the e-competence descriptions are in line with the EQF learning outcomes-based language. It therefore also supports mutual understanding and communication between industry and education and training systems.

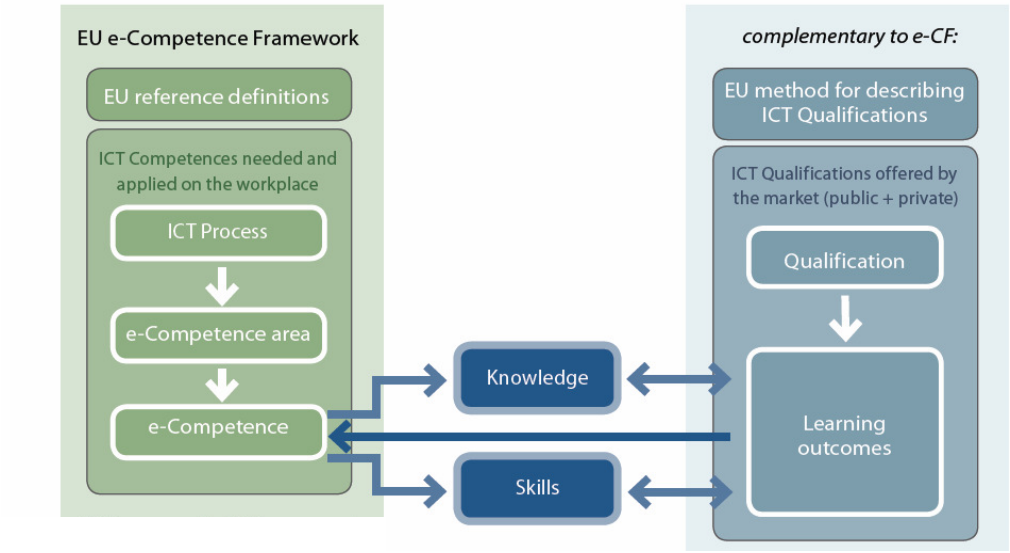


Figure 7 – Links between e-CF competences and ICT qualification offers can be easily established by the framework dimension 4, making explicit knowledge and skills. Source: www.ict-lane.eu

In the figure below the possible role of the European e-CF to support and inspire new training processes is highlighted.

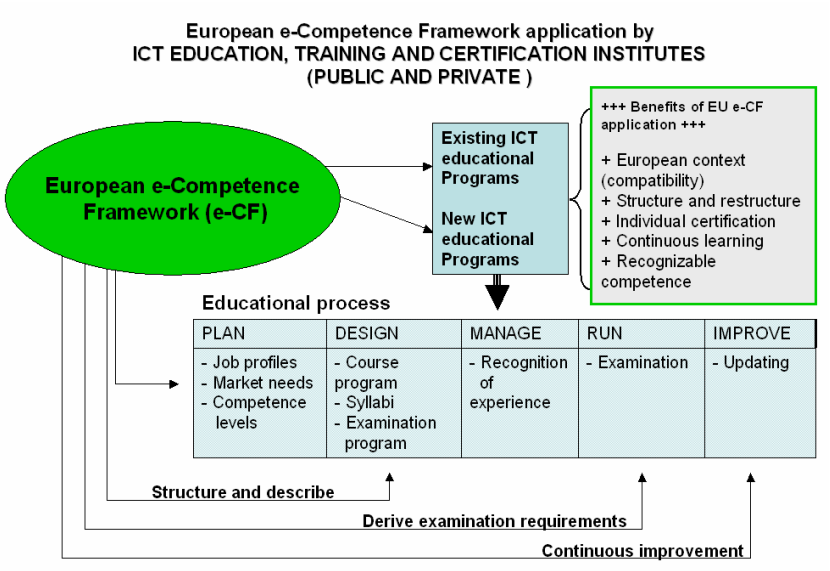


Figure 8 – EU e-CF application by ICT education, training and certification institutes (public and private)

4.4. Developing an ICT practitioner career

The European e-Competence Framework provides a pragmatic overview of the European ICT labour market from industry and public sector perspective and its competence requirements.

