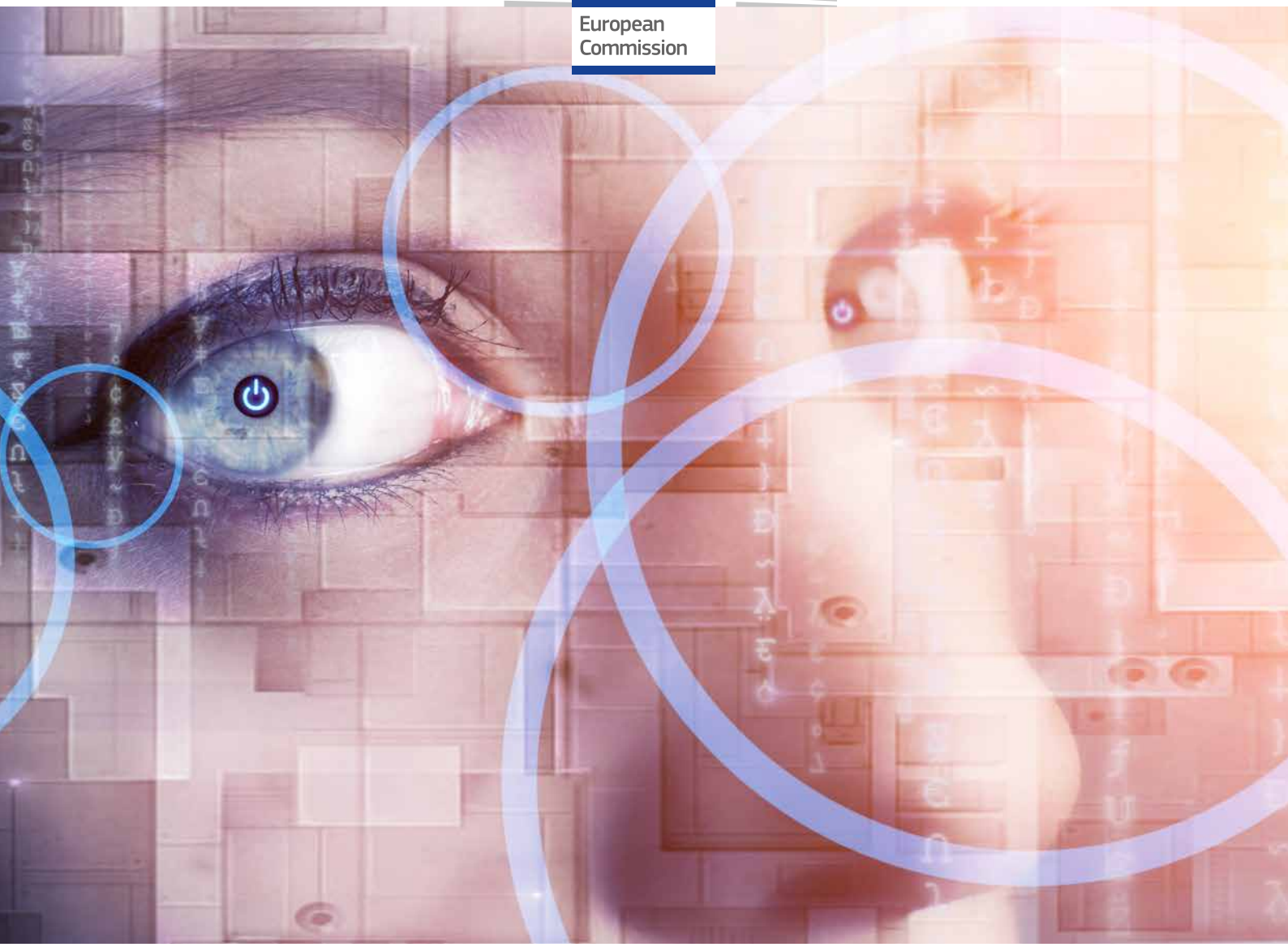
European Commission



Strengthening IT Professionalism in Europe

A European framework for IT professionalism to support and further mature the IT profession, and increase Europe's digital talent pool

Digital Agenda for Europe

Acknowledgements
The project would not have been possible without the generous participation of many experts. We are grateful for the support and contributions from the Steering Committee consisting of Mrs. Fiona Fanning (CEPIS, Council of European Professional Informatics Societies), Mr. Andrea Parola (European e-Skills Association), Mr. Adam Thilthorpe and Mr. Jeremy Barlow (BCS, The Chartered Institute for IT), Mr. Frédéric Lau (CIGREF) and Mr. Frits Bussemaker (CIONET), Mr. Juan Pablo Peñarrubia (CCII -The Spanish Chartered Informatics Engineering organisation), Mr. Eduardo Vendrell (Universitat Politecnica de Valencia). We would specifically like to acknowledge the valuable insights and contribution provided by an expert panel composed of José García Fanjul (Colegio Oficial de Ingenieros en Informática del Principado de Asturias), Fernando Suárez (Colegio Profesional de Ingeniería Informática de Galicia), Rocco Defina (Fondazione Politecnico di Milano), Prof. Marco Ferretti (CINI), Declan Brady (Ethics Chair, CEPIS), Mary Cleary and Caitriona Whelan (ICS Skills). We are also very grateful to the many professionals and stakeholders who took the time to share their views on the IT Professionalism Framework with us through interviews, workshops and other meetings.

Imprint
This brochure has been prepared by Capgemini Consulting, EY and IDC on behalf of the European Commission, Directorate General for Internal Market, Industry, Entrepreneurship and SMEs. It is a publication of the service contract 'Development and implementation of a European framework for IT professionalism', which ran from September 2015 – January 2017. Please also see www.ictprofessionalism.eu.

Editors
Dinand Tinholt, Niels van der Linden, Co Siebes (Capgemini Consulting), Francesca Bonazzoli, Marta Dimauro (EY), Gabriella Cattaneo and Marianne Kolding (IDC).

