

GOVERNANCE FRAMEWORK FOR ICT PROFESSIONALISM PROPOSAL

DECEMBER 2013

Prepared for the European Commission



by:



supported by:



**empirica Gesellschaft für Kommunikations- und
Technologieforschung mbH, Bonn, Germany**

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The study team

This study was conducted by:



empirica

and

Louise Veling
Sinéad Murnane
Conor O'Brien
Stephen McLaughlin



Innovation Value Institute (IVI)
National University of Ireland
Maynooth
Ireland.

Tel.: +353 1 708 6931
Fax: +353 1 708 6916
Email: IVI@nuim.ie
<http://ivi.nuim.ie/>

Executive Summary

1. Context

This research project was launched by the European Commission Directorate General for Enterprise and Industry as part of the European Commission's on-going e-skills agenda. The specific objective of WP5 is to develop proposals for a pan-European institutional and governance framework for the ICT profession, and as such it is also part of an on-going initiative to mature ICT Professionalism in Europe.

This work builds on earlier work undertaken in the 2012 IVI/CEPIS study on a European ICT Professionalism Framework (Mclaughlin et al., 2012) and will be followed by a research project which aims to identify a sustainable operating model for the promotion of ICT professionalism in Europe (European Commission, 2013). The current project aims to support the development of a European institutional and governance framework for ICT professionalism, with the goal of enhancing professionalism and mobility across Europe. The proposed framework has been developed iteratively in conjunction with stakeholder representatives. The research report also includes validated stakeholder value models and recommendations for next steps.

2. Building Blocks of the Profession

The 2012 report defines an ICT Professional as someone who:

- Possesses a comprehensive and up-to-date understanding of a relevant body of knowledge;
- Demonstrates on-going commitment to professional development via an appropriate combination of qualifications, certifications, work experience, non-formal and/or informal education;
- Agrees to an agreed code of ethics/conduct and/or applicable regulatory practices; and
- Through competent practice delivers value for stakeholders.

Reflecting this definition, the 2012 report identifies four key building blocks of the profession, namely, the European e-Competence Framework (e-CF), a Foundational ICT Body of Knowledge meta-model, multiple educational paths, and professional ethics. Additional components described were ICT Professional Profiles, an ICT register and a Portfolio of Evidence. This research project has taken these inputs and developed them, as well as introducing structural components necessary for operationalizing the profession: Standards, Professionalism and Promotion. These are outlined in Figure 1 below.

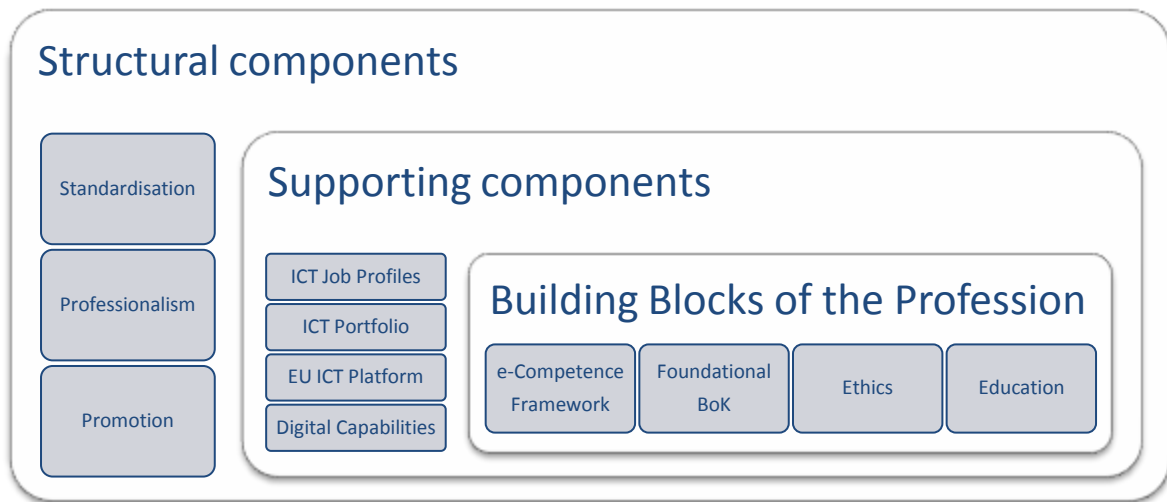


Figure 1: Components of the Institutional and Governance Framework for ICT Professionalism

3. Institutional and Governance Framework

We propose a multi-layered approach to implementing a structure for ICT Professionalism in Europe. A number of key functions are needed on a pan-European level, and these are reflected on a national level across each of the Member States. The three key functions are:

- **Standards:** Responsible for establishing, developing, and maintaining European Standards for the ICT Profession. In Europe, this is the responsibility of the European Committee for Standardization (CEN). National standards bodies are responsible for implementing the European standards in each Member State.
- **Professionalism:** This function is concerned with the practical aspects of supporting the profession. This function is comprised of:
 - *Coordination*, responsible for research into and coordination of existing professionalism initiatives;
 - *Membership*, essentially an administrative function, which includes validation of the potential member's professional credentials. Examination and licensing should be considered as longer-term goals in this area
 - *Professional Ethics*
 - *Managing the ICT Professional Portfolio and Tools* at a national level and coordinating the *EU ICT Platform and Tools* at an EU level
- **Promotion:** Responsible both for promoting ICT as a career option and for promoting the components of professionalism, such as stimulating membership of the profession of the profession at a pan-European and a national level; promoting adoption of components of the profession, such as the e-CF; developing synergies with initiatives relevant to the ICT Profession on a national, pan-European and even global level; as well as ensuring open exchange of ideas and good practices across Europe.

The key functions and their interrelations are illustrated in Figure 2 below.

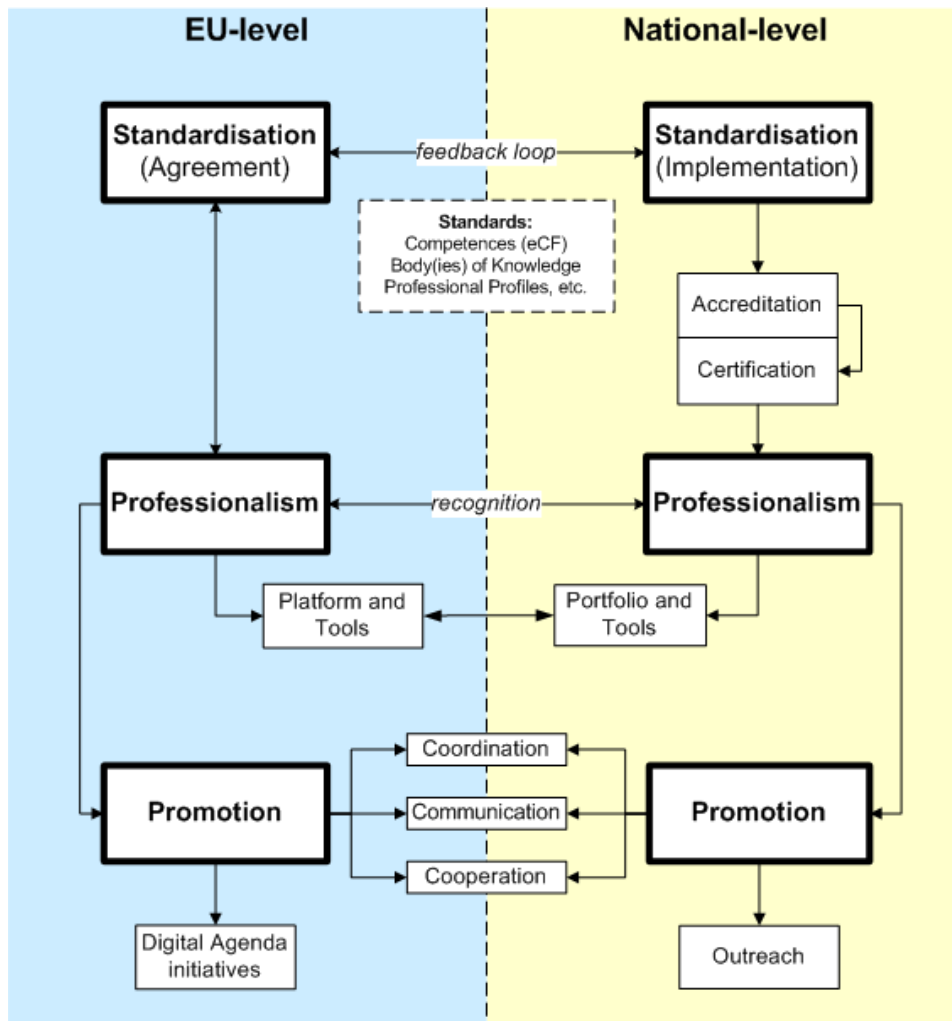


Figure 2: High-level overview of institutional and governance framework

This project proposes a Multi-stakeholder partnership (MSP) to take responsibility for Professionalism and Promotion at a European level.

An idealised model for the national level is proposed, comprising an MSP to support all three functions: the implementation of standards, national ICT professionalism and promotion. Where possible, existing initiatives and mechanisms should be retained and built into the process. Depending on existing institutions and initiatives, the maturity of ICT professionalism, and national priorities and objectives in this area, however, each Member State will most likely implement such a model differently. To this end, three illustrative case studies describing an overview of how different Member States' existing initiatives might be leveraged to reflect these models are presented.

4. Action points

As part of the project, we identified a series of action points for support the maturing and operationalizing of the profession in the short, medium and long term.

Table 1: Action points for instituting an organizational framework

Action	Description
1	Select a suitable organizational infrastructure for professionalising ICT across Europe
2	Establish coordinated national feedback loops to input into professionalism standards
3	Include relevant initiatives in future research on ICT Professionalism
4	Initiate a project to establish an ethics framework for the profession at a European level
5	Establish a function to take responsibility for coordinating and promoting relevant professionalism initiatives across Europe
6	Establish a number of national pilots to take responsibility for coordinating/bringing together relevant national professionalism initiatives
7	Define entry criteria (education, experience etc.) for the profession based on e-CF, FBoK, etc.
8	Define validation criteria for the profession
9	Research ways of validating informal education for ICT profession
10	Investigate possibility of establishing an ICT professional register
11	Pilot a number of national-level online ICT Professional Portfolios
12	Create centralised EU ICT Platform and Tools

Figure 3 below illustrates the roadmap for developing and promoting ICT professionalism across Europe in the short, medium and long term.

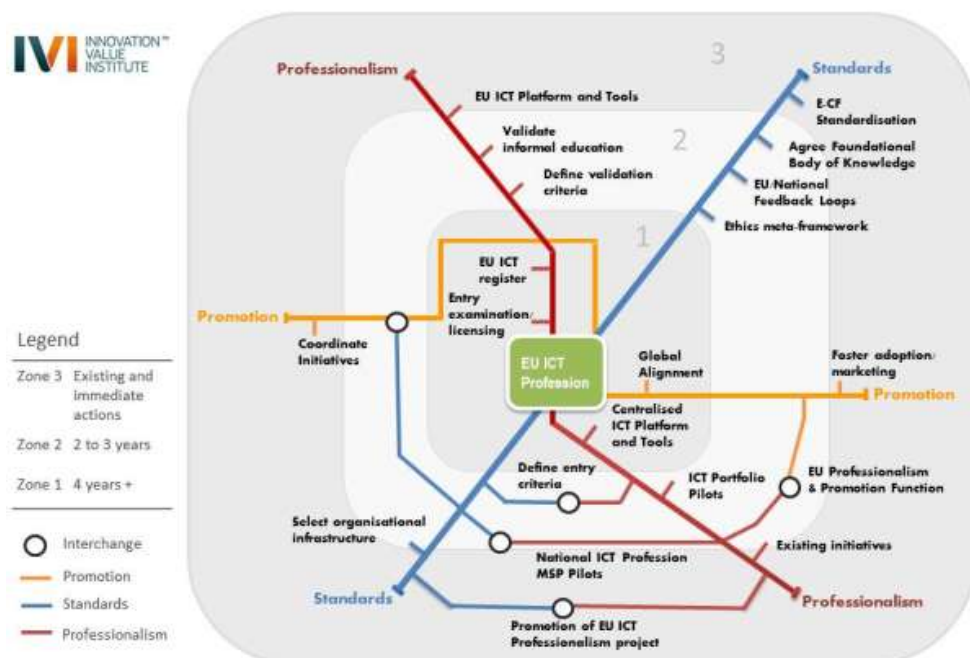


Figure 3: Roadmap for ICT Professionalism

5. Conclusion

In the course of this project, we have developed proposals for a pan-European Institutional and Governance Framework in collaboration with 57 stakeholder representatives using various interactive processes, including a questionnaire, focus groups, individual and group interviews, and a workshop.

This consultative approach served to engage key stakeholders in the design of the frameworks from an early stage of development and to ensure that the proposals were demand-driven. Engagement by and support from all of the relevant stakeholders is essential to ensure the sustainability of the proposed frameworks. Additionally, existing initiatives must be coordinated and aligned in order to successfully embed an effective structure for ICT Professionalism.

Establishing the profession will take many years and proposals for its development will need to be flexible and open to change and adaptation. It is worth noting that there is value both in achieving this goal and in the process of attaining it, in bringing together relevant stakeholders across Europe to discuss the current state of ICT professionalism and how it must be developed for the common good.

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1. Introduction

The project aims and objectives are described in this chapter and the remainder of the report is organised as follows: Chapter 0 provides details of the broader context in which ICT professionalism is embedded. The methodology and research process are described in Chapter 3, while the key findings from the research engagements are discussed in Chapter 4. Based on these findings, we present proposed institutional and governance frameworks to operationalise ICT professionalism at both EU and national levels in Chapter 5, along with illustrative case studies to describe the current landscape in Italy, Ireland and the Netherlands. Chapter 6 describes the stakeholder value models identified and validated through the research process; and finally, in Chapter 7, we present our recommendations and actions.

1.1. Background

The technologies, tools and skills related to ICT continue to develop at an accelerated rate, yet the profession has not matured in parallel (European Commission 2012). Across Europe, there is currently no common understanding of the term 'ICT professional' and no common language to describe ICT roles. The fact that new and emerging technologies continually require new skill sets and that the role of ICT in society is changing to become a more integrated and pervasive business and societal enabler further complicates this situation

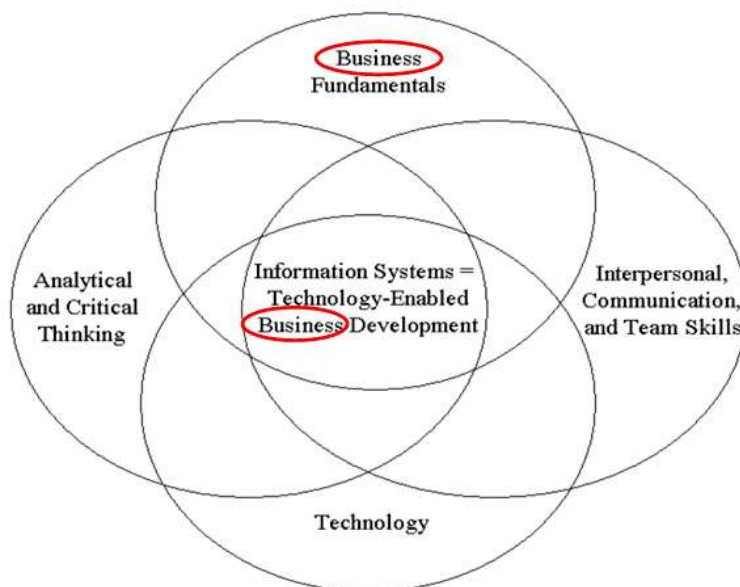


Figure 4: ACM Computing Curricula¹ IS Professional

There is, therefore, a growing need for ICT roles that respond to this changing landscape and encompass skills outside of the traditional ICT operations environment. This need has been recognised, for example, in the Information Systems (IS) curriculum guidelines which were jointly published by Association for Computing Machinery (ACM) and Association for Information Systems (AIS) (Wright et al. 2010). These emphasise that IS education must be closely aligned with business and incorporate business fundamentals, interpersonal,

¹ <http://www.acm.org/education/curricula/IS%202010%20ACM%20final.pdf> page 8

communication, and team skills, and analytical and critical thinking skills, as well as technology skills, see Figure 4.

Despite average unemployment levels of 22% for young people across Europe, employers regularly state that they are unable to fill open positions in ICT. This shortage will only become more acute (McCormack 2010), with ICT labour supply shortfalls of up to 13% forecast over the period 2010-2015. Given ICT's role as an enabler of business value (Empirica, 2009) this shortfall has the potential to act as a brake on European competitiveness and recovery, with broader implications for European society as a whole.

The labour shortages of skilled ICT workers also result in localised knowledge gaps, meaning businesses are finding it increasingly challenging to meet the demands for ICT-enabled innovation (Mclaughlin et al. 2012). In fact, recent research from Said Business School shows the high number of ICT-related project failures, with eight out of ten ICT projects experiencing cost overruns, and one in six projects experiencing a cost overrun of 200% (Mclaughlin et al. 2012). The low maturity of the ICT profession also affects public perception, and this in turn affects the number of people entering the profession.

The most important driver for change, however, as identified in the e-SKILLS AND ICT PROFESSIONALISM report (Mclaughlin et al. 2012) stems from the extent to which ICT has the potential to harm society. As technology becomes more pervasive across all aspects of business and society, the extent to which ICT is embedded in society will inevitably grow. Professionals tasked with assessing, deploying and managing these technologies need skills, education, and professional credibility. If steps are not taken to mature the profession now by enhancing its reputation and attracting significantly greater numbers, it is likely that the risks to society from ICT will grow. Another key benefit of an organised and internationally adopted profession is the improved ability for planning and policy-making for ICT labour planning.

1.2 Project Overview

This project is part of a wider European agenda to promote an ICT profession. This profession should enable mutual recognition of practitioners; facilitate cross-border mobility; be dynamic, adaptive, flexible and progressive; remain open to new entrants and play a role in promoting ICT career options; provide professionals with a comprehensive understanding of a common body of knowledge; and encourage the acquisition of education, the use and recognition of certifications and qualifications, on-the-job training and lifelong learning as ways of ensuring the competence and standing of professionals.

This project proposes an institutional and governance framework for the development and promotion of ICT Professionalism in Europe, see Chapter 5. In essence, this means proposals were developed for relevant structures, components, processes and criteria to support the development of a European ICT Profession. Stakeholder Value Models for relevant stakeholders were also developed and presented in Chapter 6.

The proposed framework builds on earlier work undertaken in the 2011 IVI/CEPIS study of a European ICT Professionalism Framework (Mclaughlin et al. 2012), on the outputs of the Multi-Stakeholder Partnerships work packages WP2 and 3, in particular the identified Best Practices, as well as a review of other relevant professionalism initiatives. The 2012 report

proposed a framework for ICT based on four building blocks: Bodies of Knowledge; Education and Training; Competences; and Ethics. The definition, which was widely accepted by the CEPIS Task Force on ICT Professionalism, and CEPIS Council members², states that ICT Professionals:

- Possess a comprehensive and up-to-date understanding of a relevant body of knowledge³;
- Demonstrate on-going commitment to professional development⁴ via an appropriate combination of qualifications, certifications, work experience, non-formal and/or informal education;
- Agree to an agreed code of ethics/conduct⁵ and/or applicable regulatory practices; and
- Through competent practice⁶ deliver value for stakeholders.

The framework and associated value models for each stakeholder presented in this report were developed iteratively through a series of interactive sessions with relevant stakeholders; including focus groups, interviews, and a workshop, see Chapter 3 for details. The framework is designed to be implemented in a multi-levelled and multi-staged way. Key activities will need to be carried out at a national level by individual Member States; however, these activities are reflected, supported and coordinated at an EU level, see Figure 5. Initially, the focus is on coordinating existing efforts related to ICT professionalism and establishing a more formal structure to support the ICT practitioner community. Existing and immediate actions also include developing and promoting components relevant to the profession, such as the e-Competence Framework (e-CF), aligned codes of ethics, commitment to lifelong learning and a common Body of Knowledge. In the medium and long-term, the report also outlines recommendations for formalising professionalism efforts (see Chapter 7). Precisely how the ICT profession develops in Europe, however, will depend on demand from practitioners and industry.

² CEPIS Council is the governing body of the **Council of European Professional Informatics Societies (CEPIS)**. Meetings are held twice a year and are attended by representatives from CEPIS Member Societies.