The framework can be used by individuals to self assess and articulate a personal competence profile. This may then be compared with a European job role defined in e-CF competence terminology. Consequently, individual competence gaps can be used to focus personal development on areas for improvement. This activity may be driven by personal motivation or through collaboration within an employers structured personal development programme.

4.5. Adopting the framework to work and staff planning: How to build job profiles

The competences provided by the European e-Competence Framework can be used as bricks for building job profiles according to specific company and work place needs.

Figure 9 shows an example from a German ICT profile.

		A 6 Application Design	1
Information technology specialist in applications development	{	B 1 Design and Development	2
		B 2 System Integration	2
		B 3 Testing	1
		B 4 Solution Deployment	1-2
		B 5 Documentation Production	1-2
		C 1 User Support	1
		E 2 Project and Portfolio Management	2
		(if applicable some other)	

Figure 9 – A job profile can be specified by a set of e-Competences – example
(example from the German dual system job profile *Fachinformatiker Anwendungsentwicklung*)

4.6. Use of the framework for recruiting and sourcing processes

Using the European e-Competence Framework as a core reference for ICT recruiting and sourcing processes facilitates improved and efficient correlation between competence demand from recruiting and/ or sourcing companies and competence supply from job seekers and the ICT service supply side.

Within companies, the recruiting process usually involves at least three interested parties:

- Line management responsible for the person to be recruited. They need to define as precisely as possible the job in terms of mission statements, responsibilities, activities, work environment and, of course, the required competences and qualifications.
- An HR representative, who has to define the compensation in relationship with HR policies (level of responsibility, expected career evolution…) and with the evolution of the job position.
- Potential applicants (internal or external to the company), who need to clearly understand the specification of the job, the company, compensation and, benefits.

Communication between these three parties is a key issue in the effectiveness and successful of the recruitment process.

The European e-Competences Framework provides a common and concise language for those involved in recruitment:

- Dimension 1 & 2 can be used to define the scope of the job.
- Dimension 3 can be used to define the required competences and proficiency level.
- Dimension 4 can be used to highlight some particular knowledge and skills required and to design assessment sessions.

The use of an internationally shared competence language in job advertisements supplied by employers and recruiters and understood by job seekers would increase transparency and efficiency of the HR recruitment process.

Using the European e-Competence Framework for competence profiling in online job portals, will also benefit employers, recruitment agencies and job seekers by sharing a common language.

4.7. Guidance and orientation to choose learning paths and training offer

If the European e-CF can provide guidance for the education and training system, it can also be a useful reference for young people, employees and job seekers. People who intend to improve their competences or to retrain according to industry requirements can

refer to the European e-CF as a guide. It offers a clear picture of competences related to business areas and proficiency levels.

In addition, e-Competence can be related to training and qualification programmes as the European e-CF language is in line with EQF learning outcomes-based recommendations. Consequently, people can see opportunities for personal growth from the European e-CF, and also select appropriate training programmes.

4.8. Anticipate, evaluate and plan ICT skills and competence needs in a long-term perspective: policy makers, industry sector associations and market surveyors

The European e-Competence Framework provides for the first time a European standard reference for communicating competence needs in a trans national and European ICT environment. It articulates knowledge, skills and competence as needed and applied in the ICT workplace for the ICT vendor and user industry as well as in the public sector.

The e-Competence definitions of the Framework can therefore be used and understood as a shared international reference. It will support sector associations, policy makers, market surveyors and further players and institutions involved in anticipating, evaluating and planning ICT skills and competence needs in a long-term perspective across the European ICT Sector.