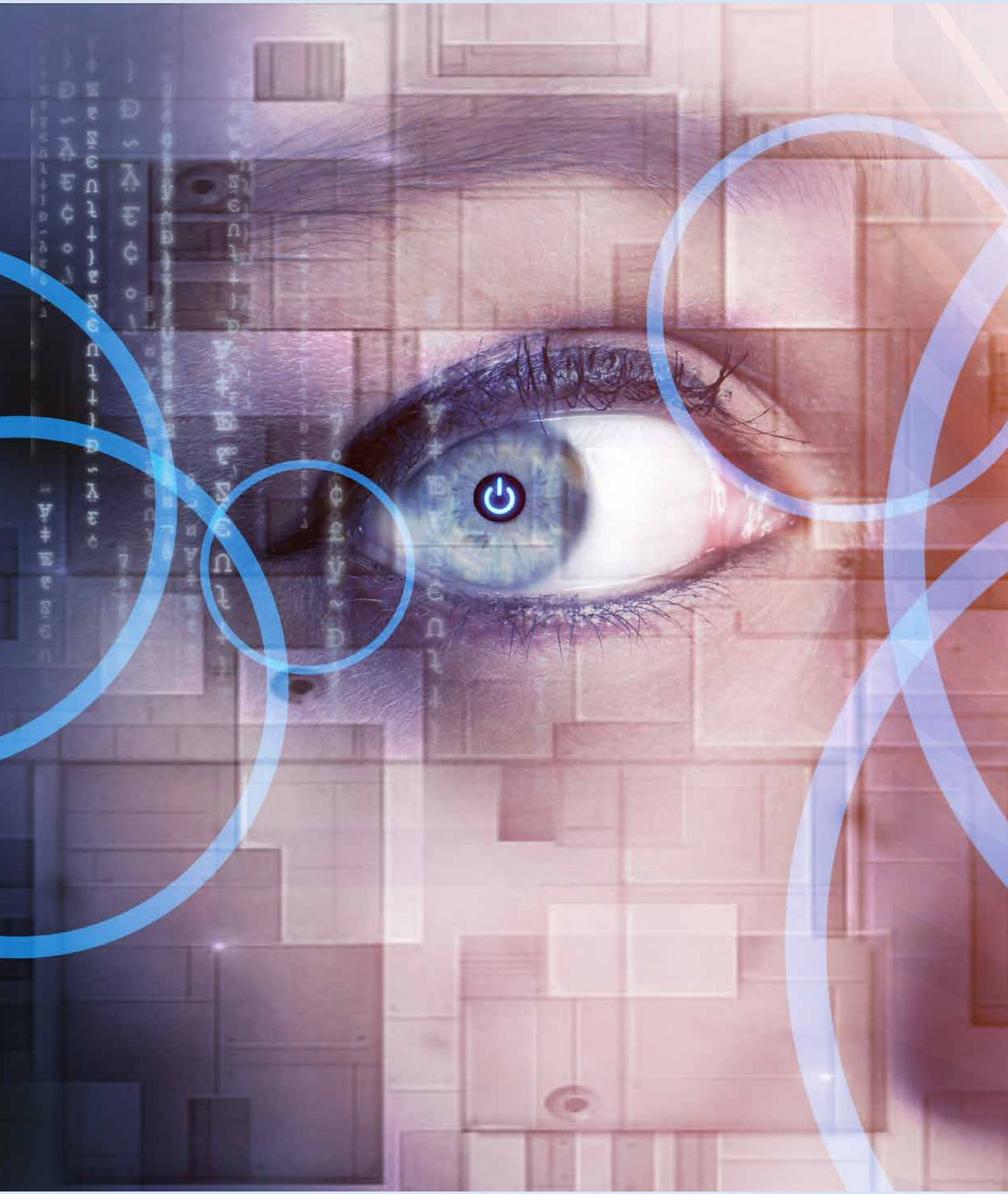
Capgemini Consulting

IDC Analyze the Future

EY Building a better working world

Strengthening IT Professionalism in Europe

A European framework for IT professionalism to support and further mature the IT profession, and increase Europe's digital talent pool



Foreword

For the first time a comprehensive proposal for a European framework for IT professionalism has been developed! It is a major milestone that contributes to our ambition to strengthen IT professionalism and increase Europe's digital talent pool.

Countries all over the world are stepping up their efforts to increase the number of IT professionals. We knew about this global race for IT talent already several years ago. Hence our 2007 Communication on "e-Skills for the 21st Century" which gave the initial impetus at EU level for the promotion of IT professionalism. Since then we have regularly monitored supply and demand, designed pan- European curriculum guidelines, and regularly benchmarked Member State policies. The e-competence framework is a European standard and the "e-Skills for Jobs" campaigns mobilised 450 stakeholders across Europe who were involved in 5.500 events that brought together over 3.4 million participants.

Good progress has been made and these activities have contributed to reducing to half the estimated IT professionals' gap, from almost 1 million to around 500,000 by 2020. Building on this momentum is a must.

At the end of 2016, stakeholders adopted the "Bratislava Declaration: Digital Skills Making the Difference", and a network of organisations committed to furthering IT professionalism was established. In December 2016, the Commission launched a "Digital Skills and Jobs Coalition", and the "e-Skills Manifesto" was released.

Professions have traditionally emerged when failure to successfully apply domain-specific knowledge had an adverse impact on society such as in medicine. Today, look at the impact of cyber-risks and IT project failures with one in six projects experiencing a cost overrun of over 200%. IT professions clearly have to mature further. IT education and training need to be adapted to meet industry's growing demand for digital skills and highly-skilled IT professionals.

This must be seen in the light of the bigger picture of the creation of a Digital Single Market in Europe. The Digital Single Market has the potential to contribute 415 billion euros per year to our economy and create 3.8 million jobs. The success of the Digital Single Market depends on our capability to address the digital skills gaps. If we fail to take steps to mature the IT profession, Europe may lose out in the global race for IT talent – the call for action is clear.

Slawomir Tokarski
Director
Innovation and Advanced Manufacturing
DG Internal Market, Industry,
Entrepreneurship and SMEs
European Commission

A call for action in support of the IT profession in Europe

"To accommodate a sound and responsible increase of digitisation of our society there is a clear need to further mature the profession that is responsible for that digitisation"

The extent to which IT is embedded in our lives is inevitably growing. The physical and digital world are blurring, imposing challenges on us as regards personal privacy, data security and even our personal relationships. If we fail to take steps to mature the IT profession, it is likely that the risks to society from IT will grow to unacceptable levels.

The IT profession is relatively young and maturing the profession will undoubtedly take time, but the time for engagement and action is now. Obtaining the status of a profession requires professional bodies to set suitable standards of knowledge and codes of conduct.

Standardising is a means to further mature a profession. This is the direction that the European Commission and key stakeholders are following: the European e-Competence Framework (e-CF) evolved in April 2016 into a European Standard (EN 16234-1). The ambition is to do more. A European framework for IT professionalism – as described in this brochure – would provide a standard that includes not only IT competences, but also other essentials for any IT professional: foundational body of knowledge, education and training qualification and certification, and finally ethics and code of conduct.

The current state of play of the IT profession shows a disparity in the level of maturity of the four building blocks and, more in general, reflects the insufficient integration between them. Many initiatives have been launched so far in various part of the world to promote IT professionalism, but most of them were still very fragmented and did not address the overall framework. Thus, a systemic approach is clearly required to tackle main challenging and pressing issues concerning the IT profession.

As our work has demonstrated, managing the four building blocks in an integrated and complementary way is the key success factor for developing a European Framework as a point of reference for all beneficiaries dealing with IT professionalism in Europe. It will serve students and IT professionals while orienting and planning their education and career as well as support education and training providers, professional associations, industry, government and public sector, in creating the right conditions to mature and promote greater IT professionalism, and ultimately increase Europe's digital talent pool and competitiveness.

Francesca Bonazzoli (EY), Niels van der Linden (Project lead, Capgemini Consulting), Marianne Kolding (IDC)

EY Building a better working world

Capgemini Consulting

IDC Analyze the Future

Key indicators on IT professionals in Europe

For the last ten years, activities relating to the EU e-skills strategy have used as indicators of progress the balance of demand and supply of IT professionals based, amongst other input, on the availability of official statistics of occupations from Eurostat – currently following the ISCO-08 classification. However, the project at hand is focusing on a narrower set of occupations, namely what we have identified as the core group of the IT professions[1]. Consequently, the key indicators included below are a subset of the broad Eurostat/OECD definitions and presents a view of the IT professional skills demand and supply picture, which is aligned with our proposal to create A European framework for IT professionalism.

The demand for IT professionals will continue to increase in the EU over the next several years, from over 5.6 million in 2015 to almost 6.3 million in 2020. This represents a compound annual growth rate of 2% over the period. However, as it has been seen in previous forecasts, growth in supply of IT skills still lags behind demand growth leading to the supply-demand gap increasing from 181,000 in 2015 (or 3.2%) to 220,000 in 2020 (or 3.5%) as shown in Figure 1.

Compared to previous estimates that looked at the broader IT profession, the gap is narrower. There are a couple of key reasons for this. One key influencer is the adoption of new technologies. First of all, we have long seen an increasing adoption of cloud delivery models and this continues at pace. Currently, the effect of this has very much been seen in efficiencies in services deliveries in IT infrastructure environments (think Amazon Web Services as an example – but also through adoption of private cloud delivery technologies). Over the forecast period, we will also increasingly see this efficiency effect in application environments, including faster application development. These technological

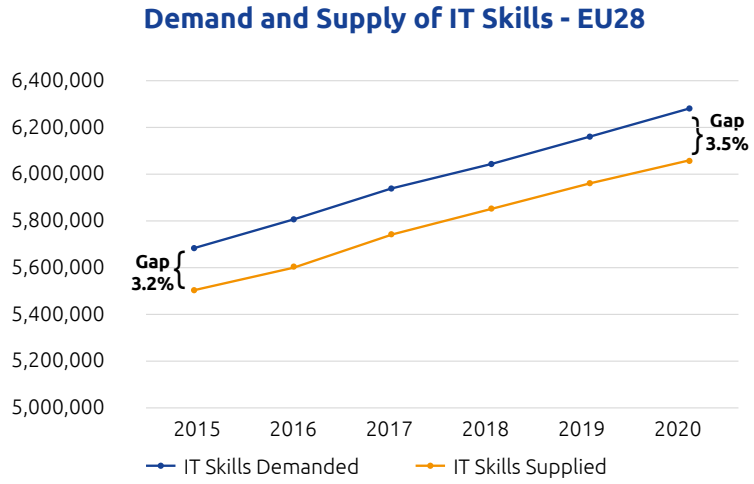


Figure 1. Demand and Supply of IT Professionals – EU 28 *Source: IDC and empirica, November 2016*

1 The core definition consists of the following ISCO-08 codes:1330: ICT service managers; 2511 Systems analysts; 2512 Software developers; 2513 Web and multimedia developers; 2514 Application programmers; 2519 Software and multimedia developers and analysts not elsewhere classified; 2521 Database designers and administrators; 2522 Systems administrators; 2523 Computer network professionals; 2529 Database and network professionals not elsewhere classified; ICT operations technicians; 3512 ICT user support technicians; 3513 Computer network and systems technicians; 3514 Web technicians.

changes and offshoring have a dampening effect on demand. At the same time, we are seeing strong growth in adoption rates of automation technologies – including cognitive systems – that will drive productivity up in e.g. IT support functions (think self-service technologies with cognitive, machine learning and artificial technology capabilities that can adapt and learn for each specific IT environment – or can be the first front end support level, such as IPSoft Amelia).

