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BSI Standards Publication

e-Competence Framework (e-CF) — A common European Framework for ICT Professionals in all industry sectors

Part 1: Framework

bsi.

National foreword

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e-Kompetenz-Rahmen (e-CF) - Ein gemeinsamer europäischer Rahmen für IKT-Fach- und Führungskräfte in allen Branchen - Teil 1: Rahmenwerk

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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European foreword

This document (EN 16234-1:2016) has been prepared by Technical Committee CEN/TC 428 "Project Committee - e-competences and ICT Professionalism", the secretariat of which is held by UNI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by October 2016, and conflicting national standards shall be withdrawn at the latest by October 2016.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes CWA 16234-1:2014.

This European Standard is made up of three parts defining an EN which is the transposition of CWA 16234-1, CWA 16234-2, CWA 16234-3 and CWA 16234-4:

– Part 1: *e-Competence Framework (e-CF) - A common European Framework for ICT Professionals in all industry sectors –Part 1: Framework* (EN);

– Part 2: *e-Competence Framework (e-CF) - A common European Framework for ICT Professionals in all industry sectors – Part 2: User guide* (TR);

– Part 3: *e-Competence Framework (e-CF) - A common European Framework for ICT Professionals in all industry sectors – Part 3: Methodology* (TR).

Part 1 is fully standalone, and Parts 2 and 3 rely on Part 1.

A relationship with the European ICT Professional Profiles (CWA 16458, original CWA updated by e-CF 3.0 competences and re-published in 2014) is established: to each Profile a number of relevant e-Competences and their applying level(s), as defined by this standard, are assigned.

This standard on qualification of personnel outlines the minimum requirements (i.e. a threshold) of the staff competence based on skills and/or knowledge. This principle needs to be taken into consideration when assessing what part is mandatory and what becomes a simple recommendation when setting out the elements of each competence (shall versus should/may/can, etc.)

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

This standard was established as a tool to support mutual understanding and provide transparency of language through the articulation of competences required and deployed by Information and Communication Technology (ICT) professionals.

To support users and guide developers of applications to this standard, the following narrative provides an overview of the underpinning philosophy and principles adopted during the standard's construction and vital for successive updates.

The Guiding Principles:

This standard is an enabler; it is designed to be a tool to empower users, not to restrict them.

This standard provides a structure and content for application by many types of users from organizations in the private and public sector, ICT user or ICT supply organizations, educational institutions including higher education and private certification providers, social partners and individuals. In this broad application context, this standard is designed to support common understanding, not to mandate the use of each and every word used within it.

This standard expresses ICT competence using the following definition: 'Competence is a demonstrated ability to apply knowledge, skills and attitudes for achieving observable results'. This is a holistic concept directly related to workplace activities and incorporating complex human behaviours expressed as embedded attitudes. Attitudes are the glue which keep knowledge and skills together. Soft skills are the attitudes' components that can be made explicit, trained and developed.

Competence is a durable concept and although technology, jobs, marketing terminology and promotional concepts within the ICT environment change rapidly, this standard remains durable requiring maintenance approximately every three years to maintain relevance.

A competence can be a component of a job role, but it cannot be used as a substitute for similarly named job titles, for example; the competence, D.7. 'Sales Management' does not represent the complete content of a 'Sales Manager' job role. Competences can be aggregated, as required, to represent the essential content of a job role or profile. On the other hand, one single competence may be assigned to a number of different job profiles.

Competence is not to be confused with process or technology concepts such as, 'Cloud Computing' or 'Big Data'. These descriptions represent evolving technologies and in the context of this standard, they may be integrated as knowledge and skills examples in Dimension 4.

This standard does not attempt to cover every possible competence deployed by an ICT professional nor are the included competences necessarily unique to ICT. This standard articulates competences associated with ICT professional roles including some that may be found in other professions but are very important in an ICT context; examples include, C.4. 'Problem Management' or E.3. 'Risk Management'. However, to maintain an ICT focus, this standard avoids generic competences such as 'Communications' or 'General Management' although very applicable these transversal competences are comprehensively articulated in other structures. Selecting competences for inclusion within this standard is therefore, not a scientific choice, but a pragmatic process engaging a broad cross-section of stakeholders who prioritize competence inclusion based upon industry knowledge and experience.

This standard is structured across four dimensions. e-Competences in Dimensions 1 and 2 are presented from the organizational perspective as opposed to from an individual's perspective. Dimension 3 which defines e-Competence levels related to the European Qualifications Framework (EQF), is a bridge between organizational and individual competences. Dimension 4 provides samples of knowledge and skills to the e-Competences in Dimension 2, they are not intended to be exhaustive but for inspiration and orientation only.

This standard has a sector specific relationship to the EQF; competence levels within this standard provide a consistent and rational relationship to levels defined within the EQF. The relativity between EQF learning levels and the e-competence proficiency levels of this standard has been systematically developed to enable consistent interpretation of the EQF in the ICT workplace environment.

Continuity of this standard is imperative; following maintenance updates it is essential that users are provided with a simple upgrade path. Users of this standard invest considerable time and resources to align processes or procedures with it. Organizations deploying these downstream activities are reliant upon this standard and need to be confident of the continued sustainability of their processes. Updates of this standard need to recognize this requirement and provide for continuity enabling use of the existing version of this standard until it is convenient to upgrade to the latest version.

This standard is neutral; it does not follow the specific interests of a few major influencers, it is developed and maintained through an EU-wide balanced multi-stakeholder agreement process, under the umbrella of the European Committee for Standardization. This standard is a key component of the European Commission's Digital Agenda; it is designed for use by any organization and individual engaged in ICT Human Resources planning and competence development.

1 Scope

This European Standard provides a reference of 40 competences as required and applied at the Information and Communication Technology (ICT) business related workplace, using a common language for competences, skills and proficiency levels that can be understood across Europe. As the first sector-specific implementation of the European Qualifications Framework (EQF), this European Standard aligns its proficiency levels to the EQF learning levels.

This European Standard was created for application by:

- ICT service, user and supply organizations,
- ICT professionals, managers and human resource (HR) departments,
- vocational education institutions and training bodies including higher education,
- social partners (trade unions and employer association), professional associations, accreditation, validation and assessment bodies,
- market analysts and policy makers,

and other organizations and stakeholders in public and private sectors.

2 Normative reference

No document has been identified as indispensable for the application of this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
ICT professional skill
capability relating or belonging to professions in the ICT sector

[SOURCE: OXFORD English Dictionary, modified – the word “ICT” has been added]

3.2
ICT management skill
capability of dealing with and controlling issues related or belonging to the ICT

[SOURCE: OXFORD English Dictionary, modified – the word “ICT” has been added]

3.3
ICT user skill
capability required for the effective application of ICT systems and devices by the individual ICT user

Note 1 to entry: ICT users apply systems as tools in support of their own work.

3.4
competence
demonstrated ability to apply knowledge, skills and attitudes for achieving observable results

3.5
knowledge
body of facts, principles, theories and practices that is related to a field of work or study

[SOURCE: EQF]

3.6
skill
ability to apply knowledge and use know-how to complete tasks and solve problems, from managerial to technical

Note 1 to entry: In the context of this standard, skills are described as cognitive (involving the use of logical, intuitive and creative thinking) or practical (involving manual dexterity and the use of methods, materials, tools and instruments).

[SOURCE: EQF]

3.7
attitude
way that one thinks and feels about somebody or something; the way that one behaves towards somebody or something that shows how one thinks and feels

[SOURCE: OXFORD English Dictionary]

Note 1 to entry: Soft skills may shape attitudes; attitudes and soft skills can influence each other. For example, positive thinking leads to a positive attitude; good communication and conflict mediator skills may benefit a leadership attitude; a listener attitude facilitates relationship skills, etc.

3.8
soft skills
personal attributes that enable someone to interact effectively and harmoniously with other people

[SOURCE: OXFORD English Dictionary]

Note 1 to entry: Soft skills include skills such as communication, ability to work on multidisciplinary teams, etc. These skills should be distinguished from technical, or “hard skills”.

3.9
proficiency level
rank in a scale defined by three facets: context complexity, autonomy and behavior

Note 1 to entry: All three facets are also present and easily identifiable within the EQF definitions and descriptions. This maintains a consistent relationship between the EQF (expressing learning levels) and this standard (expressing proficiency levels).

3.10
autonomy
capacity to act without external control or influence

Note 1 to entry: Ranges between “responding to instructions” and “making personal choices”.

3.11
context complexity
richness of the circumstances forming a context (any circumstances or situations that form the setting for an event), their variety, and their level of stability, so that the higher the context stability, the less its complexity

Note 1 to entry: Ranges between "structured – predictable" situations and "unpredictable – unstructured" situations.

3.12
behavior
observable outcome of attitudes

Note 1 to entry: Ranges between "the ability to apply" and "the ability to conceive".

3.13
plan
e-Competence area related to the capabilities of conceiving, deciding, designing and setting up products, services, actions and policies

[SOURCE: CMMI 2006]

3.14
build
e-Competence area concerned with the capabilities of development and implementation of products, services and solutions

[SOURCE: CMMI 2006]

3.15
run
e-Competence area focused on the capabilities of provisioning, supporting and maintaining the products, services and solutions delivered or deployed

[SOURCE: CMMI 2006]

3.16
enable
e-Competence area representing capabilities that produce the proper conditions and the facilities for implementing and managing ICT systems, e.g. security, quality management, marketing and selling, distributing and supplying, procuring, acquiring incl. outsourcing, disposition

[SOURCE: CMMI 2006]

3.17
manage
e-Competence area representing companies' daily business administration and improvement

[SOURCE: CMMI 2006]

4 Symbols and abbreviated terms

The following symbols and abbreviated terms are used in Clause 7.

CMMI - Capability Maturity Model Integration

COBIT - Control OBjectives for Information and related Technology

CPD - Continuing Professional Development

CSR - Corporate Social Responsibility

DBMS - DataBase Management Systems

DSS - Data Storage Server

IaaS - Infrastructure as a Service

ICT - Information and Communication Technology

IDE - Integrated Development Environment

IDL - Interface Definition Languages

IPR - Intellectual Property Rights

IS - Information Systems (in the broad understanding of including software, hardware, data, people, procedures and business processes)

ISO - International Standardization Organization

ITIL - Information Technology Infrastructure Library

KPI - Key Performance Indicator

PaaS - Platform as a Service

RAD - Rapid Application Development

SaaS - Software as a Service

SLA - Service Level Agreement

SWOT - Strengths, Weaknesses, Opportunities and Threats [analysis]

VAR - Value-Added Resellers

5 General principles

5.1 General

This standard is structured across four dimensions. These dimensions reflect different levels of business and human resource planning requirements in addition to job and work proficiency guidelines and are specified as follows.

5.2 Dimension 1: Five e-Competence areas

Five e-Competence areas were derived from the ICT main business processes PLAN – BUILD – RUN – ENABLE – MANAGE in order to identify sets of e-Competences expressing the abilities of planning (conceiving, designing, deciding, etc.), building (developing and implementing), running (delivering, supporting, maintaining, etc.), enabling (creating the proper conditions), and managing. They are named identically:

A. PLAN

B. BUILD

C. RUN

D. ENABLE

E. MANAGE

Assigning an e-Competence to a specific process, like PLAN or MANAGE, is not an exact science. It plays a less important role in the completed and applied standard than during its development. The main function of Dimension 1 in this standard is to serve as a navigation and entry point to the e-Competences in Dimensions 2, 3 and 4.

5.3 Dimension 2: 40 e-Competences

This dimension encompasses a set of reference e-Competences for each e-Competence area. Each e-Competence is specified by a title and a generic description of the competence. A total of 40 e-Competences have been identified; they provide the generic reference definitions of this standard.

The e-Competences defined within this standard are not exhaustive; nonetheless they provide a basic, clear and sound orientation for organizations which need to take decisions about recruitment, career paths, training, assessment, etc.; and also for people to understand organizations' competence needs. Furthermore, descriptions in Dimension 2 provide general and comprehensive explanations of the reference e-Competences.