5. The e-CF Profile Enabling Tool

To support users of the European e-Competence Framework a simple tool has been developed which enables the creation of e-CF profiles. This user friendly tool is accessible, using any common browser, via the European e-competence framework website at www.ecompetences.eu

Framework elements from each dimension of the e-CF can be collected in a „pick and mix“ format to create a user generated profile. These profiles can be structured using the users prefered orientation. For instance, job profile creation may be of primary interest to employers, whereas education profiles (curriculum, certification, qualification etc.) may be of value to training and education institutions.

User defined profiles can be labeled as required, e.g. „Company X help desk competence profile“, or any other title, and subsequently the created profile saved and/ or printed. Navigation tabs and click boxes support simple selection of dimension elements including required proficiency levels.

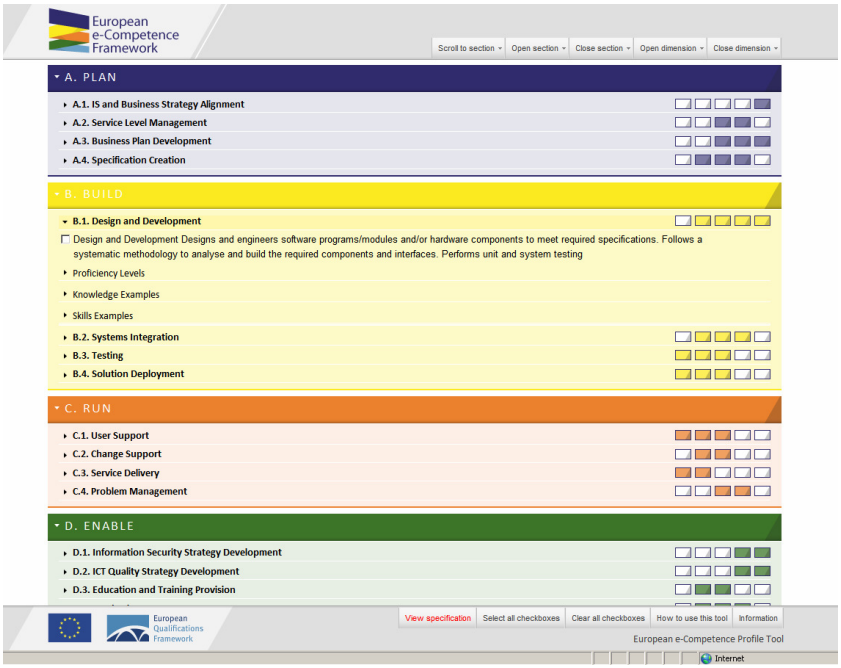


Figure 10 – The e-CF profile enabling tool – screenshot (Source: www.ecompetences.eu *from 10/10 on*)

Use of the online tool is free of charge and the simple web site design philosophy requires no specific security measures as profiles are not centraly retained.

This intuitive web tool has been designed to illuminate and bring to life the features and benefits acrued from deployment of the e-CF.

6. Acknowledgements

We are grateful and indebted to the wide group of contributors to the European e-Competence Framework, including

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  coming from Airbus, Banca d'Italia, Bayer Business Services, Breyer Publico, Cap Gemini, CIGREF, Cisco Systems, CPI Competenze per l'Innovazione, Deutsche Telekom, e-skills UK, ECABO, EMSI Grenoble, EURO CIO, EXIN International, Fondazione Politecnico di Milano, IG Metall, Institut PI, Michelin, PSA Peugeot Citroen, Syntec Informatique, UK Cabinet Office,

- and further European e-Skills stakeholders for providing highly valuable input and support throughout the four-year work programme. They are too numerous to name but the authors of the European e-Competence Framework wish to recognise the inspiration provided from institutions from across the European Union.

www.ecompetences.eu

7. Annex

European e-CF level table: Beside of concepts explicitly elaborated for the European e-Competence Framework, the table contains description elements of
- The European Qualifications Framework for Lifelong Learning (EQF), April 2008
- The PROCOM Framework, of which generic job titles have been reproduced by kind permission of e-Skills UK.