Nevertheless, despite these demand dampening technology trends, the massive penetration of technology in all aspects of business and personal lives means that demand will still continue to grow. And as we have seen over the last couple of decades: supply still has a hard time at keeping up due to many well-known hurdles: attracting students (especially girls) into the right education programs – and quickly enough to keep up with demand – and even finding ways of also attracting STEM (science, technology, engineering and mathematics) and other graduates to the IT profession since a strong IT academic background is not always necessarily needed.

IT professionals in France, Germany and the UK

While the demand and supply balance looks relatively stable across the EU over 2015-2020, looking at the situation on a country level reveals very different patterns. Figure 2 shows the gap in France, Germany and the UK in 2015 and 2020.

The gap will grow strongly over the forecast period in **France**, driven by strong pent-up demand for technology refresh and application of new digital technologies to address business improvement issues. French organisations have been quite reluctant to embrace the use of outsourcing and especially offshoring to resource IT activities and operations. However, this is changing – and the Indian offshore companies (such as Tata Consultancy Services and Infosys) are now more often than not asked to bid in request for proposal situations in large French organisations. In addition, Atos and Capgemini (the largest French-based IT services providers) are also building out their offshore capabilities to service their customers – including their domestic market. These changing approaches to sourcing IT delivery are mostly

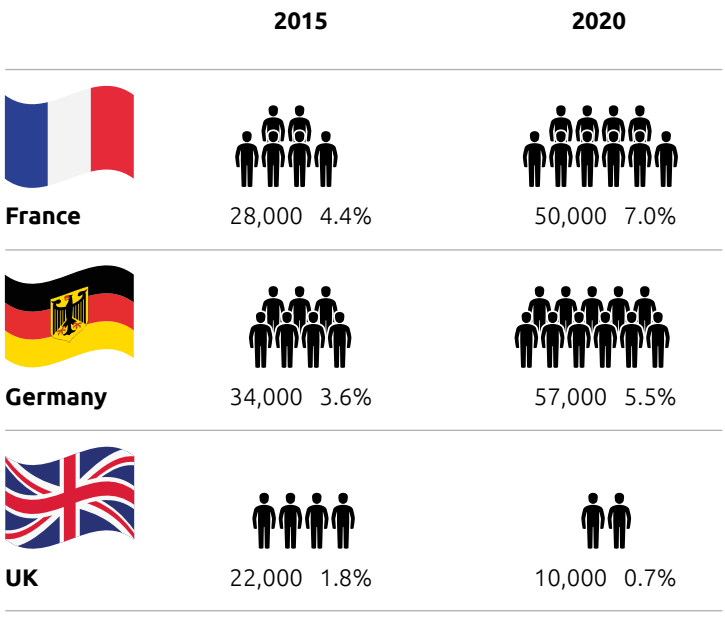


Figure 2. IT Professionals Gap in France, Germany and the UK *Source: IDC and empirica, November 2016*

adopted by large organisations. But demand for IT professionals will not only come from the large companies. As stated during one of the stakeholder interviews for this study:

Consequently, we estimate that the gap in France will increase from 4.4% in 2015 to 7% in 2020.

> *"…..the digital economy is going to get more and more important, that digital processes will involve all industries and all business dimensions and all industries: professionals, SMEs, and large enterprises into all industries. Businesses will have to digitalize their processes, otherwise they will not survive."*
> *(Francis Behr, Consultant, Syntech Numerique)*

The more stable environment in **Germany** – both in terms of the economy and in terms of IT investments – has resulted in Germany facing a higher gap over the last few years than many other European countries. With a stronger focus towards adoption of digital technologies to grow top line revenues, this is set to continue over the forecast period. Similar to France, German organisations have been more reluctant to embrace outsourcing and offshoring than the UK – but this is changing faster than in France, even if it is still not reaching deep into the all-important Mittelstand.

Digital transformation is a dominant trend in Germany, and there is high recognition at policy level by associations about the relevance of this trend. In some branches this trend is very fast; it is the case of automotive, financial services, industry machines, IoT (which accelerate a lot this trend). In Germany the digital transformation is affecting SMEs as well as large enterprises.

As a result, we estimate that the gap in Germany will increase from 3.6% in 2015 to 5.5% in 2020.

We have previously expected skills gaps in the **UK** to be very high. However, there is now a cloud of uncertainty hanging over the UK: the impact of Brexit on the economy, on business and hence also on demand for IT skills. While there has so far been a relatively mild effect on the UK economy in 2016, it is expected that IT investment levels dampen in 2017 and further into 2018-2020 as the impact of the UK leaving the EU becomes clearer and a reality. In addition, the UK has traditionally been an early adopter of new technologies and this will also be the case for cognitive and artificial intelligence technologies. In addition, cloud adoption is strong (both private and public) as is the use of offshoring and outsourcing and this will all combine to keep demand at around a 2% compound annual growth rate. However, the main reason for the gap to narrow in the UK is that the supply of IT skills will keep up with demand development. There has been a strong focus on attracting people into the IT profession over many years (e-Skills UK followed by the Tech Partnership) and new initiatives focused on supporting apprenticeships across UK businesses, include IT apprenticeships.

The effect of these developments is that we estimate the gap in the UK to decline from 1.8% in 2015 to 0.7% in 2020. However, it is worth mentioning that this decline is for the total IT workforce. There is still a potential for a skills mismatch in the sense that some specific technology skills are in high demand and in short supply, such as IT security, IT architecture, mobile application development and data analytics to name a few.

Key indicators on IT professionals in Canada, USA and Japan

In line with narrower definition applied to the EU key indicators, we have also made an assessment the demand and supply of IT professionals in Canada, the US and Japan. The resulting skills gaps are shown in Figure 3 below.

Meenakshi Gupta, Senior Director, Policy and Research for Information and Communications Technology Council (ICTC): *"In Canada, job growth in IT outpaced the overall economy by over 4 to 1 in recent years, and among the fastest growing IT careers are app developers, data analysts, and cyber security experts. The digital trend is impacting SMEs as well and about 30% of SMEs have adopted these technologies, and more work remains to be done."*

As is seen in Europe, IT spending for Canadian organisations is driven by the digital transformation wave underpinned by technologies, such as cloud, mobility, Big Data and social – not to mention security and IoT. And digital is also in Canada a board room topic. All of this drives demand for strong specific technology skills – but also for people that can bridge between technology and business.

Canada faces a skills gap that is not only about the lack of absolute numbers of IT skills but also about having access to the right skills. The gap is expected to stay significant over the forecast period narrowing only from 7% in 2015 to 6.8% by 2020.

While Japan is currently not seeing a large gap in skills, this is about to change over the forecast period, driven in particular by the lack of new supply into the IT profession. Statistics on enrolment in higher edu-

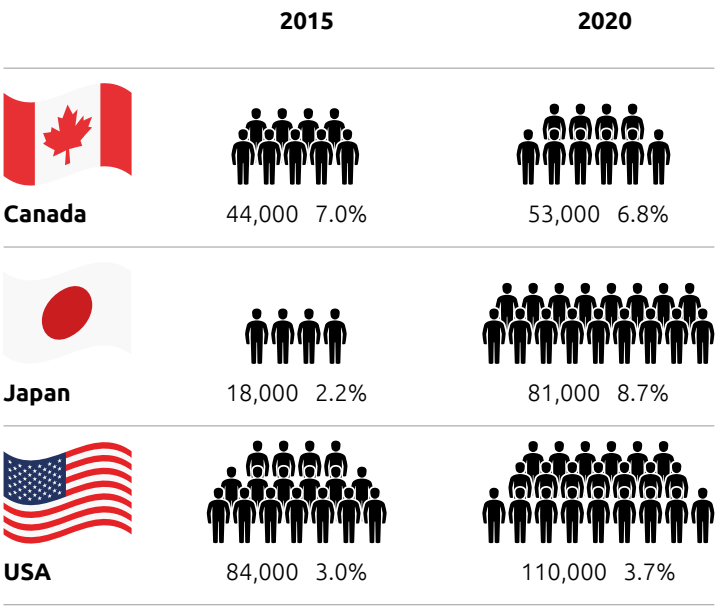


Figure 3. IT Professionals Gap in Canada, Japan and the USA, 2015 and 2020 *Source: IDC, November 2016*

cation in Japan shows that the number of new students has been declining between 2010 and 2012
(-1% from 2010-11 and by -1.9% from 2011-12). Consequently, there is a strong focus on promoting the IT profession in Japan by the Ministry of Economy, Trade and Industry (METI) and the Ministry of Internal Affairs and Communications, led by IPA taking action in collaboration with the IT sector and IT user companies. Part of what is needed is to improve the profile and attractiveness of IT. this can be difficult if IT is not seen as providing interesting job prospects and the IT department is not recognised as a valuable and highly strategic part business. Consequently, the skills gap in Japan is estimated to grow from 2.2% in 2015 to 8.7% in 2020.

