

e-Leadership Skills

For Small and Medium Sized Enterprises

Synthesis Report
August 2014

Prepared for the
European Commission
DG Enterprise & Industry



Service contract for the European Commission, DG Enterprise and Industry, Unit Key Enabling Technologies and Digital Economy

Tender No. 288/PP/ENT/CIP/13/C/N01C012

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About this document

This document is a Synthesis Report which is part of an initiative of the European Commission on "e-Leadership Skills for Small and Medium Sized Enterprises". It contains mostly work in progress which is to be updated and improved by the submission of the final report in June 2015. Results should be considered as basis for further discussion and should not be quoted or published without permission.

About e-Leadership for SMEs

The service contract on "e-Leadership Skills for Small and Medium Sized Enterprises" has been launched by the European Commission DG ENTR in January 2014 with a consortium led by empirica. The aim is to develop targeted actions for start-ups and fast growing SMEs to provide them with relevant e-leadership skills and qualifications for entrepreneurs, managers and advanced ICT users that are recognized trans-nationally.

It is a contribution to the follow up of the Commission's Communication on "e-Skills for the 21st Century" which presents an EU long term e-skills agenda, of "The Digital Agenda for Europe" and of the Communication "Towards a Job-rich Recovery". It is also contributing to the "Grand Coalition for Digital Jobs" which has been launched by the Commission in 2013.

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Bonn, August 2014

Acknowledgements

This report as well as the whole work programme involves close research of SMEs as well as stakeholder involvement through interviews, surveys and workshops. especially would like to thank the following firms – as well as numerous others who wished to stay anonymous – for participating in the interviews of successful SMEs.

- ABC Design, Bulgaria
- Apple world, United Kingdom
- ARBOR, Belgium
- Aspect Enterprise solutions, United Kingdom
- Assuria, Airinmar, United Kingdom
- B-Able, Netherlands
- BeAligned, Belgium
- Blikbook, United Kingdom
- Bul SI, Bulgaria
- C&G IT Solutions, SL, Spain
- Darik Info, Bulgaria
- ebpSource Limited, United Kingdom
- Eltoria Secrets, United Kingdom
- eStat, Bulgaria
- GroupJoos, Belgium
- Hispania, Escuela de Español SL, Spain
- Imaga, Bulgaria
- IntelDay Solution, Bulgaria
- Komfo, Bulgaria
- Nemetschek Bulgaria
- Neteris Consulting SL, Spain
- On Retrieval, Spain
- Realtech System Consulting SL, Spain
- Sirma ITT, Bulgaria
- SkillWeb, United Kingdom
- Surus Inversa SL, Spain
- System associates, United Kingdom
- Ticketbis Sociedad Limitada, Spain
- Urban Science, United Kingdom
- Virtually Free Lmted, United Kingdom
- Vision, Belgium
- Womenalia Network SL., Spain
- world marketing surfers, S.L., Spain
- XS Software, Bulgaria
- Zaptext, United Kingdom
- Zendos Tecnologia SL, Spain

We would also like to thank the following national experts for contributing analysis and helping us understand the national e-leadership environments:

- Bulgaria: George Sharkov, "Foundation "European Software Institute – Center Eastern Europe" (ESI CEE)
- Czech Republic: Milan Ruzicka, independent expert
- Denmark: James Varnham, E-SCN European Skills and Certification Network
- Estonia: Helena Rozeik, Praxis Center for Policy Studies
- Finland: Kari Mikkela, Urban Mill
- France: Béatrice Melin, independent expert
- Greece: Nikolaos Amanatidis, Independent expert
- Lithuania: Austė Kiškienė, IRII
- Malta: Fabianne Ruggier, Malta Information Technology Agency (MITA)
- Portugal: Marta Marques, University of Aveiro
- Romania: Doinita Ariton, Danubius University
- Slovakia: Radoslav Delina, University Kosice
- Slovenia: Vasja Vehovar, University Ljubljana
- Sweden: Torsten Gareis, Independent expert

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1 Executive Summary

The work is part of service contract commissioned by the European Commission on “*e-Leadership Skills for Small and Medium Sized Enterprises*” with a view to develop targeted actions for start-ups and fast growing SMEs to provide them with relevant e-leadership skills and qualifications for entrepreneurs, managers and advanced ICT users that are recognized trans-nationally.