EQF levels	EQF Levels descriptions	e-CF Levels	e-CF Levels descriptions	Typical Tasks	Complexity	Autonomy	Behaviour
8	Knowledge at the most advanced frontier, the most advanced and specialised skills and techniques to solve critical problems in research and/or innovation, demonstrating substantial authority, innovation, autonomy, scholarly or professional integrity.	e-5	**Principal** Overall accountability and responsibility; recognised inside and outside the organisation for innovative solutions and for shaping the future using outstanding leading edge thinking and knowledge.	IS strategy or programme management	Unpredictable - unstructured	Demonstrates substantial leadership and independence context which are novel requiring the solving of issues that involve many interacting factors.	Conceiving, transforming, innovating, finding creative solutions by application of a wide range of technical and / or management principles
7	Highly specialised knowledge, some of which is at the forefront of knowledge in a field of work or study, as the basis for original thinking, critical awareness of knowledge issues in a field and at the interface between different fields, specialised problem-solving skills in research and/or innovation to develop new knowledge and procedures and to integrate knowledge from different fields, managing and transforming work or study contexts that are complex, unpredictable and require new strategic approaches, taking responsibility for contributing to professional knowledge and practice and/or for reviewing the strategic performance of teams.	e-4	**Lead Professional / Senior Manager** Extensive scope of responsibilities deploying specialised integration capability in complex environments; full responsibility for strategic development of staff working in unfamiliar and unpredictable situations.	IS strategy/holistic solutions		Demonstrates leadership and innovation in unfamiliar, complex and unpredictable environments. Addresses issues involving many interacting factors.	
6	Advanced knowledge of a field of work or study, involving a critical understanding of theories and principles, advanced skills, demonstrating mastery and innovation in solving complex and unpredictable problems in a specialised field of work or study, management of complex technical or professional activities or projects, taking responsibility for decision-making in unpredictable work or study contexts, for continuing personal and group professional development.	e-3	**Senior Professional / Manager** Respected for innovative methods and use of initiative in specific technical or business areas; providing leadership and taking responsibility for team performances and development in unpredictable environments.	Consulting	Structured - unpredictable	Works independently to resolve interactive problems and addresses complex issues. Has a positive effect on team performance.	Planning, making decisions, supervising, building teams, forming people, reviewing performances, finding creative solutions by application of specific technical or business knowledge/skills
5	Comprehensive, specialised, factual and theoretical knowledge within a field of work or study and an awareness of the boundaries of that knowledge, expertise in a comprehensive range of cognitive and practical skills in developing creative solutions to abstract problems, management and supervision in contexts where there is unpredictable change, reviewing and developing performance of self and others.	e-2	**Professional** Operates with capability and independence in specified boundaries and may supervise others in this environment; conceptual and abstract model building using creative thinking; uses theoretical knowledge and practical skills to solve complex problems within a predictable and sometimes unpredictable context.	Concepts/Basic principles		Works under general guidance in an environment where unpredictable change occurs. Independently resolves interactive issues which arise from project activities.	Designing, managing, surveying, monitoring, evaluating, improving, finding non standard solutions
4	Factual and theoretical knowledge in broad contexts within a field of work or study, expertise in a range of cognitive and practical skills in generating solutions to specific problems in a field of work or study, self-management within the guidelines of work or study contexts that are usually predictable, but are subject to change, supervising the routine work of others, taking some responsibility for the evaluation and improvement of work or study activities.				Structured - predictable		Scheduling, organising, integrating, finding standard solutions, interacting, communicating, working in team
3	Knowledge of facts, principles, processes and general concepts, in a field of work or study, a range of cognitive and practical skills in accomplishing tasks. Problem solving with basic methods, tools, materials and information, responsibility for completion of tasks in work or study, adapting own behaviour to circumstances in solving problems.	e-1	**Associate** Able to apply knowledge and skills to solve straight forward problems; responsible for own actions; operating in a stable environment.	Support/Service		Demonstrates limited independence where contexts are generally stable with few variable factors.	Applying, adapting, developing, deploying, maintaining, repairing, finding basic-simple solutions