The US economy continues to improve overall but in a fairly volatile manner. The past seven years have caused organizations to keep a strong cost and efficiency focus in any investment plans, including IT budgets. However, changing customer demands and a need to start seeing growth on the revenue line, means that organizations are looking for ways to free up funds for transformation - and new digital technologies play a crucial role in this. The availability of IT professionals experienced in these new technologies is crucial and sought after.

Many of these developments are still only taking shape – and so are the skills needed to take full advantage of the technologies. In the words of Dr John Keppler from the IEEE Computer Society: *"It is important to keep in mind that these new IT technologies are still evolving and far from being mature. More and more new skills will evolve and develop as Big Data, Cloud Computing, Mobile, Social Media and IoT evolve and develop."*

US organisations are strong users of offshoring and outsourcing but also early adopters of new technologies. The US is in an interesting position in that the country dominates in terms of IT innovation overall. It furthermore has a tradition for supporting new innovative start-ups through venture capital funding, which means that from a perspective of positioning IT as a career, it is probably further ahead than many. However, not all IT professionals will become millionaire entrepreneurs – many still have to take on the more mundane tasks internally in IT departments. So also in the US is there a need for promoting the career.

It is estimated that the skills gap in the USA will increase from 3% in 2015 to 3.7% in 2020 as demand growth outstrips growth in supply.

Dr Keppler, Senior Manager, Certifications & Professional Education, IEEE Computer Society:
"We need to be more proactive in communicating to young candidates about the importance of IT and describing the potential IT careers available to them as early as possible, highlighting that these careers are good prospects for entrepreneurship and offer high wages."

Introducing the European Framework for IT Professionalism

A joined-up strategy to tackle the skills gap

It is estimated that growth in supply of core IT professionals will remain to lag behind demand growth resulting in a supply-demand gap of 220,000 in 2020. Closing this gap has been the main priority of the EU e-skills strategy. Various initiatives at national level and multi-stakeholder coalitions (Grand Coalition for Digital Jobs) have contributed over the years to increasing the supply and reducing the estimated gap.

Delivering on its strategy to create a Digital Single Market, the European Commission unveiled its industry-related package with plans to help European industry, SMEs, researchers and public authorities make the most of new technologies. An important element of this package is **the New Skills Agenda** for Europe announced in June 2016 that will help to give people the skills needed for jobs in the digital age. Digital technologies are a major engine for growth, fuelled by the ideas of **highly skilled IT professionals** and business leaders. The European Commission launched a new Digital Skills and Jobs Coalition in December 2016 and will support Member States in their efforts to promote digital skills and qualifications and raise Europe's level of IT professionalism. The adoption of a European framework for IT professionalism will help achieve this goal.

Mary Cleary, Chair of the CEN Workshop on ICT Skills and Deputy CEO of the Irish Computer Society / ICS Foundation:

'The CEN Workshop on ICT Skills aims to promote excellence in the IT sector and strengthen the IT Profession through the creation of relevant supporting pre-standards that can be applied throughout Europe and around the world. The IT Professionalism framework is a major milestone in further maturing the IT profession and securing the digital economy and society we live in.'

Defining IT Professionalism

In their famous book "Social Issues in Computing" published in 1973, Calvin Carl Gotlieb and Allan Borodin tackled the idea of "professionalization and responsibility," whereby they addressed IT education, professional development, ethics, etc. Their work paved the way for maturing the IT Profession.

Since 1973, significant developments have taken place in the IT sector regarding professionalism, in Europe and outside of it. Many stakeholders and governments have invested time and resources to mature the IT profession at both national and international level. This led to defining the characteristics of an IT professional and the outline of A European framework for IT professionalism by the Innovation Value Institute (IVI) and the Council of European Professional Informatics Societies (CEPIS) in 2012. The framework is constructed on four building blocks: competences, knowledge, education and training and certification, and ethics.

The current project has further developed and refined this framework and has also started implementation in a few countries and through cross-EU actions. It is a reference model, intended to both systematise and synthesise the corpus of IT professionalism concepts developed and the lessons learned. It aims to evolve dynamically with a surrounding supportive eco-system.

The four building blocks of IT professionalism and available tools

There are four building blocks and each of them includes standards or instruments to

support further development of the IT professional as well as the IT profession itself. *See Figure 4.*

Here is a short overview of the most relevant tools for each of the four building blocks.

1. **Competences:** the **European e-Competence Framework** (e-CF) is a European standard (2016) that offers a reference of 40 IT competences, using a common language for competences, skills, knowledge and proficiency levels to a growing community of users in Europe and worldwide. It can be used to facilitate decision-making concerning the selection, qualification and recruitment of candidates, as well as the professional development of IT professionals. It contributes to a competent professional IT workforce. Adoption of the e-CF by employers, education providers and other important stakeholders will increase the transparency, mobility and efficiency of IT professionals.
2. **Knowledge:** a first **Pan-European Foundational IT Body of Knowledge** (fBOK) was developed in 2014 and references the base-level knowledge required from IT professionals. It provides a uniform language for IT knowledge areas and constitutes a 'go-to' reference for IT in Europe and the fundamental basis to set standards, qualifications and certifications. It also refers to specific bodies of knowledge in the areas of expertise for specialisation. It is useful for education providers as inspiration for curriculum design and development, for professional associations to promote to their members as the basis for certifications and for HR departments to use to improve the recruitment and people development processes.
3. **Education and training:** in a knowledge-based digital economy, aiming to compete globally across various sectors, **lifelong learning** is a key factor to attain stable and sustainable growth in Europe. Qualifications, certifications, non-formal learning and informal learning are mutually supportive components for the development of an IT professional's career,

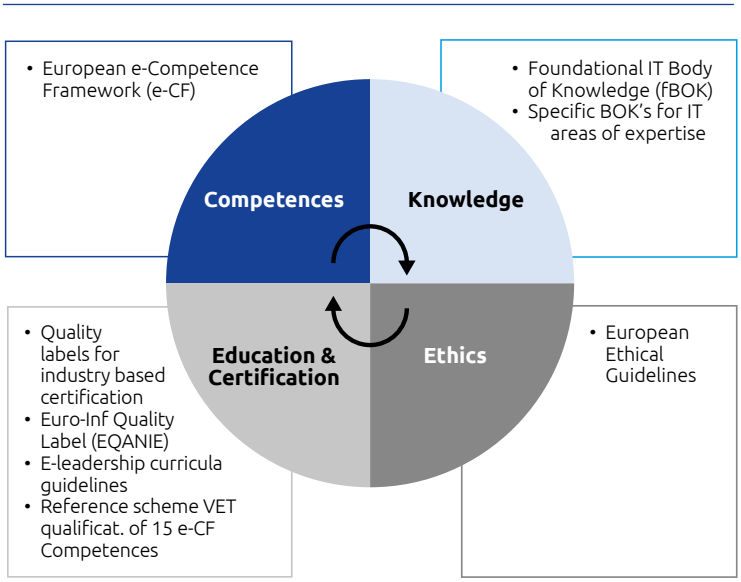


Figure 4. The building blocks of the IT Professionalism framework and included instruments

since they attest to an individual's competences and skills. This is particularly important for the maturing of the IT profession. Several initiatives have been carried out throughout EU, to recognise and validate IT professional career development based on formal education and training, certification by industry, non-formal and informal learning, based on the European Qualifications Framework (EQF), the European Credit System for Vocational Education and Training (ECVET) and the European Quality Assurance in Vocational Education and Training (EQAVET). To mention three important initiatives:

- The **Euro-Inf Quality Label (EQANIE)** is awarded to degree programmes at Bachelor's and Master's level that comply with the Euro-Inf Framework Standards and Accreditation Criteria. The objectives of the Euro-Inf Quality Label are to enhance quality and transparency of educational programmes in informatics, to provide information on study programmes across Europe through an appropriate label for accredited educational programmes in informatics, to facilitate mutual transnational recognition of qualifications and to increase mobility of students.