³ The term *relevant body of knowledge* encompasses the requirement for a broad and deep knowledge base, which is up-to-date, accommodating both a common ICT body of knowledge, and pertinent specialist knowledge and skills

⁴ *Professional development* focuses on improving professional competence in a professional role, with the objective of enhancing personal performance and career progression opportunities. It can encompass both technical aspects (e.g. keeping abreast of latest technological trends) as well as non-technical aspects (e.g. developing better presentation skills)

⁵ Professionals are accountable to themselves, the ICT Profession, and Society, through an agreed *code of ethics/conduct* or applicable regulatory practices

⁶ *Competent practice* communicates the concept of quality products and services being delivered by practitioners

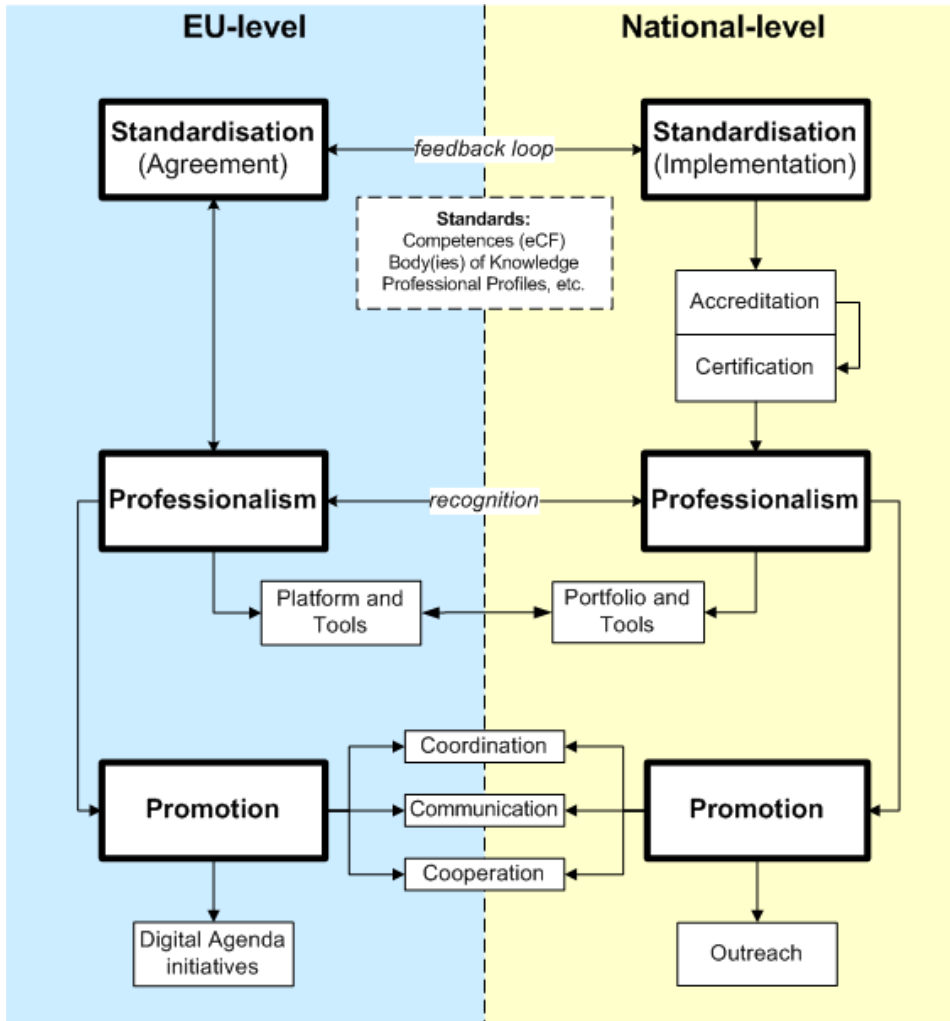


Figure 5: High level overview of multi-levelled approach

2. Context

2.1. Introduction

The following chapter gives an overview of some of the relevant initiatives that are related to and have informed our proposed framework for ICT Professionalism.

2.2. The ICT Professionalism Framework

As outlined in Chapter 1, this project builds on the proposals and recommendations of the IVI/CEPIS report on *e-Skills and ICT professionalism: Fostering the ICT profession in Europe* released by the European Commission in May 2012 (see McLaughlin et al., 2012). The 2012 report proposed a framework for ICT based on four building blocks: Bodies of Knowledge; Education and Training; Competences; and Ethics, and developed a European Framework for ICT Professionalism, the key elements of which are summarised in Figure 3 below.

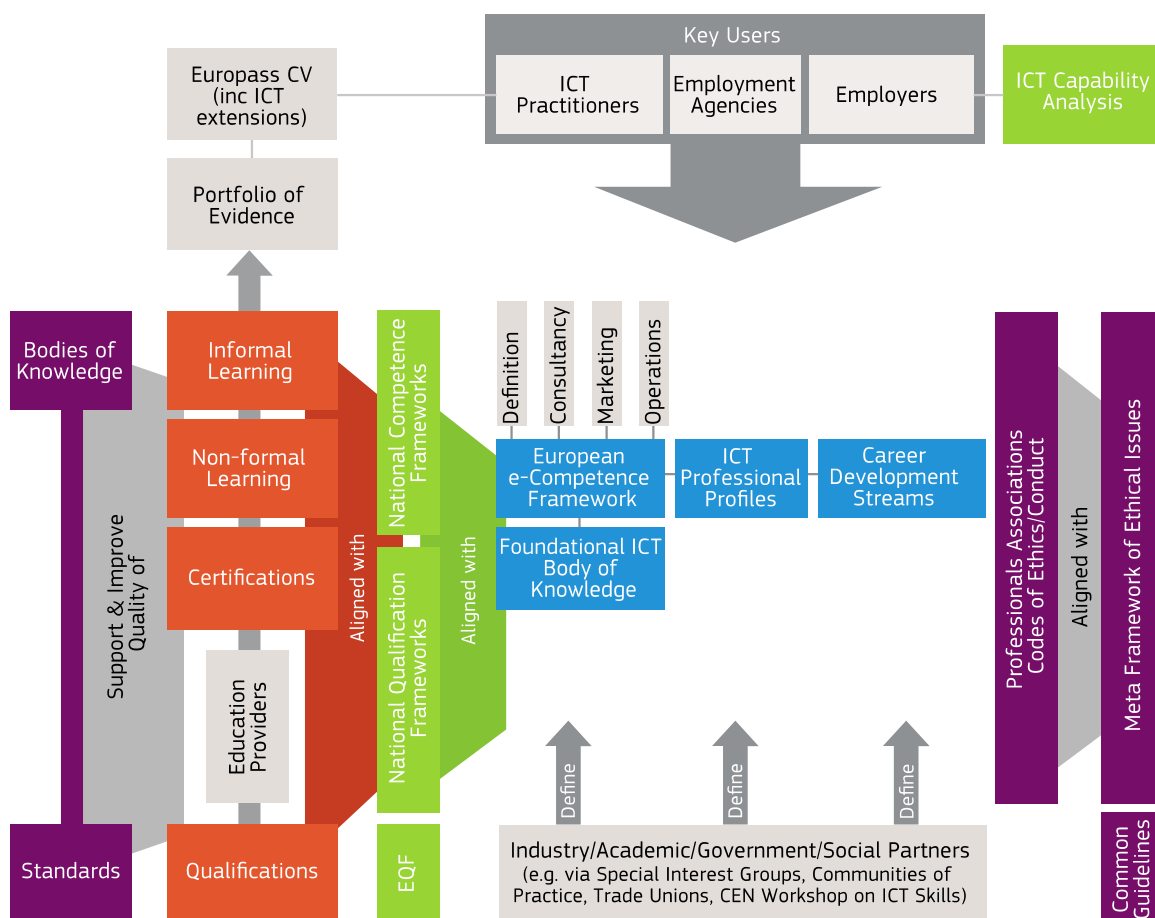


Figure 6: High-level view of the European ICT Professionalism framework

2.2.1. The European e-Competence Framework (e-CF)

The IVI/CEPIS report identifies the European e-Competence Framework (e-CF) and its broad adoption as one of the key components of the proposed framework. The e-CF defines a set of 36 ICT competences and five levels of proficiency or professionalism, from *Associate* to *Principal* (see Figure 7 below).

Higher competence levels may be acquired via any educational path, i.e. formal, informal, or non-formal. Practitioners may opt to demonstrate their competences through qualifications and certifications, or simply add evidence to their portfolio to support the claimed competences.

The e-CF represents a common standard that can be used across Europe by practitioners, employers and educators to assess practitioner competences and proficiencies, and against which to define professional ICT job roles, and relevant certifications and qualifications. It might also be used to define entry criteria and requirements for progression within the profession.

The e-CF also form the basis for the ICT Professional Profiles project that defines a selection of ICT profiles with their respective e-competences and proficiency levels which can be extended to define ICT career streams, providing practitioners with greater clarity over potential careers in ICT and the competences required to achieve this progression.

The original report envisages that an eco-system of organisations will develop around the e-CF, providing toolsets to facilitate its use among stakeholders, as well as supporting and promoting its adoption. This idea has been further elaborated and is discussed in more detail in section 5.2.1.1 of this document, along with an outline of more recent updates to the e-CF.

Dimension 1	Dimension 2	Dimension 3				
5 e-competence areas (A - E)	36 e-competences identified	e-competence proficiency levels e-1 to e-5 (related to EQF levels 3-8)				
		e-CF levels identified for each competence				
		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 or Project Planning					
	A.5. Design Architecture					
	A.6. Application Design					
	A.7. Technology Watching					
	A.8. Sustainable Development					
B. BUILD	B.1. Design and Development					
	B.2. Systems Integration					
	B.3. Testing					
	B.4. Solution Deployment					
	B.5. Documentation Production					
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					
	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					
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. IT Governance					

Figure 7: e-CF Competences

2.2.2. The Foundational ICT Body of Knowledge (BoK)

The report proposes that all practitioners wanting to be classed as “ICT professionals” should possess an understanding of a Foundational ICT Body of Knowledge (FBoK). The FBoK should cover a wide range of topics (both technical and non-technical) in order to provide a solid platform for future professional progression. Education providers will be encouraged to map their modules to the FBoK to facilitate this process.

A EU Commission DG Enterprise and Industry (European Commission 2013) tender has since been issued to initiate its development, see section 0 for details.

2.2.3. Education and Training

Education is considered one of the cornerstones of, and key enablers for, the adoption of the proposed professionalism framework. The report emphasises the need to give equal recognition and importance to non-formal and informal learning as to formal qualifications and certifications.

Formal education paths are well established, with recognised accreditation and validation methods. However, a challenge remains to recognise, validate and demonstrate less formal routes. This is dealt with in the context of the proposals for the new institutional and governance framework in section 5.2.1.3.

2.2.4. Professional Ethics

The original report recognises the difficulties of creating a universal code of ethics for the ICT profession due to cultural, legal, social and political differences between Member States and therefore calls for a more consistent approach towards ethics across the EU. The report highlights the need for national computing associations to align their codes of ethics/conduct with a meta-framework of ethical issues, while remaining responsible for developing, maintaining, and implementing its own code. This would ensure that a common core set of ethical issues are addressed in ethical codes across Member States.

Professional ethics in the new framework is dealt with in section 5.2.1.4.

2.2.5. Europass CV / Portfolio of Evidence

The Portfolio of Evidence is envisaged as a medium for practitioners to document their skills for employers in a consistent fashion using a standard Europass CV with appropriate ICT-specific extensions, based on e-CF competences.

The current project uses the term 'ICT Portfolio and Tools' to develop this idea, which also includes many of the characteristics described in 'The Register of ICT Education' below. This idea is developed in section 5.2.2.2 below.

2.2.6. Register of ICT Education

The 2012 report recommends the development of a Register of ICT Education, which would contain the qualifications and certifications held by a given practitioner, and elaborates on how it might be implemented. As described above, this idea is developed in this report under the heading 'ICT Portfolio and Tools' which is described in section 5.2.2.2, while an ICT register is considered simply as a documented (possibly searchable) list of registered professionals and is detailed in section 5.2.2.3.

2.2.7. ICT Capability Analysis

ICT capability of an organisation represents the sum output of its ICT workers, its ICT enabled processes, as well as its technology. Therefore, professional competence is an important enabler of improved organisational ICT capability. The 2012 report identifies how an analysis of an organisation's capability can be used by organisations to identify gaps in its ICT competences.

2.2.8. Summary

The original framework has been further developed based on intervening developments, including, for example, the recent creation of a project committee to promote the e-CF as a standard, feedback from participants and within the context of an operational structure. The resulting proposals for an institutional and governance framework for the promotion of ICT Professionalism in Europe, its updated components, stakeholders and value models are detailed in Chapter 5 and 6 of this report.

2.3. The European Committee for Standardization (CEN)

The European Committee for Standardization (CEN) focuses on developing new standards, harmonising national standards, promoting implementation of international standards, and supporting the work of the International Organization for Standardization (ISO), among other activities. It produces:

- European Standards (ENs)
- Technical Specifications which are prospective standards for provisional application in certain technical fields
- Technical Reports for communication and the transfer of information
- 'CEN Workshop Agreements' which are consensus-based documents created in a Workshop environment.

Standards are driven by business and drafted by experts in the field, including industry, trade federations, public authorities, academia and NGO representatives (CEN/CENELEC 2013). The route for participating in the development of European Standards is through a National Standards Body (NSB) or through a trade federation. Through the NSB, participants can become involved in a national 'mirror committee' which is responsible for developing a national position on a particular standard and representing this position to the relevant CEN Technical Committee. It may also be possible for participants to become members of the national delegation to the CEN Technical Committee or to be nominated to serve as an expert in one of the Working Groups.

The CEN Workshop delivers a CEN Workshop Agreement (CWA), which is a less formal document. A CWA will satisfy market demands for a more flexible and timelier alternative to the traditional European Standard (ENs), but one which still possesses the authority derived from the 'openness of participation' and agreement inherent in the operations of CEN and its national members. Participation in a workshop is thus open to anyone.

The CEN Workshop on ICT Skills has been in existence for 10 years. In that time, it has delivered a number of significant initiatives central to the proposals developed in this report, including the e-CF and the ICT Professional profiles. It is a European workgroup consisting of both national and international representatives from the ICT industry, vocational training organisations, social partners and other institutions (approximately 100 entities in all).

The recently formed project committee on "Professions for ICT" will be responsible for transitioning the e-CF to a formal standard. Once this is complete, a Technical Committee (TC) will take over the management of the e-CF with 2-3 national experts represent each Member State on the TC.

The CEN Workshop on ICT Skills, although not having a formal responsibility for maintaining the e-CF, will continue to provide recommendations for its development and act as a sounding board. It will also play a role to develop and maintain any future developments relevant to ICT professionalism that may subsequently develop into standards, such as the Foundational Body of Knowledge (see section 2.2.2 and 5.2.1.2)

The technical committee and the CEN Workshop on ICT Skills play a central role in the proposed institutional and governance framework, as outlined in section 5.3.2.1.

2.4. Quality Labels

The European Commission launched a new project in January 2012 (Quality Labels for Training Fostering e-Skills for Competitiveness and Innovation) aimed at developing quality labels for industry-based training and certification (IBTC) in line with European Quality Assurance Reference Framework for Vocational Training and Education (EQAVET). The Quality Labels project provides a mechanism that makes it possible to distinguish different types of certification and training, referenced against the e-Competence Framework. In addition, new tools and services are provided with information and evidence about demand and supply of e-skills in Europe, along with a prototype service and tool to support career development, job placement and recruitment, by giving guidance on certification.⁷

Quality labels and associated tools and services provide vital support tools for the proposed Professionalism framework, as elaborated in section 5.2.2.3 below.

2.5. The IEEE PAB-IT

2.5.1. Introduction

The Institute of Electrical and Electronics Engineers (IEEE) is a global professional association for professionals working in technology. The IT Committee of the Professional Activities Board (PAB-IT) was established in 2009 to provide leadership and suggested course(s) of action for the IEEE Computer Society in the IT field of computing. Their initial step was to address the broader issue of an "IT Profession" with the ultimate aim of planning IEEE Computer Society initiatives, products and policies in the IT domain. The definition of "IT Profession" was agreed in 2010 and this led to further, related initiatives, including the creation of an IT Body of Knowledge and an IT Competency Model, which are currently underway.

2.5.2. The PAB-IT IT Professional Framework

The IEEE, in the White Paper 'Towards a Definition of the IT Profession', depicts the relationships between the elements of a profession as shown in Figure 8.

⁷ http://eskills-quality.eu/fileadmin/eSkillsQuality/downloads/e-Skills_Quality%20Labels.pdf

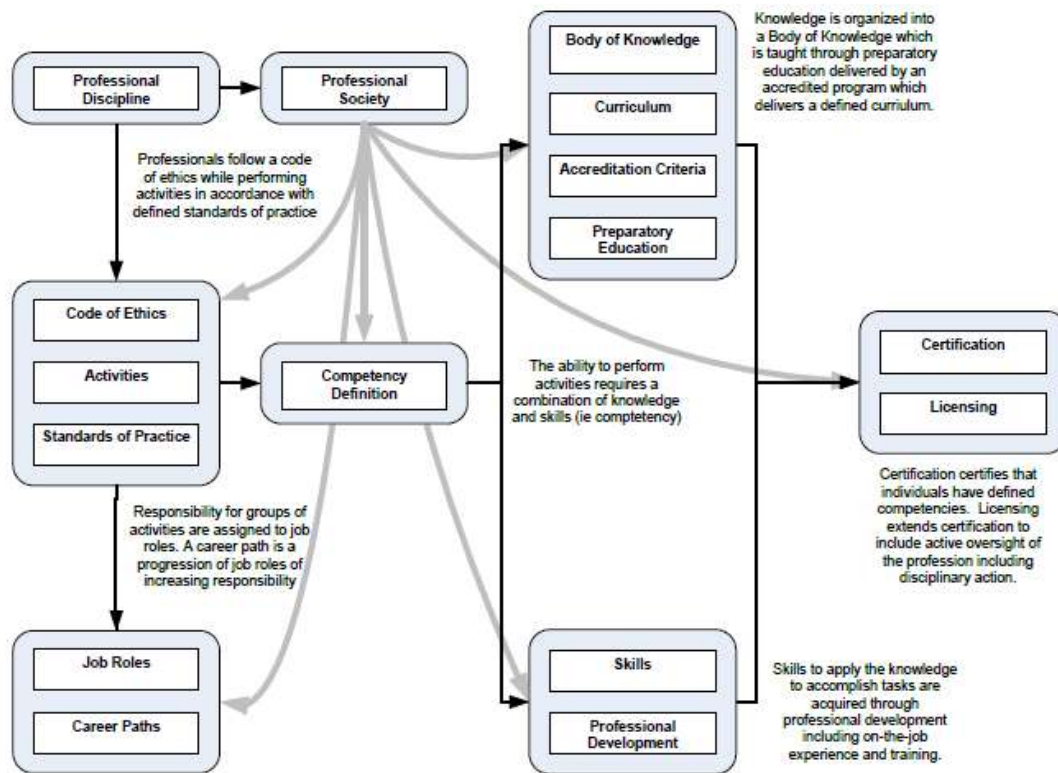


Figure 8: IEEE Computer Society Model of an IT Profession

The IEEE identified three sub-disciplines of the computing field: Business Solution Analysis and Architecture, Solution Development and Maintenance, and IT Operations and Support (PAB-IT 2010). The components of the framework are outlined in Table 2 below.

Table 2 Components of the PAB-IT Professional Framework

Component	Description
Professional Societies	Professional societies are a key enabler, and therefore a key component of the professional framework
Common code of ethics	A code of ethics which specifies appropriate professional conduct to engage in the profession common to all IT sub-disciplines.
Activity Specification	The IEEE describes activities in terms of both the e-CF competence areas outlined above and the OSPM ICT competency profiles, which describe ICT activities under the categories of: Specification; Development; Testing; Operation; Support and maintenance of information technologies; and Application and management of such technologies.
Standards of practice	This component identifies standards that specify techniques, methods, procedures and performance norms, agreed to by the profession, which supports the best in professional practice.
Job Roles	The IEEE model uses SFIA to define the level of responsibility and the ICT competency profile to define streams and sample job titles.
Career Paths	Competency definitions (Competence Model): This component of the IEEE profession maps to ICT Competency Profiles (OSPM) for business/interpersonal competencies, technical competencies, behaviour indicators, the Washington Accord graduate profiles for Professional competency profile, and the e-CF. This component maps to

	the ICT competency profile (OSPM) Clusters
Body of Knowledge	<p>The IEEE component specifies a clearly defined core body of knowledge along with supporting knowledge areas such as technical management, etc. The format it specifies is a description of the knowledge, methods, and practices that define the content of the profession. It also advocates consensual validation of the knowledge and a rational, scientific foundation for the knowledge.</p> <p>Reference models used are: the IEEE/ACM IT Curriculum Model for knowledge areas; the ACS CBoK Model for Core BOK knowledge areas; role specific BOK knowledge areas; complementary BOK knowledge areas; topics; the Washington Accord graduate profiles for Knowledge profiles; and the e-CF for knowledge.</p>
Curriculum	The IEEE model includes prescriptive curriculum content to support establishing and improving educational programmes.
Accreditation criteria	The IEEE profession includes an accreditation system that ensures the quality and suitability of the preparatory education. The IEEE model aligns to certification regimes, including the e-CF for skills.
Preparatory Education	The IEEE model stipulates a minimum level of education and training required in order to be employed at an entry level in the profession.
Skills	This component uses the SFIA to define skills. Skills are defined as “the ability to influence things; to take what you know and apply it so as to cause a real effect to occur.”
Professional Development	Multiple means to maintain and advance skills and knowledge and the education, training and experience necessary to keep current and advance in the profession.
Certification	The IEEE advocates a standard and recognised certification process against a consistent body of knowledge. Certification certifies that individuals have defined competencies by validation, by a community of peers, that an individual possesses the knowledge and competence of a professional.
Licensing	Licensing extends certification to include active oversight of the profession including disciplinary action. This component is implemented by other authoritative bodies and supported by clear body of knowledge, certification standards, competency standards, code of ethics, and a clear boundary of a licensed discipline.