1.1 Objectives and methodology

Activities started off by gathering information and insight into the role of e-leaders in SMEs and entrepreneurial firms. “Academic Partners”, a set of high profile European business schools, have engaged with SMEs and co-created important insights into what kinds of leaders SMEs rely on to ensure they can use ICT to develop, grow and compete, aiming to research on how SMEs use ICT to develop, grow and compete and what kind of e-leadership skills they need to succeed. Interviews were carried out to learn how successful SMEs hire, train and retain e-leadership skills. This case study based research was augmented by a survey of about 300 firms to validate findings.

This work represents an important step forward towards helping business schools and SMEs collaborate and develop insights and a common language for SMEs to access and foster leaders who are both business and ICT-savvy (“e-leaders”) and who ensure SMEs use ICT effectively. It is laying the groundwork for the planning of targeted educational offers for SMEs and entrepreneurs by business schools and universities, which will be demonstrated within the project duration.

It also engages with other stakeholder groups from education and the labour market, associations representing SMEs, start-ups and gazelles and others to take into account the target groups evolving requirements for e-leadership.

It aims to sharpen the e-leadership definitions and metrics, specify data requirements for establishing monitoring mechanisms which can be used as a basis for policy making and to improve monitoring of demand and supply of these skills. Technology trends are analysed to understand their impact on new business models and organisation of companies and their e-leadership requirements. An overview of the present European e-leadership policy landscape for the different target groups is developed as well as an overview of the present European landscape of e-Leadership courses and MOOCs. In addition a search and analysis of initiatives from industry, education and training organisations is carried out.

1.2 Findings

1.2.1 e-Leadership Skills: Definition, Metrics and Monitoring

We are starting from the widely accepted early (2004¹) definition of e-business skills, which is still found very useful in giving a rationale for defining the term, but needs to be further elaborated to be operationally useful as it lacks the definition content of the skills:

The capabilities needed to exploit opportunities provided by ICT, notably the Internet, to ensure more efficient and effective performance of different types of organisations, to explore possibilities for new ways of conducting business and organisational processes, and to establish new businesses. e-Business skills are

¹ http://ec.europa.eu/enterprise/sectors/ict/files/e-skills-forum-2004-09-fsr_en.pdf

strategic and related in particular to innovation management, rather than technology-management, skills - which are part of ICT practitioner skills.

We have therefore tried to define e-Leadership skills in four layers, with each layer becoming more concrete in the specification of skills. The definition above can here be seen as the **first layer**, as it gives the rationale of dealing with e-leadership skills, namely, in a very simplified version, using ICT to be innovative.

The **second layer** definition builds on an e-leadership description by Fonstad (2013²) who states:

E-leadership is the accomplishment of a goal that relies on ICT through the direction of human resources and uses of ICT.

E-leadership is thus a type of leadership that is distinguished by the type of goal that needs to be accomplished and by the resources a leader must coordinate and align. Both the goal and the resources involve using ICT. e-Leaders are thus both business and ICT savvy. They might be ICT leaders who are also business-savvy or business leaders who are ICT-savvy. E-leadership will involve leading and managing e-skilled professionals as well as other professionals. We take on the notion of e-leaders being leaders with a T-shaped portfolio of skills: both business and ICT-savvy and argue that the T-shaped portfolio should be broken down into two sets of vertical expertise skills, namely ICT and market skills and one set of horizontal/transversal expertise, namely that of developing organizations, which requires strategic and tactical skills.

The **third layer** of defining e-leadership skills will be an explication of actual skills that together define e-leadership. For this, the three domains of skills **ICT skills**, **market skills** and **strategic/tactical skills** are made explicit by enumerating lists of skills that exemplify e-leadership in these areas. Due to both a) the diversity of e-leadership skills needs across industries, enterprise sizes and life-cycle stages and b) the dynamics of technological developments in ICT (and, although perhaps to a lesser degree, in entrepreneurship and management science) we do not claim to produce complete lists of skills but rather view our approach as discussion basis, which can be continually honed and will evolve as parties interested and involved engage in the development of the discussion.