5.4 Dimension 3: Five proficiency levels with EQF relationship

In Dimension 3, specific proficiency levels are assigned to each e-Competence generally described in Dimension 2. The level specifications of this standard encompass the e-Competence levels e-1 to e-5. These levels have a sector specific, consistent and rational relationship to the EQF levels 3 – 8 (see Table 1).

Table 1 — e-Competence levels e-1 to e-5 related to EQF level 3–8

e-Competence level	related to EQF level
e-5	8
e-4	7
e-3	6
e-2	4 and 5
e-1	3

The relationship between EQF learning levels and the e-Competence proficiency levels of this standard has been systematically developed to enable consistent interpretation of the EQF in the ICT workplace (see B.1).

Precisely, the EQF expresses a progression from

a) absence of autonomy and responsibility, EQF level 1, to full accountability and substantial authority in one or more fields, EQF level 8 (third EQF column - Autonomy and Responsibility),

b) basic knowledge, EQF level 1, to “knowledge at the most advanced frontier of a field of work or study and at the interface between fields”, EQF level 8 (first EQF column - Knowledge),

c) “basic skills required to carry out simple tasks”, EQF level 1, to “the most advanced and specialized skills and techniques, including synthesis and evaluation, required to solve critical problems”, EQF level 8 (Second EQF column – Skills).

Likewise, the descriptions of e-Competence proficiency levels assigned to any e-Competence, in terms of abilities, context complexity, autonomy and accountability, are comparable to the EQF. However, e-Competence level specifications cover only relevant proficiency levels for each e-Competence descriptor in Dimension 2. No competence is allocated at all five levels. Moreover, e-Competence proficiency levels do not link directly to any degrees; they focus specifically on "demonstrated abilities" in practical work experiences.

5.5 Dimension 4: Knowledge and skills

Samples of knowledge and skills relate to the e-Competences in Dimension 2. They are provided to add value and context and are not intended to be exhaustive but for inspiration and orientation only.

5.6 Embedded in Dimension 2, 3 and 4: Attitudes

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

5.7 Overview

An overview of the e-Competence Framework is given in Table 2.

Table 2 — e-Competence Framework overview

Dimension 1 5 e-CF areas (A – E)	Dimension 2 40 e-Competences identified	Dimension 3 – e-Competence proficiency levels e-1 to e-5, *related to EQF levels 3–8*				
		e-1	e-2	e-3	e-4	e-5
A. PLAN						
	A.1. IS and Business Strategy Alignment				■	■
	A.2. Service Level Management			■	■	
	A.3. Business Plan Development			■	■	■
	A.4. Product/ Service Planning		■	■	■	
	A.5. Architecture Design			■	■	■
	A.6. Application Design	■	■	■		
	A.7. Technology Trend Monitoring				■	■
	A.8. Sustainable Development			■	■	
	A.9. Innovating				■	■
B. BUILD						
	B.1. Application Development	■	■	■		
	B.2. Component Integration		■	■	■	
	B.3. Testing	■	■	■	■	
	B.4. Solution Deployment	■	■	■		
	B.5. Documentation Production	■	■	■		
	B.6. Systems Engineering			■	■	
C. RUN						
	C.1. User Support	■	■	■		
	C.2. Change Support		■	■		
	C.3. Service Delivery	■	■	■		
	C.4. Problem Management		■	■	■	
D. ENABLE						
	D.1. Information Security Strategy Development				■	■
	D.2. ICT Quality Strategy Development				■	■
	D.3. Education and Training Provision		■	■		
	D.4. Purchasing		■	■	■	
	D.5. Sales Proposal Development		■	■		
	D.6. Channel Management			■	■	
	D.7. Sales Management			■	■	■
	D.8. Contract Management		■	■	■	
	D.9. Personnel Development		■	■	■	
	D.10. Information and Knowledge Management			■	■	■
	D.11. Needs Identification			■	■	■
	D.12. Digital Marketing		■	■	■	
E. MANAGE						
	E.1. Forecast Development			■	■	
	E.2. Project and Portfolio Management		■	■	■	■
	E.3. Risk Management		■	■	■	
	E.4. Relationship Management			■	■	
	E.5. Process Improvement			■	■	
	E.6. ICT Quality Management		■	■	■	
	E.7. Business Change Management			■	■	■
	E.8. Information Security Management		■	■	■	
	E.9. IS Governance				■	■

6 Objective

The prime objective of this standard is to provide a common European language for ICT workplace-related competences, skills and proficiency levels as required and applied by professionals of the sector. In this way, all sector stakeholders, including public and private sector and individuals, have access to a shared reference.

In particular, this standard supports the articulation, definition and description of:

- jobs, role profiles, recruitment offers and needs and other types of competence specifications,
- training courses, qualifications, certifications and higher education curricula,
- career paths and professional development needs,
- formal and non-formal learning paths,
- competence gaps analysis at the individual, team or organizational level,
- education and training needs at the individual, team or organizational level,
- criteria for competence assessment and market-trend watching, etc.

The opportunities for improving the efficiency and effectiveness of European ICT HR-related processes by adopting this standard are significant. It provides a link between jobs, competences and qualification. This means in more detail:

a) This standard describes competence and can be used in a broad variety of applications where consistency of competence language is required. These include job descriptions, role profiles, competence specifications and the articulation of professional development needs.

b) This standard identifies proficiency at five 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.

c) This standard supports assessment of competence from a job role perspective, enabling targeted and efficient recruitment, contracting, sourcing and hiring.

d) This standard makes it possible to measure competence gaps at the individual, team or organizational level. It enables short and long-term planning by HR management or by individuals to assess and budget for education and training needs. As this standard becomes more universally applied, further applications can be envisaged. These include curriculum and ICT qualification and certification development.

e) This standard is also an enabler, making it possible for students to better understand the possibilities offered by ICT jobs and to identify future career opportunities. This standard is a tool which facilitates new national and international offers of education/qualification including higher education programs. In addition it may support the development of employer focused certification.

7 40 e-Competences

7.1 A. PLAN (DIMENSION 1)

7.1.1 A.1. IS and Business Strategy Alignment (DIMENSION 2)

The professional person possessing the competence **IS and Business Strategy Alignment** shall be able to:

1) anticipate long-term business requirements;

2) influence improvement of organizational process efficiency and effectiveness;

3) determine the IS model and the enterprise architecture in line with the organization's policy and ensures a secure environment;

4) make strategic IS policy decisions for the enterprise, including sourcing strategies.

DIMENSION 3

Moreover, to perform a job correctly at the appropriate proficiency levels, the professional person possessing the competence **IS and Business Strategy Alignment** shall be able to:

- provide leadership for the construction and implementation of long-term innovative IS solutions. (level e-4);

  and/or

- provide IS strategic leadership to reach consensus and commitment from the management team of the enterprise. (level e-5).

No further levels are available for the e-Competence A.1.

DIMENSION 4

This person should have knowledge of or be familiar with:

K1 business strategy concepts;

K2 trends and implications of ICT internal or external developments for typical organizations;

K3 the potential and opportunities of relevant business models;

K4 the business aims and organizational objective;

K5 the issues and implications of sourcing model;

K6 the emerging technologies (e.g. distributed systems, virtualization, mobility, data sets);

K7 architectural frameworks;

K8 security.

This person may be able to apply the following skills:

S1 analyse future developments in business process and technology application;

S2 determine requirements for processes related to ICT services;

S3 identify and analyse long-term user/customer needs;

S4 contribute to the development of ICT strategy and policy, including ICT security and quality;

S5 contribute to the development of the business strategy;

S6 analyse feasibility in terms of costs and benefits;

S7 review and analyse effects of implementations;

S8 understand the impact of new technologies on business (e.g. open/big data, dematerialization opportunities and strategies);

S9 understand the business benefits of new technologies and how these can add value and provide competitive advantage (e.g. open/big data, dematerialization opportunities and strategies);

S10 understand the enterprise architecture;

S11 understand the legal and regulatory landscape in order to factor into business requirements.

7.1.2 A.2. Service Level Management (DIMENSION 2)

The professional person possessing the competence **Service Level Management** shall be able to:

1) define, validate and make applicable SLAs and underpinning contracts for services offered;

2) negotiate service performance levels taking into account the needs and capacity of stakeholders and business.

DIMENSION 3

Moreover, to perform a job correctly at the appropriate proficiency levels, the professional person possessing the competence **Service Level Management** shall be able to:

- ensure the content of the SLA (level e-3);

  and/or

- negotiate revision of SLAs, in accordance with the overall objectives and ensure the achievement of planned results (level e-4).

No further levels are available for A.2.

DIMENSION 4

This person should have knowledge of or be familiar with:

K1 SLA documentation;

K2 how to compare and interpret management data;

K3 the elements forming the metrics of SLAs;

K4 how service delivery infrastructures work;

K5 impact of service level non-compliance on business performance;

K6 ICT security standards;

K7 ICT quality standards.

This person may be able to apply the following skills:

S1 analyse service provision records;

S2 evaluate service provision against SLA;

S3 negotiate realistic service level targets;

S4 use relevant quality management techniques;

S5 anticipate and mitigate against potential service disruptions.

7.1.3 A.3. Business Plan Development (DIMENSION 2)

The professional person possessing the competence **Business Plan Development** shall be able to:

1) address the design and structure of a business or product plan including the identification of alternative approaches as well as return on investment propositions;

2) consider the possible and applicable sourcing models;

3) present cost benefit analysis and reasoned arguments in support of the selected strategy;

4) ensure compliance with business and technology strategies;

5) communicate and sell business plan to relevant stakeholders and addresses political, financial, and organizational interests.

DIMENSION 3

Moreover, to perform a job correctly at the appropriate proficiency levels, the professional person possessing the competence **Business Plan Development** shall be able to:

- exploit specialist knowledge to provide analysis of market environment (level e-3);

  and/or

- provide leadership for the creation of an information system strategy that meets the requirements of the business (e.g. distributed, mobility-based) and includes risks and opportunities (level e-4);

  and/or

- apply strategic thinking and organizational leadership to exploit the capability of ICT to improve the business (level e-5).

No further levels are available for A.3.

DIMENSION 4

This person should have knowledge of or be familiar with:

K1 business plan elements and milestones;

K2 the present and future market size and needs;

K3 competition and SWOT analysis techniques (for product features and also the external environment);

K4 value creation channels;

K5 profitability elements;

K6 the issues and implications of sourcing models;

K7 financial planning and dynamic;

K8 emerging technologies;

K9 risk and opportunity assessment techniques.

This person may be able to apply the following skills:

S1 address and identify essential elements of product or solution value propositions;

S2 define the appropriate value creation channels;

S3 build a detailed SWOT analysis;

S4 generate short and long-term performance reports (e.g. financial, profitability, usage and value creation);

S5 identify main milestones of the plan.

7.1.4 A.4. Product/Service Planning (DIMENSION 2)

The professional person possessing the competence **Product/Service Planning** shall be able to:

1) analyse and define current and target status;

2) estimate cost effectiveness, points of risk, opportunities, strengths and weaknesses, with a critical approach;

3) create structured plans; establishes time scales and milestones, ensuring optimization of activities and resources;

4) manage change requests;

5) define delivery quantity and provides an overview of additional documentation requirements;

6) specify correct handling of products, including legal issues, in accordance with current regulations.

DIMENSION 3

Moreover, to perform a job correctly at the appropriate proficiency levels, the professional person possessing the competence **Product/Service Planning** shall be able to:

- act systematically to document standard and simple elements of a product (level e-2);

  and/or

- exploit specialist knowledge to create and maintain complex documents (level e-3);

and/or

- provide leadership and take responsibility for, developing and maintaining overall plans (level e-4).

No further levels are available for A.4.

DIMENSION 4

This person should have knowledge of or be familiar with:

K1 effective frameworks and methodologies for governance plans;

K2 typical KPIs;

K3 basic decision-making methods;

K4 IPR principles and regulation;

K5 agile techniques;

K6 structured project-management methodologies (e.g. agile techniques);

K7 optimization methods (e.g. lean management);

K8 emerging technologies.