- **Quality labels for IT industry-based certification** can be assigned to IT training and certification programmes – either for the programme or for the delivery of the programme. They are mapped against the e-CF and included in the list of IT certificates. The mapping against the e-CF makes the label clearer for IT professionals, consultants, training providers, certification bodies, and employment and recruitment agencies. In particular, quality labels are expected to bring transparency to the IT industry-based certification market, and to ensure a higher quality of delivery.
- The **e-CF Alliance** is developing a common reference scheme for vocational qualifications and certification, compliant with the e-CF and the ESCO IT occupations, ensuring transparency and comparability. It is implementing about 15 competences from the e-CF into learning units; design and implement a joint vocational qualification based on ESCO IT occupations by pilot blended/ local/ transnational joint training actions and develop ESCO/e-CF-based competence certifications.

4. **Ethics:** ethical behaviour is a very important element of IT professionalism. It regulates the boundaries of relationships with customers, colleagues and society. We reached an agreed approach amongst stakeholders to finalise a first version of **European Ethical Guidelines for IT professionals**. It addresses the numerous and complex ethical issues related to IT professionals in a multi-stakeholder and international context, providing guidelines to be implemented by organisations. The need for a set of guidelines stems from the plethora of possible applications of IT and from the potential risk of harming society. It helps to promote IT responsibility and to raise the awareness of IT professionals' obligations towards society. It fills the gap between ethics taught at university and the ethical issues faced in the workplace.

The European framework for IT professionalism is designed to be more than the sum of its parts. The main strength of the proposed framework is the combination of stable components with a high degree of flexibility allowing adaptation to rapid IT changes and emerging market requirements. This project showcases examples of how these building blocks establish synergies for both the IT professionals and the many users that exist in education, government, professional associations, certification providers and employers. At the same time, other issues could be considered in addition to the four building blocks. These could be the intersection of IT with other fields (health, legal, security, etc.), with personal sphere (privacy, fundamental rights, etc.), with the "new digital economy" etc. Further development will hence need to follow an iterative approach.

The Framework is user-centric and offers value in each stage of the IT professional's career path. It is intended as a comprehensive guide to orient and support IT professionals throughout the professional life cycle, from graduation to senior roles in industry. Therefore, the integrated components of the framework (Competences, Body of Knowledge, Education and Ethics) should not be considered in isolation but in synergy with each other and interacting with the surrounding and continuously evolving IT-ecology.

Andrea Parola, General Manager, European e-Skills Association:
"The engagement from so many experts in Europe illustrates the importance of the IT Professionalism framework and the commitment to put ambition into action. This will offer solid grounds for continuing developments that will contribute to further maturing the IT profession."

Benefits for IT professionals: pride and better job and career opportunities

Europe is strongly depending on sufficient skills to further boost the digital economy. It is clear that demand will outstrip the supply of IT skills that can help organisations design, build, implement and manage new digital technologies. The A European framework for IT professionalism contributes to closing this gap as well as to further maturing the IT profession. It is the IT professional who will benefit from this. The framework offers standards and tools that support continuous development of IT knowledge, skills and competences.

The framework is intended as a guide to orient and support IT professionals throughout their professional life cycle, from early school years to career development and progress. We analysed various use cases to determine value-add of the framework: from people preparing to enter the IT profession, to people that actually started a career in IT, to those further developing their career or some that will change their career – either within IT or from outside this profession. There are evident values for IT professionals that this framework contributes to:

- **International recognition of IT skills, competences and knowledge, which enhances both credibility as well as mobility opportunities of professionals.** The e-CF is a standard for e-competences used across (and even outside of) Europe. The Foundational IT Body of Knowledge has not yet obtained that status. Both however contribute to providing a common, universal 'language' when talking about IT professionals. It presents references for certifications and thus allows professionals to 'proof' their professionalism. Job matching tools based on this reference framework will also make it easier for professionals to match on vacancies in other countries.

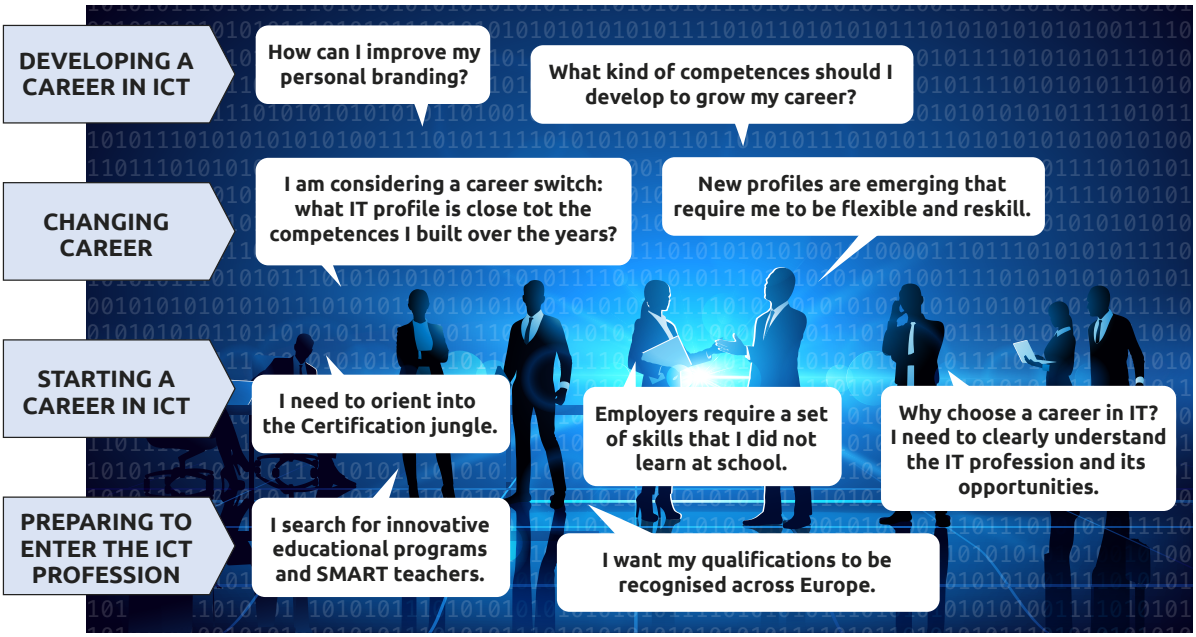


Figure 5. Responding to different needs of (potential) IT professionals

- **Improved clarity over IT education and career paths as well as competence requirements.** The framework offers the opportunity to professionals to shape a path in various stages of a career, either through advancing to a next proficiency level within an area of expertise or by switching to another closely related area of expertise.
- **Improved image and public perception of IT jobs and IT professionals.** Suitable standards of competences and knowledge and behaviour, as defined by professional bodies, will lead to higher levels of professionalism, and consequently to improved perception about the profession in general.
- **Improved understanding of IT for IT-using professionals.** Besides mere digital user skills, the e-competences and knowledge areas also apply in jobs that are not core-IT, but do involve a significant IT element. It can serve as reference to identify sectoral-specific IT-competences and skills.

Finally, these values strengthen the pride IT professionals take in their jobs. They can further organise themselves, either in generic associations and/or in specialist associations around an area of expertise. This can consequently trigger also other people's interest and possibly attract them to a career in IT.

Roberto Bellini, Vice-President, Italian Association for Informatics and Automatic Calculation (AICA):
'IT professionals will benefit from this IT Professionalism Framework as it enhances their credibility, mobility, career clarity and public image – but above all it recognises and values them as professionals. It offers proud. It will bring trust.'

Benefits for employers: better quality and greater IT performance

Any organisation would want its IT staff to be highly confident and performant in their practice, and to be recognised and accepted as being real IT professionals. The European framework for IT professionalism helps employers all over Europe in providing a common language for IT professionals' development, while facilitating the geographical and professional mobility of employees and offering them guidance and tools to develop their careers. The benefits to organisations (and society!) include IT professionals having an adequate level of knowledge, providing a higher level of products and services, and abiding by the highest professional standards and codes of ethics[2].