2.5.3. Summary and Lessons Learned

It is likely that the scope of the EU ICT Professional, which will also include topics that are not traditionally “ICT” such as “soft skills” and business knowledge (European Commission 2013) will be broader than that which is defined here. Additionally, while this model will be centrally managed, a European-wide model will be consensus based, with input from many stakeholders, see Chapter 5 for details.

However, there are many similarities between components and potential for possible future synergies. Like the IEEE model, our proposed institutional and governance model sees a central role for professionalising ICT at a national level for professional associations, building on existing initiatives. Both frameworks highlight the centrality of ethics, competences, professional profiles/career streams and a Foundational Body of Knowledge.

The role of licensing, which is a key component of the IEEE model, may be considered as a long-term goal for EU professionalism, should there be a demand for it. Recommendations and actions are outlined in Chapter 7.

2.6. International Professional Practice Partnership (IP3)

The IP3 was initiated by the International Federation for Information Processing (IFIP) in 2006. Its mission is to define world standards for ICT professionalism and to create a global ICT infrastructure to support the development of a mature ICT profession. The IP3 aim is not to build a fully formed international profession, but to build a framework that will facilitate the development of such a profession through action by member societies.

Six organisations currently have established membership within the IP3: the Australian Computer Society; the Canadian Information Processing Society; the Computer Society of South Africa; the Computer Society of Zimbabwe; the Information Processing Society of Japan; and the Institute of IT Professionals New Zealand. The IP3 has also set up a collaborative relationship with a number of academic organisations in South Korea.

The IP3P™ is the first IP3 professional standard. It is a way of accrediting an organisation's suitability to certify an individual as a professional. Figure 9 outlines the building blocks of this standard.

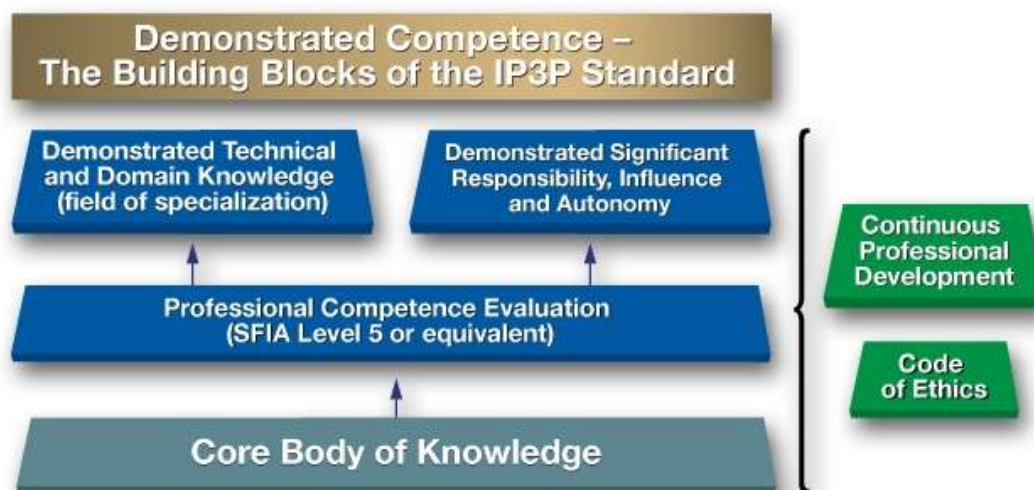


Figure 9 IP3P™ professional standard

2.6.1. The IP3P™ professional standard

The IP3 has adopted SFIA as a reference document for ICT competences. The model is not otherwise prescriptive with regard to the content Bodies of Knowledge or ethical frameworks, adopting instead an approach of approving of existing models. However, to be eligible, organisations need to certify that IT professionals have the appropriate requirements, as outlined in Table 3 below.

Table 3 Components of the IP3P™ professional standard

Component	Description
Core Body of Knowledge	<p>Mastery of core body of knowledge is set at an appropriate standard for certification. The IP3 does not define a central body of knowledge, but rather approves a number of existing Bodies of Knowledge including:</p> <ul style="list-style-type: none"> • IP3 CBOK Model Code • Australian Computer Society (ACS) • British Computer Society (BCS) • CIPS Body of Knowledge
Competences and Skills	<p>Competence and skills requirements are set at an appropriate level. The IP3 uses the Skills Framework for the Information Age (SFIA), or equivalent, as the reference document for establishing the minimum professional standard of competence. The professional autonomy and responsibility level has been set at SFIA Level 5 or above (or equivalent).</p>
Continuing Professional Development (CPD)	<p>The model advocates the role of continuing professional development (CPD) and that appropriate requirements are in place to ensure CPD.</p>
Code of Ethics	<p>Appropriate enforceable code of ethics and conduct is in place</p>

2.6.2. Summary and Lessons Learned

Although the aims of the standard outlined above are somewhat different to maturing the ICT Profession in Europe, once again, there are similarities in the approaches. Central to this framework are core competences, skills and a Foundational Body of Knowledge. This standard also highlights the centrality of ethics to the profession, although the degree of enforcement is greater than what is proposed in this report, see section 5.2.1.4.

The IP3P standards advocates the bringing together of existing initiatives, rather than stipulating a definitive approach.

Although the certification or licensing of professionals is not an immediate goal for EU Professionalism as outlined in Chapter 7, there may be possible synergies in the long-term.

This project has considered these approaches, the results of which are outlined in Chapter 5. We also recommend that these parallel initiatives are fully considered in future projects, see section 7.3.2.

2.7. British Computer Society (BCS)

The British Computer Society is a British ICT Professional Association running a number of initiatives related to ICT Professionalism in Europe, as described below.

2.7.1. Chartered IT Professional (CITP)

The CITP standard is a professionalism benchmark, based on the needs of industry, which allows IT practitioners to demonstrate knowledge of their business and can add business value through the use of technology. Periodic revaluation is central to the CITP.

CITP status is granted to practitioners with relevant qualifications and experience (typically 8-10 years), and based on skills equivalent to SFIA Level 5. It is awarded to professionals with demonstrated responsibility, full accountability, and well developed business skills. Applicants must pass a 'Breadth of Knowledge' test and a rigorous peer assessment interview to examine competence within specific areas of expertise. As described in section 5.5.2, the Irish Computer Society (ICS) is currently accredited by the BCS to award Chartered IT Professional (CITP) status in Ireland.

2.7.2. Professionalism Board

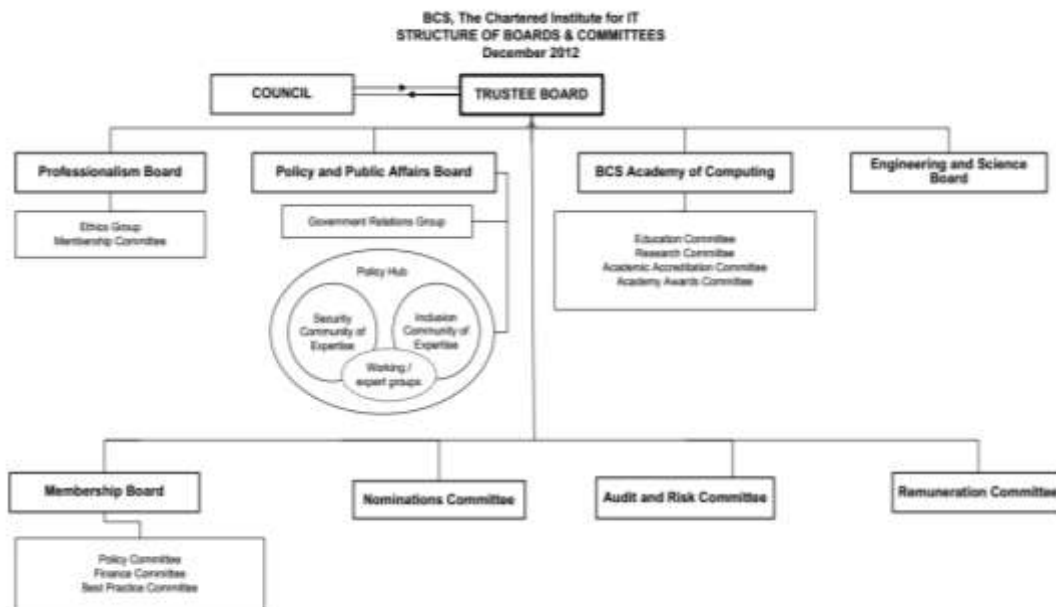


Figure 10: Structure of BCS boards and committees

The BCS Professionalism Board provides key strategic oversight for the BCS strategy for achieving recognition for the IT profession in the UK and overseas in support of the BCS programme to promote professionalism in IT, as detailed in Figure 10.

The Board oversees the admission of members to the Society, to the register of Chartered IT Professionals, and to the registers of the Engineering Council or Science Council, consistent with BCS status as a Licensed Body of these institutions. The Professionalism Board takes responsibility for Membership and Ethics. These functions were considered for our framework, the results of which are detailed in section **Fehler! Verweisquelle konnte nicht gefunden werden.**

3. Methodology

3.1. Introduction

The aim of this project is to develop proposals for a pan-European institutional and governance framework for the promotion of ICT professionalism corresponding to the expectations and requirements of industry, governments, and academia. The success of the proposed frameworks and the validity of the stakeholder value models are, to a large extent, dependent on commitment from the stakeholder community, particularly with regard to taking ownership of the development of the building blocks of the ICT profession and facilitating each other to do so in a collaborative fashion. Winning and maintaining support for the development of an ICT profession should be recognised as a crucial goal or objective of e-skills programmes.

The development of these proposals and the associated stakeholder value models was based on an iterative and consultative approach, building on extant knowledge of key priorities and best practices. In particular, we used the basic stakeholder value models contained in the 2012 IVI/CEPIS study on *Fostering ICT professionalism in Europe* and the best practices identified by the Multi-Stakeholder Partnership work packages (WP 2 and 3) as a starting point and built these out through an iterative process of consultation with key stakeholders and subject matter experts (SMEs).

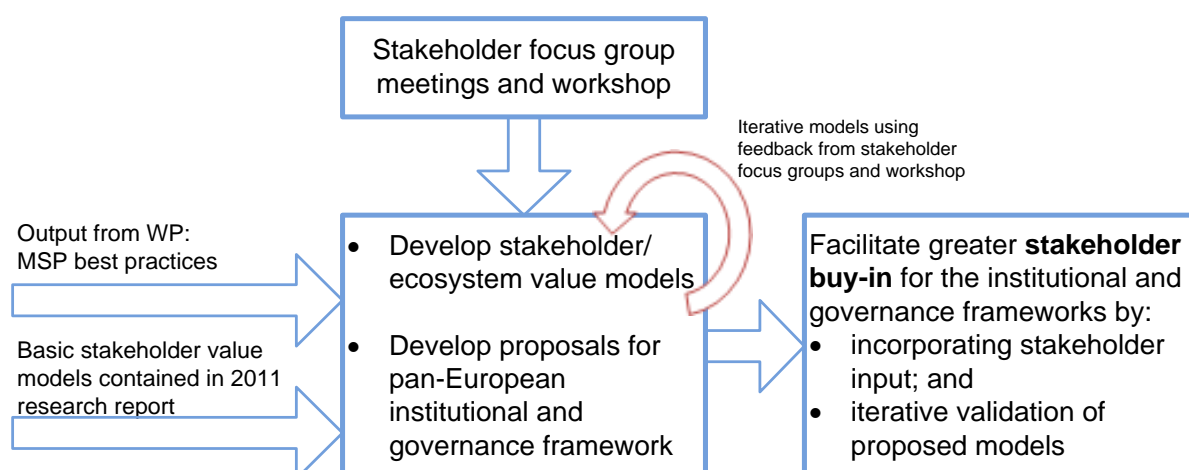


Figure 11: Research design

Stakeholders were consulted through a number of interactive processes, including initial questionnaire, focus groups, individual and group interviews, and a workshop as detailed below. The consultative approach also served to engage key stakeholders in the design of the frameworks from an early stage of development and to ensure that the stakeholder value models were inclusive and reflective of multiple perspectives, both in terms of stakeholder type and national representation. The iterative research process is illustrated in Figure 11.

The engagement processes were designed to address a number of key issues:

1. To validate and/or update the IVI/CEPIS framework and its key components;
2. To identify structures for operationalising the ICT profession on a pan-European basis;
3. To identify the key functions, processes, and stakeholders to support these structures;

4. To identify value propositions for relevant stakeholders in relation to each function, specifically:
 - a) The value of professionalising ICT;
 - b) The value of a unified pan-European approach;
 - c) The value of common standards for competences, bodies of knowledge, and ethics; and
 - d) Appropriate credentials and/or entry requirements for the profession.

These inputs were used to help construct and validate a series of detailed value models for each stakeholder, and ultimately, for the ecosystem as a whole (see Chapter 6).

During the course of the interviews, focus groups, and workshop, a number of relevant existing national, European, and global professionalism initiatives were identified, which presented potential opportunities for development and coordination of the profession. Key initiatives are outlined in Chapter 0.

3.2. Stakeholder engagement

The stakeholder value models and proposed pan-European institutional and governance frameworks for ICT professionalism were developed iteratively, based on input and feedback from a range of stakeholders. As these models and frameworks are intended to inform the on-going promotion of ICT Professionalism in a pan-European context, it was important to engage a broad range of stakeholders and establish support and buy-in for the proposals from an early stage.

Table 4 Key stakeholder categories

Initial stakeholder categories	Refined categories
ICT students, practitioners, and managers	
ICT employers	
Industry	ICT and non-ICT
ICT educators	Public and Private
Certification providers	
Professional associations	ICT and cognate professions
EU and national policy decision makers	
Society	
Other	Guilds and Trade Unions

We had identified several key categories of stakeholders based on the findings of the IVI/CEPIS report and our own desktop research. Through the consultative process, we further refined our stakeholder list to include cognate professional associations (e.g. Engineering associations) and other professional organisations (e.g. Trade Unions and Guilds). We further distinguished between ICT and non-ICT industries, i.e. industries that are

primarily concerned with the development or provision of ICT products or services, as opposed to industries that are primarily consumers of those products and services (see **Fehler! Verweisquelle konnte nicht gefunden werden.**).

3.2.1. Participant selection

We initially approached 140 potential participants, drawn from our pool of contacts, which included international representatives from each of the initial stakeholder categories identified. 48 responded and we received feedback on our initial positioning from fourteen. Of the 48 respondents, twelve participated in focus groups, five were interviewed individually, and two took part in a group interview. These participants were also invited to attend a larger workshop held in Brussels; of the 30 attendees at this workshop, two came from this pool of participants, see Figure 12.

Following the workshop, we conducted a further seven interviews with ten participants representing SMEs to elaborate on the current ICT professionalism landscape and existing national-level initiatives underway in the Netherlands, Italy, and Ireland. These focused case studies served to further validate our models and demonstrate how existing mechanisms and processes might align with our proposed frameworks.

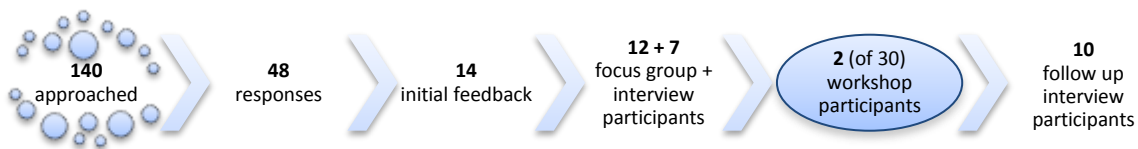


Figure 12: Participant selection

A more detailed participant profile is provided in section 4.1 below4.1 unterhalb.

3.3. Research design

We took a multi-stage approach to this research, reflecting the need to develop the stakeholder value models and pan-European institutional and governance framework for ICT professionalism iteratively, and maximise stakeholder engagement and buy-in. Each stage of the research process is detailed below.

3.3.1. Desktop research

Our initial desktop research encompassed existing work done by IVI/CEPIS and a review of key international ICT professionalism initiatives, outlined in Chapter 0. Engagement with stakeholders also identified areas for exploration through on-going desktop research, ensuring the research process was truly iterative.

3.3.2. Initial positioning

A number of crude institutional and governance frameworks, which loosely described ‘end of spectrum’ models, were circulated to the initial 48 respondents. Using open questions to elicit opinions on the scenarios presented, these models were purposely designed to provoke comment and generate discussion in terms of the desirability and feasibility of

various possible institutional and governance arrangements. We received fourteen submissions based on this initial positioning questionnaire.

A copy of this document is included as an Appendix to this report.

3.3.3. Focus groups and interviews

Four virtual focus groups, with between two and five participants, were held between late August and early September. These were supplemented by five individual interviews and one group interview with two participants (see **Fehler! Verweisquelle konnte nicht gefunden werden.**).

Table 5 Schedule of focus groups and interviews

Date	# participants	Engagement
28 th August	1	Individual interview
30 th August	2	Focus group
2 nd September	2	Focus group
5 th September	5	Focus group
6 th September	3	Focus group
12 th September	2	Group interview
19 th September	2x1	2 x Individual interview
23 rd September	1	Individual interview
27 th September	1	Individual interview

All of the focus group sessions and interviews (two exceptions) were audio recorded, with participants' permission, and subsequently transcribed. Notes were also taken during all of these sessions. Feedback from the initial positioning document informed the discussions during the earlier focus groups and interviews, while the later sessions built more on the detailed discussions and themes emerging from the preceding engagements. Discussions covered the topics of stakeholder identification; ICT professionalism and its components; possible alternative structural, functional, and governance arrangements; and existing related initiatives.

As the engagement phase progressed, the discussions tended to focus more on specific issues that had been raised by previous groups. The crude models that had been developed for the initial positioning phase of the research were further refined based on the input received from the focus groups. Emerging themes and research findings are outlined in Chapter 4 and have been incorporated into the prototype institutional and governance models outlined in Chapter 5.

3.3.4. Workshop

The workshop, which took place on 30 September 2013 in Brussels, formed part of a broader workshop being organised by Empirica. Thirty subject matter experts (SMEs), two of whom had engaged in the earlier focus groups and interviews, were in attendance.

Draft proposals for the institutional and governance frameworks, based on the research findings to this time, were presented for discussion. The SMEs provided their views, contributions, and feedback, which were subsequently incorporated into further iterations of the proposed frameworks.

3.3.5. Case study follow up interviews

Following on from the workshop, it was decided to develop three brief case studies to describe current national-level initiatives in relation to promoting ICT professionalism, demonstrating how the existing landscape might align with the proposed frameworks. A further six individual interviews and two group interviews with five participants were conducted to develop these national-level case studies of the Netherlands, Italy, and Ireland (see section 5.6).

Table 6 Schedule of follow up interviews

Date	# participants	Engagement
9 th October	2	Group interview
10 th October	3	Group interview
11 th October	1	Individual interview
15 th October	1	Individual interview
18 th October	1	Individual interview
1 st November	1	Individual interview
5 th November	2x1	2 x Individual interview

3.3.6. Timeline

The timeline for the engagement phase of this research project is illustrated in Figure 13 below.



Figure 13: Research timeline

4. Research Findings

In this section, we present an overview of the results from the stakeholder engagement research, presented as key emerging themes and trends. The proposed institutional and governance frameworks and associated stakeholder value models were developed based on these findings and are presented in Chapters 5 and 6 respectively.

4.1. Participant profile

Potential participants were approached from a pool of 140 contacts representing multiple stakeholder types from across European Member States and other countries. Of the 48 that responded initially, 27 took part in one or more of our engagement exercises.

The gender distribution of participants is male dominated, reflecting the profile of ICT practitioners in general, see Figure 14. Prior to the inclusion of post-workshop interview participants, the male to female ratio was even more pronounced, with only 5% female representation.