This person may be able to apply the following skills:

S1 identify all potential targets for the product or service;

S2 define the communication plan; identify key users and create related documentation;

S3 produce quality plans;

S4 ensure and manage adequate information for decision makers;

S5 manage the change request process;

S6 manage the product/service development management lifecycle (inclusive of the formal change request process).

7.1.5 A.5. Architecture Design (DIMENSION 2)

The professional person possessing the competence **Architecture Design** shall be able to:

1) specify, refine, update and make available a formal approach to implement solutions, necessary to develop and operate the IS architecture;

2) identify change requirements and the components involved: hardware, software, applications, processes, information and technology platform;

3) take into account interoperability, scalability, usability and security;

4) maintain alignment between business evolution and technology developments

DIMENSION 3

Moreover, to perform a job correctly at the appropriate proficiency levels, the professional person possessing the competence **Architecture Design** shall be able to:

- exploit specialist knowledge to define relevant ICT technology and specifications to be deployed in the construction of multiple ICT projects, applications or infrastructure improvements (level e-3);

  and/or

- act with wide ranging accountability to define the strategy to implement ICT technology compliant with business need and take account of the current technology platform, obsolescent equipment and latest technological innovations (level e-4);

  and/or

- provide ICT strategic leadership for implementing the enterprise strategy, apply strategic thinking to discover and recognize new patterns in vast data sets and new ICT systems, to achieve business savings (level e-5).

No further levels are available for A.5.

DIMENSION 4

This person should have knowledge of or be familiar with:

K1 architecture frameworks, methodologies and systems design tools;

K2 systems architecture requirements: performance, maintainability, extendibility, scalability, availability, security and accessibility;

K3 costs, benefits and risks of a system architecture;

K4 the company's enterprise architecture and internal standards;

K5 emerging technologies (e.g. distributed systems, virtualization models, data sets, mobile systems).

This person may be able to apply the following skills:

S1 provide expertise to help solve complex technical problems and ensure best architecture solutions are implemented;

S2 use knowledge in various technology areas to build and deliver the enterprise architecture;

S3 understand the business objectives/drivers that impact the architecture component (data, application, security, development etc.);

S4 assist in communication of the enterprise architecture and standards, principles and objectives to the application teams;

S5 develop design patterns and models to assist system analysts in designing consistent applications.

7.1.6 A.6. Application Design (DIMENSION 2)

The professional person possessing the competence **Application Design** shall be able to:

1) analyse, specify, update and make available a model to implement applications in accordance with IS policy and user/customer needs;

2) select appropriate technical options for application design, optimizing the balance between cost and quality;

3) design data structures and build system structure models according to analysis results through modelling languages;

4) ensure that all aspects take account of interoperability, usability and security;

5) identify a common reference framework to validate the models with representative users, based upon development models (e.g. iterative approach).

DIMENSION 3

Moreover, to perform a job correctly at the appropriate proficiency levels, the professional person possessing the competence **Application Design** shall be able to:

- contribute to the design and general functional specification and interfaces (level e-1);

  and/or

- organize the overall planning of the design of the application (level e-2);

  and/or

- account for own and others actions in ensuring that the application is correctly integrated within a complex environment and complies with user/customer needs (level e-3).

No further levels are available for A.6.

DIMENSION 4

This person should have knowledge of or be familiar with:

K1 requirements modelling and need analysis techniques;

K2 software development methods and their rationale (e.g. prototyping, agile methods, reverse engineering, etc.);

K3 metrics related to application development;

K4 user interface design principles;

K5 languages for formalizing functional specification;

K6 existing applications and related architecture;

K7 DBMS, Data Warehouse, DSS, etc.;

K8 mobile technologies;

K9 threat modelling techniques.

This person may be able to apply the following skills:

S1 identify customers, users and stakeholders;

S2 collect, formalize and validate functional and non-functional requirements;

S3 apply estimation models and data to evaluate costs of different software lifecycle phases;

S4 evaluate the use of prototypes to support requirements validation;

S5 design, organize and monitor the overall plan for the design of application;

S6 design functional specification starting from defined requirements;

S7 evaluate the suitability of different application development methods for the current scenario;

S8 establish systematic and frequent communication with customers, users and stakeholders;

S9 ensure that controls and functionality are built into the design.

7.1.7 A.7. Technology Trend Monitoring (DIMENSION 2)

The professional person possessing the competence **Technology Trend Monitoring** shall be able to:

1) investigate latest ICT technological developments to establish understanding of evolving technologies;

2) devise innovative solutions for integration of new technology into existing products, applications or services or for the creation of new solutions.

DIMENSION 3

Moreover, to perform a job correctly at the appropriate proficiency levels, the professional person possessing the competence **Technology Trend Monitoring** shall be able to:

- exploit wide ranging specialist knowledge of new and emerging technologies, coupled with a deep understanding of the business, to envision and articulate solutions for the future; provide expert guidance and advice, to the leadership team to support strategic decision-making (level e-4);

  and/or

- make strategic decisions envisioning and articulating future ICT solutions for customer-oriented processes, new business products and services; direct the organization to build and exploit them (level e-5).

No further levels are available for A.7.

DIMENSION 4

This person should have knowledge of or be familiar with:

K1 emerging technologies and the relevant market applications;

K2 market needs;

K3 relevant sources of information (e.g. magazines, conferences and events, newsletters, opinion leaders, online forum, etc.);

K4 the rules of discussions in web communities;

K5 applied research program approaches.

This person may be able to apply the following skills:

S1 monitor sources of information and continuously follow the most promising;

S2 identify vendors and providers of the most promising solutions; evaluate, justify and propose the most appropriate;

S3 identify business advantages and improvements of adopting emerging technologies.

7.1.8 A.8. Sustainable Development (DIMENSION 2)

The professional person possessing the competence **Sustainable Development** shall be able to:

1) estimate the impact of ICT solutions in terms of eco responsibilities including energy consumption;

2) advise business and ICT stakeholders on sustainable alternatives that are consistent with the business strategy;

3) apply an ICT purchasing and sales policy which fulfills eco-responsibilities.

DIMENSION 3

Moreover, to perform a job correctly at the appropriate proficiency levels, the professional person possessing the competence **Sustainable Development** shall be able to:

- promote awareness, training and commitment for the deployment of sustainable development and apply the necessary tools for piloting this approach (level e-3);

  and/or

- define objective and strategy of sustainable IS development in accordance with the organization's sustainability policy (level e-4).

No further levels are available for A.8.

DIMENSION 4

This person should have knowledge of or be familiar with:

K1 metrics and indicators related to sustainable development;

K2 CSR of stakeholders within the IS infrastructure.

This person may be able to apply the following skills:

S1 monitor and measure the ICT energy consumption;

S2 apply recommendations in projects to support latest sustainable development strategies;

S3 master regulatory constraints and international standards related to ICT sustainability.

7.1.9 A.9. **Innovating** (DIMENSION 2)

The professional person possessing the competence **Innovating** shall be able to:

1) devise creative solutions for the provision of new concepts, ideas, products or services;

2) deploy novel and open thinking to envision exploitation of technological advances to address business/society needs or research direction.

DIMENSION 3

Moreover, to perform a job correctly at the appropriate proficiency levels, the professional person possessing the competence **Innovating** shall be able to:

- apply independent thinking and technology awareness to lead the integration of disparate concepts for the provision of unique solutions (level e-4);

  and/or

- challenge the status quo and provide strategic leadership for the introduction of revolutionary concepts (level e-5).

No further levels are available for A.9.

DIMENSION 4

This person should have knowledge of or be familiar with:

K1 existing and emerging technologies and market applications;

K2 business, society and/or research habits, trends and needs;

K3 innovation processes and techniques.

This person may be able to apply the following skills:

S1 identify business advantages and improvements of adopting emerging technologies;

S2 create a proof of concept;

S3 think out of the box;

S4 identify appropriate resources.

7.2 B. BUILD (DIMENSION 1)

7.2.1 B.1. **Application Development** (DIMENSION 2)

The professional person possessing the competence **Application Development** shall be able to:

1) interpret the application design to develop a suitable application in accordance with customer needs;

2) adapt existing solutions by e.g. porting an application to another operating system;

3) code, debug, test and document, communicate, product development stages;

4) select appropriate technical options for development such as reusing, improving or reconfiguration of existing components;

5) optimize efficiency, cost and quality;

6) validate results with user representatives;

7) integrate and commission the overall solution.

DIMENSION 3

Moreover, to perform a job correctly at the appropriate proficiency levels, the professional person possessing the competence **Application Development** shall be able to:

- act under guidance to develop, test and document applications (level e-1);

  and/or

- systematically develop and validate applications (level e-2);

  and/or

- act creatively to develop applications and to select appropriate technical options; account for others development activities; optimize application development, maintenance and performance by employing design patterns and by reusing proved solutions (level e-3);

No further levels are available for B.1.

DIMENSION 4

This person should have knowledge of or be familiar with:

K1 appropriate software programs/modules;

K2 hardware components, tools and hardware architectures;

K3 functional and technical designing;

K4 state of the art technologies;

K5 programming languages;

K6 Power consumption models of software and/or hardware;

K7 DBMS;

K8 operating Systems and software platforms;

K9 IDE;

K10 RAD;

K11 IPR issues;

K12 Modelling technology and languages;

K13 IDLs;

K14 security.

This person may be able to apply the following skills:

S1 explain and communicate the design/development to the customer;

S2 perform and evaluate test results against product specifications;

S3 apply appropriate software and/or hardware architectures;

S4 develop user interfaces, business software components and embedded software components;

S5 manage and guarantee high levels of cohesion and quality;

S6 use data models;

S7 perform and evaluate test in the customer or target environment;

S8 cooperate with development team and with application designers.

7.2.2 B.2. Component Integration (DIMENSION 2)

The professional person possessing the competence **Component Integration** shall be able to:

1) integrate hardware, software or sub system components into an existing or a new system;

2) comply with established processes and procedures such as, configuration management and package maintenance;

3) take into account the compatibility of existing and new modules to ensure system integrity, system interoperability and information security;

4) verify and test system capacity and performance and documentation of successful integration.

DIMENSION 3

Moreover, to perform a job correctly at the appropriate proficiency levels, the professional person possessing the competence **Component Integration** shall be able to:

- act systematically to identify compatibility of software and hardware specifications, document all activities during installation and records deviations and remedial activities (level e-2);

  and/or

- account for own and others actions in the integration process, complies with appropriate standards and change control procedures to maintain integrity of the overall system functionality and reliability (level e-3);

  and/or

- exploit wide ranging specialist knowledge to create a process for the entire integration cycle, including the establishment of internal standards of practice. Provides leadership to marshal and assign resources for programs of integration (level e-4).

No further levels are available for B.2.

DIMENSION 4

This person should have knowledge of or be familiar with:

K1 old, existing and new hardware components/software programs/modules;

K2 the impact that system integration has on existing system/organization;

K3 interfacing techniques between modules, systems and components;

K4 integration testing techniques;

K5 development tools (e.g. development environment, management, source code access/revision control);

K6 best practice design techniques.

This person may be able to apply the following skills:

S1 measure system performance before, during and after system integration;

S2 document and record activities, problems and related repair activities;

S3 match customers' needs with existing products;

S4 verify that integrated systems capabilities and efficiency match specifications;

S5 secure/back-up data to ensure integrity during system integration.

7.2.3 B.3. Testing (DIMENSION 2)

The professional person possessing the competence **Testing** shall be able to:

1) construct and execute systematic test procedures for ICT systems or customer usability requirements to establish compliance with design specifications;

2) ensure that new or revised components or systems perform to expectation;

3) ensure meeting of internal, external, national and international standards; including health and safety, usability, performance, reliability or compatibility;

4) produce documents and reports to evidence certification requirements.