Using this approach, e-leadership skills would be combinations of a sufficient number and level of skills from all three domains. As skills requirements to be an e-leader differ according to the job role of their incumbent, as well as by industry and service or product, by size of enterprise and its life-cycle stage, there is not one definite set of e-leadership skills to be attained by anyone who wants to be an e-leader.

Regarding ICT skills, use is made of the European e-Competence Framework and the ICT Job Profiles to build an e-Leadership component e-CF e-skills index. The “top ten” e-CF skills contributing to e-leadership are the following:

² Fonstad, Nils 2013: Chapter “e-Leadership skills” in Hüsing et al.: e-Leadership: e-Skills for Competitiveness and Innovation Vision, Roadmap and Foresight Scenarios. Final Report of the study “Vision, Roadmap and Foresight Scenarios for Europe 2012-2020”

Figure 1-1: “Top Ten” e-Leadership component e-CF e-skills

Rank	e-CF skill	e-CF 3.0 location	
1	IS and Business Strategy alignment	Plan	A.1
2	Technology Trend Monitoring	Plan	A.7
3	Business Plan Development	Plan	A.3
4	Business Change Management	Manage	E.7
5	Project and Portfolio Management	Manage	E.2
6	Risk Management	Manage	E.3
7	Architecture Design	Plan	A.5
8	IS Governance	Manage	E.9
9	Relationship Management	Manage	E.4
10	Information Security Management	Manage	E.8

Market/business skills will include

- Specific knowledge of the domain and industry the company operates in and its requirements as well as its capability to provide functional expertise based on deep and broad knowledge and understanding of business processes, flows and related concepts coupled with a profound understanding of the product features, technology and emerging markets;
- Deep sector expertise grounded in a thorough understanding of customers and the ability to identify the right strategic direction that builds value and acquires businesses and the ability to manage technology-driven challenges and opportunities taking advantage and making best use of ICT developments and trends by exploiting innovation in identifying and designing new business models that deliver value to the organisation.

Strategic and tactical skills:

- Are a set of intrapersonal and interpersonal skills that effectively drive tactical actions, strategic thinking and decision making towards an organisation’s improved performance and value built upon exploiting innovation using ICT;
- Represent a combination of forward looking strategic skills with here-and-now tactical ones gained through past experiences³;
- Denote the ability to chart the course and make agile alterations in line with the organisation's long-term purpose and goals (strategic skills) in combination with the aptitude to effectively deploy actions and tactics leading to a successful implementation of the right strategy targeting the desired objective (tactical skills).

Strategic and tactical skills also include *intrapersonal skills*:⁴

- Capable of developing a compelling vision
- Making sense of a situation: Determine the deeper meaning/significance of what is being expressed
- Ability to anticipate problems/challenges and seek innovative opportunities
- Novel and adaptive thinking capabilities

³ Cooper, C.D., Scandura, T.A., and Schriesheim, C. A. (2005): Looking forward but learning from our past: Potential challenges to developing authentic leadership theory and authentic leaders. *The Leadership Quarterly* 16 (2005) 475–493.

⁴ See also: Hogan, R., and Kaiser, R.B. (2005): What We Know about Leadership. *Review of General Psychology* 2005, Vol. 9, No. 2, 169–180;

- Ability to organise and lead by effectively using past experiences.

Strategic and tactical skills also include interpersonal skills (interacting with and influencing other people):⁵

- Effectively communicate an innovation idea, to propose an innovation project and guiding that innovation project to success;
- Ability to lead qualified staff from different disciplines towards identifying and designing business models;
- Building and aligning relationships across boundaries: Not so much intra organizational communication across departments, but communication across the boundaries of the firm, in an eco-systems (service providers (IT, non-IT), consortium partners, freelancers, supply chain relations in vertical markets, e.g. relationship to corporate, powerful customers).

A **fourth layer** has not yet been defined but is only conceptually sketched as (in this case: SME specific) e-leadership job profiles or curriculum profiles. Specific sets of skills can be agreed on and aggregated into job profiles, and accordingly curriculum profiles which would inform educational programmes to be developed. Going forward, this may be considered and developed if found feasible.