Employers have a key mission in the IT labour market being responsible for the recruiting process and the upskilling/reskilling of IT professionals while paying attention to the dynamics of the market as a whole. The framework offers clear values for employers:

- **Reduced effort and time to recruit, deploy, train and develop suitable IT resources, as well as improved capability to align IT resources with business requirements.** When using the same reference framework, employers who hire IT resources and those who provide those resources can match more efficiently, and hence reduce time and costs involved. The framework enables employers to build IT job profiles and curricula in a consistent way, and to develop transparent career paths. This could also improve retention. Using the framework could provide insight into the extent that employees' competences support the business and strategic goals of the organisation. At the same time this will also facilitate the employer to develop training paths for its employees in line with that strategy, and ensure the training budget is spent effectively.
- **Highly competent IT workforce, reflecting industry demand.** The quality of the IT workforce will go up. Use of pan-European standards will lead to IT professionals that master an adequate level of knowledge, providing a higher level of products and services, and demonstrate professional, ethical, behaviour. The framework and its components are the result of a multi-stakeholder process and are reflecting today's IT business needs.
- **It will also contribute to efficient collaboration between IT and HR departments.** They can have different interests and needs, but they have to share a common language in terms of competences, knowledge and professional development to effectively recruit, select and manage IT workforce.

Frits Bussemaker, secretary general international relations CIONET (the biggest community of IT executives worldwide):
'The IT Professionalism Framework provides the neutral basis for a common understanding of an individual's skills by the stakeholders – policy makers, vendors, end-users, academics, and the IT professionals – to help promote, produce and professionalise Information Technology across Europe.'

2 Ridge, J., Australian Computer Society, Available online here: http://press.anu.edu.au/apps/bookworm/view/Professionalism+in+the+Information+and+Communication+Technology+Industry/10791/ch02.xhtml

- **Potential to facilitate cooperation with IT services companies and third parties through consistent, agreed definitions of roles and competences.** A common language will contribute to better understanding of employees and external resources involved in IT services activities, for instance for service managers. In similar fashion it can serve so-called 'stacked' products or services that involve various sub-contractors in various stages of the product cycle, or in for instance public-private partnerships. It will also make it easier to understand in the internal organisation how results were achieved and to transfer work to replacing resources.

The framework offers a common language in defining competences, knowledge, skills and behaviour that can be used across borders. It will improve professional development of employees – and thus their productivity – as well as open opportunities to reduce costs in recruitment, training and deployment.

Benefits for education providers: preparing students for the future

Education and shared knowledge is the foundation of a profession. Continuous IT education and training – a life-long learning commitment – is crucial for every IT professional. Education is important throughout one's career: when preparing for a first job, when growing as a professional and when orienting on a next career move. The European framework for IT professionalism allows education providers to prepare students for a prosperous career by ensuring their curricula are in line with requirements as defined by the broader IT community. The benefits for education providers when using the framework are:

- **Increased market size opportunities resulting from improved transparency and comparability of IT educational offering**. Using a common language such as the e-CF and the fBOK, and other related standard references as the Euro-Inf quality label, to map educational offerings to, will make it easier for students to understand and compare these offerings. This can also enhance their mobility and therefore open up new opportunities for universities to attract new students. It will also increase insight into the quality of IT curricula and the extent to which they cover the knowledge areas that are important to gain a proper understanding of the breadth of IT. The latter will then allow to specialising in a specific area of IT expertise. Education providers can distinguish themselves on these specific areas while also covering the breadth of knowledge. Working according to European standards for e-competences will be perceived as criteria for quality.
- **Bridging the gap between IT education and training providers and employers' needs.** A better understanding of the market requirements gained through the use of the framework could facilitate the alignment between the demand and supply side thereby supporting graduates' placements. The reference framework contributes to consistent knowledge building and – during a career – competence development. It also covers soft skills that are of major importance for IT professionals. It is quite generic and therefore leaves flexibility in educational offerings to adapt to knowledge that is essential for new technologies or new jobs that are increasingly in demand. This will make it easier for employees to settle in their new job. On the other hand, increased standardisation of educational offerings will also make it easier for professionals to build competences during their career in a consistent and transparent way. This increases their employability and also makes the hiring process for employers more transparent and thus easier.
- **Increased alignment of IT education providers of all kind supports life-long learning requirements.** The adherence to a common framework increases standardisation of education,

Eduardo Vendrell, professor at the Universitat Politècnica de València:
'The IT Professionalism Framework increases transparency of education offerings and therefore helps students to make well-informed choices. It will also support Education providers on their innovation journey as it explains how competences can be integrated in programmes, the breadth of knowledge of IT and supports innovations - such as adaptability of education and post-academic certifications - by creating uniformity.'

at least as regards the generic parts of IT curricula. This will make it easier to align and build on various forms of learning in different stages of a career (primary/secondary school, university, vocational). It leads to sustainable careers as it empowers students/professionals to make informed decisions concerning their education. This will also benefit the education providers as it can reduce drop-outs and will increase results of motivated students. Regarding career developments: this framework would allow education providers to set up upskilling and reskilling programmes in close cooperation with the industry. As a consequence, the role of the education providers in enhancing students' employability would be strengthened and enable a better matching of demand and supply in the IT labour market.

- **Support in innovating curricula to keep up with new IT developments.** The fBOK consists of the base-level knowledge required by IT professionals, and it refers to specialist areas of knowledge for further specialisation (for instance into architecture or service management). These specific areas of expertise have curricula that allow professionals to grow into more senior positions (for instance various TOGAF certifications that apply in different stages of a career). The knowledge foundations that are responsible for these curricula and certifications (the Open Group in the case of TOGAF) are very up-to-date with developments in their area of expertise. As a consequence, trends and innovations in these areas of expertise will also feed into the framework updates and can thus benefit education providers.

Benefits for IT professional associations: higher recognition of the IT profession

Representative bodies for informatics professionals play an important role in developing, promoting and sustaining the IT profession. Standardising is a means to further mature a profession. **Obtaining the status of a profession requires professional bodies to set suitable standards of knowledge, competences and codes of conduct.** Professionalism is absolutely fundamental to the effective practice of IT.

The European Union is unique. Each Member States has a different background composed of historical, cultural, economic and societal roots. There are different approaches and a different mentality. However, each Member States can benefit from applying European standards as regards IT professionalism, and the road towards that goal should take into account those differences. In this respect, national stakeholders and IT professional associations can play an important role.

Adhering to pan-European standards has significant impact on user-organisations. There is work to be done if an organisation wants to adopt a competency framework: for the HR department in writing the career framework and training guidelines, for the IT department to possibly ask for IT knowledge and competencies in different wording than before, and for the IT professionals working for that organisation in developing their own IT profile and career. It requires structured organisational change. Again, IT professional associations can offer support to each of these stakeholders separately and by bringing them together in communities that encourage further take-up and smoother implementation of the framework. Such communities can share good practice as well as key challenges that need to be overcome. The ITPE network (www.itprofessionalismeurope.org) launched by CEPIS in November 2016 is an excellent example of this.

The value for IT professional associations lies within: the opportunity to mature the IT profession and boost membership, a stronger role in communicating and shaping emerging industry practice, the promotion of IT professionals' interests at various levels, and the development of educational offerings or tools that could support IT professionals or stakeholder groups.

Depending on future developments IT professional associations should have a pivotal role in case (voluntary) registering and licensing IT professionals would be considered by the IT industry and other stakeholders. This would concern how the profession is regulated and who is responsible for making sure that professionals are doing their jobs properly. In other professions that are license to practice, such as law or medicine, professional bodies set the standards and codes of conduct.

Finally, and in collaboration with governmental bodies, there is a clear need to promote the European framework for IT professionalism in the interest of the professionals it represents. This role could contribute to an enhanced visibility of supply and demand of IT skills, helping to provide a robust and granular basis for informed policy setting at local, national and European level.

Fiona Fanning, Secretary General, Council of European Professional Informatics Societies (CEPIS) and IT Professionalism Europe (ITPE):
'The IT Professionalism Framework is an important part of the solution to the issues facing the IT profession in Europe today. Not buying into this framework, can have a real cost for European companies and the European economy.'

Putting ambition into action: early adopters of the framework for IT professionalism

Begin with the end in mind. In the long-term, the European Commission aims for recognition of the Framework as a standard that is used by all European countries. Early adopters taking the first actions in that process of implementation will trigger others to follow, and eventually reach that long-term goal. This project, on the short-term, identified these early adopters, selected feasible actions in close collaboration with these adopters that commenced during the course of this project, and provided support during the initial steps. Commitment of these early adopters is necessary to continue and monitor the actions initiated after this project has ended.

The support for this Framework and further maturing the IT profession is overwhelming. It is also a prerequisite to any successful implementation and therefore leaves us confident that – also after the project ends – there will be continuation of the actions initiated under this project as well as follow up on other important ideas raised in the first phase of this project.

Rocco Defina, Project Director and e-CF senior expert, Fondazione Politecnico di Milano and ERASMUS+ project e-CF Alliance that is working on a common reference scheme for IT vocational qualifications and certifications (VET):

"We strongly believe that a new era of cooperation between the different players in the IT sector is needed. Especially when leading EU funded projects it is crucial to assure the effort to build on the existing, in order to maximize the results of the activities."