DIMENSION 3

Moreover, to perform a job correctly at the appropriate proficiency levels, the professional person possessing the competence **Testing** shall be able to

- perform simple tests in strict compliance with detailed instructions (level e-1);

  and/or

- organize test programs and build scripts to stress test potential vulnerabilities; record and report outcomes providing analysis of results (level e-2);

  and/or

- exploit specialist knowledge to supervise complex testing programs, ensure tests and results are documented to provide input to subsequent process owners such as designers, users or maintainers, and accountable for compliance with testing procedures including a documented audit trail (level e-3);

and/or

- exploit wide ranging specialist knowledge to create a process for the entire testing activity, including the establishment of internal standard of practices, and provide expert guidance and advice to the testing team (level e-4).

No further levels are available for B.3.

DIMENSION 4

This person should have knowledge of or be familiar with:

K1 techniques, infrastructure and tools to be used in the testing process;

K2 the lifecycle of a testing process;

K3 the different sorts of tests (functional, integration, performance, usability, stress, etc.);

K4 national and international standards defining quality criteria for testing;

K5 web, cloud and mobile technologies and environmental requirements.

This person may be able to apply the following skills:

S1 create and manage a test plan;

S2 manage and evaluate the test process;

S3 design tests of ICT systems;

S4 prepare and conduct tests of ICT systems;

S5 report and document tests and results.

7.2.4 B.4. Solution Deployment (DIMENSION 2)

The professional person possessing the competence **Solution Deployment** shall be able to:

1) following predefined general standards of practice carry out planned necessary interventions to implement solution, including installing, upgrading or decommissioning;

2) configure hardware, software or network to ensure interoperability of system components and debug any resultant faults or incompatibilities;

3) engage additional specialist resources if required, such as third party network providers;

4) formally hand over fully operational solution to user and completes documentation recording all relevant information, including equipment addressees, configuration and performance data.

DIMENSION 3

Moreover, to perform a job correctly at the appropriate proficiency levels, the professional person possessing the competence **Solution Deployment** shall be able to:

- remove or install components under guidance and in accordance with detailed instructions (level e-1);

and/or

- act systematically to build or deconstruct system elements, identifies failing components and establishes root cause failures, provide support to less experienced colleagues (level e-2);

  and/or

- account for own and others actions for solution provision and initiate comprehensive communication with stakeholders; exploit specialist knowledge to influence solution construction providing advice and guidance (level e-3).

No further levels are available for B.4.

DIMENSION 4

This person should have knowledge of or be familiar with:

K1 performance analysis techniques;

K2 techniques related to problem management (operation, performance, compatibility);

K3 software packaging and distribution methods and techniques;

K4 the impacts of deployment on the current architecture;

K5 the technologies and standards to be used during the deployment;

K6 web, cloud and mobile technologies and environmental requirements.

This person may be able to apply the following skills:

S1 organize deployment workflow and product roll-out activities;

S2 organize and plan beta-test activities, testing solution in its final operational environment;

S3 configure components at any level to guarantee correct overall interoperability;

S4 identify and engage expertise needed to solve interoperability problems;

S5 organize and control initial support service provision including user training during system start-up;

S6 organize population of databases and manage data migration;

S7 collaborate to modify third party code; support and maintain modified software.

7.2.5 B.5. Documentation Production (DIMENSION 2)

The professional person possessing the competence **Documentation Production** shall be able to:

1) produce documents describing products, services, components or applications to establish compliance with relevant documentation requirements;

2) select appropriate style and media for presentation materials;

3) create templates for document-management systems;

4) ensure that functions and features are documented in an appropriate way;

5) ensure that existing documents are valid and up to date.

DIMENSION 3

Moreover, to perform a job correctly at the appropriate proficiency levels, the professional person possessing the competence **Documentation Production** shall be able to:

- use and apply standards to define document structure (level e-1);

  and/or

- determine documentation requirements taking into account the purpose and environment to which it applies (level e-2);

  and/or

- adapt the level of detail according to the objective of the documentation and the targeted population (level e-3).

No further levels are available for B.5.

DIMENSION 4

This person should have knowledge of or be familiar with:

K1 tools for production, editing and distribution of professional documents;

K2 tools for multimedia presentation creation;

K3 different technical documents required for designing, developing and deploying products, applications and services;

K4 version control of documentation production.

This person may be able to apply the following skills:

S1 observe and deploy effective use of corporate standards for publications;

S2 prepare templates for shared publications;

S3 organize and control content management workflow;

S4 keep publications aligned to the solution during the entire lifecycle.

7.2.6 B.6. System Engineering (DIMENSION 2)

The professional person possessing the competence **System Engineering** shall be able to:

1) engineer software and/or hardware components to meet solution requirements such as specifications, costs, quality, time, energy efficiency, information security and data protection;

2) follow a systematic methodology to analyse and build the required components and interfaces;

3) build system structure models and conduct system behaviour simulation;

4) perform unit and system tests to ensure requirements are met.

DIMENSION 3

Moreover, to perform a job correctly at the appropriate proficiency levels, the professional person possessing the competence **System Engineering** shall be able to:

- ensure interoperability of the system components, exploit wide ranging specialist knowledge to create a complete system that will satisfy the system constraints and meet the customer's expectations (level e-3);

  and/or

- handle complexity by developing standard procedures and architectures in support of cohesive product development; establish a set of system requirements that will guide the design of the system and identify which system requirements should be allocated to which elements of the system (level e-4).

No further levels are available for B.6.

DIMENSION 4

This person should have knowledge of or be familiar with:

K1 appropriate software programs/modules, DBMS and programming languages;

K2 hardware components, tools and hardware architectures;

K3 functional and technical designing;

K4 state of the art technologies;

K5 programming languages;

K6 power consumption models of software and/or hardware;

K7 information Security Basics;

K8 prototyping.

This person may be able to apply the following skills:

S1 explain and communicate the design/development to the customer;

S2 perform and evaluate test results against product specifications;

S3 apply appropriate software and/or hardware architectures;

S4 design and develop hardware architecture, user interfaces, business software components and embedded software components;

S5 manage and guarantee high levels of cohesion and quality in complex software developments;

S6 use data models;

S7 apply appropriate development and/or process models, to develop effectively and efficiently.

7.3 C. RUN (DIMENSION 1)

7.3.1 C.1. User Support (DIMENSION 2)

The professional person possessing the competence **User Support** shall be able to:

1) respond to user requests and issues, recording relevant information;

2) ensure resolution or escalates incidents and optimize system performance in accordance with predefined SLAs;

3) understand how to monitor solution outcome and resultant customer satisfaction.

DIMENSION 3

Moreover, to perform a job correctly at the appropriate proficiency levels, the professional person possessing the competence **User Support** shall be able to:

- interact with users, apply basic product knowledge to respond to user requests, solve incidents, following prescribed procedures (level e-1);

  and/or

- systematically interpret user problems and identify solutions and possible side effects, use experience to address user problems and interrogate database for potential solutions; escalate complex or unresolved incidents, record and track issues from outset to conclusion (level e-2);

  and/or

- manage the support process and accountable for agreed SLA, plan resource allocation to meet defined service level, act creatively, and applies continuous service improvement; manage the support function budget (level e-3).

No further levels are available for C.1.

DIMENSION 4

This person should have knowledge of or be familiar with:

K1 relevant ICT user applications;

K2 database structures and content organization;

K3 corporate escalation procedures;

K4 software distribution methods and procedures for fix application and file transmission methodologies applicable to software fixes;

K5 sources of information for potential solutions.

This person may be able to apply the following skills:

S1 effectively interrogate users to establish symptoms;

S2 analyse symptoms to identify broad area of user error or technical failure;

S3 deploy support tools to systematically trace source of error or technical failure;

S4 clearly communicate with end users and provide instructions on how to progress issues;

S5 record and code issues to support growth and integrity of online support tools.

7.3.2 C.2. Change Support (DIMENSION 2)

The professional person possessing the competence **Change Support** shall be able to:

1) implement and guide the evolution of an ICT solution;

2) ensure efficient control and scheduling of software or hardware modifications to prevent multiple upgrades creating unpredictable outcomes;

3) minimize service disruption as a consequence of changes and adhere to defined SLA;

4) ensure consideration and compliance with information security procedures.

DIMENSION 3

Moreover, to perform a job correctly at the appropriate proficiency levels, the professional person possessing the competence **Change Support** shall be able to:

- act systematically, during change, to respond to day by day operational needs and react to them, avoiding service disruptions and maintaining coherence to (SLA) and information security requirements (level e-2);

  and/or

- ensure the integrity of the system by controlling the application of functional updates, software or hardware additions and maintenance activities; comply with budget requirements (level e-3).

No further levels are available for C.2.

DIMENSION 4

This person should have knowledge of or be familiar with:

K1 functional specifications of the information system;

K2 the existing ICT application technical architecture;

K3 how business processes are integrated and their dependency upon ICT applications;

K4 change management tools and technique;

K5 the best practices and standards in information security management.

This person may be able to apply the following skills:

S1 share functional and technical specifications with ICT teams in charge of the maintenance and evolution of ICT solutions;

S2 manage communications with ICT teams in charge of the maintenance and the evolution of IS solutions;

S3 analyse the impact of functional/technical changes on users;

S4 anticipate all actions required to mitigate the impact of changes (training, documentation, new processes…).

7.3.3 C.3. Service Delivery (DIMENSION 2)

The professional person possessing the competence **Service Delivery** shall be able to:

1) ensure service delivery in accordance with established SLAs;

2) take proactive action to ensure stable and secure applications and ICT infrastructure to avoid potential service disruptions, attending to capacity planning and to information security;

3) update operational document library and logs all service incidents;

4) maintain monitoring and management tools (i.e. scripts, procedures);

5) maintain IS services;

6) take proactive measures.

DIMENSION 3

Moreover, to perform a job correctly at the appropriate proficiency levels, the professional person possessing the competence **Service Delivery** shall be able to:

- act under guidance to record and track reliability data (level e-1);

  and/or

- systematically analyse performance data and communicates findings to senior experts, escalate potential service level failures and security risks, recommend actions to improve service reliability; track reliability data against SLA (level e-2);

  and/or

- program the schedule of operational tasks, manage costs and budget according to the internal procedures and external constraints; identify the optimum number of people required to resource the operational management of the IS infrastructure (level e-3).

No further levels are available for C.3.

DIMENSION 4

This person should have knowledge of or be familiar with:

K1 how to interpret ICT service delivery requirements;

K2 best practices and standards in ICT service delivery;

K3 how to monitor service delivery;

K4 how to record service delivery actions and able to identify failures;

K5 the best practices and standards in information security management;

K6 web, cloud and mobile technologies.

This person may be able to apply the following skills:

S1 apply the processes which comprise the organization's ICT service delivery strategy;

S2 fill in and complete documentation used in ICT service delivery;

S3 analyse service delivery provision and report outcomes to senior colleagues;

S4 plan and apply manpower workload/requirements for efficient and cost effective service provision.

7.3.4 C.4. Problem Management (DIMENSION 2)

The professional person possessing the competence **Problem Management** shall be able to:

1) identify and resolve the root cause of incidents;

2) take a proactive approach to avoidance or identification of root cause of ICT problems;

3) deploy a knowledge system based on recurrence of common errors;

4) resolve or escalate incidents;

5) optimize system or component performance.

DIMENSION 3

Moreover, to perform a job correctly at the appropriate proficiency levels, the professional person possessing the competence **Problem Management** shall be able to:

- identify and classify incident types and service interruptions, record incidents cataloguing them by symptom and resolution (level e-2);

  and/or

- exploit specialist knowledge and in-depth understanding of the ICT infrastructure and problem management process to identify failures and resolve with minimum outage; make sound decisions in emotionally charged environments on appropriate action required to minimize business impact; rapidly identify failing component, select alternatives such as repair, replace or reconfigure (level e-3);

  and/or

- provide leadership and accountability for the entire problem management process, schedule and ensure well trained human resources, tools, and diagnostic equipment are available to meet emergency incidents; show depth of expertise to anticipate critical component failure and make provision for recovery with minimum downtime; construct escalation processes to ensure that appropriate resources can be applied to each incident (level e-4).