1.2.2 e-Leadership Skill Requirements by SMEs and Entrepreneurs

The requirements have been researched in close interaction with SMEs and entrepreneurs through interviews and surveys. The following rests on an as yet superficial analysis of the interviewing and survey work carried out. The analysis will be refined during the project lifetime and final results be made available with the Final Report.

SMEs and entrepreneurs requirements of e-leadership education appear very diverse, yet some patterns emerge from the analysis so far.

Content

e-Leadership can be simplified as a combination of business and ICT savvy, whereby the traditional separation between ICT and other business functions entails that specialisation often means leaders have deep skills in one area and savvy in another. Our surveys show, regarding **content** of potential e-leadership education offers to be developed, that many SMEs actually need leaders with **very strong, also practical, hands-on, ICT skills**. Whereas in the corporate world, the ICT skills requirements of leaders often can be described as an excellent understanding of ICT capabilities (knowing what is possible, being able to budget, source and allocate work to be done), leaders in (some) SMEs tend to be more closely involved in the production of their ICT based product or service (or ICT supported other business function such as finance, marketing, accounting etc.)

Another significant finding is that many SMEs rely heavily on **outsourcing** for their ICT needs. Outsourcing recipients may be consultancies, vendors or other partner enterprises in the value chain. While the e-leadership definition includes being able to lead qualified interdisciplinary staff to exploit ICT best, an eminent finding for e-leadership requirement in SMEs therefore is to **lead qualified interdisciplinary staff and consultants, contractors and vendors** and other partners.

In terms of technical content needed most, **cloud computing, big data/data analytics** and **mobile apps** development have been mentioned as those technology trends that result in

⁵ See also: Mumford, T. V., Campion, M. A., and Morgeson, F. P. (2007): The leadership skills strataplex: Leadership skill requirements across organizational levels. *The Leadership Quarterly* 18 (2007) 154–166.

increased training and education needs for SMEs. Other more technical skills mentioned included **software development, mobile application and web development** including skills in **PHP, Flash, Java, Java Script** etc.; **3D animation; ERP systems; (Big) data tools such as SQL, Hadoop, Python and Django.**

ICT management trainings that were found most useful include **Enterprise Architecture, ICT governance and ICT Management.**

Regarding other **e-leadership skills** required, answers were quite diverse and trainings could cover a full range of topics. **Communication skills** were mentioned, an **understanding of the customers and the market**, as well as **change management** and **project management, business development and sales and marketing.**

Format

Regarding the **format** of the e-leadership education, it is useful to look at how e-leadership skills have so far been acquainted by the SMEs interviewed.

There is, obviously, a need for a basis of deep technical and business skills that, however, is usually not attained by sending current employees to training, but that in most cases the founders and key staff bring to the enterprise as they start or enter the company. These e-leadership skills may have been obtained through **MSc. /PhD and/or MBA programmes** and **previous work experience elsewhere.** This needs to be mentioned here so as not to give the impression that e-leadership for SMEs could rely solely on shorter, focussed trainings, which many SMEs have reported to favour over longer programmes when up-skilling their staff.

e-Leadership skills are usually not gained through learning alone, but require learning that builds on previous professional practitioner and management experience. Therefore long, academic programmes, such as MBA and MSc. programmes are usually offered to people with work experience and as part-time studies for workers who typically already have at least a first academic degree. There is a need for these kinds of programmes even for SMEs. Our scanning of the education market and landscape that is presented in chapter 8 has found quite a number of these **“long” professional oriented combination programmes capable of providing e-leadership skills.**

On the other hand, SMEs have expressed, in our interviews and surveys, the need for **short, targeted, affordable and sometimes even ad-hoc trainings.** These trainings can be technical or business skills related, which makes the *programmes* not per-se “e-leadership type” programmes (i.e. combining ICT and business) but can contribute to a *person’s* e-leadership skills nevertheless by adding missing e-leadership skills components to an existing individual skills portfolio.