The ambition for this project was to have at least a clear view on possible interested countries and a long list of solutions, and starting the implementation in three countries. However, besides having started in three countries, a few more very relevant initiatives were taken on at European level – for instance with the great support of CEPIS and the BCS, The Chartered Institute for IT. And there was more than we could handle within the scope of this project. This is very encouraging and positive signal for the second phase of the project. But more: **it is a great step towards establishing an IT profession that is mature, transparent, and trustworthy.**

Maturing the framework for IT professionalism and the profession go hand in hand. This project provides a long-list of possible implementation actions that are all contributing to two sub-goals:

- The building blocks of the framework should be further developed and reach a level that allows them to be recognised as standards – similar to the path of the e-CF;
- The framework itself should be adopted by (professional organisations in) countries in Europe, and used in practice.

This brochure captures the essence of the initiatives that have been initiated under this project, both within Spain, Italy and Ireland as well as with CEPIS, the BCS and ASL-BiSL.

Launch of Ethical Guidelines

Ethics is one of the four core components of the European framework for IT professionalism. While within the other building blocks, models or instruments already exist – such as the e-Competence Framework – there is no common guideline on ethics in Europe.

With huge support by the CEPIS' Taskforce on Ethics, and with the aim to support the further development of the European framework for IT professionalism, a first version of European Ethical Guidelines as well as concrete recommendations on the adoption and the use of the guidelines in practice are now released.

These guidelines set out basic principles which are expected from Statements of Professional Ethics for the IT Profession in Europe. They are intended to be applied to both the direct actions of the professional and to the indirect actions i.e. the automated actions of the technologies implemented by the professional.

Observance to a Statement of Professional Ethics that is compliant with these principles confers an obligation to satisfy these principles or, failing that, to explain why at the earliest possible opportunity.

The creation of compliant statements of Professional Ethics brings with them the need to promote a practice of continuous compliance and periodic re-evaluation, in strong preference to a practice of periodic compliance via audit. This way, such statements become the basis for ensuring that the highest levels of Professional Ethics are obtained.

The creation of a framework for IT professionalism, and with it a building block on IT Professional Ethics, creates a need to provide suitable supports. Such supports are intended to include:

- Promoting the highest levels of Professional Ethics, in industry, among professionals, and to society and the public.
- Assistance for the professional in trying to address problematic areas, including "safe spaces" where ethical issues can be discussed.
- Educational support to prepare professionals to address ethical areas within their professional environments.
- Case studies and other educational resources to help develop professionals' expertise in considerations of Professional Ethics.

The framework acknowledges that there are limitations. Professionals, no matter how expert, nor how highly trained, are nevertheless human beings working in human environments; "to err is human". Ethics itself is not static; it evolves to reflect changes in cultural norms and technological challenges; this evolution itself drives the need for continuing education and development for professionals in Professional Ethics, as well as for professionals to contribute appropriately to the discussions that are involved in that evolution.

Declan Brady, Chair of the CEPIS Professionalism Taskforce and principal consultant at the SQS Group:
'European Ethical Guidelines are a vitally important element of the IT professionalism framework; these will stimulate awareness and promote consideration of ethical values; they will encourage adoption and help to support IT professionals' ethical development. Above all, it will help us to start posing relevant ethical questions.'

This report recommends that procurers of IT services and systems should require that the relevant implementing professionals have an explicit, validated statement of adherence to a code of ethics/conduct/practice that is compliant with these European guidelines.

There are four general principles of Professional and ethical conduct which form the basis for any statement on Professional Ethics. These principles recognise that activities of a professional nature impose specific duties on IT professionals; these are to serve:

- the interests of the public and of society
- the employer or client
- the informatics profession
- the professional practitioner.

These duties imply particular requirements that need to be observed by IT professionals, and which need to be incorporated into any compliant Statement of Professional Ethics along with appropriate guidance.

Sometimes these principles may find themselves at odds. It is the skill of the IT Professional to apply expert judgement in achieving the most appropriate balance, or to advise where an appropriate balance cannot be found.

General principles of Professional and ethical conduct at the basis of Professional Ethics

Protection of Public Interest and Legal Compliance

"The IT Professional acts to protect the safety and interests of the Public, and Society; and at all times acts in compliance with the relevant law."

Responsibility to Employers and Clients

"The IT Professional acts in the best interests of their employer or client, to use their relevant knowledge, skill and capability to provide the best possible solution to the best of their ability."

Professional Dignity and Promotion of Professional Aims

"The IT Professional protects the dignity of the IT Profession, and acts to develop and promote both the Profession and its practitioners."

Competence, Responsibility and Impartiality

"The IT Professional acts openly and impartially, within their own competence, taking responsibility for their work, and any work directed by them."

Bringing e-CF and SFIA closer together

Both e-CF and SFIA (Skills Framework for the Information Age) are highly valued and recognised frameworks that describe skills and competence for IT professionals. SFIA was preceded by a several UK initiatives, some dating back to 1990, that came together in 2000. Our work marked in 2016 an important step towards closer alignment of the two models. The ambition of BCS the Chartered Institute for IT and of the European Commission is to bring these frameworks closer together. A workshop with experts was held in June 2016 to explore how the current versions of the frameworks align and how they might further converge in the future.

In working towards a solution, it is important to ensure transparency and a smooth transition to allow users to adapt to changes coming from future updates. One of the users of e-CF clearly stated that 'a rapid major change is not preferential as it would require the organisation to consequently adapt too'.

The first task was to identify how the current versions of the framework (e-CF version 3 and SFIA version 6) align with each other. A mapping methodology was agreed with experts from both frameworks. Then it was used to produce a first draft mapping for discussion among the group. The final mapping is to be published on both e-CF and SFIA websites and used for describing the relationship between the two frameworks.

The process for developing the next versions of e-CF and SFIA are at the early stages. The key to closer alignment is in the definition of the levels. This does not necessarily mean that the frameworks change their respective numbers of levels but that there could be closer alignment in how they are defined. Closer alignment, including development timeframes and content maintenance could then evolve over time so that process causes minimal disruption the respective user bases.

Jeremy Barlow, Director of Standards at the BCS, The Chartered Institute for IT:

'The BCS is committed to collaborating with European partners on aligning e-CF and SFIA and is heavily engaged in the wider Skills and IT professionalism agenda. This particular initiative to bring both competence frameworks closer together represents a major step towards further maturing the IT profession and is an excellent example of where international collaboration can lead to.'

Specific IT Knowledge Foundations enrich and deepen the IT professionalism framework

The European framework for IT professionalism includes instruments like the e-CF and the Foundational IT Body of Knowledge that are reference models. The fBOK for instance describes fundamental IT knowledge in all areas of the IT profession, and then refers to other specific bodies of knowledge for further IT specialisation. These specific bodies of knowledge are usually kept up to date with the latest accepted insights and trends by specific knowledge foundations or services libraries.

A very important step is to achieve consistency between the framework and its components and other related sources of knowledge and competences. We initiated the alignment between one of these knowledge foundations (**the ASL BiSL foundation**) and the IT professionalism framework, with the aim of encouraging other foundations that represent many of the other IT knowledge areas (of for instance project management, architecture etc.) to follow the same path – and hence creating a common language across the IT profession.

Lucille van der Hagen, managing director ASL Bisl Foundation:
'The ASL BiSL Foundation offers an integrated chain for information supply management and seeks to bring business and IT closer together. The foundation has managed key ideas in the areas of application services and business information services for several years, and is now developing them further through also aligning with European developments such as the IT professionalism framework.'

For instance, application design and development is a key part of the knowledge area of software design and development. ASL is a specific body of knowledge that covers this topic extensively. In 2015, an international ISO standard for application management based on ASL was published: ISO 16350. This demonstrates the international recognition of ASL's body of knowledge. For a next version of the fBOK it is essential that specific Knowledge Foundations such as ASL BiSL Foundation – but also others like ITIL, PRINCE, IPMA and the like – review the current version and map it to their own specific body of knowledge, with the purpose of a) improving both bodies and b) aligning them. At the same time, it is important for the ASL BiSL Foundation to work according to internationally accepted standards and terminology.

Under this project various concrete actions have been taken up by the ASL BiSL Foundation to implement the European framework for IT professionalism. Examples of these are the mapping of the BiSL Foundation certification and ASL Foundation certification to the fBOK, providing feedback and recommendations for version 2.0 of the fBOK, describe the typical career path of both AM/BIM profiles based on current training programs, and selecting e-CF competences to complete profiles of the Application Manager and the Business Information Manager – that are key roles that ASL BiSL Foundation distinguishes. This would lead to profiles that are in line with the framework and could be used for upcoming updates of e-CF.