No further levels are available for C.4.

DIMENSION 4

This person should have knowledge of or be familiar with:

K1 the organization's overall ICT infrastructure and key components;

K2 the organization's reporting procedures;

K3 the organization's critical situation escalation procedures;

K4 the application and availability of diagnostic tools;

K5 the link between system infrastructure elements and impact of failure on related business processes.

This person may be able to apply the following skills:

S1 monitor progress of issues throughout lifecycle and communicate effectively;

S2 identify potential critical component failures and take action to mitigate effects of failure;

S3 conduct risk management audits and act to minimize exposures;

S4 allocate appropriate resources to maintenance activities, balancing cost and risk;

S5 communicate at all levels to ensure appropriate resources are deployed internally or externally to minimize outages.

7.4 D. ENABLE (DIMENSION 1)

7.4.1 D.1. Information Security Strategy Development (DIMENSION 2)

The professional person possessing the competence **Information Security Strategy Development** shall be able to:

1) define and make applicable a formal organizational strategy, scope and culture to maintain safety and security of information from external and internal threats, i.e. digital forensic for corporate investigations or intrusion investigation;

2) provide the foundation for Information Security Management, including role identification and accountability;

3) use defined standards to create objectives for information integrity, availability, and data privacy.

DIMENSION 3

Moreover, to perform a job correctly at the appropriate proficiency levels, the professional person possessing the competence **Information Security Strategy Development** shall be able to:

- exploit depth of expertise and leverage external standards and best practices (level e-4);

  and/or

- provide strategic leadership to embed information security into the culture of the organization (level e-5);

No further levels are available for D.1.

DIMENSION 4

This person should have knowledge of or be familiar with:

K1 the potential and opportunities of relevant standards and best practices;

K2 the impact of legal requirements on information security;

K3 the information strategy of the organization;

K4 possible security threats;

K5 the mobility strategy;

K6 the different service models (SaaS, PaaS, IaaS) and operational translations (i.e. Cloud Computing).

This person may be able to apply the following skills:

S1 develop and critically analyse the company strategy for information security;

S2 define, present and promote an information security policy for approval by the senior management of the organization;

S3 apply relevant standards, best practices and legal requirements for information security;

S4 anticipate required changes to the organization's information security strategy and formulate new plans;

S5 propose effective contingency measures.

7.4.2 D.2. ICT Quality Strategy Development (DIMENSION 2)

The professional person possessing the competence **ICT Quality Strategy Development** shall be able to:

1) define, improve and refine a formal strategy to satisfy customer expectations and improve business performance (balance between cost and risks);

2) identify critical processes influencing service delivery and product performance for definition in the ICT quality management system;

3) use defined standards to formulate objectives for service management, product and process quality. Identifies ICT quality management accountability.

DIMENSION 3

Moreover, to perform a job correctly at the appropriate proficiency levels, the professional person possessing the competence **ICT Quality Strategy Development** shall be able to:

- exploit wide ranging specialist knowledge to leverage and authorize the application of external standards and best practices (level e-4);

  and/or

- provide strategic leadership to embed ICT quality (i.e. metrics and continuous improvement) into the culture of the organization (level e-5).

No further levels are available for D.2.

DIMENSION 4

This person should have knowledge of or be familiar with:

K1 the major information technology industry frameworks, e.g. COBIT, ITIL, CMMI, ISO and their implications for corporate IS governance;

K2 the information strategy of the organization;

K3 the different service models (SaaS, PaaS, IaaS) and operational translations (i.e. Cloud Computing).

This person may be able to apply the following skills:

S1 define an ICT quality policy to meet the organization's standards of performance and customer satisfaction objectives;

S2 identify quality metrics to be used;

S3 apply relevant standards and best practices to maintain information quality.

7.4.3 D.3. Education and Training Provision (DIMENSION 2)

The professional person possessing the competence **Education and Training Provision** shall be able to:

1) define and implement ICT training policy to address organizational skill needs and gaps;

2) structure, organizes and schedules training programs and evaluates training quality through a feedback process and implements continuous improvement;

3) adapt training plans to address changing demand.

DIMENSION 3

Moreover, to perform a job correctly at the appropriate proficiency levels, the professional person possessing the competence **Education and Training Provision** shall be able to:

- organize the identification of training needs; collate organization requirements, identifies, selects and prepares schedule of training intervention (level e-2);

  and/or

- act creatively to analyse skills gaps; elaborate specific requirements and identify potential sources for training provision; show specialist knowledge of the training market and establish a feedback mechanism to assess the added value of alternative training programs (level e-3).

No further levels are available for D.3.

DIMENSION 4

This person should have knowledge of or be familiar with:

K1 appropriate pedagogical approaches and education delivery methods e.g. classroom, online, text, DVD;

K2 the competitive market for educational offering;

K3 training needs analysis methodologies;

K4 empowerment techniques.

This person may be able to apply the following skills:

S1 organize training and education schedules to meet market needs;

S2 identify and maximize use of resources required to deliver a cost effective schedule;

S3 promote and market education and training provision;

S4 analyse feedback data and use it to drive continuous improvement of education and training delivery;

S5 design curricula and training programs to meet customer ICT education needs;

S6 address CPD needs of staff to meet organizational requirements.

7.4.4 D.4. Purchasing (DIMENSION 2)

The professional person possessing the competence **Purchasing** shall be able to:

1) apply a consistent procurement procedure, including deployment of the following sub processes: specification requirements, supplier identification, proposal analysis, evaluation of the energy efficiency and environmental compliance of products, suppliers and their processes, contract negotiation, supplier selection and contract placement;

2) ensure that the entire purchasing process is fit for purpose;

3) add business value to the organization compliant to legal and regulatory requirements.

DIMENSION 3

Moreover, to perform a job correctly at the appropriate proficiency levels, the professional person possessing the competence **Purchasing** shall be able to:

- understand and apply the principles of the procurement process; place orders based on existing supplier contracts; ensure the correct execution of orders, including validation of deliverables and correlation with subsequent payments (level e-2);

  and/or

- exploit specialist knowledge to deploy the purchasing process, ensuring positive commercial relationships with suppliers. Select suppliers, products and services by evaluating performance, cost, timeliness and quality. Decide contract placement and complies with organizational policies (level e-3);

  and/or

- provide leadership for the application of the organization's procurement policies and make recommendations for process enhancement; apply experience and procurement practice expertise to make ultimate purchasing decisions.

No further levels are available for D.4.

DIMENSION 4

This person should have knowledge of or be familiar with:

K1 typical purchase contract terms and conditions;

K2 own organization purchasing policies;

K3 financial models e.g. discount structures;

K4 the current market for relevant products or services;

K5 the issues and implications of outsourcing services;

K6 different service models (SaaS, PaaS, IaaS) and operational translations (e.g. Cloud Computing).

This person may be able to apply the following skills:

S1 interpret product/service specifications;

S2 negotiate terms, conditions and pricing;

S3 analyse received proposals/offers;

S4 manage the purchasing budget;

S5 lead purchase process improvement;

S6 analyse the energy efficiency and environmental-related aspects of a proposal;

S7 verify that purchasing processes respect legal issues including IPR.

7.4.5 D.5. Sales Proposal Development (DIMENSION 2)

The professional person possessing the competence **Sales Proposal Development** shall be able to:

1) develop technical proposals to meet customer solution requirements and provide sales personnel with a competitive bid;

2) underline the energy efficiency and environmental impact related to a proposal;

3) collaborate with colleagues to align the service or product solution with the organization's capacity to deliver.

DIMENSION 3

Moreover, to perform a job correctly at the appropriate proficiency levels, the professional person possessing the competence **Sales Proposal Development** shall be able to:

- organize collaboration between relevant internal departments, for example, technical, sales and legal, facilitate comparison between customer requirement and available 'off the shelf' solutions (level e-2);

  and/or

- act creatively to develop proposal incorporating a complex solution, customize solution in a complex technical and legal environment and ensures feasibility, legal and technical validity of customer offer (level e-3).

No further levels are available for D.5.

DIMENSION 4

This person should have knowledge of or be familiar with:

K1 customer needs;

K2 internally adopted sales and marketing techniques;

K3 legal requirements;

K4 internal business practices;

K5 product or service unique selling points;

K6 the different service models (SaaS, PaaS, IaaS) and operational translations (e.g. Cloud Computing).

This person may be able to apply the following skills:

S1 construct the framework for proposal documentation;

S2 coordinate and facilitate multidisciplinary teams contributing to the proposal;

S3 interpret the terms and conditions of the tender documentation;

S4 evaluate the strengths and weaknesses of potential competitors;

S5 ensure that a proposal is of high quality and is submitted on time;

S6 communicates the energy efficiency and environmental-related aspects of a proposal;

S7 ensure that proposals meet compliance requirements.

7.4.6 D.6. Channel Management (DIMENSION 2)

The professional person possessing the competence **Channel Management** shall be able to:

1) develop the strategy for managing third party sales outlets;

2) ensure optimum commercial performance of the VARs channel through the provision of a coherent business and marketing strategy;

3) define the targets for volume, geographic coverage and the industry sector for VAR engagements and structures incentive programs to achieve complimentary sales results.

DIMENSION 3

Moreover, to perform a job correctly at the appropriate proficiency levels, the professional person possessing the competence **Channel Management** shall be able to:

- act creatively to influence the establishment of a VAR network, manage the identification and assessment of potential VAR members and set up support procedures (level e-3);

  and/or

- exploit wide ranging skills in marketing and sales to create the organization's VAR strategy and establish the processes by which VARs will be managed to maximize business performance (level e-4).

No further levels are available for D.6.

DIMENSION 4

This person should have knowledge of or be familiar with:

K1 the competition (what and where);

K2 the market distribution across the field;

K3 sales channel typologies (e.g. direct sales, VAR, web marketing);

K4 incentive policies;

K5 user experience of each channel type;

K6 legal issues relating to channels and VAR organizations.

This person may be able to apply the following skills:

S1 choose the best sales channel according to the product or solution being delivered;

S2 define discounts according to the competitive environment;

S3 select value added retailers based on thorough analyzes, plan and make contacts;

S4 monitor and supervise channel performances in line with sales forecast and able to define corrective actions if necessary;

S5 apply digital marketing methods.

7.4.7 D.7. Sales Management (DIMENSION 2)

The professional person possessing the competence **Sales Management** shall be able to:

1) drive the achievement of sales results through the establishment of a sales strategy;

2) demonstrate the added value of the organization's products and services to new or existing customers and prospects;

3) establish a sales support procedure providing efficient response to sales enquiries, consistent with company strategy and policy;

4) establish a systematic approach to the entire sales process, including understanding customer needs, forecasting, prospect evaluation, negotiation tactics and sales closure.

DIMENSION 3

Moreover, to perform a job correctly at the appropriate proficiency levels, the professional person possessing the competence **Sales Management** shall be able to:

- contribute to the sales process by effectively presenting products or services to customers (level e-3);

  and/or

- assesse and estimate appropriate sales strategies to deliver company results; decide and allocate annual sales targets and adjust incentives to meet market conditions (level e-4);

  and/or

- assume ultimate responsibility for the sales performance of the organization, authorize resource allocation, prioritize product and service promotions, advise board directors of sales performance (level e-5).

No further levels are available for D.7.

DIMENSION 4

This person should have knowledge of or be familiar with:

K1 customer organization (needs, budget allocation and decision makers);

K2 company specific processes (sales, ITIL, etc.);

K3 market trends and own service offering portfolio;

K4 legal, financial and contractual rules;

K5 project management procedures;

K6 current market imperatives e.g. risks, changes, innovation.

This person may be able to apply the following skills:

S1 develop strong co-operation between customers and own organization;

S2 keep abreast of market news e.g. risks, changes, innovations and communicate to internal business units, to improve service and product portfolio;

S3 react proactively to customer business changes and communicate them internally;

S4 generate sustainable customer relationships;

S5 analyse sales performance to build forecasts and develop a tactical sales plan.