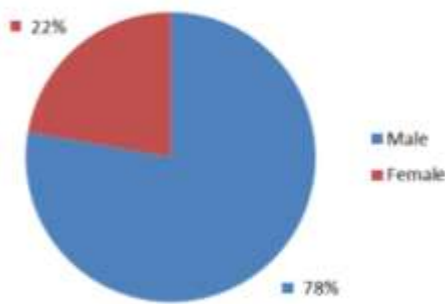


Figure 14: Gender distribution of participants

Respondents to the initial positioning questionnaire and participants in the focus groups and interviews, both pre- and post-workshop, represent stakeholders from eight countries across Europe, see Figure 15. The most highly represented countries are Ireland (30%), the Netherlands (18%), and Italy (15%). The national case study focus on these countries accounts for their relatively higher representation. Germany was also well-represented with 15% of the participants based there.

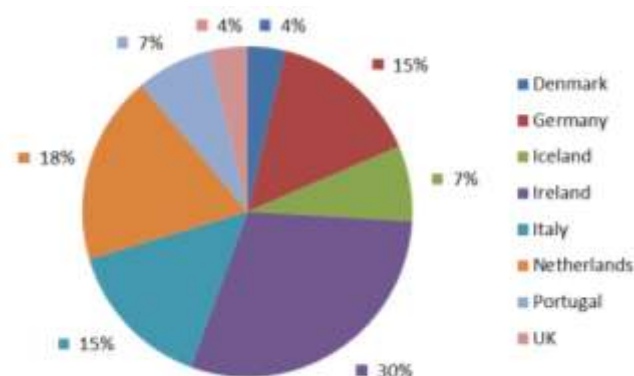


Figure 15: Geographic representation of participants

Key stakeholders represented included practitioners, professional associations, industry, education, and government. The distribution of stakeholder types is illustrated in Figure 16 below.

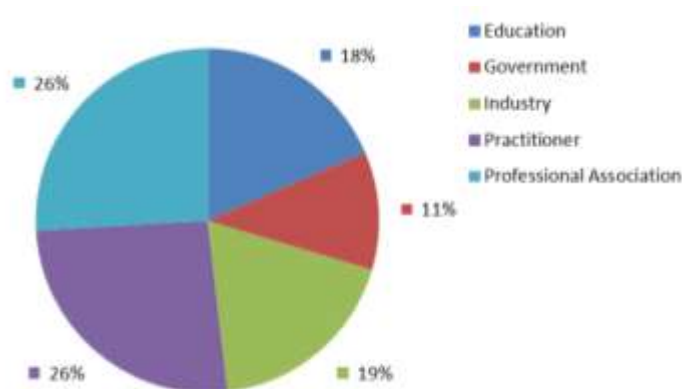


Figure 16: Distribution of key stakeholder types

A further 30 participants from across Europe, including two from the pool above, took part in the workshop organised by Empirica.

4.2. Key trends

4.2.1. The ICT Field

4.2.1.1. Disparate/fragmented field

There was general agreement that while the ICT field is young, disparate, and fragmented, it is also at the cutting edge in terms of process, technology, and having a global perspective. A framework for developing the profession should therefore be flexible enough to incorporate multiple perspectives, cultural differences, and future technological developments.

“Ultimately, to be seen as a profession it needs to have stability and room for growth.”

“Bring about cohesion... common understanding...”

“For a young industry like ICT we need to ensure that what we embed within our view is an opportunity to grow, mature and develop.”

Participants did, however, also identify the need for stability and a common language, which, it was felt, the professionalism project should aim to provide. Additionally, the global nature of ICT was highlighted, prompting calls for the professionalism effort to be developed in a global context, possibly reflecting the global structure of multinational organisations. By contrast, however, there was also a tendency to envisage the potential organisational structure on a national vs. pan-European structure.

4.2.1.2. *Leverage existing global initiatives*

A key trend arising out of the focus groups and interviews was the need for any potential framework to leverage existing global initiatives, rather than seeking to create new ones. In this sense, the framework should emphasise a coordinating and integrating function, rather than establishing new mechanisms and requirements in an already crowded market.

“There are lots of activities that may be streamlined or may have synergies, efficiency gains, better streamlined.”

“We shouldn’t reinvent the wheel”

4.2.2. *Existing models/Exemplars*

The research explored other initiatives relevant to the development of the ICT profession to gain insights into exemplars that might be considered when developing proposals. The British Computer Society and their competence (SFIA) and chartering (CITP) model were highlighted as exemplars that should be considered in the development of the framework. The Portuguese Engineering Guild was identified as a possible model for instituting and governing ethical codes. Other existing models that arose as suggestions include, the existing professional register of the Dutch VRi association, validation services like the Quality Labels project, existing mechanisms for recognition of prior learning such as the RPL system or the Dutch AVC model. The Danish IT-Vest was held up as a model for the promotion of ICT education, academic cooperation and defining the scope of ICT.⁸

It was also recognised that there were already strong connections between Industry and Academia, particularly in the ICT field, which should be leveraged and built on for this effort.

With reference to the development of the Body of Knowledge and the existence of in-company competence management systems, participants also mentioned more established initiatives such as the academic ICT categorisation standard of “theory, abstraction and design”.

4.2.3. *Processes*

There was some agreement that the key benefit of establishing a process and framework for the development of ICT professionalism would be to get the conversations going. There was general consensus that the process should be multi-staged and iterative. Here again, the importance of communication and establishing an effective forum for communication was emphasised.

“...the point is the process”

“Instigate a feedback loop”

⁸ See <http://www.futurepeople.dk/>

4.2.4. Structures/stakeholders/institutional infrastructure

4.2.4.1. MSP: National vs. Pan-European, Definition vs. management

There was clear support across all of the focus groups and interviews for an MSP approach, whether on a national, European, or global level. The key stakeholder categories identified in the framework for promotion of ICT professionalism were: practitioners/professional associations, industry, and academia. Users of ICT and non-ICT industries were also identified as stakeholders. Governments were singled out as significant stakeholders in terms of supporting and promoting the profession, for example by adopting the e-CF to describe competences and providing financial incentives. There was some evidence of cultural differences between participants from different countries and organisations in terms of ideal organisational models.

“A battlefield of ideas”

“Depends on collaboration between industry, professionals, educators. If their interests are aligned it will have a chance.”

“The only way to go anyway. The only way that we may have a chance of seeing something that is adopted. Open initiative where all the different stakeholders can contribute”

4.2.4.2. Promotion and Advocacy

The requirement for promotion or advocacy of the profession also emerged from the research. There was an identified need to get financial support for aspects the professionalism effort, as well as mustering support for action and establishing a shared vision. In addition, there were suggestions that prompted the idea of engaging independent influencers, particularly from industry, to champion the professionalism effort, for example by

“Who will be the first to throw away their own body of knowledge and framework and embrace the new one?”

adopting the e-CF competence descriptions and job profiles when advertising job roles.

“You need a critical mass to get things going”

4.2.5. Transparency and skills demonstration

There was strong support for the need for improved means of skills demonstration and transparency of practitioner skills and achievements in the form of, for example, an ICT Professional Register or Skills Portfolio. However, there were some concerns whether a dedicated platform would adequately represent practitioners

“So HR people can see ‘this guy comes from X university and has an Information Systems masters and therefore has a 60% e-CF coverage’”

“People do not always fit into little boxes”

4.2.6. Ethics

While it was widely acknowledged that it would be difficult to achieve a common, pan-European agreement on a code of ethics, due to existing cultural differences and possible duplication or clashes with current national legislation and/or industry codes, there was a great deal of support for such an effort. Primary reasons that emerged for the development of such a code were uniting professionals under a set of common values and promoting trust in the profession.

Approaches to instituting a common set of values were also discussed and practitioners favoured a staged approach, starting with a meta-level, pan-European framework.

There was also a remarkable consensus amongst much of the groups with regard to high level ethical standards that were relevant to the ICT profession, specifically the issues of privacy, quality, and conflict of interest.

With regard to how, or to what degree, these codes should be enforced and general disciplinary issues, participants cited multiple examples of existing models that warrant further investigation. Current international examples of how codes of ethics, conduct, or practice might be implemented included reconfirming commitments and continuous professional development. Similarly, sanctions imposed on practitioners found to be in breach of such codes included, for example, publishing violations, legal consequences, being “struck off”, and the degree to which an individual could practice, under the guidance of another, passing additional examinations, etc.

“If we really regard ourselves as professionals we need to have a position on this”

4.2.7. Core professionalism components

4.2.7.1. Education/Experience

There was a huge response from participants with regard to the need for recognition and transparency of informal and non-formal experience and education. Some ways of demonstrating and validating this knowledge mentioned include peer interviews, reviews and endorsements, employer references and endorsement, evidence of time spent, assessment and evidence of past success/successful project completion. Other topics that arose include utilising existing mechanisms for transferring informal and non-formal learning into recognised academic qualifications. Existing mechanism should be leveraged here, including the Bologna process, EQF and e-Competence Benchmark. The existing relationships between ICT industry and academia were also highlighted as effective existing relationships

“Education you can show your paper but that paper doesn’t show anything about how you dealt with that knowledge after you studied. The paper only shows that you able to copy information that was handed to you. It doesn’t present a total package”

that should be leveraged. There was both scepticism and support for industry-based accreditation.

“...always sceptical of company certification of people... company’s goals not sufficiently divorced from commercial interest”

“...we [organisation] never accepted an outside certification or validation”

4.2.8. Competences

Participants felt that a common language was instrumental in the profession, in terms of entry into and progression within the profession as well as aiding communication and transparency. There was an identified need to institute a designated body to oversee the mapping of other frameworks to the e-CF, particularly at a global level but also with regard to the BCS model, SFIA.

4.2.8.1. Bodies of knowledge

There was a lot of support for and interest in the development of a Foundational Body of Knowledge (FBoK) for the profession. There was, however, less agreement in terms of its scope. One participant commented that they struggled with the idea of a single body of knowledge. Other participants felt that the FBoK should contain only a very general and base level of knowledge. There was widespread consensus that the FBoK should be expressed in terms derived from university education, specifically module outlines and expressed as (learning) outcomes. More in this area than any other, participants felt the dual need for flexibility and stability. In terms of ownership, it was felt that universities and Industry were instrumental in its creation: universities will be needed to disseminate the knowledge and industry to define the need. Again, these mechanisms are already in existence but there is an opportunity to formalise them here.

“The things that belong in the common body of knowledge are things that are not likely to change over a period of time.”

4.2.9. Mentoring/apprenticeship

Mentoring and apprenticeship arose as important aspects of a profession.

4.3. Conclusion

These research findings, together with the foundations laid in the earlier work undertaken in the 2012 IVI/CEPIS study, and key learnings from relevant professionalism initiatives informed the initial prototypes for our proposals for a pan-European Institutional and Governance Framework. These prototypes were further refined in subsequent feedback sessions as outlined in Chapter 3 and are presented in the next Chapter.

5. Proposals for a Pan-European Institutional and Governance Framework

5.1. Introduction

This project aims to develop proposals for a relevant pan-European governance framework for the promotion of ICT Professionalism corresponding to the expectations and requirements of industry, governments and academia. The models presented below were developed based on an iterative and consultative process as outlined in Chapter 3.

In order to establish the infrastructure required to support and promote ICT professionalism across Europe, we are proposing a multi-layered approach, with a number of key activities on a pan-European level, as well as dedicated initiatives across the EU at national level, see Figure 17 below. Where possible, existing initiatives and mechanisms should be retained and built into the process. Where new functions are required, we are proposing a multi-stakeholder (MSP) approach as detailed below in section 5.3.2.2 and 5.4.2.

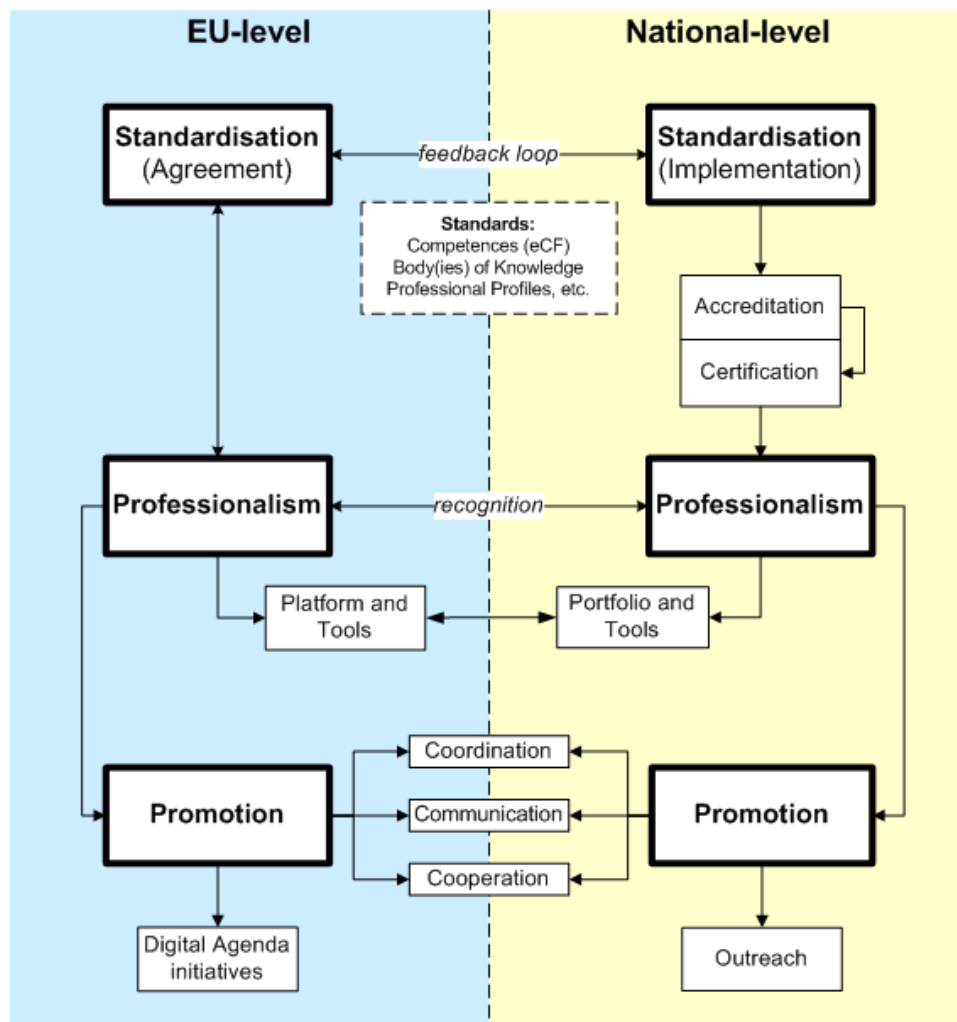


Figure 17: High-level overview of institutional and governance framework

In this chapter we will discuss the key functional areas of the framework, followed by proposed models at the EU and national level. While we will describe a general national-level model, due to differences between nation states in terms of national-level ICT initiatives, organisations, and levels of maturity in ICT professionalism, the infrastructure will vary from country to country. We will therefore also present three national case studies, for the Netherlands, Italy and Ireland, to illustrate how existing national initiatives may be leveraged and coordinated to support the professionalisation of ICT.

It is worth noting that the models presented here are an ‘idealised’ version of how this might ultimately be organised and are based on existing initiatives and current thinking in this area. We recognise that it will not be possible to step into straight to this position. Interim and localised solutions will need to be adopted, which will continue to be built on, as we strive towards an optimal configuration. Indeed, given the required interim solutions, the final topography of the institutional and governance framework may in fact differ from the proposals presented here, making use of new mechanisms and initiatives. The key aim, however, is to promote ICT professionalism across Europe, rather than to ensure the specific structures outlined here are established.

5.2. Components of the framework

The proposed institutional and governance framework builds on the four key building blocks of the ICT Profession: Competences; Bodies of Knowledge; Education and Training; and Ethics. The model for institutional and governance frameworks proposed here also builds on the supporting components of the ICT Job Profiles, the ICT Professional Portfolio and Tools, EU ICT Platform and Tools, and Organisation Digital Capabilities. While these are mentioned in the original report, the proposed framework includes some key changes to what was proposed, as detailed below. This institutional and governance framework also introduces structural components, necessary for operationalising the profession: Standards, Professionalism and Promotion.

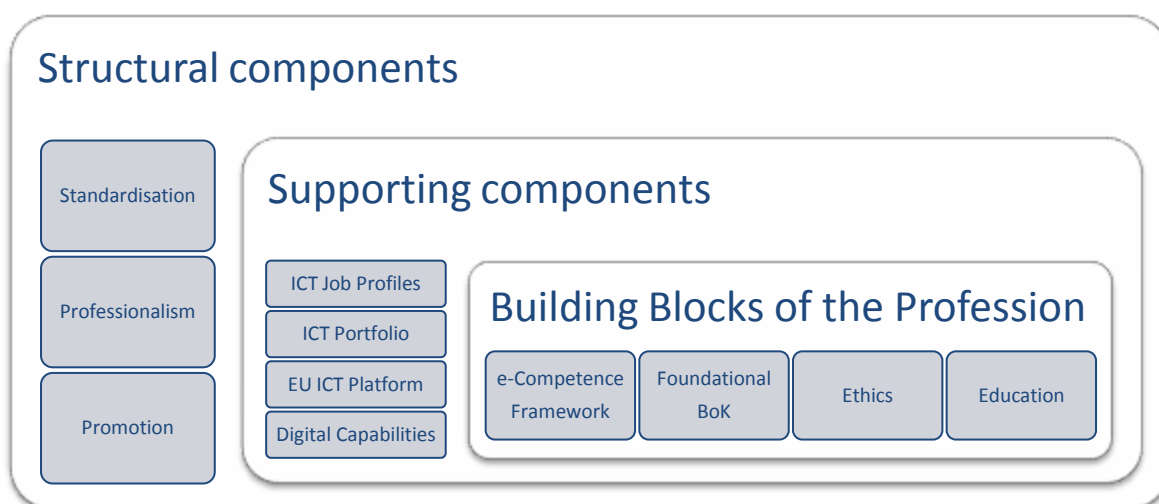


Figure 18: Components of the Institutional and Governance Framework for ICT Professionalism

5.2.1. Building Blocks of the Profession

5.2.1.1. *The e-Competence Framework (e-CF)*

As detailed in section 2.2.1, the **e-Competence Framework (e-CF)** is one of the central pillars of the ICT Professional Framework. Version 1 of the e-CF, published in 2008, distilled the competence requirements of ICT professionals across all industry sectors to 36 e-competences. Version 2.0, issued in 2010, is a CEN Workshop Agreement (CWA) and as such has a valid life-span of a few years. A third version of the standard, e-CF 3.0 is in the process of being defined as an industry standard through CEN. Once it has become a standard, its ongoing maintenance will be overseen by a Technical Committee. Support from the EU Commission, CEN, and multi-stakeholder partnerships are crucial to drive content and ensure relevance. The CEN Workshop on ICT skills, under which the e-CF was developed, will continue to develop recommendations to develop and maintain relevant standards for ICT professionalism.

5.2.1.2. *The Foundational Body of Knowledge (FBoK)*

An EU Commission DG Enterprise and Industry tender has been issued to initiate the development of the **Foundational Body of Knowledge (FBoK)** (European Commission 2013). Both the main findings and recommendations of the IVI/CEPIS report and the achievements of the CEN ICT Skills Workshop will constitute a strong basis for this work. This research project will identify a suitable structure for, and develop a first version of, a pan-European foundational ICT body of knowledge. The service contract stipulates that a meta-model approach should be adopted to facilitate the maintenance of the FBoK, and to allow for the highly dynamic nature of the ICT environment. Additionally, the contract identifies that the scope of the ICT body of knowledge would also include “non-ICT topics taken into account the growing demand and importance of “soft skills” and of so-called “dual-thinkers (e.g. business savvy ICT professionals).” (European Commission 2013)

The model and recommendations in this report take into account this upcoming contract and its affect on any future framework for EU ICT professionalism.

5.2.1.3. *Education and Training*

Education and Training are key building blocks of the ICT Profession, which embraces all the acquired skills and experience gained by the professional whether through formal educational routes (whether industry-based or in third level education), work experience or other means, such as self-directed learning.

The proposed framework is primarily concerned with the comparability, validation and demonstration of educational achievements and continuing professional development (CPD). There are existing mechanisms and initiatives around recognition and comparability of formal degree courses, however, there is a need for similar and compatible recognition of non-formal and informal education, and demand for this will most likely grow taking into account new learning opportunities such as Massive Open Online Courses (MOOCs) and apprenticeships.

Education and Training in the context of ICT professionalism spans all of the other components, as educational criteria in the form of **competences** and **Bodies of Knowledge** will form the basis for becoming a professional and progression within the profession.

Therefore, providing tools and services to demonstrate educational achievements and identify gaps play a role here, see below for details on the **ICT Professional Portfolio**, as well as validation of accomplishments and experience, such as through Quality Labels and accreditation.