The support of ASL BiSL Foundation as an early adopter could accelerate take-up of the framework by other Knowledge Foundations while at the same time further maturing and developing it.

IT-Professionalism in Spain: broad commitment to support implementation in all focus areas

Since the work for the development and implementation of a European framework for IT professionalism was launched, Spain played an active role thanks to the broad commitment of the Consejo General de Colegios Profesionales de Ingeniería Informática (CCII) and other key stakeholders.

The CCII is the Spanish Chartered Informatics Engineering organisation, set up in 2010 by a specific agreement of the Spanish Parliament with the main purpose of representing the Spanish informatics-engineering professionals on the national and international level; regulating the professional practice; ensuring proper standards and promoting an ethical practice and contribution of informatics-engineering to general interest. Since 2014, CCII is involved in CEN PC 428 e-Competences and IT Professionalism, whose main goal has been producing the upcoming EN 16234 (European Norm about IT Profession Competences by the European Committee for Standardisation - CEN).

The Spanish approach encompassed all the building blocks of the framework, including an impressive list of potential initiatives that they were keen on taking forward within a selected network of Spanish experts representing key stakeholders. Spanish implementation includes an action plan design; framework promotion actions for instance through the presentation and calling for participation during a major international event in Madrid (the Digital Enterprise Show or DES, 2016); Spanish framework registration web; participatory workshop for the framework implementation in Spain; Design of Spanish National Commission on Ethics in IT; Contribution to produce the Spanish translation of the EN 16234 and its use in Spain, and various others. As part of this approach, several core initiatives have been selected, which focus on the least-developed fields such as Ethics, Certifications and Quality Labels. Relevant initiatives has been taken in the past years from the European Commission to promote the definition of an European Quality Label for IT Industry Training and Certification, but there is still much to do.

At this aim, an IT Certification map is set up by a joint effort of CCII and Fondazione Politecnico di Milano. It builds on a crowdsourcing mechanism amongst professionals in IT to obtain the required information. The objective is to provide everyone involved in the IT sector with a powerful tool for a better and clearer understanding of the use of IT certification. It will start in a pilot version in Spain, and through this experience it should be scaled-up to other European countries.

Juan Pablo Peñarrubia, President of the Spanish General Council of Professional Colleges of Computer Engineering (CCII):

'The definition of professional practice in an essential element in any highly innovative field: a solid definition of the IT Profession is a necessary and strategic element for the construction of the Information and Knowledge Society in Europe and around the world. Informatics is of vital concern at present and in the future. We need a clear definition of the IT Profession and regulation as the basis to manage informatics in a trustable and sustainable way for our society.'

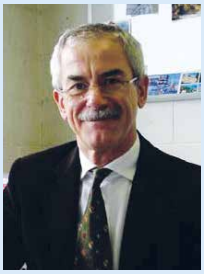
IT-Professionalism in Italy: implementing the framework for IT professionalism in the security domain

The current scenario of IT professionalism in Italy shows positive trends in terms of employability and compensation in a broad range of sectors. These results demonstrate the value of successful initiatives carried out by different stakeholders' groups working together to boost IT professionalism. Since Italy adopted the e-CF as a National standard in 2013 (UNI 11506:2013), much progress has been made that also positions Italy as a pioneer in Europe and provide "good practices" that can be used as reference by other countries.

However, many issues have still to be addressed, especially in terms of skill shortage, as recent studies show. Security Management is one of the most crucial domains, requiring high qualifications to meet market needs. A lack of skilled talent in Security Management is putting organizations at risk and leaving businesses across industries vulnerable to attacks.

Given the increasing value of Security Management, the C.I.N.I. (Consorzio Interuniversitario Nazionale per l'Informatica) has launched an initiative under this IT Professionalism project that aims at mapping existing Italian bachelor and/or master level University curricula with respect to the field of IT Security Management, adopting the European Foundational Body of knowledge and e-Competence Framework (e-CF 3.0). The initiative is a joint effort of two C.I.N.I. National Laboratories: CFC (digital Competences, Formal training and Certification and Cyber Security).

The approach adopted for the assessment mainly consists of a web-based survey addressed to those who are responsible for the IT Security curricula design in some 20 Engineering/Informatics Universities. In a short-term perspective, the survey serves a first understanding of the existing Educational offerings and their alignment to the mentioned European Frameworks. In a long term perspective, the initiative will be extended to other IT domains in order to further improving University curricula and build a bridge to the workplace environment, in cooperation with industries.



Marco Ferretti, President, Italian Computer Society and Professor, University of Pavia:

'The IT professionalism framework helps formal education get feedback from other stakeholders in the process of updating and redesigning curricula – a long-standing effort that faces the continuous changes in the IT domain.'

IT-Professionalism in Ireland: boosting Continuous Professional Development (CPD)

The Irish Computer Society (ICS) has developed a new career progression pathway for Ireland's IT professionals: the Continuous Professional Development (CPD). The CPD is part of a new online system which supports IT professionals to record and track their development. It is fully in line with the European framework for IT professionalism that is excellently promoted on the association's website.

The new pathway is the result of long consultations with industry experts, academics and other stakeholders about what IT professionals need from CPD, and what Ireland's innovative economy needs from IT professionals. The CPD is presented as a unique journey with clear benefits for both professionals and organisations as well as for the profession as a whole. It distinguishes between IT students, IT professionals, and IT leaders to look at their different needs. Finally, it also includes the opportunity to track 'contributions' of the professional (e.g. signing up to the ICS code of conduct, research & publishing or volunteering). *See Figure 7.*

The four types of CPD

Continuous Professional Development is about more than attending training courses. A wide range of activities can count towards earning CPD points.

See the four-part CPD model below.

FORMAL	NON-FORMAL	INFORMAL	CONTRIBUTION
Intentional, structured activities leading to formal recognition.	Intentional and structured, but not leading to formal certification.	Everyday activities that enhance your professional expertise.	Supporting the profession, the wider community and society.
EXAMPLES: Professional or academic qualifications relevant to your profession.	EXAMPLES: Attendance at conferences and events, keeping up with the latest developments.	EXAMPLES: Job shadowing, secondments and working on new/stretching projects.	EXAMPLES: Mentoring, contributing to and helping with not-for-profit events.

Figure 7. Continuous Professional Development by the Irish Computer Society

ICS is establishing a National Coalition as part of the launch of the Digital Skills and Jobs Coalition on the 1st of December. As part of this we are looking at specific activities which promote professionalism such as developing an industry-supported graduate development programme and seeking to pilot e-CF implementation in one or more Irish organisations.

The ICS was very keen on supporting the project in many ways, for instance through promoting project initiatives at their National Day for the IT professional, and in general is a great ambassador for the European framework for IT professionalism.

Caitriona Whelan, Professional Development Lead, Irish Computer Society / ICS Foundation:

'As technology rapidly evolves, so workers in the IT sector need to constantly adapt and update their knowledge. The Irish Computer Society recognises the importance of learning and development and supports individuals in chartering their career progression and managing their learning. We ask all stakeholders to join us as we create a national coalition to extend development initiatives across the country.'

Way Forward

The conference on IT Professionalism on 6 December 2016 in Brussels (http://ictprofessionalism.eu) confirmed the importance and the relevance of the European framework for IT professionalism, as well as the general need to take action to further mature the IT profession and reduce the skills gap.

'You can go fast alone, but you will go further together'.

The work on this IT professionalism framework will hence not stop here, with this brochure. It will continue. It will be fostered by relevant communities such as the European standardisation Committee (CEN TC 428 on digital competences and ICT professionalism and the CEN Workshop on ICT Skills) as well as the Digital Skills and Jobs Coalition launched by the European Commission on 1 December 2016 as well as the European e-Skills Association and the IT Professionalism Europe (ITPE) network etc.

It will also be further promoted by the organisations in countries where implementation took off during the course of our work in 2016: Spain, Ireland and Italy. In the coming years the framework will be implemented by other Member States and several countries outside of the EU have shown strong interest. These developments offer a great opportunity for the future of the IT profession.

The European Commission will further support IT Professionalism in the coming years and strengthen the synergy between IT professionalism and the successful digitisation of organisations (industry, SME's, public administrations etc.).

The strong collaboration between all stakeholders involved will enable successful development and implementation of the IT Professionalism Framework in Europe and beyond.

Contact Information
For further information, please contact:

European Commission

Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs
Unit F3 for Key Enabling Technologies, Digital Manufacturing and Interoperability
GROW-F3@ec.europa.eu

02-005.17

Publications Office