7.4.8 D.8. Contract Management (DIMENSION 2)

The professional person possessing the competence **Contract Management** shall be able to:

1) provide and negotiate contract in accordance with organizational processes;

2) ensure that contract and deliverables are provided on time, meet quality standards, and conform to compliance requirements;

3) address non-compliance, escalate significant issues, drive recovery plans and if necessary amends contracts;

4) maintain budget integrity;

5) assess and address supplier compliance to legal, health and safety and security standards;

6) actively pursue regular supplier communication.

DIMENSION 3

Moreover, to perform a job correctly at the appropriate proficiency levels, the professional person possessing the competence **Contract Management** shall be able to:

- act systematically to monitor contract compliance and promptly escalate defaults (level e-2);

  and/or

- evaluate contract performance by monitoring performance indicators and ensure performance of the complete supply chain; influence the terms of contract renewal (level e-3);

and/or

- provide leadership for contract compliance and is the final escalation point for issue resolution (level e-4).

No further levels are available for D.8.

DIMENSION 4

This person should have knowledge of or be familiar with:

K1 applicable SLA;

K2 company policy for contract management;

K3 legal regulations applicable to ICT contracts;

K4 legal issues including IPR;

K5 different service models (SaaS, PaaS, IaaS), service levels and contractual translations (e.g. Cloud Computing).

This person may be able to apply the following skills:

S1 foster positive relationships with stakeholders;

S2 negotiate contract terms and conditions;

S3 apply judgment and flexibility in contract negotiations compliant with internal rules and policies.

7.4.9 D.9. Personnel Development (DIMENSION 2)

The professional person possessing the competence **Personnel Development** shall be able to:

1) diagnose individual and group competence, identifying skill needs and skill gaps;

2) review training and development options and selects appropriate methodology taking into account the individual, project and business requirements;

3) coach and/or mentor individuals and teams to address learning needs.

DIMENSION 3

Moreover, to perform a job correctly at the appropriate proficiency levels, the professional person possessing the competence **Personnel Development** shall be able to:

- brief/train individuals and groups, hold courses of instruction (level e-2);

  and/or

- monitor and address the development needs of individuals and teams (level e-3);

  and/or

- take proactive action and develop organizational processes to address the development needs of individuals, teams and the entire workforce (level e-4).

No further levels are available for D.9.

DIMENSION 4

This person should have knowledge of or be familiar with:

K1 competence development methods;

K2 competence and skill needs analysis methodologies;

K3 learning and development support methods (e.g. coaching, teaching);

K4 technology and processes;

K5 empowerment techniques.

This person may be able to apply the following skills:

S1 identify competence and skill gaps;

S2 identify and recommend work based development opportunities;

S3 incorporate within routine work processes, opportunities for skills development;

S4 coach;

S5 address professional development needs of staff to meet organizational requirements.

7.4.10 D.10. Information and Knowledge Management (DIMENSION 2)

The professional person possessing the competence **Information and Knowledge Management** shall be able to:

1) identify and manage structured and unstructured information and considers information distribution policies;

2) create information structure to enable exploitation and optimization of information;

3) understand appropriate tools to be deployed to create, extract, maintain, renew and propagate business knowledge in order to capitalize from the information asset.

DIMENSION 3

Moreover, to perform a job correctly at the appropriate proficiency levels, the professional person possessing the competence **Information and Knowledge Management** shall be able to:

- analyse business processes and associated information requirements and provide the most appropriate information structure (level e-3);

  and/or

- integrate the appropriate information structure into the corporate environment (level e-4);

  and/or

- correlate information and knowledge to create value for the business and apply innovative solutions based on information retrieved (level e-5).

No further levels are available for D.10.

DIMENSION 4

This person should have knowledge of or be familiar with:

K1 methods to analyse information and business processes;

K2 ICT devices and tools applicable for the storage and retrieval of data;

K3 challenges related to the size of data sets (e.g. big data);

K4 challenges related to unstructured data (e.g. data analytics).

This person may be able to apply the following skills:

S1 gather internal and external knowledge and information needs;

S2 formalize customer requirements;

S3 translate/reflect business behaviour into structured information;

S4 make information available;

S5 ensure that IPR and privacy issues are respected;

S6 capture, storage, analyse, data sets, that are complex and large, not structured and in different formats;

S7 apply data mining methods.

7.4.11 D.11. Needs Identification (DIMENSION 2)

The professional person possessing the competence **Needs Identification** shall be able to:

1) actively listen to internal/external customers, articulate and clarify their needs;

2) manage the relationship with all stakeholders to ensure that the solution is in line with business requirements;

3) propose different solutions (e.g. make-or-buy), by performing contextual analysis in support of user centred system design;

4) advise the customer on appropriate solution choices;

5) act as an advocate engaging in the implementation or configuration process of the chosen solution.

DIMENSION 3

Moreover, to perform a job correctly at the appropriate proficiency levels, the professional person possessing the competence **Needs Identification** shall be able to:

- establish reliable relationships with customers and help them clarify their needs (level e-3);

and/or

- exploit wide ranging specialist knowledge of the customers' business to offer possible solutions to business needs and provide expert guidance to the customer by proposing solutions and supplier (level e-4);

  and/or

- provide leadership in support of the customers' strategic decisions, help customer to envisage new ICT solutions, and foster partnerships and creates value propositions (level e-5).

No further levels are available for D.11.

DIMENSION 4

This person should have knowledge of or be familiar with:

K1 emerging technologies and the relevant market applications;

K2 business needs;

K3 organization processes and structures;

K4 customer need analysis techniques;

K5 communication techniques;

K6 “Story telling” techniques challenges related to unstructured data (e.g. data analytics).

This person may be able to apply the following skills:

S1 analyse and formalize business processes;

S2 analyse customer requirements;

S3 present ICT solution cost/benefit.

7.4.12 D.12. Digital Marketing (DIMENSION 2)

The professional person possessing the competence **Digital Marketing** shall be able to:

1) understand the fundamental principles of digital marketing;

2) distinguish between the traditional and digital approaches;

3) appreciate the range of channels available;

4) assess the effectiveness of the various approaches and applies rigorous measurement techniques;

5) plan a coherent strategy using the most effective means available;

6) understand the data protection and privacy issues involved in the implementation of the marketing strategy.

DIMENSION 3

Moreover, to perform a job correctly at the appropriate proficiency levels, the professional person possessing the competence **Digital Marketing** shall be able to:

- understand and apply digital marketing tactics to develop an integrated and effective digital marketing plan using different digital marketing areas such as search, display, e-mail, social media and mobile marketing (level e-2);

  and/or

- exploit specialist knowledge to utilize analytical tools and assess the effectiveness of websites in terms of technical performance and download speed, evaluate the user engagement by the application of a wide range of analytical reports and understand the legal implications of the approaches adopted (level e-3);

  and/or

- develop clear meaningful objectives for the Digital Marketing Plan, select appropriate tools and sets budget targets for the channels adopted, monitor, analyse and enhance the digital marketing activities in an ongoing manner (level e-4).

No further levels are available for D.12.

DIMENSION 4

This person should have knowledge of or be familiar with:

K1 marketing strategy;

K2 web technologies;

K3 search engine marketing (PPC);

K4 search engine optimization (SEO);

K5 mobile marketing (e.g. Pay Per Click);

K6 social media marketing;

K7 e-mail marketing;

K8 display marketing;

K9 legal issues/requirements.

This person may be able to apply the following skills:

S1 understand how web technology can be used for marketing purposes;

S2 understand User Centric Marketing;

S3 use and interpret web analytics;

S4 understand the online environment.

7.5 E. MANAGE (DIMENSION 1)

7.5.1 E.1. Forecast Development (DIMENSION 2)

The professional person possessing the competence **Forecast Development** shall be able to:

1) interpret market needs and evaluate market acceptance of products or services;

2) assess the organization's potential to meet future production and quality requirements;

3) apply relevant metrics to enable accurate decision making in support of production, marketing, sales and distribution functions.

DIMENSION 3

Moreover, to perform a job correctly at the appropriate proficiency levels, the professional person possessing the competence **Forecast Development** shall be able to:

- exploit skills to provide short-term forecast using market inputs and assessing the organization's production and selling capabilities (level e-3);

  and/or

- act with wide ranging accountability for the production of a long-term forecast, understand the global marketplace, identifying and evaluating relevant inputs from the broader business, political and social context (level e-4).

No further levels are available for E.1.

DIMENSION 4

This person should have knowledge of or be familiar with:

K1 market size and relevant fluctuations;

K2 accessibility of the market according to current conditions (e.g. government policies, emerging technologies, social and cultural trends, etc.);

K3 the extended supply chain operation;

K4 large scale data analysis techniques (data mining).

This person may be able to apply the following skills:

S1 apply what-if techniques to produce realistic outlooks;

S2 generate sales forecasts in relation to current market share;

S3 generate production forecasts taking into account manufacturing capacity;

S4 compare sales and production forecasts and analyse potential mismatches;

S5 interpret external research data and analyse information.

7.5.2 E.2. **Project and Portfolio Management** (DIMENSION 2)

The professional person possessing the competence **Project and Portfolio Management** shall be able to:

1) implement plans for a program of change;

2) plan and direct a single or portfolio of ICT projects to ensure co-ordination and management of interdependencies;

3) orchestrate projects to develop or implement new, internal or externally defined processes to meet identified business needs;

4) define activities, responsibilities, critical milestones, resources, skills needs, interfaces and budget, optimize costs and time utilization, minimize waste and strives for high quality;

5) develop contingency plans to address potential implementation issues;

6) deliver project on time, on budget and in accordance with original requirements;

7) create and maintains documents to facilitate monitoring of project progress.

DIMENSION 3

Moreover, to perform a job correctly at the appropriate proficiency levels, the professional person possessing the competence **Project and Portfolio Management** shall be able to:

- understand and apply the principles of project management and apply methodologies, tools and processes to manage simple projects; optimize costs and minimize waste (level e-2);

  and/or

- account for own and others activities, working within the project boundary, making choices and giving instructions, optimizing activities and resources; manage and supervise relationships within the team; plan and establish team objectives and outputs and documents results (level e-3);

  and/or

- manage complex projects or programs, including interaction with others, influence project strategy by proposing new or alternative solutions and balancing effectiveness and efficiency, revise rules and choose standards; take overall responsibility for project outcomes, including finance and resource management and works beyond project boundary (level e-4);

  and/or

- provide strategic leadership for extensive interrelated programs of work to ensure that ICT is a change enabling agent and delivers benefit in line with overall business strategic aims; apply extensive business and technological mastery to conceive and bring innovative ideas to fruition (level e-5).

No further levels are available for E.2.

DIMENSION 4

This person should have knowledge of or be familiar with:

K1 a project methodology, including approaches to define project steps and tools to set up action plans;

K2 technologies to be implemented within the project;

K3 company business strategy and business processes;

K4 development and compliance to financial plans and budgets;

K5 IPR principles and regulation;

K6 Structured project management methodologies (e.g. agile techniques).

This person may be able to apply the following skills:

S1 identify project risks and define action plans to mitigate;

S2 define a project plan by breaking it down into individual project tasks;

S3 communicate project progress to all relevant parties reporting on topics such as cost control, schedule achievements, quality control, risk avoidance and changes to project specifications;

S4 delegate tasks and manage team member contributions appropriately;

S5 manage external, contracted resources to achieve project objectives;

S6 optimize project portfolio timelines and delivery objectives by achieving consensus on stakeholder priorities.

7.5.3 E.3. Risk Management (DIMENSION 2)

The professional person possessing the competence **Risk Management** shall be able to:

1) implement the management of risk across IS through the application of the enterprise defined risk management policy and procedure;

2) assess risk to the organization's business, including web, cloud and mobile resources;

3) document potential risk and containment plans.