5.2.1.4. Professional Ethics

Currently, CEPIS keeps a repository of national Codes of Ethics. It is envisaged that professional Ethics codes will be managed at a national level by the **Professionalism** function. These could potentially be used as inputs to the development of a common meta-framework of ethical guidelines for ICT professional ethics. This could be implemented locally and contextualised at a national level, or potentially coordinated centrally by the EU-level **Professionalism** function. Should the meta-framework be considered a potential standard, it will become the responsibility of the **Standardisation** function managed by CEN at a European level.

5.2.2. Supporting components

5.2.2.1. ICT Professional Profiles

The CEN ICT Skills Workshop has elaborated a set of European **ICT Professional Profiles** based on the e-CF. Twenty three representative ICT Profiles have been created to date to streamline the huge number of ICT Profile Frameworks and Profile descriptions that are currently used in European ICT Business and Qualification systems.⁹ The profiles are intended as a reference, or as the starting point, to develop further ICT professional profile generations, by European stakeholders and are managed at European-level by CEN.

5.2.2.2. ICT Professional Portfolio and Tools

Currently, there are a number of tools and services to support specific components of the profession, such as the e-Competence Benchmark tool and the e-Skills landscape tool (see section 5.2.2.3 below for details) as well as standardised ways of demonstrating skills and experience, for example, the Europass CV. The proposed **ICT Professional Portfolio and Tools** includes support tools and services to allow practitioners to assess and demonstrate their ICT credentials in a uniform way. This would be managed at a national level by the **Professionalism** function and would feed into a European-level **EU ICT Platform and Tools**, as described below.

5.2.2.3. EU ICT Platform and Tools

The **EU ICT Platform and Tools** should be managed at an EU level by the **Professionalism** function. While initially it might simply provide links to existing services, it could be developed to host and integrate a range of related services for practitioners, employers, and other key stakeholders, such as the **ICT Professional Portfolio**, competence-based e-skills / ICT professional online registration, quality-labelled training and certification, career guidance and job matching. Specifically, such new and existing services could include:

⁹ <ftp://ftp.cen.eu/CEN/Sectors/List/ICT/CWAs/CWA%2016458.pdf>

1. *Professional Register*: Members of a future EU ICT Profession might be listed on a professional ICT Register, which would be managed on a national basis. Entry and visibility on such a register would be voluntary. A pan-European register, hosted on the EU ICT Platform, could collate data released by the national registers.
2. *ICT Professional Portfolio and Tools*: Hosted by the **Professionalism** function at a national-level, the **ICT Professional Portfolio** provides the means to evaluate and demonstrate one's own professional credentials in a consistent way, based, for example on the ICT Job Profiles and Europass CV.
3. *Benchmarking and Career Planning tools*: Providing links to tools for ICT practitioners to measure, demonstrate and validate their professionalism credentials and identify future career paths and development needs. Existing tools are:
 - e-Skills Landscape self-assessment tool: www.eskillslandscape.eu
 - CEPIS e-Competence Benchmark: www.cepis.org/ecompetencebenchmark
 - EXIN e-Competence Assessment: <http://www.e-CFassessment.org/en/1/home>
4. *Profile Linking*: In the longer term, it may be possible to develop interfaces between the **ICT Professional Portfolio** and the benchmarking tools so that a practitioner might link their various profiles. Should such interfaces be developed, individual practitioners will retain control over the information that is made viewable or searchable.
5. *Education Mapping tools*: Maps industry-based certification and higher education programmes to the e-CF (see www.eskills-quality.eu and www.eskills-guide.eu) and uses the e-skills landscape service as a springboard for the e-skills quality labels (see www.eskillslandscape.eu)
6. *Quality Labels*: Awards a European e-skills quality label for ICT industry training and certification (see: proposal made by www.eskills-quality.eu)
7. *Jobs Marketplace*: Provides an overview of e-skills demand (vacancies) and supply (ICT professionals) for practitioners, employers, and policy makers, including statistical information (e.g. trending supply/demand gaps) and links to existing portals such as EURES (<https://ec.europa.eu/eures/>). Keeping listed recruitment campaigns and job seekers up to date might be managed automatically through 'expiration dates' on posted notices, or by posters themselves.

5.2.2.4. **Organisation Digital Capabilities**

An organisation's digital capability encompasses all of the available resources that can be harnessed to achieve desired ICT outcomes, including practitioner competences, and organisational processes, systems and assets. As such, professional competence is an important enabler of improved organisational ICT capability.

There are a number of existing ICT management frameworks, models and standards that allow organisations to measure and manage their digital organisational capabilities. Understanding how professional competences map to organisational capabilities will allow organisations to get a better understanding of their competence requirements for recruiting new and developing existing ICT employees.

Additionally, a digital capability standard can support other professionalism initiatives, for example, by providing an additional reference point for **ICT Professional Profiles** and in defining the **Foundational Body of Knowledge**. Should organisational digital capabilities be considered as a standard to support the ICT professionalism effort, it will be managed by the **Standards** function.

5.2.3. Structural Components/Key Functional Areas

In order to support the operationalisation of the framework, we have divided the professionalism components and their associated activities to three key functional areas: Standardisation, Professionalism and Promotion. These functions are recommended at both an EU and national level.

5.2.3.1. Standardisation

On an EU level, the **Standardisation** component is concerned with developing, establishing and maintaining European Standards for the ICT Profession. In Europe, this is the responsibility of the European Committee for Standardization (CEN). On a national level, national standards bodies are responsible for implementing the European standards. Currently, the e-CF is the only component in the process of becoming a defined standard, but future standards might include the Foundational Body of Knowledge, a Meta-Framework for Ethics and Organisation Digital Capabilities.

5.2.3.2. Professionalism

The **Professionalism** function is concerned with the practical aspects of ‘managing’ the profession. This function is comprised of:

- *Coordination*, responsible for research into and coordination of existing professionalism initiatives;
- *Membership*, essentially an administrative function, which includes validation of the potential member’s professional credentials. Examination and licensing should be considered as longer-term goals in this area
- *Professional Ethics*
- Managing the *ICT Professional Portfolio and Tools* at a national level and coordinating the *EU ICT Platform and Tools* at an EU level

5.2.3.3. Promotion

The **Promotion** function is key to establishing and developing a pan-European ICT profession through, for example, stimulating membership of the profession at a national level; promoting adoption of components of the profession, such as the e-CF; developing synergies with initiatives relevant to the ICT Profession on a national, pan-European and even global level; as well as ensuring open exchange of ideas and good practices across Europe. The *Coordination* activities outlined above serve both the **Professionalism** and the **Promotion** functions. Similarly, the *Online Platform* can be used to promote ICT professionalism at a national and European level, for example supporting collaboration and liaison between country-level associations and facilitating cross-national initiatives. Various initiatives that fall under the auspices of the *European e-Skills Strategy and European Digital Agenda*, e.g. EeSA, and the Grand Coalition for Digital Jobs, can also be promoted through this platform.

5.3. EU level

5.3.1. Introduction

Although significant professionalism efforts will take place at a national level, a pan-European approach will be required to ensure a common European approach to standardising the components of the profession, managing the profession, and promoting

the profession on a European stage. The European Commission and the European Committee for Standardization (CEN) will act as catalysts helping to bring together the different stakeholders and Member States.

This model envisages the three key functions as outlined above (section 5.2.3), overseen at the European level by two entities: CEN; and an alliance of existing European partners who come together as a multi-stakeholder partnership (MSP) dedicated to professionalising ICT across Europe.

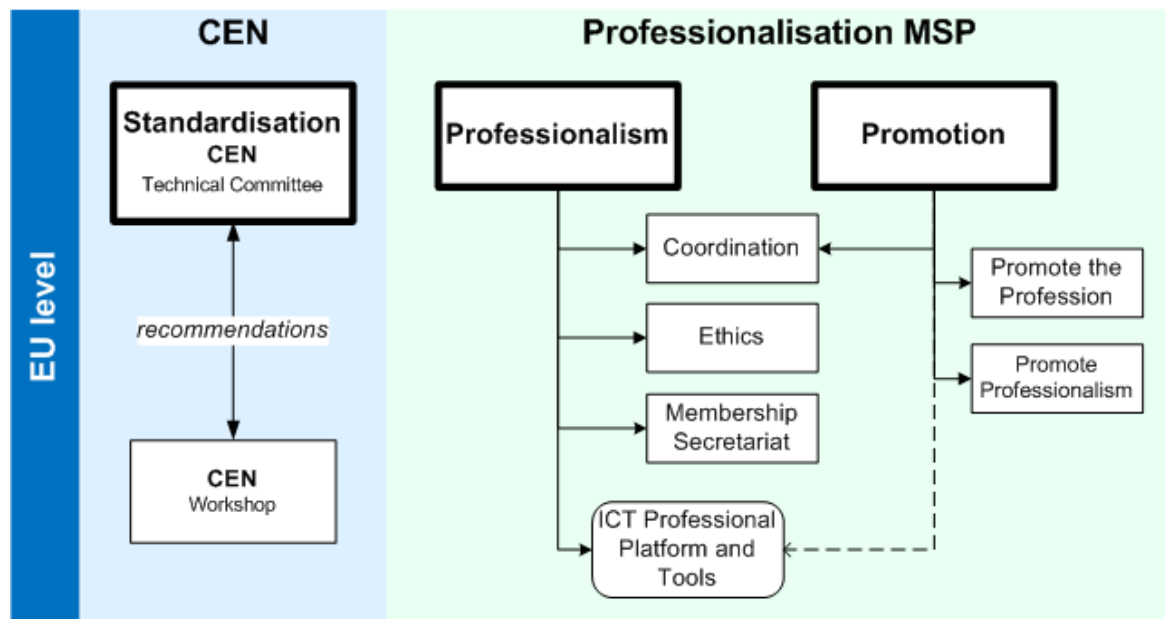


Figure 19: Distribution of key functions at EU level

5.3.2. EU-level Stakeholders

5.3.2.1. CEN

The **Standardisation (Agreement)** function is concerned with standardising the required knowledge, skills, and competences for the profession (see section 2.3 for an overview of CEN). This role is already established and overseen by CEN.

The definition of standards in this context happens on two levels, as detailed in Figure 19 above. Briefly, this is described in terms of:

- **The Technical Committee (TC)**, which manages each component (i.e. e-CF, BoK, etc.) once it has become a standard. 2-3 national experts represent each Member State on the TC; and
- **The CEN Workshop**, which will continue to develop recommendations to develop and maintain relevant standards for ICT professionalism. Ongoing relevance will be ensured through engaging with the market, instigating a feedback loop with national standards and professionalism bodies, as well as organisations using the e-CF, practitioners, consultancies, and agencies. This will apply to the e-CF and also to

other components of professionalism in varying states of maturity, e.g. the proposed Foundational Body of Knowledge (FBoK) and the ICT Professional Profiles.

5.3.2.2. *ICT Professionalism MSP*

The model depicts a multi-stakeholder partnership (MSP) responsible for **Professionalism** and **Promotion** at the EU-level. Specifically, this will involve coordination, membership, member validation (including Quality Labels), ethics, the EU ICT Platform and Tools and promotion. The MSP will require representation from ICT practitioners, educators and accreditation/certification providers, and industry. Some of the identified relevant stakeholders are:

The *Council of European Professional Informatics Societies (CEPIS)*: represents national informatics associations throughout greater Europe and, as such, is in a position to coordinate national-level professionalisation initiatives.

The *European e-Skills Association (EeSA)*: is an existing community of stakeholders supporting the development of e-skills and digital literacy in Europe in cooperation with the European Commission, public authorities and SMEs across Europe. EeSA is already engaged in promoting the exchange of ideas, awareness raising and good practices at EU and Member State levels; supporting the development of tools and methodologies for the governance of e-skills; and leading the implementation of concrete e-skills activities in cooperation with other stakeholders. It would therefore be in a good position to support the promotion of the ICT Profession.

ISO-certified certification/accreditation providers: provide ICT industry examination, certification, and accreditation services (e.g. *EXIN*, etc.) and could also provide validation services for membership of the profession.

Other stakeholders that should be represented are:

- EU and National governments
- Industry, employers and relevant associations (e.g. *EuroCIO*, *CIONET*, SME associations, *Eurochambers*, *EURES* (EUROpean Employment Services) network of national employment agencies offering a European Job Mobility Portal and *EuroCiett* the European Confederation of Private Employment Agencies)
- ICT educators, including universities, schools and other vendors offering ICT-based training and certification.

5.4. National level

5.4.1. Introduction

While there will be a coordinating and standardising role at a European level, a significant amount of the professionalisation effort will take place at a Member State level. Ideally, existing national institutions and partnerships with experience in ICT professionalism will be leveraged to accomplish this. Implicit in this model is the recognition that each Member State will differ in their attitude and approach to professionalising ICT, as well as the maturity of their initiatives in this area. Further work will be required to understand the specific requirements of each individual country. Our model, therefore, demonstrates a general outline of how the three functions might be organised on a national level, see Figure 20.

Section 5.5 presents case studies to illustrate how three Member States have arranged their initiatives related to professionalism in practice.

5.4.2. National ICT Professionalisation MSP Responsibility

Our prototype depicts a national-level MSP for ICT Professionalism overseeing the three key functions: **Standards Implementation**, **Professionalism**, and **Promotion**. Key stakeholders will vary from country to country, but are generally expected to include national standards bodies, national professional associations (and/or other ICT practitioner representatives), industry, education and government representatives, as well as national experts in relevant aspects of the profession, for example, e-CF experts.

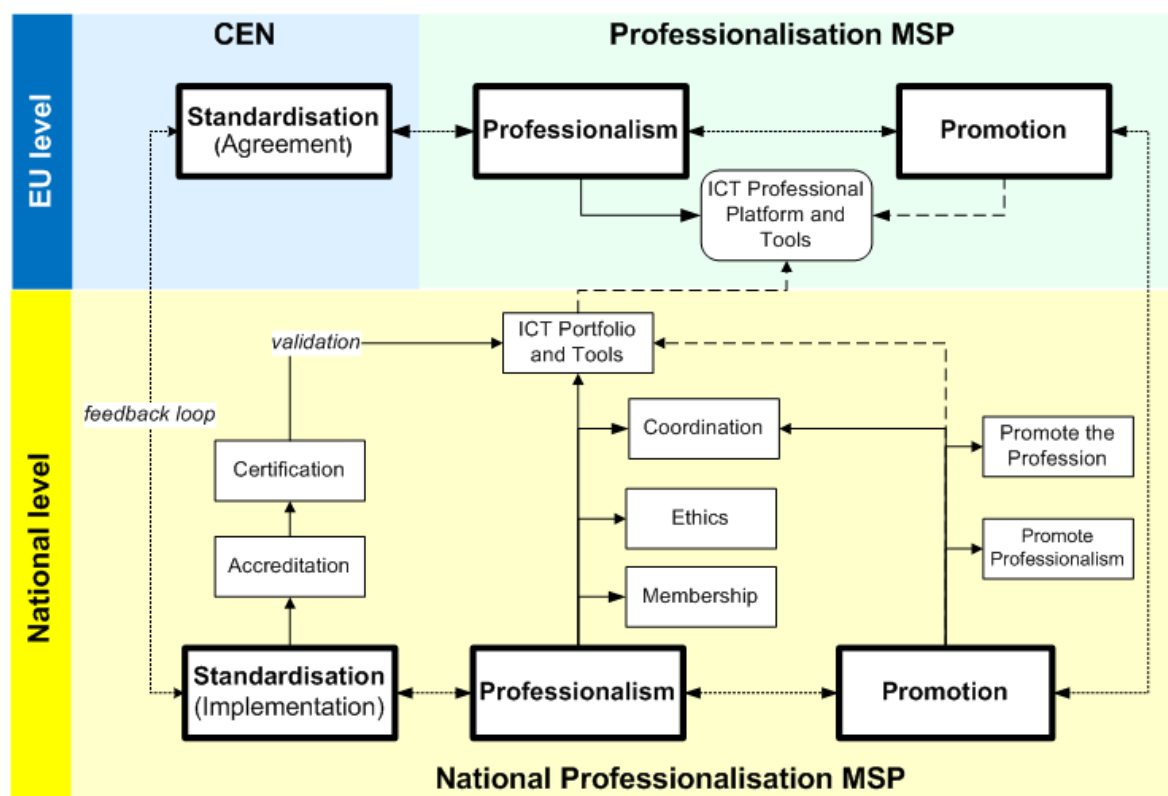


Figure 20: Distribution of key functions at national level

Standards Implementation will take responsibility for the implementation of professionalism standards at a national level. Some of the activities of this function will include representing national perspectives to the EU-level group, as well as engaging national bodies in a feedback loop to ensure on-going relevance of applicable standardisation initiatives.

This function will also be responsible for the standardisation of national ICT accreditation and certifications from the perspective of ICT professionalism.

The **Professionalism** function is responsible for coordinating professionalisation at a national level. *Coordination* activities should bring together existing initiatives relevant to professionalism within each country. There is also a role to seek and perhaps collaborate, partner with, or leverage initiatives in other European countries on a targeted basis. Liaison with other national-level and EU-level bodies will enable opportunities for allowing shared

norms to emerge, sharing good practices and learning points, leveraging synergies, and strengthening ties between countries. This also supports the **Promotion** of ICT professionalism across Europe at the national level. This function is also responsible for managing the *Membership* and membership validation of the profession at a national level. The national **Professionalism** function will also be responsible for *Professional Ethics* at a national level. This function also provides links to tools with which practitioners can develop their *ICT Professional Portfolio*. The *ICT Professional Portfolio and Tools* should link to the *EU ICT Platform and Tools*, although the degree of integration ultimately achievable here will be dependent upon the interoperability of the various systems in use in each country.

Nationally, the **Promotion** function plays the dual role of both promoting the profession and promoting professionalism. *Promoting the Profession* may be achieved through outreach campaigns and other engagement initiatives that target second- and third-level students, as well as job seekers or career changers. Such campaigns are designed to raise awareness of the ICT profession, develop skills from digital literacy to eLeadership, and/or showcase the range of potential roles available and skills applied within the ICT profession.

Promoting Professionalism, on the other hand, involves advocating and supporting the use of key components of the ICT Professionalism framework, such as the e-CF, the BoK, and appropriate codes of ethics, as well as encouraging and fostering membership of the profession.

5.5.National case studies

5.5.1. Italy

5.5.1.1. Context

The Italian context is described against a background where there are not yet established common frameworks for ICT professionalism, nor structured/formalised continuing professional development (CPD) programmes. Up to this point, the government's key priorities for promoting a digital agenda have been focused on improving the physical infrastructure and reducing the digital divide through the education system. Initiatives to develop eLeadership skills were not a priority for government and so were devolved to the marketplace.

More recently, however, the Italian government has acted on recommendations from the Grand Coalition for Digital Jobs to promote the e-CF as a key enabler to foster ICT skills and competences. Government Ministries have recognised the importance and relevance of developing eLeadership skills and have started to develop centralised guidelines for continuous training.

5.5.1.2. Key Stakeholders

The Italian Digital Agenda: established under law in 2012 through the participation of six government Ministries (including Economic Development, Education & Research, Public Administration, Finance, Territory Cohesion, and the Presidency of the Council). Its task has been to define the Italian strategy to implement the objectives of the EU2020 strategy.

The Agency for Digital Italy: established under law in 2012 is responsible for implementing the Italian strategy in the Public Administration (PA); monitoring the execution of the action plans within the PA; ensuring the effectiveness of PA services to citizens and enterprises; and launching further plans annually, in line with the Digital Agenda for Europe.

UNI: the national standardisation body, which develops national standards based on CEN input, input from its members (industry, professionals associations, education, etc.), with contributions from national stakeholders and organisations. Its role is to guarantee the production and issue of standards based on CEN or the market needs. UNI developed a national standard for ICT Professions based on the e-CF (UNI 11506:2013), to provide a set of shared, common, competence-based reference standards.

Professional Associations: the AIP (Italian Computer Society) and AICA (Italian Informatics Association) are both members of CEPIS, representing Italian ICT practitioners. AIP has adopted the e-CF as a basis for assessing and admitting new members to the Society, while the CIO AICA Forum has developed an initiative to promote awareness about the growing role of IT professionals within the Italian economy. IWA Italy (International Association of Web professionals) is a member of the CEN e-Skills Workshop and has adopted the e-CF to revise their 23 Web profiles.

Sindacato-Workers: established by the Italian Workers Union (UILTuCS), this is the first online platform addressing ICT professionals and workers. Developed in cooperation with

enterprises and industry associations (e.g. ASSINTEL, also a member of RETE), JobICT.it is their online job-matching tool based on the e-CF.

RETE: the Italian Competence Network for the Digital Economy is a Multi-Stakeholder Partnership (MSP) comprised of the five main ICT industry associations in Italy, plus Fondazione Politecnico di Milano as their scientific referent. It promotes and disseminates the e-CF through awareness-raising and pre-competitive initiatives aimed at creating a culture of eLeadership, targeting ICT and end-user companies, policy makers, and public administration.