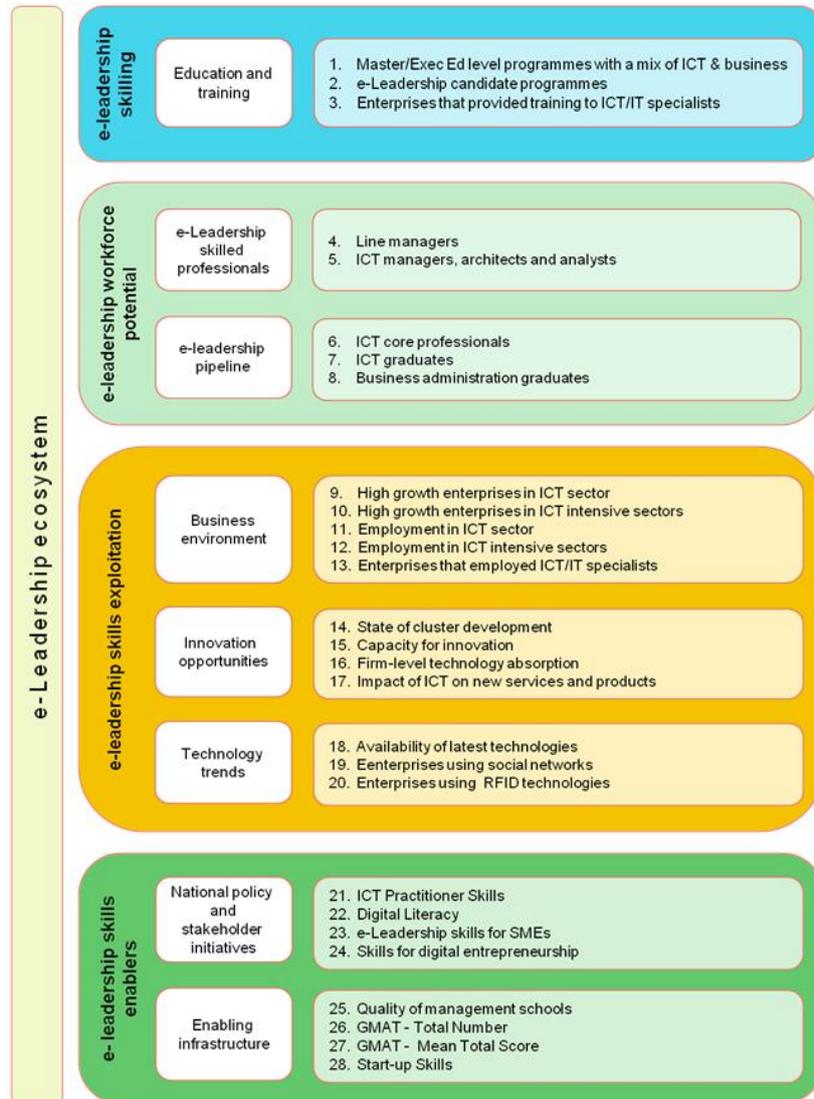
1.2.3 European e-Leadership Scoreboard and Index

An e-leadership scoreboard is drafted which attempts to offer an approach to monitoring and assessing issues related to e-leadership skills development, such as: education offers, workforce potential, exploitation opportunities, and enabling policies or other driving mechanisms. It compares at Member State level the e-leadership “performance” of EU28 Member states across several building blocks, thereby allowing for comparisons on relative strengths and weaknesses of e-leadership ecosystems between countries, with the major goal of informing and enabling policy discussions at national and EU level.

The e-leadership scoreboard is an evolving model to be further refined through input from academic / experts debates and feedback from other interested parties. It comprises a series of indicators using data from both primary and secondary sources. It is based on a straightforward yet comprehensive framework for measuring determinants of demand and supply for e-leadership skills in each country. Conceptually, the e-leadership scoreboard

comprises four levels, 28 **indicators**; 8 **building blocks**; 4 **dimensions**, which can be aggregated to receive an overall e -leadership **Index** (eLI). The framework is depicted below:

Figure 1-2: Framework of e-leadership scoreboard



The “e-leadership skilling” dimension consists of one building block, namely *Education and Training*. This building block aims to capture e-leadership education and training through three indicators: The number of Master's/Exec Ed level programmes with a mix of ICT & business (per population), the number of e-leadership candidate programmes (per population), and the share of enterprises that provided training to ICT/IT specialists. In the second dimension, “e-leadership workforce potential”, the *e-Leadership Skilled Professionals* and *e-Leadership Pipeline* building blocks aim to gauge the extent of e-skills/ICT practitioners and e-leadership in the workforce. The expectation is that e-leadership competences, as defined in the context of this study, prevail in or recruit from these two selected categories. Overall this dimension of the scoreboard looks to offer a proxy for the potential estimates of e-leaders in each country. A third dimension is entitled “*e-leadership skills exploitation*” and attempts to assess the friendliness of a country’s business framework and extent of its preparedness in exploiting opportunities provided by ICT. It contains three building blocks capturing aspects from *Business Environment*, *Innovation Opportunities* and *Technology Trends* in each country. The fourth dimension: “e-leadership skills enablers” rests on the proposition that countries with efficient enabling mechanisms (policies, infrastructure, etc.)

are well positioned to produce the right mix of e-leadership skills in line with the dynamics of the job market demand and talent requirement. This dimension looks to capture e-skills / e-leadership skills enablers, differentiating between two building blocks: *National policy and stakeholder initiatives* and *Enabling Infrastructure*.

Results on the country profiles are built upon data from a number of primary and secondary data sources. Two country examples have been added to the main body of this report and work on the scoreboard and index will continue, with important input expected from the next expert workshop.

Scoreboard and Index results per country will also be part of still to be produced 28 “**Country Briefs**”, which will be submitted to the Commission as a separate, non-contractual deliverable.

Methodologically, the e-Leadership Index is built from the data selected for the scoreboard. It is calculated using a weighted average of the rescaled scores for every indicator included in the scoreboard. All 28 variables have been normalised into a [0-10] range, with higher scores representing better performance for the indicators. The weighting approach distributes equal weights to each of the building blocks.

1.2.4 Technology Trends

ICT trends expected to affect the demand of e-skills and specifically e-leadership skills in the next decade, and the evolution of the mix of skills requested by emerging innovation, including SMEs, have been researched by IDC for this report.

The main focus is on high tech and high growth SMEs (Gazelles), who particularly need ICT and e-leadership skills to enhance competitiveness and being or continuing to be successful. The leading question is the impact of technology trends on skills.

The selection of the most important trends was based on the following criteria:

- **They are disruptive technologies**, according to the definition provided by McKinsey, that is they are still rapidly advancing, they have a broad potential scope of impact, may affect significant economic value, and they can dramatically change the status quo of the market;
- **Their development is profoundly changing the mix of skills requested** in the new ICT environment, driving demand for new specialized skills to design, develop and deploy new digital services, decreasing demand for operational and practical ICT skills, particularly in user industries, and stimulating an overarching demand for e-leadership skills, in order to exploit the new technologies for business growth.
- These characteristics are documented by at least two separate sources.

All the main sources agree in identifying the following technologies as the most important trends affecting the ICT market and the socio-economic system in the next 10 years:

- **Mobility**: The incredibly rapid penetration of mobile devices and technologies in the market and the broad phenomenon of leveraging mobile solutions in the business environment;
- **Cloud computing**: the disruptive delivery model of software and ICT services, based on flexible and on-demand business models;
- **Big data analytics**: a new generation of technologies and architectures, designed to economically extract value from very large volumes of a wide variety of data, by enabling high velocity capture, discovery, and/or analysis;

- **Social media** technologies: the use of social media within and outside the enterprise, implementing social marketing techniques and facilitating collaboration and knowledge sharing;
- **Internet of Things:** A dynamic global network infrastructure with self-configuring capabilities based on standard and interoperable communication protocols where physical and virtual “things” have identities, physical attributes, and virtual personalities, use intelligent interfaces, and are seamlessly integrated into the information network.

In addition the following trends have been selected for their impact on market dynamics and the demand of skills

- **Customer Experience IT (CXIT)** refers to the IT-related investments required to manage and optimise the customer's (or a citizen's) experience with an organisation. This is a new concept reflecting the increasing convergence of innovative IT (mobile, social technologies, cloud, Big Data, IoT) into applications and services centred on the customer experience, implemented through investments made by business managers other than CIOs.
- **IT security:** given the increasing dependency of European organizations on ICT systems, and the growing complexity of connected environments, there is strong demand for and diffusion of software and tools to ensure systems security at all levels;

Finally, all these studies underline the relevance of the convergence of these new technologies and their cumulative effect on the market.