DIMENSION 3

Moreover, to perform a job correctly at the appropriate proficiency levels, the professional person possessing the competence **Risk Management** shall be able to:

- understand and apply the principles of risk management and investigate ICT solutions to mitigate identified risks (level e-2);

  and/or

- decide on appropriate actions required to adapt security and address risk exposure, evaluate, manage and ensure validation of exceptions; audit ICT processes and environment (level e-3);

  and/or

- provide leadership to define and make applicable a policy for risk management by considering all the possible constraints, including technical, economic and political issues, and delegate assignments (level e-4).

No further levels are available for E.3.

DIMENSION 4

This person should have knowledge of or be familiar with:

K1 corporate values and interests to apply risk analysis taking into account corporate values and interests;

K2 the return on investment compared to risk avoidance;

K3 good practices (methodologies) and standards in risk analysis.

This person may be able to apply the following skills:

S1 develop risk management plan to identify required preventative actions;

S2 communicate and promote the organization's risk analysis outcomes and risk management processes;

S3 design and document the processes for risk analysis and management;

S4 apply mitigation and contingency actions.

7.5.4 E.4. Relationship Management (DIMENSION 2)

The professional person possessing the competence **Relationship Management** shall be able to:

1) establish and maintain positive business relationships between stakeholders (internal or external) deploying and complying with organizational processes;

2) maintain regular communication with customer/partner/supplier, and address needs through empathy with their environment and managing supply chain communications;

3) ensure that stakeholder needs, concerns or complaints are understood and addressed in accordance with organizational policy.

DIMENSION 3

Moreover, to perform a job correctly at the appropriate proficiency levels, the professional person possessing the competence **Relationship Management** shall be able to:

- account for own and others actions in managing a limited number of stakeholders (level e-3);

  and/or

- provide leadership for large or many stakeholder relationships, authorize investment in new and existing relationships, lead the design of a workable procedure for maintaining positive business relationships (level e-4).

No further levels are available for E.4.

DIMENSION 4

This person should have knowledge of or be familiar with:

K1 organization processes including, decision making, budgets and management structure;

K2 business objectives, own and of other stakeholders;

K3 how to measure and apply resources to meet stakeholder requirements;

K4 business challenges and risks.

This person may be able to apply the following skills:

S1 deploy empathy to customer needs;

S2 identify potential win-win opportunities for customer and own organization;

S3 establish realistic expectations to support development of mutual trust;

S4 monitor ongoing commitments to ensure fulfilment;

S5 communicate good and bad news to avoid surprises.

7.5.5 E.5. Process Improvement (DIMENSION 2)

The professional person possessing the competence **Process Improvement** shall be able to:

1) measure effectiveness of existing ICT processes;

2) research and benchmark ICT process design from a variety of sources;

3) follow a systematic methodology to evaluate, design and implement process or technology changes for measurable business benefit;

4) assess potential adverse consequences of process change.

DIMENSION 3

Moreover, to perform a job correctly at the appropriate proficiency levels, the professional person possessing the competence **Process Improvement** shall be able to:

- exploit specialist knowledge to research existing ICT processes and solutions in order to define possible innovations and make recommendations based on reasoned arguments (level e-3);

  and/or

- provide leadership and authorize implementation of innovations and improvements that will enhance competitiveness or efficiency; demonstrate to senior management the business advantage of potential changes (level e-4).

No further levels are available for E.5.

DIMENSION 4

This person should have knowledge of or be familiar with:

K1 research methods, benchmarks and measurements methods;

K2 evaluation, design and implementation methodologies;

K3 existing internal processes;

K4 relevant developments in ICT (e.g. virtualization, open data, etc.), and the potential impact on processes;

K5 web, cloud and mobile technologies;

K6 resource optimization and waste reduction.

This person may be able to apply the following skills:

S1 compose, document and catalogue essential processes and procedures;

S2 propose process changes to facilitate and rationalize improvements;

S3 implement process changes.

7.5.6 E.6. ICT Quality Management (DIMENSION 2)

The professional person possessing the competence **ICT Quality Management** shall be able to:

1) implement ICT quality policy to maintain and enhance service and product provision;

2) plan and define indicators to manage quality with respect to ICT strategy;

3) review quality measures and recommends enhancements to influence continuous quality improvement.

DIMENSION 3

Moreover, to perform a job correctly at the appropriate proficiency levels, the professional person possessing the competence **ICT Quality Management** shall be able to:

- communicate and monitor application of the organization's quality policy (level e-2);

  and/or

- evaluate quality management indicators and processes based on ICT quality policy and proposes remedial action (level e-3);

  and/or

- assess and estimate the degree to which quality requirements have been met and provide leadership for quality policy implementation; provide cross functional leadership for setting and exceeding quality standards (level e-4).

No further levels are available for E.6.

DIMENSION 4

This person should have knowledge of or be familiar with:

K1 which methods, tools and procedure are applied within the organization and where they should be applied;

K2 the IS internal quality audit approach;

K3 regulations and standards in energy efficiency and e-waste.

This person may be able to apply the following skills:

S1 illustrate how methods, tools and procedures can be applied to implement the organization's quality policy;

S2 evaluate and analyse process steps to identify strengths and weaknesses;

S3 assist process owners in the choice and use of measures to evaluate effectiveness and efficiency of the overall process;

S4 monitor, understand and act upon quality indicators;

S5 perform quality audits.

7.5.7 E.7. Business Change Management (DIMENSION 2)

The professional person possessing the competence **Business Change Management** shall be able to:

1) assesse the implications of new digital solutions;

2) define the requirements and quantify the business benefits;

3) manage the deployment of change taking into account structural and cultural issues;

4) maintain business and process continuity throughout change, monitoring the impact, taking any required remedial action and refining approach.

DIMENSION 3

Moreover, to perform a job correctly at the appropriate proficiency levels, the professional person possessing the competence **Business Change Management** shall be able to:

- evaluate change requirements and exploit specialist skills to identify possible methods and standards that can be deployed (level e-3);

  and/or

- provide leadership to plan, manage and implement significant ICT led business change (level e-4);

  and/or

- apply pervasive influence to embed organizational change (level e-5).

No further levels are available for E.7.

DIMENSION 4

This person should have knowledge of or be familiar with:

K1 digital strategies;

K2 the impact of business changes on the organization and human resources;

K3 the impact of business changes on legal issues.

This person may be able to apply the following skills:

S1 analyse costs and benefits of business changes;

S2 select appropriate ICT solutions based upon benefit, risks and overall impact;

S3 construct and document a plan for implementation of process enhancements;

S4 apply project management standards and tools.

7.5.8 E.8. Information Security Management (DIMENSION 2)

The professional person possessing the competence **Information Security Management** shall be able to:

1) implement information security policy;

2) monitor and take action against intrusion, fraud and security breaches or leaks;

3) ensure that security risks are analysed and managed with respect to enterprise data and information;

4) review security incidents, make recommendations for security policy and strategy to ensure continuous improvement of security provision.

DIMENSION 3

Moreover, to perform a job correctly at the appropriate proficiency levels, the professional person possessing the competence **Information Security Management** shall be able to:

- systematically scan the environment to identify and define vulnerabilities and threats, record and escalates non-compliance (level e-2);

  and/or

- evaluate security management measures and indicators and decide if compliant to information security policy; investigate and instigate remedial measures to address any security breaches (level e-3);

  and/or

- provide leadership for the integrity, confidentiality and availability of data stored on IS and complies with all legal requirements (level e-4).

No further levels are available for E.8.

DIMENSION 4

This person should have knowledge of or be familiar with:

K1 the organization's security management policy and its implications for engagement with customers, suppliers and subcontractors;

K2 the best practices and standards in information security management;

K3 the critical risks for information security management;

K4 the ICT internal audit approach;

K5 security detection techniques, including mobile and digital;

K6 cyber-attack techniques and counter measures for avoidance;

K7 computer forensics.

This person may be able to apply the following skills:

S1 document the information security management policy, linking it to business strategy;

S2 analyse the company critical assets and identify weaknesses and vulnerability to intrusion or attack;

S3 establish a risk management plan to feed and produce preventative action plans;

S4 perform security audits;

S5 apply monitoring and testing techniques;

S6 establish the recovery plan;

S7 implement the recovery plan in case of crisis.

7.5.9 E.9. IS Governance (DIMENSION 2)

The professional person possessing the competence **IS Governance** shall be able to:

1) define, deploy and control the management of IS in line with business imperatives;

2) take into account all internal and external parameters such as legislation and industry standard compliance to influence risk management and resource deployment to achieve balanced business benefit.

DIMENSION 3

Moreover, to perform a job correctly at the appropriate proficiency levels, the professional person possessing the competence **IS Governance** shall be able to:

- provide leadership for IS governance strategy by communicating, propagating and controlling relevant processes across the entire ICT infrastructure (level e-4);

  and/or

- define and align the IS governance strategy incorporating it into the organization's corporate governance strategy; adapt the IS governance strategy to take into account new significant events arising from legal, economic, political, business, technological or environmental issues (level e-5).

No further levels are available for E.9.

DIMENSION 4

This person should have knowledge of or be familiar with:

K1 the ICT infrastructure and the business organization;

K2 the business strategy of the company;

K3 the business values;

K4 the legal requirements.

This person may be able to apply the following skills:

S1 manage applicable governance models;

S2 analyse the business context of the company and its evolution;

S3 define and implement appropriate KPI's;

S4 communicate the value, risks and opportunities derived from the IS strategy.

Annex A
(informative)

Examples of e-Competence usage

Example 1: Applying this standard in large ICT demand organizations

Key perspectives

- Job profile creation.
- Internal ICT staff development.
- Cross company and cross border common language.

Value and benefits

This standard maintains a consistent perspective across all personnel, for example, across employees to managers and the human resources department. It facilitates exchange of views, and promotes consensus. This enables rationalization of job descriptions that tend to proliferate over time, adding confusion rather than clarity. The international dimension of this standard and its consistency with other frameworks such as the French CIGREF nomenclature, SFIA, EUCIP and the German VET and AITTS systems also strengthen its value. The foundation for a competence based human capital management model can be established. Furthermore, training portfolios can be consolidated and rationalized based upon optimization of a company's training needs bringing greater added value from the education and training budget.

Example 2: Applying this standard in a corporate/ ICT supplier environment

Key perspectives

- Identifying training needs.
- Training development.
- Competence gap identification.

Value and benefits

This standard enables to better understand the competence development requirements of the organization and of individual employees within the organization. By focusing upon these competence needs, as clearly articulated within the competence descriptors of the standard, the relevance and capability of relevant training opportunities become much clearer. Deploying this standard brings a better common understanding of training options and opportunities. An online training reference manual and booking facility can be developed based upon the metrics of this standard. The cell and level structure of this standard readily lends itself to being systemized and provides a consistent matrix for deployment within online tools. Furthermore, future training programs can be developed to meet the identified competence requirements of the workforce, closely following the competences articulated by this standard and providing targeted training opportunities.

Example 3: Applying this standard by small and medium sized enterprises (SME's) - competence need analysis and managerial dashboard

Key perspectives

- Application in a micro enterprise environment.
- This standard as a marketing aid.
- This standard as a business development tool.
- Competence need analysis.
- Linking business strategy and competence development.
- Develop or buy new competences.
- This standard for SME consultants.

Value and benefits

This standard enables to better understand the SME's competence requirements in relation to their business strategy, namely reinforce the quality of their communication to clients and enlarge their client network. The competence need analysis is relatively straightforward and fast using this standard as a reference.

Dimension 2 of the standard can support SMEs in identifying e-Competences that describe their core activities and their business. The standard provides the structure and appropriate articulation by which management can analyse current competence capability, future requirements and support the development of business strategy. In this example, this standard can help to identify the proper e-Competences for their current business, realize which growing/innovating opportunities for the future according to their current e-Competences; plan which e-Competences to be developed, in order to get future business results.

Example 4: SME competence assessment and business card creation based upon this standard

Key perspectives

- SME competence self-assessment.
- Business card creation.
- Business capability.
- This standard for SME consultants.