The key stakeholders and their relationships are illustrated in Figure 21 below.

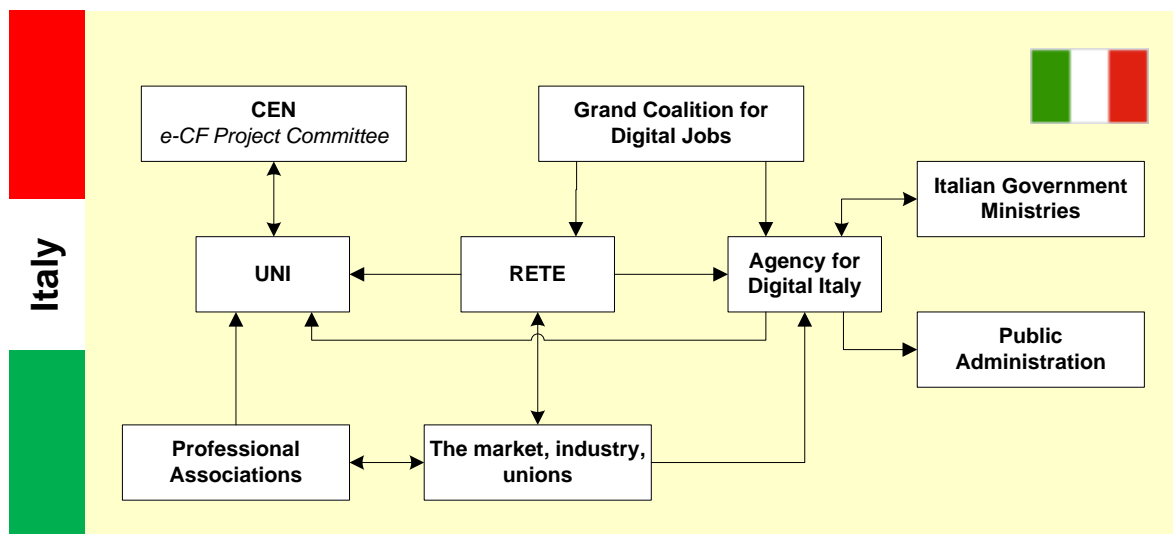


Figure 21: Key stakeholders (Italy)

5.5.1.3. Standardisation and Implementation

In relation to the e-CF, RETE, representing the market, is positioning itself to act as the main liaison point between the e-CF supranational governance and national level implementation. Thus, as illustrated in Figure 22, UNI is responsible for the standard provision, whilst RETE is responsible for its implementation and diffusion, fostering the development of ICT competences and eLeadership skills in the market and industry training, through precompetitive initiatives.

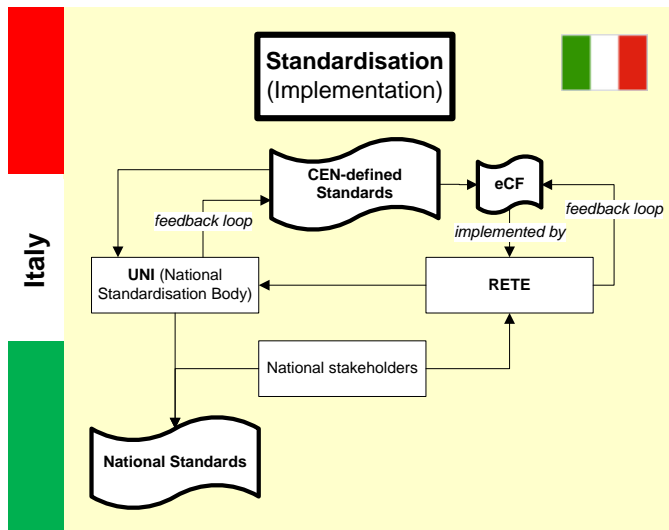


Figure 22: Implementing standards (Italy)

5.5.1.4. Professionalism and Promotion

There are a number of national initiatives underway in Italy that aim to increase and promote the levels of professionalism amongst ICT practitioners. (Please see **Country Report: Italy** for further details of the specific initiatives.)

There may be synergies to be leveraged between RETE and the practitioner supply and demand portal being developed under the Sindacato-Networkers, JobICT.it initiative. These could also be linked with the ICT Professional Portfolio profile and/or to the European-level ICT Platform and Tools. Other countries might consider partnering with Italy to develop or share similar tools.

Currently, there are no initiatives underway to develop a formal Professional Register or Portfolio tools for ICT practitioners in Italy. Again, a partnership with a country where this already exists, or a joint development effort with another Member State, could be worthwhile.

5.5.2. Ireland

5.5.2.1. Context

The ICT sector in Ireland is well-established and has been a significant source of employment, inward migration, and foreign direct investment in R&D, production, and service provision, particularly from large US multi-national companies, for many years.

The ICT Action Plan, which was developed by multiple stakeholders, including government agencies, professional bodies, academia, and employers, directly addresses the looming skills gap and shortage of ICT practitioners. One of the key targets of this Action Plan is to double the annual output of ICT graduates to 2,000 by the year 2018.

The influence of the ICT industry is particularly strong, however, focusing much of the government's energy towards the development of specific technological skills, graduates, and jobs.

5.5.2.2. Key Stakeholders

Government Agencies: Responsibility for developing strategies relating to the development and promotion of ICT professionalism is spread across several government agencies, including:

- **Forfás:** Ireland's policy advisory board for enterprise, trade, science, technology, and innovation;
- **Industrial Development Authority (IDA):** responsible for industrial development in Ireland;
- **Enterprise Ireland:** responsible for the development and growth of Irish enterprises in world markets;
- **Higher Education Authority (HEA):** the statutory planning and policy development body for higher education and research in Ireland;
- **Quality and Qualifications Ireland (QQI) formerly HETAC:** the qualifications awarding body for third-level education and training institutions outside of the university sector;
- **Science Foundation Ireland (SFI):** invests in academic research in the fields of Biotechnology, Information and communication technology, and Sustainable and energy-efficient technology; advances cooperative efforts among education, government, and industry; and promotes achievements internationally.
- **National Standards Authority of Ireland (NSAI):** is the national certification authority for standardisation and provides a certification service to enable businesses to demonstrate that Irish goods and services conform to applicable standards.

Professional Associations:

- The **Irish Computer Society (ICS)**, a member of CEPIS, represents and promotes the interests of ICT professionals in Ireland and seeks to advance Irish participation in the Information Society. ICS is also accredited by the British Computer Society (BCS) to award Chartered IT Professional (CITP) status in Ireland;
- **Engineers Ireland** represents members from all engineering disciplines in Ireland. Technically-focused practitioners, e.g. software engineers, may identify more readily with the engineering profession and choose Engineers Ireland as their representative body.

Industry Organisations: several industry-based representative bodies have been involved in various national and international initiatives to promote ICT professionalism in Ireland, for example:

- **Irish Software Association (ISA)**, representative body for the digital and software technology sector in Ireland;
- **Irish Internet Association (IIA)**, professional body for those conducting business via the Internet from Ireland;
- **ICT Ireland**, representative body for the technology sector in Ireland, which runs a number of programmes, both for third level students of technology courses and for second level students considering a degree course in technology;
- **ICT Ireland Skillnet**, comprises a group of companies in the ICT sector who have come together specifically to provide advanced training and development activities for technical and engineering staff in Irish ICT companies;
- **Fast Track to IT (FIT)**, an industry-led initiative that works in close collaboration with government departments and national education and training agencies, local development organisations and a host of community based organisations.

5.5.2.3. Standardisation (Implementation)

The NSAI formulates Irish standards through consultative and advisory committees, whose members are drawn from relevant consumer groups, industry, and government agencies. The NSAI also represents Irish interests in the development and publication of European and international standards. The proposed committee responsible for implementing the e-CF in Ireland is composed of representatives from the ICS, industry, and academia, see Figure 23.

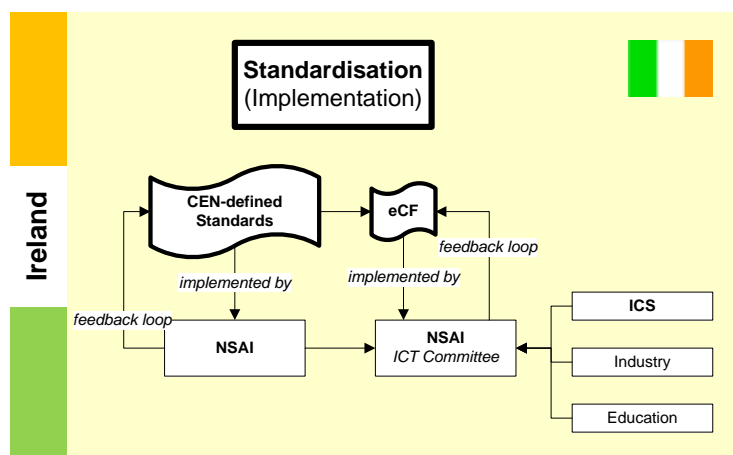


Figure 23: Implementation of standards (Ireland)

Formal education in Ireland is overseen by the Department of Education, either directly (second-level state examinations), or indirectly through one of its agencies (HEA for university degrees, QQI for other third-level qualifications). Institutions at third-level have considerable autonomy in terms of syllabus design, but the qualifications or certifications they award are accredited by the relevant government body, see Figure 24. To ensure on-going relevance, third-level courses are generally subject to regular, periodic review. Such programmatic reviews, while academically driven, often consult with industry. The ICS and

Engineers Ireland also participate in these reviews of content and syllabus design for ICT-related courses. The ICS in particular, advocates and supports the inclusion of learning outcomes designed around the e-CF (and the proposed ICT FBoK when it comes on-stream) in curricula in this area.

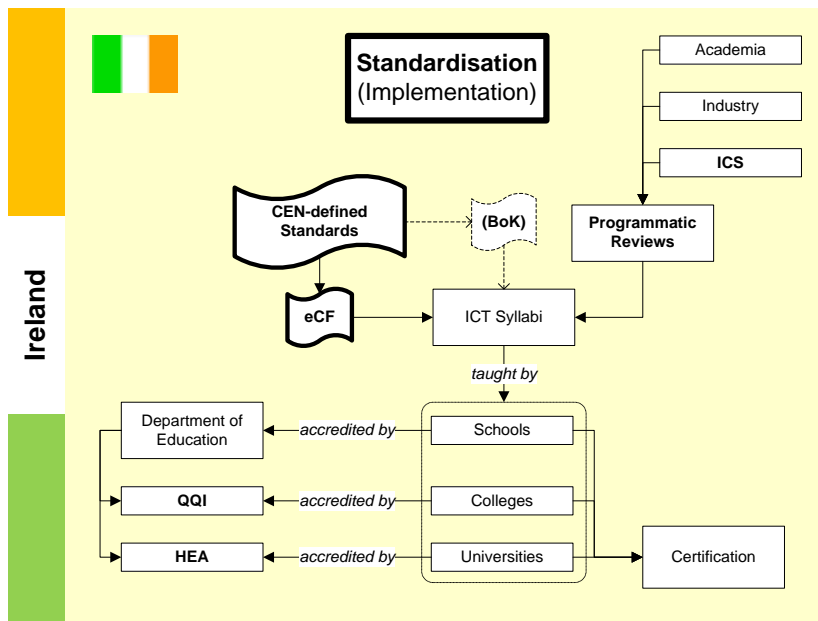


Figure 24: Implementation of standards (Ireland)

5.5.2.4. Professionalism and Promotion

In line with the government’s ICT Action Plan for Jobs, there are a number of key initiatives currently underway in Ireland to promote careers in ICT aimed variously at school children (Scratch, Smart Futures, F1 in Schools, Choose IT), third-level students (Choose IT, Fast Track to IT), graduates (Graduate conversion programme), and those seeking to reskill or re-enter the workforce (Level 8 conversion programme, Springboard, ICT Skillnet).

These programmes form an integral part of the government’s strategy to double the annual number of ICT graduates to 2,000 by the year 2018. They are designed to stimulate interest in ICT careers, showcase the variety of career paths available, and ensure that graduates are equipped with the requisite skills to work productively in industry. While many of these initiatives are technologically focused, there is also recognition of the diversity of skills required of an ICT practitioner. More detailed information about these initiatives can be found in the **Country Report: Ireland**.

Whilst many of these initiatives are industry-driven, the ICS is a key stakeholder in terms of promoting ICT-related education in Ireland, particularly in terms of raising awareness of ICT careers, engaging students, and providing outreach and support to primary and secondary schools and third-level institutions. They are also central to liaising internationally, engaging in cross-national collaboration (offering CITP certification through the BCS, see section 2.7.1) and representing Irish interests on the European stage through their membership of CEPIS.

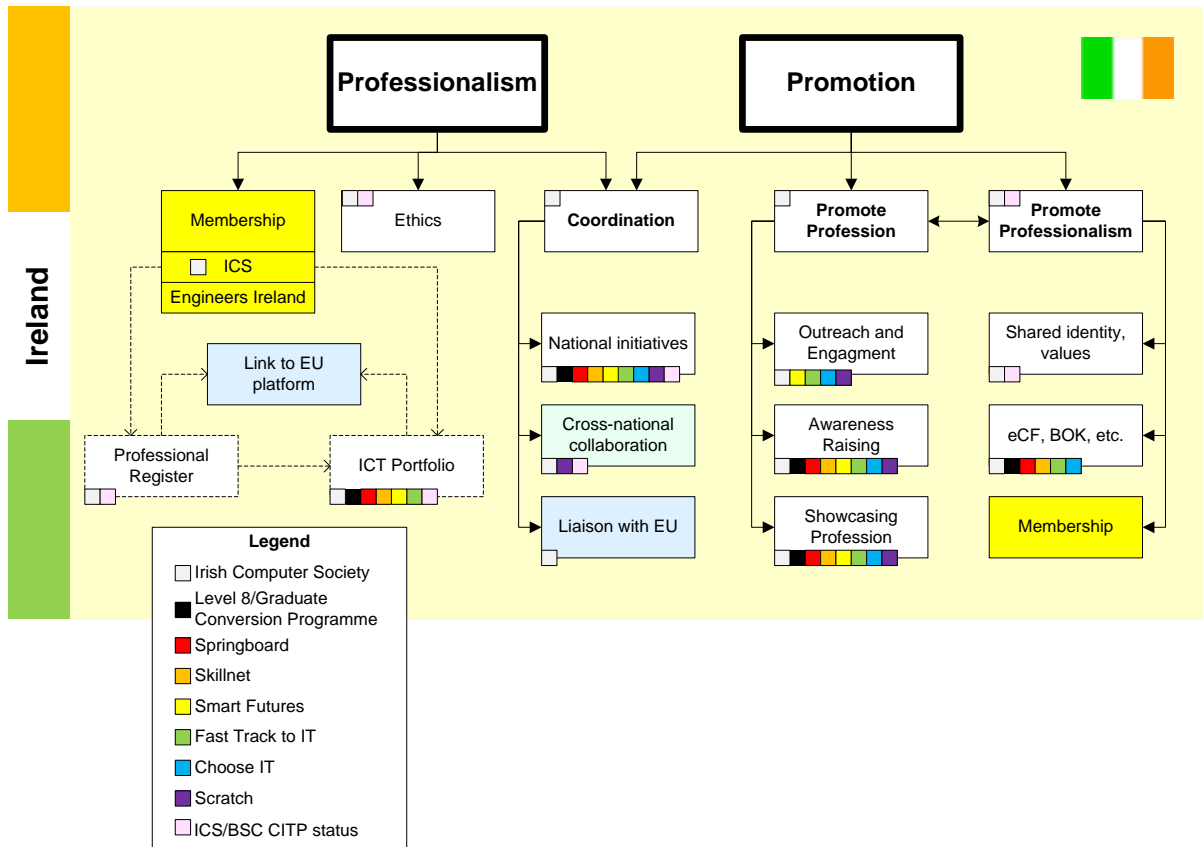


Figure 25: National ICT professionalism and promotion initiatives (Ireland)

The CITP (Chartered IT Practitioner) status is seen as the hallmark of excellence in practice for ICT professionals, reflecting high standards of integrity, professionalism, and dedication to quality. CITPs are formally recognised on a professional register. Affiliate and Associate members of the ICS are not currently (publicly) registered, however, should registration become part of the formal professionalism effort, this may be an initiative that the ICS would be well placed to coordinate on a national level.

5.5.3. The Netherlands

5.5.3.1. Context

While there are a number of initiatives underway in the Netherlands, the optimal format(s) for organising and promoting ICT professionalism at a national level have not yet stabilised.

In the past, individual organisations were responsible for ensuring that their staff had appropriate skills and training but more recently there has been increasing pressure for a collective approach to address such issues at an industry-wide level. Such an approach is seen to require governmental support and backing in order to be sustainable, however there appears to be a reluctance to formalise a legal structure around e-skills and the associated activities required to embed these structures and principles.

5.5.3.2. Key Stakeholders

Digivaardig & Digiveilig: A public-private partnership sponsored by the *Ministry of Economic Affairs* with several public, private and civil society partners, this is a national digital skills programme.

ECP: A national information society foundation and platform bringing together government, industry and civil society organisations, which coordinates the *Digivaardig & Digiveilig* programme. Chairman Tineke Netelenbos is appointed as the Dutch Digital Champion under the cabinet of Neelie Kroes, DG connect.

Expertisecentrum Mediawijzer: The Expert Centre for Media Literacy is an initiative created by the *Ministry of Education, Culture and Science*, involving numerous partners from both the public and the private business sector.

NEN: The Dutch Standardisation Body with existing connections to *Digivaardig & Digiveilig*.

Workgroup e-CF NL: a public/private workgroup set up in cooperation with NEN to adapt the European e-Competence Framework for the Dutch situation.

HBO-I: The HBO-I foundation (HBO-I) is a cooperation of ICT players within Higher Professional Education in the Netherlands (formerly known as “HBO-I platform”) and has connections with the *Digivaardig & Digiveilig*. Its initiatives include programmes for Information Technology, Business Information Technology and Computer Science.

Dutch Universities: In relation to developing strategies for promoting ICT education and professionalising ICT, no existing collaborative or cooperative initiatives between Dutch universities were identified. The universities remain, however, a key stakeholder in terms of developing a cohesive national agenda for promoting ICT as a career path and promoting the professionalism of graduating practitioners.

Professional Associations: VRi and Ngi representing Dutch ICT practitioners are both members of CEPIS. More recently, these complementary bodies are joining forces to collaborate formally on ICT professionalism and Ethics and to create stronger representation for their members. There is currently no formal connection to *Digivaardig & Digiveilig*.

Nederland ICT: representing industry vendors, Nederland ICT (formerly known as ICT~Office) is a trade association for more than 550 IT, telecom, internet and office companies in the Netherlands.

CIO-Platform Nederlands: an independent association of CIOs and IT directors of private and public organisations in the Netherlands, representing diverse sectors such as manufacturing, banking and insurance, regulatory bodies, utilities, and others.

CA-ICT Foundation: the Training & Development fund for the ICT and Telecoms sectors, governed by social partners consisting of employers, employees, and the government.

5.5.3.3. Standardisation and Implementation

NEN is the national standardisation body in the Netherlands, formulating Dutch standards and representing Dutch interests in the development and publication of European and global standards. ECP, the coordinator of Digivaardig & Digiveilig, and the workgroup e-CF assigned NEN to a set up standardisation committee to realise the Dutch translation of the European framework, are working together adapt the e-CF for use in the Netherlands and promote its use (see **Fehler! Verweisquelle konnte nicht gefunden werden.**). An adoption plan is due to be finalised in 2013 and the main stakeholders are expected to sign an agreement on November 14th 2013 undertaking to fully adopt the framework within the following years.

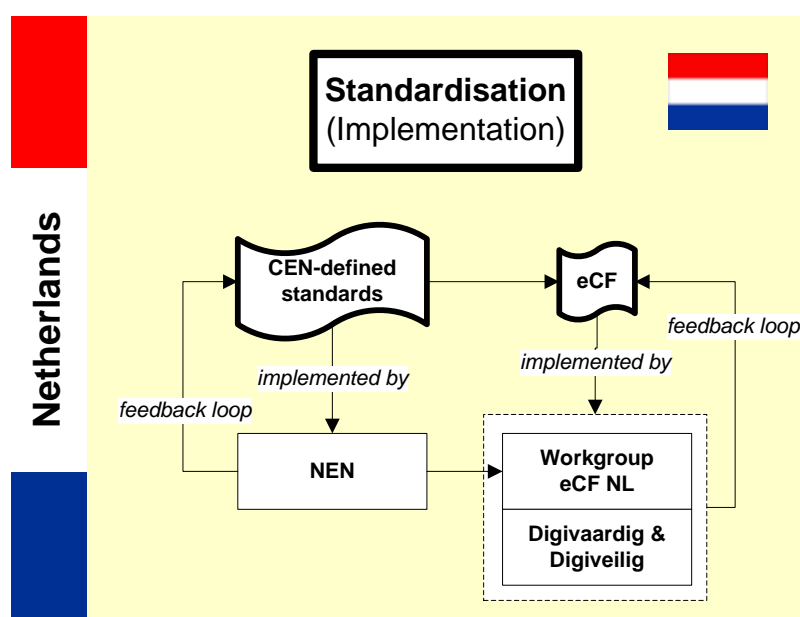


Figure 26: Implementing standards (Netherlands)

5.5.3.4. Professionalism and Promotion

Digivaardig & Digiveilig, coordinated by ECP, focuses on increasing digital and e-skills amongst the Dutch (working) population, by promoting digital literacy skills, stimulating societal trust in ICT and internet, increasing digital safety and digital awareness, and establishing a regular dialogue between relevant stakeholders. Digivaardig & Digiveilig also focuses on ICT Professionals, amongst others, establishing an *Image Committee* with links to the Grand Coalition to improve the image of the ICT profession.

HBO-I, with connections to Digivaardig & Digiveilig, aims to strengthen the position and image of ICT in the Netherlands, for both future students and industry.

CIO Platform Nederland represents the perspective of ICT-user organisations, or the demand side of IT. This Platform was established to share knowledge and best practices amongst the network of CIOs and their staff in the Netherlands. Recent initiatives include facilitating several CIO special interest groups, company visits, and ICT Challenge events for university students.

Nederland ICT provides services to improve insight on the development of the ICT labour market and aims to improve the levels of students undertaking ICT education, improve synchronisation between ICT education and the labour market, foster social innovation through increased employability and lifelong learning, and support greater levels of ICT usage within education.

The Expertisecentrum Mediawijzer aims to connect the use of ICT with all parts of life: from childhood education towards professional development to lifelong learning. The activities include, *inter alia*, raising awareness through media campaigns, establishing a network of actors, and fostering research.

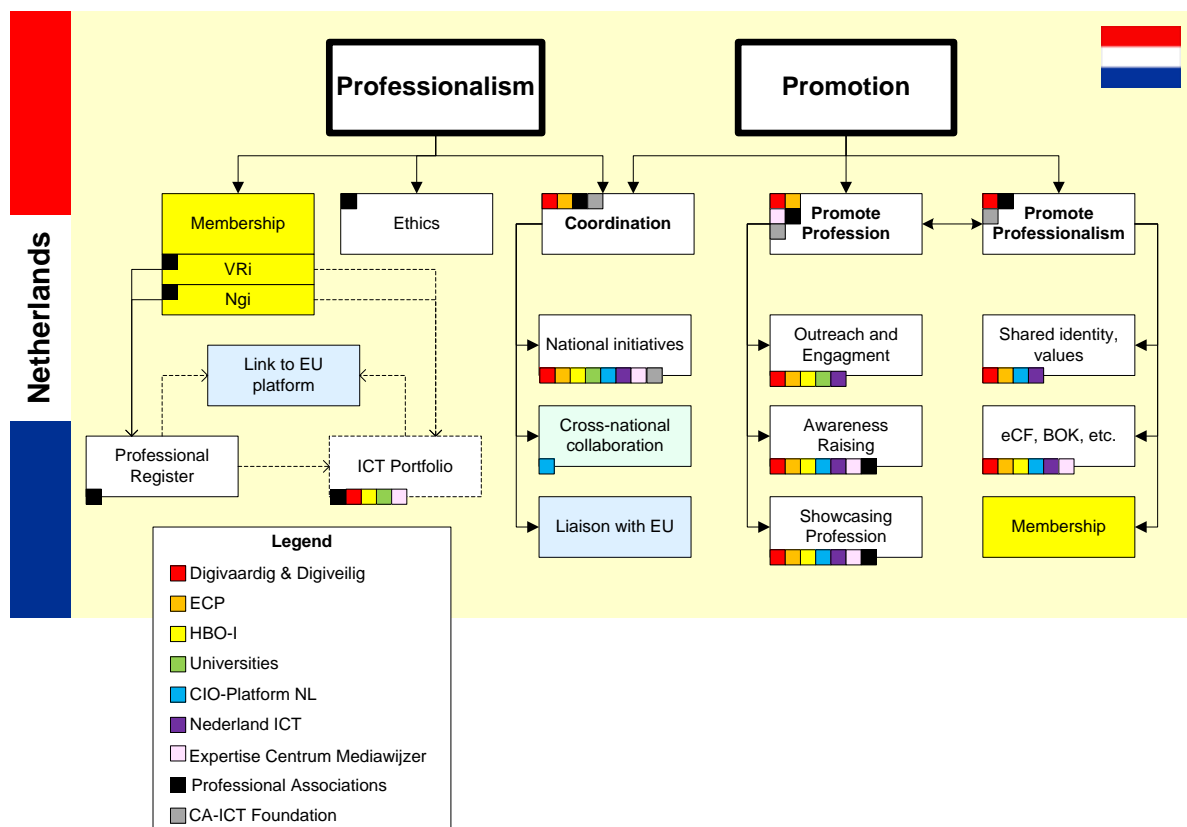


Figure 27: Professionalism and promotion initiatives (Netherlands)

Both of the national professional associations for ICT practitioners in the Netherlands, VRi and Ngi, are concerned with promoting professionalism amongst their members through delivery of high quality and socially engaged ICT products, services, and solutions. Aimed at

professionals, students, and organisations, they advocate continuing professional education, adherence to a code of practice, and facilitate networking opportunities for practitioners to develop local support communities and special interest groups. Both maintain a register of members. FRI, a joint initiative between VRi and Ngi, was established on 1 January 2013 to enhance both associations' efforts to improve quality and integrity, taking advantage of the complementarities between the two, and leveraging their combined resources.

The CA-ICT Foundation grants subsidies for employment and personal development in cooperation with EU and Dutch Ministries. This is the only source for funding to improving employment in ICT.

Figure 27 illustrates a summary of how these initiatives fit within the proposed models.

5.5.4. Applicability of proposed model to national contexts

The brief case studies above demonstrate very clearly that there are significant differences between Member States in terms of maturity of ICT professionalism, national priorities and objectives, and existing initiatives and approaches. What is also very clear, however, is that there is strong recognition of the importance of developing ICT professionalism on a national basis and substantial enthusiasm and willingness to engage in its promotion.

Despite the identified differences, each country's current initiatives fit within the proposed national-level framework for managing and promoting ICT professionalism. In many cases, a single initiative may answer several of the suggested functional areas; similarly, more than one initiative can contribute to each function.

We recognise that any attempt to impose a rigid structure on Member States to demarcate their professionalism initiatives would be counterproductive. Instead, the proposed framework should be seen as a loose guide to the types of activities that might be considered for developing and promoting ICT professionalism. The frameworks are proposed as models *of* how such initiatives might feed into one another, rather than a model *for* how they would. We submit that the mapping of existing initiatives in Ireland (section 5.5.2.4) and the Netherlands (section **Fehler! Verweisquelle konnte nicht gefunden werden.**) illustrates this point.

Key to designing specific programmes or initiatives in each country is ensuring their relevance to the particular context in which they will be implemented. An MSP in each Member State, with representation from industry, education, professional bodies, and government, would be best placed to understand national priorities and constraints. They will be able to develop appropriate solutions, which are germane to the cultural and regulatory environment, and responsive to local demands and requirements.

Additionally, a broader understanding of the situation and existing initiatives in other Member States would enable each national professionalism and promotion MSP to identify possible opportunities for developing cross-national collaborative partnerships. Professional associations, through their membership of CEPIS, may be well-positioned to act as the central liaison point, or locus of activity in leveraging or coordinating with existing efforts in other jurisdictions. Where countries are attempting to initiate new programmes, they may be able to learn from the experience of their European counterparts, or indeed, adapt or dovetail with already established initiatives. Alternatively, a number of Member States may choose to develop joint solutions in tandem. The detailed country reports prepared under the auspices of the GUIDE, MONITOR, and INTERNATIONAL projects represent a starting point for identifying such potential synergies.

6. Stakeholder Value Models

6.1. Introduction

Key to establishing a structure for operationalising the ICT Profession in Europe is the need to identify the key stakeholders involved and to understand their interests in and requirements of a framework for ICT Professionalism. It is therefore necessary to identify tangible benefits for each stakeholder group to ensure that the proposals gain the necessary traction to enable its successful adoption.

McLaughlin et al. identified high-level stakeholder value models for key stakeholders as a means of capturing and understanding key benefits (McLaughlin et al. 2012), and these values have been further validated and developed during our stakeholder engagements.

The research team used the IVI/CEPIS definition of an ICT Professional to define the ICT Profession, which could then be assessed from a value perspective by the participants. We therefore evaluated stakeholder attitudes to:

- The value of professionalising ICT
- The value of a unified pan-European approach
- The value of common standards for competences, Bodies of Knowledge and Ethics
- Appropriate credentials/entry requirements and ways to demonstrate these
- The value of committing to continual professional development (CPD)
- What constituted competent practice and stakeholder value

6.2. Overview of stakeholders

As elaborated in the *eSkills and ICT professionalism: Fostering the ICT profession in Europe* report, all of society has a stake in defining how ICT practitioners are engaged and consulted. Table 7 below identifies the key stakeholder grouping identified for this research, as elaborated in Chapter 3.

Table 7: Key stakeholder categories

Initial stakeholder categories	Refined categories
ICT students, practitioners, and managers	
ICT employers	
Industry	ICT and non-ICT
ICT educators	Public and Private
Certification providers	
Professional associations	ICT and cognate professions
EU and national policy decision makers	
Society	
Other	Guilds and Trade Unions

We have further refined this list in order to identify six key stakeholders for operationalising the ICT profession across Europe. They are: ICT Practitioners; Employers; Industry; Educators and Certifiers; Professional Associations and other professional representatives, such as Trade Unions; and Government entities and the public interest.

6.2.1. ICT Practitioner

Central to any professionalism framework are the ICT Professionals. This includes current and future ICT practitioners and students. The proposed framework offers potential ICT professionals a clear value proposition. ICT Professionals would benefit from improved employment prospects arising from a better understanding of ICT skills and the development of a common language to describe them (such as the e-CF), particularly when it comes to choosing training/educational courses and defining job roles. A common language will also improve the ability of practitioners to work together in teams and across national boundaries. Additionally, the framework would help to define and support career development by providing clear and flexible career paths.

An ICT profession and framework would also support greater mobility within the EU and globally, by providing clear and transparent job roles across national boundaries. A flexible and up-to-date framework will assist ICT practitioners in staying current with the latest technological developments and business skills. The ICT Professional Portfolio and Tools will provide practitioners with a consistent way to validate and demonstrate their experience, including non-traditional forms of education.

Finally, elevating ICT to a professional status would give ICT practitioners a greater recognition of their skill and heightened prestige and an improved public perception of ICT practitioners and ICT as a stable career option.

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Table 8: Value Model for ICT Professionals

ICT Practitioners
<ul style="list-style-type: none">• Mobility• Professional standing and trust• Improved employment prospects/job enablement• Visible, flexible career paths• Improved public perception of ICT Profession/Professionals• Common understanding of ICT skills, competences and professional profiles• Provision of tool sets for self-assessment• Provision of tool sets for demonstration of experience• Validation of experience, esp. non-traditional• Common identity/cohesion• Transparency of potential training courses, educational options• Means to stay current/up to date• Improved ability to work together, communication between team members• Long term stability of ICT as a career option• Improved ability to organise/leverage work environment

6.2.2. Employers

This stakeholder group includes all organisations and agencies that employ or wish to employ ICT staff. There is a clear incentive for employers of ICT staff to support and adopt a professionalism framework. Mapping to a common standard such as the e-CF will ensure there is a common language to describe and communicate ICT roles and will give employers improved insight into their staffing needs. This will improve the ability to align ICT workers to business requirements. There will be improved transparency and compatibility between candidates and their experience, as well as improved ability to validate candidates ICT experience. Non-ICT employers will have an improved insight into the ICT field and vetting of candidates. The ICT Professional Portfolio and Tools will provide assistance to employers in defining ICT roles and information about candidates. All of these improvements will ensure decreased risk, reduced recruitment costs and time to recruit candidates.

Table 9: Value Model for Employers

Employers
<ul style="list-style-type: none">• More qualified graduates• Improved insight into staffing needs• Improved ability to match candidates to open positions• A common language to describe and communicate ICT roles• Improve the ability to align ICT workers to business requirements• Transparency/comparability between candidates• Validation/accreditation of potential candidates• Usage of a register by employers to validate the educational achievements of potential employees• Improved understanding of ICT field for non-ICT industry employers• Reduced recruitment costs and time to recruit candidates• Improved transparency of education across national barriers• Provision of toolsets to facilitate defining ICT roles

6.2.3. Industry

As employers of ICT workers, industry will share many of the values as expressed in section 6.2.2 above. However, not all values are directly relating to the engagement of ICT workers. Industry, as a separate stakeholder, will benefit from the professionalisation of ICT by ensuring a more credible and competent ICT workforce is in place to meet specific organisational needs. Additionally, being able to hire a professional reduced the ICT-related risk for an organisation. As users of ICT products, industry will benefit from improved quality of ICT products and services, which will positively affect productivity, efficiency and motivation within the organisation. Improved productivity will also arise from improved communication, both within IT and between IT and the business. This is true for communication within organisations, between the organisation and their clients, as well as between countries.

Industry will benefit from having ICT professionals with a broader knowledge base, such as better business skills, able to deliver improved products and services, and to reduce ICT-related risks. Additionally, ICT professionals will be more proficient at managing change and delivering innovation. Overall, a professional ICT taskforce will help the organisation to gain a competitive advantage. This will also lower the cost of staff development and training and help to simplify the definition of any training requirements. A transparent profession will also increase the decision-making process for outsourcing, offshoring or mergers and acquisitions.

There will also be an opportunity to develop new toolsets to support the profession.

Table 10: Value Model for Industry

Industry
<ul style="list-style-type: none">• Improved productivity• Improved reliability of ICT practitioners• Improved ability to develop high-quality products and services• Improved ability to source usable products and services• Reduced risks• Competitive advantage• Improved staff motivation (both ICT and non-ICT)• Lower the cost of staff development and training• Improved transparency of ICT department• Opportunity to develop new toolsets• Support decision-making process for outsourcing/offshoring and M&A

6.2.4. Educators

This stakeholder category includes all entities that provide ICT training, including second- and third-level institutions, industry training, and online courses. ICT Certification Bodies are also included in this category.

For ICT educators, the promotion of ICT to a professional class and improved public perception, as well as the stability that comes with a recognised profession, will see increased demand for ICT courses. Currently, third-level educators are competing with older, more traditional professions. Formalising the profession will add a level of stability to a field that is considered unstable. There will also be increased demand for ICT courses stemming from the proposed Foundational Meta-level ICT Body of Knowledge and the need for CPD. The availability of funding for research in the area of ICT is also an incentive.

The use of a common language will make it easier to align courses with industry, to identify teaching aims, and to communicate with potential students. A common language will also make it easier to recruit students from other countries. Comparability of courses will allow increased recognition of certification and qualifications outside of national boundaries.

Finally, the proposed EU ICT Platform and Tools will provide Educators with support services, such as mapping tools.

Table 11: Value Model for Educators

Educators	
	<ul style="list-style-type: none">• Stability• Increased demand for ICT courses• Improved ability to align training to industry needs• Increased market size• Improved ability to recruit students from other countries• Improved communication between educator and potential student• Support for identification of teaching aims, provision and certification awards• Increased recognition of certification/qualification outside of national boundaries• Provision of toolsets to facilitate mapping• ICT research funding

6.2.5. Professional Associations

This stakeholder grouping includes Professional Associations and other professional representatives, such as Trade Unions. Professional associations are expected to play a key role in operationalising the ICT profession at a national level and providing ICT practitioner representation at EU-level. As described in section 5.4.2 in this report, ICT professional Association are key stakeholders in national-level MSPs. It is envisaged that they will continue their role in advocacy, coordination, education and, in some cases, certification. Others will fill accreditation roles and membership services.

A coordinated professionalism effort should provide support for existing Professional Association initiatives and opportunities to pool efforts with other national and European associations. An ICT Profession will provide an additional incentive for practitioners to become members and should therefore lead to increased membership. Belonging to a European-wide initiative to mature the profession will also provide professional associations and representatives with the opportunity to give input in to how to mature the profession and the components of the profession in a wider context. This will also give Professional Associations, and the practitioners they represent, greater influence on industry practice and government policy. There may also be opportunities to expand current practice to include professionalism education and validation services.

Table 12: Value Model for Professional Associations

Professional Associations	
<ul style="list-style-type: none">• Support for initiatives and opportunities to pool efforts• Increase membership• Increased influence on industry practice• Increased influence on government policy• Increased opportunity to represent practitioner interest• Possible role in education• Possible role in validation	

6.2.6. Government Entities and the Public Interest

This stakeholder grouping includes local, national and European government bodies and others representing the public interest. Wider society is also considered as a part of this grouping.

Society as a whole will benefit from a more efficient, effective and transparent ICT profession in a number of ways. Improved employment prospects will benefit people directly, as well as society as a whole. Additionally, society will benefit from improved quality of ICT products and services for citizens, in terms of enhanced utility, as well as trustworthiness (i.e. information security, etc.). An improved ICT infrastructure will also decrease the risks to society due technology failures and their attendant risks to the public welfare. Better design of ICT products and services will help to make technology more accessible to all and decrease health and safety risks. Additionally, society can expect that minimum quality and ethical standards will apply to engagements with ICT Professionals.

Government entities and policy makers will benefit from enhanced visibility of supply and demand of e-Skills, for example, with enhanced statistics with regard to skills gaps and skills shortages.

An improved ICT profession in Europe will enhance European competitiveness on a global stage.

Table 13: Value Model for Government Entities and the Public Interest

Government Entities and the Public Interest	
<ul style="list-style-type: none">• More efficient, effective and transparent ICT profession• Improved employment prospects• Improved quality of ICT products and services• Improved ICT infrastructure• Decreased risk• Accessibility• Enhanced visibility of supply and demand of e-skills• Improved European competitiveness	

7. Recommendations and Actions

7.1. Translating research into actions

As identified in (Mclaughlin et al. 2012), the process of maturing the ICT profession will take many years. This project has taken a first step in proposing an institutional and governance model to operationalise the profession in across Europe.

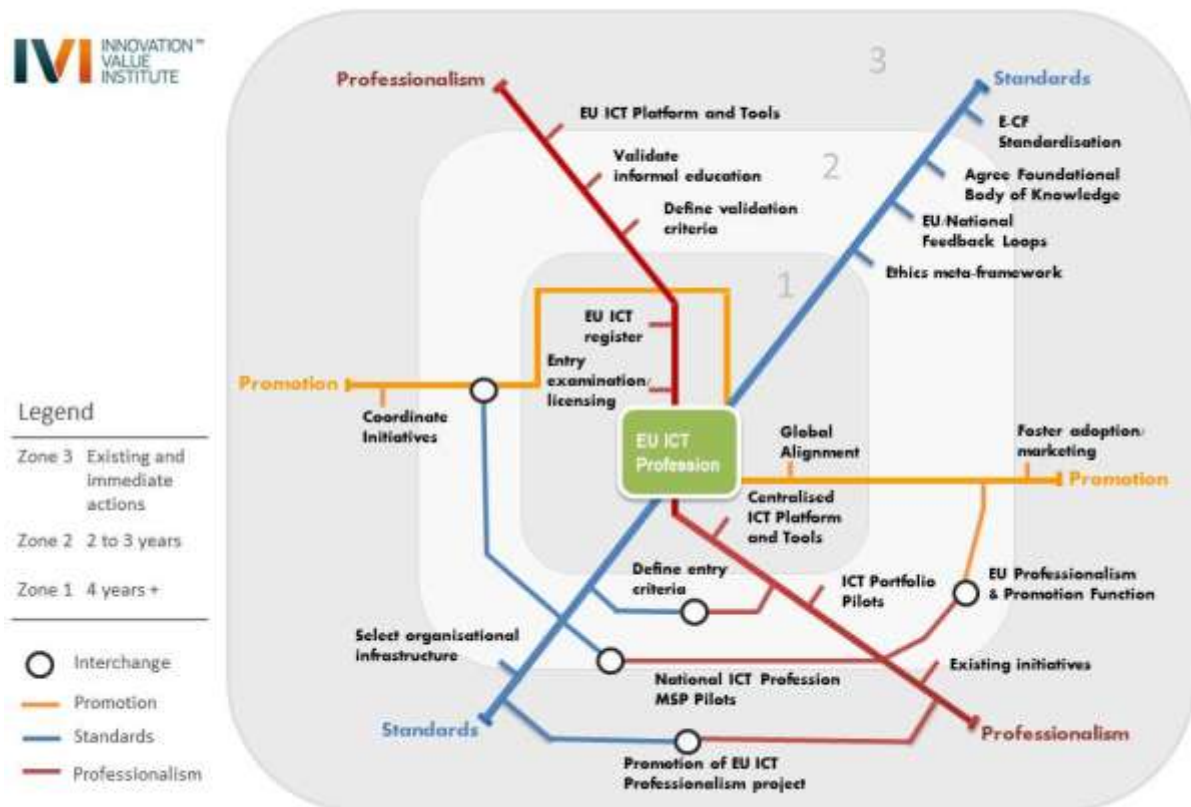


Figure 28: Roadmap for ICT Professionalism

We have identified a number of short-, medium-, and long-term recommendations to be considered for the maturing of the ICT profession in Europe. While some of the components and functions of the proposed model are already established, such as the Standards function, which is looked after by CEN and the existing structures and initiatives based on the e-CF, others are optional and still open for discussion. In some cases, the value will be in making proposals in order to frame future conversations. **Fehler! Verweisquelle konnte nicht gefunden werden.** above gives an overview of key stages in the maturing of ICT Professionalism in Europe, with Zone 3 representing existing and immediate actions, and Zone 1 representing longer term actions.