Value and benefits

This standard allows straightforward expressions and maps of ICT professional skills and competences. Enterprises are able to access standard vocabulary and definitions. For small IT enterprises, it is very useful to be able to demonstrate that they have the competences required to fulfill client demands. Customers no longer look for technical skills only, they seek business partners able to work in teams, manage projects and processes, and able to communicate. This standard describes such skills, providing full competence descriptions. Therefore this standard is an effective tool to help SMEs identify, articulate and communicate their complex know-how. Using this standard, enterprises have found a way to describe the technical and soft competences inclusively, which is a key ability when managing relationships with foreign companies.

Example 5: Using this standard to build SME job descriptions

Key perspectives

- Job description development.
- Intercompany communication.
- Recruitment aid.

Value and benefits

This standard can provided the engine to describe requirements and competences in a consistent and commonly understandable way. The standard facilitates communication and collaboration between the internal functions of HR and ICT operations. Prior to using this standard, staff from ICT and HR may talk at cross-purposes, typically ICT people speaking about special technical issues and HR people about training issues. Deploying this standard, ICT executives and HR representatives can describe collectively requirements of existing and future workplaces and work processes and existing and needed competences. This supports e.g. harmonization of internal job descriptions for better support to enterprise growth. For this purpose, it is necessary to describe requirements and competences in a common and understandable way. Using this standard makes collaboration between ICT and HR department easier, and optionally, an external expert familiar with the principles of this standard can support this aim.

Example 6: Applying this standard by qualification providers

Key perspectives

- Matching education supply to market needs.
- The difference between competence development and traditional learning.
- Student motivation from a competence approach.
- Compliance of this standard and EQF.

Value and benefits

This standard describes competences for the ICT sector in a very comprehendible and consistent way. Furthermore, this standard and its inherent principles allow qualification providers to follow an outcome and competence orientated approach. Key benefits of such an approach are:

a) promotion of employability: the use of this standard supports the learning outcome approach prevalent in the EQF. It is therefore easier to implement programs, which not only develop skills or procure knowledge, but offer the possibility for continuous professional development in the workplace;

b) quality enhancement: this standard facilitates the communication and comparability of learning outcomes as it provides a common language for communication about competence in the ICT sector. Consequently, it is easier for qualification providers to match the requirements of employers and the labour market. Vice versa it is also easier for organizations to articulate their needs;

c) furthermore this standard makes it easier to identify levels of experience and competence in ICT. Due to the relationship between this standard and the EQF, it is easy to align the identified levels of competence to qualification levels of the EQF, or national or higher education frameworks;

d) this standard also makes it easier for qualification providers to achieve external certification

requirements, whether from a learning outcomes and examination perspective or from a capability level viewpoint;

e) better promotion and marketing for the qualification providers: qualification providers show by using this standard, that they are in line with European guidelines, ICT standards and market needs. Furthermore, that they support sustainable competence development and enhance their market position.

Example 7: Applying this standard in a certification environment

Key perspectives

- Matching certification supply to market needs.
- Increasing transparency in the European e-Skills landscape.

Value and benefits

This standard has become the framework of choice for recent tools as it represents a European recognized competence structure incorporating the skills and knowledge components inherently incorporated within certification programs supplied by a range of Internationally known certification suppliers. Tools that provide education and training guidance require a suitable underpinning structure on which to anchor certifications and training programs and support navigation through the plethora of training opportunities that exist. By deploying this standard as an engine to drive appropriate certification identification, online tool developers are able to provide a consistent perspective of e-skills industry based training and certification supply across Europe. By relating e-skills certifications to this standard, a new competence transparency can be created that informs students, professionals, managers and training providers.

Example 8: Using this standard for ICT professional self-assessment

Key perspectives

- Self-assessment.
- CV and self-promotion.

Value and benefits

This standard can be used as an aid to assess and promote personal competences. Furthermore, employers are ultimately interested in the competences of potential employees and this standard provides a common language that can be understood by both parties. In the context of competence identification this standard provides a consistent language that articulates competences and enables a holistic description of competence independent but complimentary to formal certifications or qualifications. ICT professionals are readily able to understand the competences of this standard and can be confident that they are using a standard supported by many market stakeholders and the European Commission.

Example 9: Using this standard for linking e-curricula supply and demand

Key perspectives

- Competence connected to learning outcomes.
- Compliance of this standard and EQF.
- Personal career development.
- Competence based e-curriculum.

Value and benefits

This standard is EQF compliant, it is a suitable reference framework for competences to be dealt with as learning outcomes. Moreover, each e-Competence is constructed and described with its components and levels. Accordingly, this standard can be a good input for developing learning modules. Its modular structure allows us to combine different e-Competences and their elements to build learning units and modules. This standard was created as an answer to the stakeholders' request for a shared European framework of competences in the ICT business areas. Accordingly, this standard provides the reference content for vocational training in the ICT sector. This standard has adopted the EQF grammar and it is built upon the principle of "operational descriptions", namely observable and measurable descriptions, as learning outcomes themselves are. Through analysis of Dimension 3, this standard is able to suggest both *the content*, namely the learning outcomes to be developed within learning modules, and the learning units included in the learning modules; and *the method* as well. The closer the e- Competences are to complex behaviours, including soft-contextual-managerial skills, the more valuable experiences become.

Example 10: Application by ICT professional associations

Key perspectives

- Assessment.
- Benchmark criteria.
- Community building.

Value and benefits

This standard can provide the core of assessment procedures and shows a way to link professional qualification with the European environment. By mapping skills and competences from specific environments with this standard, a shared vocabulary based upon shared definitions can be applied in Europe and beyond.

Example 11: This standard in support of ICT training quality improvement

Key perspectives

- Specialized competences.
- Specialist role development.
- Matching education supply and demand.

Value and benefits

This standard enables better comprehending the characteristic e-Competences and their interrelationships relevant to a specific field, e.g. the internet. By specifically identifying the necessary competences to specific internet job role profiles, based on a transparent and consistent methodology, a standard framework for the development of training modules can be established that simultaneously targets the education requirements of the market. By using this standard, training institutions gain a deeper insight and develop a better understanding of how training offerings should be shaped to match market needs. In parallel, employers are able to define specific competences that are necessary to meet their organizational needs.

Example 12: Applying this standard for assessment and career tools

Key perspectives

- Assessing an ICT professional's capability

- Recognition of formal and informal learning

Value and benefits

This standard makes it a valuable framework for identifying and benchmarking ICT professional capabilities across the continent. Competence is the commodity sought by employers and customers; this standard provides a tangible structure to assess and demonstrate competence. Competence articulated within this standard is a holistic concept incorporating, skills and knowledge. The structure of this standard provides a simple shorthand identifier. For example, B.1. represents 'Application Design' and can be expressed from levels e-1 to e-3, so e.g. B.1. level e-3 demonstrates the highest level of competence in Application Design. Consequently, this standard is an ideally structured framework for incorporation within software tools as it provides a simple notation for complex concepts. This standard provides a quantitative and qualitative e-Competence Framework that identifies and enables the recording of an ICT professional's capability. It does not dependent solely upon certification and qualifications but takes into account history, experience and on the job training to provide an understanding of capability. This standard recognizes that competence is based upon the outcome of an individual's education and development rather than the input of education and certification only. It is a combination of knowledge, skills and attitude.

Example 13: This standard for National and EU policy makers

Key perspectives

- Ensuring qualified ICT workforce in a long-term.
- Communication between policy makers and ICT business.
- e-curricula building.
- Cross-European common language.

Value and benefits

This standard is founded on the multi-stakeholder collaboration between public institutions, business and education. It provides a framework of good technical quality embedded in real-life practicality. Political trust is affirmed from the development umbrella provided by the European Committee for Standardization (CEN) and backed by the European Commission.

The European dimension, achieved by exchanging and engaging many national perspectives, makes the framework a valuable tool for multiple applications in a wide variety of environments. The provision of this standard maintains a consistent perspective across all stakeholder environments, and facilitates, for example, dialogue between ministries, European and national authorities, ICT employers and qualification providers. This standard facilitates exchange of views, unifies language, and promotes consensus. The framework is the fruit of multiple expert input across the EU and can therefore be seen as a technical "quintessence" of current ICT HR know-how. The international dimension of this standard and its ease in application within a local environment also strengthens its value. A special benefit lies in the compliance between this standard and the EQF, which provides this standard with another compelling argument for implementation in European and National environments.

Example 14: Using this standard to relate or integrate to other frameworks

Key perspectives

- Use of this standard in an established structure.
- Relating this standard to other frameworks.
- Relating workplace and qualification perspective by this standard and the EQF.

Value and benefits

This standard brings the required solution to standardize and provide a common language describing ICT competences. By using this standard, e.g. the French CIGREF's nomenclature has achieved competence coherence to facilitate assessment and definition of activities in role and job positions. By adding stable and complete descriptions of competences to their framework, the organizations membership, training organizations, recruitment agency, etc. now possess a tool to share descriptions across all aspects of job roles, from mission to competences and in a consistent way. The parallel applications of this standard in France and Germany facilitates direct comparison between French and German Profiles for mutual understanding and learning and provides them both with an international dimension of competence articulation. Using an existing single and quality proofed European solution, instead of investing further work in definition of competences, means a big benefit to the sector. This standard enables communication within HR related work groups and it encourages and supports the increasing trend which can be observed within many organizations changing perspective from profiles towards, competences. This standard can be used as a key driver for discussing and growing understanding of the competence concept.

Example 15: Using this standard for European ICT Professional Profiles creation

Key perspectives

- Including competence into a job Profile.
- Communication between HR, management and ICT professionals.
- Building and linking local profiles to a recognized European structure.

Value and benefits

This standard when supplemented by job/role profile provides a substantial component of any profile and ensures that the profile has a European wide connection. Furthermore the currency of this standard ensures the profile benefitting from the common language contained within each e-Competence. Of significant benefit to any profile builder, is the availability of the pre-prepared descriptors from this standard and avoid starting from a ‘blank canvas’. The modular construction of this standard readily supports mix and match of competence components and provides clearly articulated statements for inclusion across a broad range of specialist ICT roles. The availability of this standard makes it possible to anchor each profile in a real world environment, firmly connected to the knowledge, skills and capabilities required. The competences articulated within this standard provide clear pointers to the tasks that need to be identified for each profile. This standard provides a commonly recognized EU competence language and a bridge between the two differing viewpoints of competence and job profiling, facilitating the application of competence management within the traditional approach of job profiling or structuring. This leads to better understanding by management of the roles within their organizational environment and provides an interpretation that is useful to educational institutions for guiding curriculum development matching industry needs.

Annex B
(normative)

Basic reference works

Table B.1 — e-CF and EQF level correspondent table

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 specialized 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; recognized inside and outside the organization for innovative solutions and for shaping the future using outstanding leading edge thinking and knowledge	IS strategy or program management		Demonstrates substantial leadership and independence context which are novel requiring the solving of issues that involve many interacting factors	Conceiving, transforming, innovating, finding
7	Highly specialized 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, specialized problem-solving skill s 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 specialized integration capability in complex environments; full responsibility for strategic development of staff working in unfamiliar and unpredictable situations	IS strategy/holistic solutions	Unpredictable - unstructured	Demonstrates leadership and innovation in unfamiliar, complex and unpredictable environments. Addresses issues involving many interacting factors.	creative solutions by application of a wide range of technical and/or management principles

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 specialized 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 -	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/skill
5	Comprehensive, specialized, 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	Concepts/Basic principles	unpredictable	Works under general guidance in an environment where unpredictable change occurs. Independently	Designing, managing, surveying, monitoring, evaluating, improving, finding non standard solutions Scheduling,
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		theoretical knowledge and practical skills to solve complex problems within a predictable and sometimes unpredictable context.		Structured -	resolves interactive issues which arise from project activities.	organizing, 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	predictable	Demonstrates limited independence where contexts are generally stable with few variable factors	Applying, adapting, developing, deploying, maintaining, repairing, finding basic-simple solutions

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