7.2.Organisational Infrastructure

7.2.1. Action point 1: Select suitable organisational infrastructure for professionalising ICT across Europe

A number of institutions and initiatives are already in existence that an organisational infrastructure for the maturing of ICT professionalism in Europe can be built around. CEN and the e-CF standardisation process are the most obvious examples of how the future profession in Europe may be developed and promoted. This research has presented a number of existing and new entities that might be leveraged or established to support the maturing of ICT professionalism; CEN to take responsibility for all standards relevant to ICT professionalism in Europe; a European-wide MSP to take responsibility for the coordination and promotion of pan-European ICT professionalism and national-level MSPs to manage all three professionalism functions: standardisation, professionalism and promotion on a national basis. The upcoming contract E-SKILLS: PROMOTION OF ICT PROFESSIONALISM IN EUROPE (European Commission 2013) will further develop a sustainable operating model for the promotion of ICT professionalism in Europe. One possible starting point might be the creation of a lean business case for the establishment of a European-wide MSP for coordinating and promoting the profession, as well as a limited number of national-level pilot MSPs.

7.3.Standards

Of our three identified functions, Standards is the most developed, having at its core CEN and the e-CF, which forms the cornerstone of the European ICT professionalism effort. Additionally, the first steps have been taken to define the Foundational ICT Body of Knowledge ((European Commission 2013). However, a small number of actions are recommended based on the proposals developed in this research project.

7.3.1. Action point 2: Establish coordinated national feedback loops to input into professionalism standards

Once the necessary infrastructure has been put in place to support national-level ICT professionalism efforts, it will also facilitate a coordinated means of getting input from individual Member States and professionalism initiatives in the establishment and development of standards related to the ICT profession. Our recommendation is that formalised and regular feedback loops are instigated between the EU-level standards national-level Standards functions.

7.3.2. Action point 3: Include relevant initiatives in future research on ICT Professionalism

As identified in Chapter 0 and section 0 of this report, there a number of relevant initiatives relevant to ICT Professionalism in Europe and globally. This research has elaborated on specific case studies for the Netherlands, Italy and Ireland. It is recommended that future research develop specific case studies for other Member States, elaborating on relevant initiatives and stakeholders, as well as looking at relevant pan-European and Global initiatives.

7.3.3. Action point 4: Initiate a project to establish an ethics framework for the profession at a European level

As identified in (Mclaughlin et al. 2012), a defining aspect of any profession involves adhering to professional ethical conduct. Currently, existing national professional associations have their own ethics codes and CEPIS provide an ethics repository of national ethics codes at a European level. These could potentially be used as inputs to the development of a pan-European framework for ICT professional ethics. The key benefit of such an approach would be to unite ICT professionals under a set of common values and establish a shared identity as well as improving key values such as those identified by participants in this study: quality, privacy and information security.

Table 14: Detailed roadmap for Standards Function

Component	Level	Stage 1	Stage 2	Stage 3
Competences	EU	e-CF as Standard		
	National	<ul style="list-style-type: none"> • Foster adoption • Mapping aligning • Self-assessment 		
Foundational Body of Knowledge	EU	Tender	Agree	Possible Standards route
	National	Provide input and feedback	Provide input and feedback	<ul style="list-style-type: none"> • Foster adoption • Mapping aligning • Self-assessment
Ethics	EU	Existing CEPIS repository	Initiate project: Meta-Framework Ethics EU	
	National	Existing professional associations ethics codes	Provide input and feedback	

7.4. Professionalism and Promotion

7.4.1. Action point 5: Establish function to take responsibility for coordinating and promoting relevant professionalism initiatives across Europe

This research has identified the need to formalise the coordination and promotion of ICT professionalisation efforts at a European level. This new entity could take the form of a pan-European MSP as identified in section 5.3.2.2. and will be responsible for coordination,

membership, member validation (including Quality Labels), ethics, the EU ICT Platform and Tools and promotion at a European level.

7.4.2. Action point 6: Establish a number of national pilots to take responsibility for coordinating/bringing together relevant national professionalism initiatives

This research has also identified the need to formalise the standardisation, coordination and promotion of ICT professionalisation efforts at a national level. It is recommended that this could be rolled out as pilots in a limited number of European countries, before being rolled out across all Member States. The role of these national-level MSPs is described in section 5.4.2 and will include responsibilities for implementing standards, coordination of professionalism initiatives, membership, member validation, ethics and ICT Professional Portfolio and Tools at a national level.

7.4.3. Action point 7: Define entry criteria (education, experience etc.) for the profession based on e-CF, FBoK, etc.

It will be the responsibility of all of the entities with responsibility for ICT professionalism to define the criteria for entry into and progression within the profession. This will be based on knowledge and competences as defined by the e-CF and the Foundational Body of Knowledge.

7.4.4. Action point 8: Define validation criteria for the profession

Related to defining the criteria for entry into and progression within the profession, will be the need to define and agree suitable validation criteria for members of the profession. These could include, for example, existing mechanisms such as self-assessment, peer reviews, quality labels, Mozilla Badges or new methods, such as a professional examination.

7.4.5. Action point 9: Research ways of validating informal education for ICT profession

Our research identified a strong need to find new ways of demonstrating and validating informal education, such as work experience and self-directed learning. This project recommends that further research is undertaken to identify ways of accrediting and mapping/transferring informal education in ways that are comparable to formal learning. Examination and licensing should be considered as longer-term goals in this area.

7.4.6. Action point 10: Investigate possibility of establishing an ICT professional register

A number of Professional Associations in Europe already have a register of ICT professionals. Depending on how the profession develops in Europe, there may be a need in the medium to long term to establish a register of ICT professionals.

7.4.7. Action point 11: Pilot a number of national-level online ICT Professional Portfolios

Currently, there are a number of tools and services to support specific components of the profession, such as the e-Competence Benchmark tool and the e-Skills landscape tool (see section 5.2.2.3 for details) as well as standardised ways of demonstrating skills and

experience, for example, the Europass CV. It is recommended that a number of European countries pilot an online ICT Professional Portfolio, which would include support tools and services to allow practitioners to assess and demonstrate their ICT credentials in a uniform way. Existing platforms such as LinkedIn or Mozilla Badges could form models of how this might work. A longer-term goal might be to feed these national-level portfolios into the European-level ICT Platform and Tools, see below.

7.4.8. Action point 12: Create centralised EU ICT Platform and Tools

It is recommended that a European-wide, centralised platform is made available which links to existing support tools and services. This platform can then be utilised for showcasing initiatives related to the profession and act as a promotion/communication tool. The degree of integration ultimately achievable will be dependent upon the interoperability of the various systems in use in each country.

Table 15: Detailed roadmap for Professionalism and Promotion Function

Component	Level	Stage 1	Stage 2	Stage 3
Coordination	EU	Establish Professionalism & Promotion function	Identify synergies	Linking relevant projects
	National	National EU Professionalism MSP pilots	Identify synergies	Pilot - Linking relevant projects
Membership	EU	Establish Professionalism & Promotion function	Define entry criteria	Admin
	National	Identify existing initiatives		
Validation	EU	Research existing	Validate informal	Legal status/entry exam/licensing
	National	Research existing	Validate informal	
Professional Register	EU	Existing	Investigate need	
EU ICT Platform	EU	Self-assessment tools/ Link to	Expand links	Host
ICT Professional Portfolio	National	Pilot	Feeding into EU ICT Platform	
Promotion	EU	<ul style="list-style-type: none"> Establish promotion function Harness existing initiatives & stakeholders 		Global alignment
	National	National EU Professionalism MSP		

7.5.Conclusion

In the course of this project, we have developed proposals for a pan-European Institutional and Governance Framework in collaboration with 57 stakeholder representatives using various interactive processes, including a questionnaire, focus groups, individual and group interviews, and a workshop.

This consultative approach served to engage key stakeholders in the design of the frameworks from an early stage of development and to ensure that the proposals were demand-driven. Engagement by and support from all of the relevant stakeholders is essential to ensure the sustainability of the proposed frameworks. Additionally, existing initiatives must be coordinated and aligned in order to successfully embed an effective structure for ICT Professionalism.

Establishing the profession will take many years and proposals for its development will need to be flexible and open to change and adaptation. It is worth noting that there is value both in achieving this goal and in the process of attaining it, in bringing together relevant stakeholders across Europe to discuss the current state of ICT professionalism and how it must be developed for the common good.

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Appendix: Initial Positioning Document

ICT professionalism: e-Skills Monitor Project

*Prepared for the European Commission Directorate General Enterprise and
Industry*

1. Introduction

The Innovation Value Institute (IVI), in conjunction with Empirica, is developing a framework to help with the development and adoption of ICT Professionalism across the European Union.

This document is the first stage of an iterative process that seeks to elicit your views on the defining aspects of the framework. The next step will be to hold a series of focus groups with participants to develop a selection of governance models that will provide value for each of the stakeholders. The ultimate aim is to develop a sustainable and successful Framework for ICT Professionalism and the promotion of ICT Professionalism across Europe.

What follows in this document is a short overview of the framework so far, followed by some key questions to help us understand your views of the initial ideas for an institutional and governance framework. We should be grateful if you would take the time to provide your preliminary feedback on these five questions prior to participating in the focus groups, details of which are in the accompanying email.

Once you have completed the questions in this document, please return them to IVI at the following email address: (ivi@nuim.ie)

2. An Overview of the ICT Professionalism Framework

The framework aims to provide an end-to-end view of the ICT professional landscape. The proposed framework for ICT professionalism defines ICT Professionals as:

- Possessing a comprehensive and up-to-date understanding of a relevant body of knowledge¹⁰;
- Demonstrating on-going commitment to professional development¹¹ via an appropriate combination of qualifications, certifications, work experience, non-formal and/or informal education;
- Adhering to an agreed code of ethics/conduct¹² and/or applicable regulatory practices; and
- Through competent practice¹³ delivering value for stakeholders

Reference: CEPIS/IVI (2012) *Fostering the ICT Profession in Europe*, available from <http://cepis.org/index.jsp?p=827&n=940>

Figure A outlines a summary of the key components of the framework.

¹⁰ The term *relevant body of knowledge* encompasses the requirement for a broad and deep knowledge base, which is up-to-date, accommodating both a common ICT body of knowledge, and pertinent specialist knowledge and skills

¹¹ *Professional development* focuses on improving professional competence in a professional role, with the objective of enhancing personal performance and career progression opportunities. It can encompass both technical aspects (e.g. keeping abreast of latest technological trends) as well as non-technical aspects (e.g. developing better presentation skills)

¹² Professionals are accountable to themselves, the ICT Profession, and Society, through an agreed *code of ethics/conduct* or applicable regulatory practices

¹³ *Competent practice* communicates the concept of quality products and services being delivered by practitioners

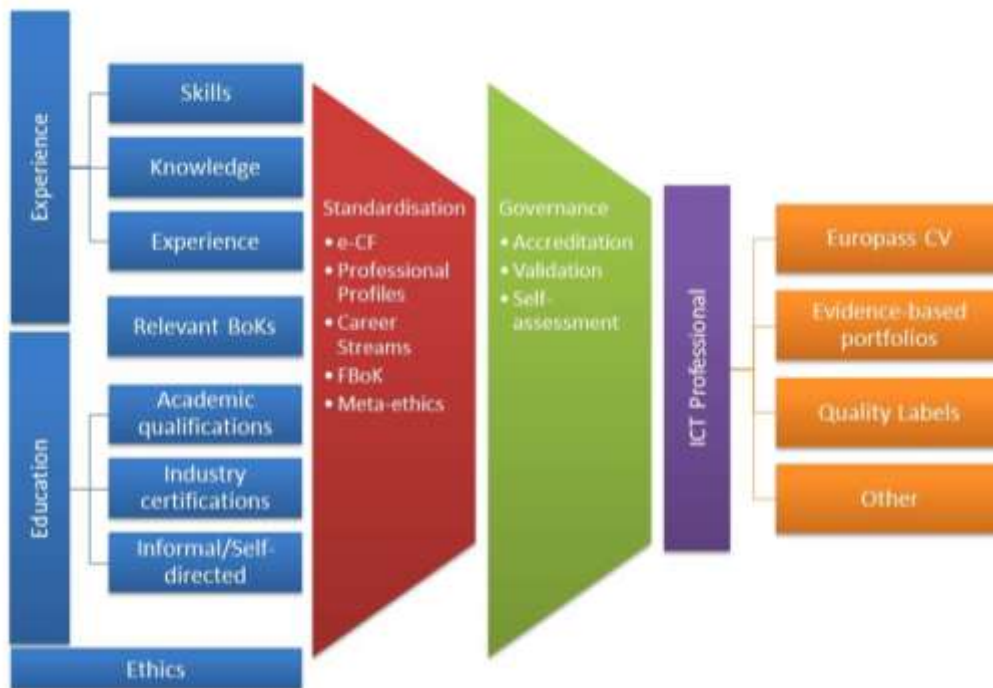


Figure A: Summary of building blocks of the ICT professionalism framework

The framework is designed to ensure that relevant skills, knowledge and experience, whether gained through industry experience, formal education, self-directed learning, or other means, will be considered when assessing an individual’s professional status, and will be standardised through the use of:

- The *European e-Competence Framework* (e-CF), which describes defines 36 key ICT competences and five levels of proficiency against which ICT practitioners can assess their level of professionalism (see www.ecompetences.eu)
- *ICT Professional Profiles* which defines a series of typical ICT role profiles for use by ICT practitioners and employers (see www.ecompetences.eu/2165,ICT+Professional+Profiles.html)
- *ICT Career Streams* which highlights career progression/paths in terms of various role profiles for use by ICT professionals and employers
- The *Foundational ICT Body of Knowledge*, which will support a common understanding of relevant ICT topics for those wishing to develop their careers in ICT (see, for example, the Body of Knowledge developed by the [Australian Computer Society](#))
- A core set of *ethical issues* to be specified in a meta-framework of ethical issues (see, for example, this position paper developed by the [British Computer Society](#)).

It is the intention that the ICT professional can use these standardised descriptions to demonstrate their accomplishments in a number of different ways:

- *The Europass CV*: Acting as a single portfolio to provide proof of qualifications and skills across Europe, the Europass currently provides a common structure that allows for extensions in which applicants can state their proficiencies in linguistic skills. It is intended that this is also done for ICT competences for ICT professionals
- *Evidence-based portfolios*: There may be scope for the creation of a centralised platform for describing the full scope of an ICT professional's professional record, including the various educational and career paths and accomplishments
- *E-Skills Quality*: A service contract carried out by Empirica and EXIN, together with a group of e-skills experts, has developed a concept for an online e-skills landscape service and self-assessment tool to facilitate referencing the diverse range of European-wide certification and training projects against the e-CF (see www.eskills-quality.eu and www.eskillslandscape.eu)
- *CEPIS e-Competence Benchmark*: Proposals for a European e-skills quality label for ICT industry training and certification, and a model for a European multi-stakeholder partnership to establish an institutional and governance model or partnership for the promotion of the European e-Competence Framework (e-CF) and associated services (see www.cepis.org/ecompetencebenchmark)
- *Other existing platforms* for demonstrating the ICT practitioners' accomplishments, including the traditional CV and existing online platforms such as LinkedIn, Mozilla Badges, Accredible, etc.

A key benefit of an organised and internationally adopted profession would be the improved ability for planning and policy-making for ICT labour planning and statistics agencies.

For more information on the ICT Profession, including download links for the *Fostering the ICT Profession in Europe* Executive Summary and Full Report, please go to:

<http://cepis.org/index.jsp?p=827&n=940>

3. Governance of the ICT Profession

Governance, in this context, refers to *how* and *by whom* the ICT profession should be managed, including aspects such as validation, accreditation, and self-assessment. Key to building a workable framework is understanding how these aspects will manifest in a practical, meaningful way that will be seen as valuable to all stakeholders involved.

Key governance aspects of the profession are:

1. Responsibility for developing, maintaining and promoting the ICT profession
2. Defining minimum entry criteria for entering the profession, such as the content for the Foundational Body of Knowledge
3. Mapping of competences, job roles and educational courses (among others) to e-CF, Foundational Body of Knowledge, Professional Profiles, Career Streams and professional grades by practitioners, employers, educators, certifiers, professional societies, 3rd parties and statistics agencies/policy makers
4. Evidence portfolios, CVs, labels, platforms, etc.
5. Ethics

Responsibility for developing, maintaining and promoting the ICT profession

Responsibility for driving the agenda for the ICT profession might fall to a single oversight body, or be devolved across a number of key stakeholders.

- (a) For the first option, the profession may be governed at state level or by a professional body. The professional body could derive its authority either from its members, from the state (e.g. has its authority listed in the relevant statutory legislation), or through a hybrid of member and state conferred authority.
- (b) Alternatively, rather than a single organisational entity driving the agenda for the ICT Profession, the ICT Profession would evolve through the collaborative efforts of a multi-stakeholder partnership (MSP) including representative interests from industry, academia, professional organisations, and education and certification providers.

Question 1: Please give your opinion on the above:

[Click here to enter text.](#)

Defining minimum entry criteria for entering the profession, such as the content for the Foundational Body of Knowledge

A key part of the framework will be the need to define, develop and maintain content relevant to the ICT profession, for example, the Foundational Body of Knowledge, the e-CF and course content. There are a number of options for who should be responsible for developing this content or who should oversee this process.

- (a) On the one hand, a multi-stakeholder partnership (MSP) comprising industry, academia, professional bodies and training/certification providers could be responsible for managing these.
- (b) Alternatively, a central pan-European agency, with representation at national level could be established to take responsibility for maintaining these.
- (c) Another suggestion is that these components should be established as trademarks to use under an appropriate licence.

Question 2: Please give your opinion on the above:

[Click here to enter text.](#)

Mapping to relevant standards: the e-CF, the Foundational Body of Knowledge, Professional Profiles, Career Streams and professional grades

Central to the proposed framework will be the need for various stakeholders to map their offerings (including courses, job descriptions and competences) to the e-CF, the Foundational Body of Knowledge, Professional Profiles, Career Streams and professional grades. To make this work, many different stakeholders will need to carry out this mapping:

- (a) ICT practitioners would need to express their competences in e-CF terms;
- (b) Employers would map their job roles to these standards;
- (c) Educators and certification providers will map their courses and certifications to these standards;
- (d) Professional bodies and 3rd parties may be required to formally validate this mapping process;
- (e) Potential role of new or existing online support tools, such as the CEPIS Benchmark or eSkills Landscape;
- (f) Penalties may be applied for invalid mapping.

Question 3: Please give your opinion on the paragraph above:

[Click here to enter text.](#)

Evidence portfolios, CVs, labels, platforms, etc.

Currently, it is up to the employer whether they need to validate practitioner claims, whether presented in a CV format or in existing online platforms. For the promotion of ICT Professionalism, it might be useful to have a centralised database with externally validated practitioner claims. However, there are many different ways of doing this, and aspects of a professional's career to concentrate on.

- (a) Employer validates practitioner claims through reference checks, verification of qualifications, etc.;
- (b) Practitioner provides externally certified verification of claims of expertise, etc.;
- (c) Central register of ICT skills, qualifications, etc.;
- (d) Maintenance and management of central database.

Question 4: Please give your opinion on the paragraph above:

[Click here to enter text.](#)

Ethics

Ethics are a key consideration in the development of an ICT Profession.

- (a) It might be possible to develop a common ethics code to unite all EU ICT Professionals and ensure a set of shared values.
- (b) Alternatively, a meta-framework of ethical issues could be developed and made available to allow professional bodies to align their codes of ethics/conduct to it, if desired.

Question 5: Please give your opinion on the paragraph above:

Click here to enter text.

Thank you for taking the time to give us your feedback.

Please return the completed document to IVI (ivi@nuim.ie)