Impacts on the Demand of ICT Practitioner Skills

In summary, these are the main considerations:

- High level ICT practitioner skills are in increasing demand, but this is coupled with lower demand for traditional technical skills, particularly in the infrastructure and traditional IT management area.
- A revival of hardware innovation (driven by hyperscale data centres, storage, and all the new devices connected to the IoT) stimulates demand for highly specific hardware-related and systems management skills particularly in the ICT industry.
- The demand for highly specialized resources tends to move from the ICT users to the ICT vendors, while the profiles required by ICT users become more business-oriented and project-oriented, with a strong focus on the design of new services and apps, and the ability to outsource/ rely on standardized platforms and services;
- The applications skills area is the most dynamic, naturally so given the emergence of the so-called “apps economy”. This builds on software skills but with very innovative demands, including the capability to manage a flexible and never-ending apps process.
- The emergence of highly integrated, automated and scalable infrastructures is driving new demand for standardization and interoperability skills (within the ICT industry) and capability to understand, select and manage standards and interoperability (within the ICT user industry).

Table 1-1: Summary of main demand trends of ICT Practitioners skills

	ICT Industry		ICT User Industries	
	Increased Demand	Reduced Demand	Increased Demand	Reduced Demand
Infrastructure	<p>Design, development and management of data centres and cloud services</p> <p>Integration of fixed-mobile systems (BYOD management)</p> <p>Data protection/ Privacy protection/ new IT security challenges</p> <p>Systems management skills for highly integrated, automated and scalable infrastructures (IoT)</p> <p>Design and management of end-to-end protection of emerging smart networks and cyber infrastructures</p>	<p>Operational skills to manage and maintain corporate IT systems</p> <p>Maintenance and support of legacy systems (PCs, desktops...)</p>	<p>Selection, configuration, combination, orchestration of cloud services, either public, private or hybrid</p> <p>Integration of fixed-mobile systems (BYOD management)</p> <p>Systems management skills for highly integrated, automated and scalable infrastructures (IoT)</p> <p>Data protection/ Privacy protection/ new IT security challenges</p> <p>Implementation and management of end-to-end protection of emerging smart networks and cyber infrastructures</p>	<p>Operational skills to manage and maintain corporate IT systems</p> <p>Maintenance and support of legacy systems (PCs, desktops...)</p>
Application	<p>Development and implementation of apps/ services based on mobility/cloud/Big Data/ Social Media/ IoT</p> <p>Business data analytics, Data scientists, Big Data skills</p> <p>Apps, web, IT service development for customer-centred design and deployment (CXIT)</p>	<p>Maintenance of legacy applications</p>	<p>Development and implementation of apps/ services based on mobility/cloud/Big Data/ Social Media/ IoT + industry knowledge</p> <p>Business data analytics, Data scientists, Big Data skills</p> <p>Apps, web, IT service development for customer-centred design and deployment (CXIT)</p>	<p>Maintenance of legacy applications</p>
General	<p>Skills to design and implement sophisticated identity and access management solutions</p> <p>Skills on standardisation/ IT regulation/ interoperability developments</p> <p>Ownership of skills certification</p>	<p>Traditional IT management skills focused on proprietary systems and custom developments</p>	<p>IT asset management and governance expertise</p> <p>Implementation of sophisticated identity and access management solutions</p> <p>Skills on standardisation/ IT regulation/ interoperability developments</p> <p>Ownership of skills certification</p>	<p>Traditional IT security skills by public cloud users</p> <p>Traditional IT management skills focused on proprietary systems and custom developments</p>
R&D	<p>Sophisticated R&D and development skills (especially for interoperability and standardization challenges)</p>	<p>None evident</p>	<p>Sophisticated R&D and development skills, focused on industry needs</p>	<p>None evident</p>

Impacts on the Demand of e-Leadership Skills

In summary, the emerging demand for e-leadership skills is driven by the digital transformation process of enterprises and the cumulative impact of main technology innovation trends. In our view, e-leadership skills can be articulated in three main strands, complementary to each other: general management skills, hybrid business-IT skills, and industry specific skills.

Table 1-2: Summary of main demand trends of e-Leadership skills and SMEs implications

	Emerging Demand	Implications for High tech, high growth SMEs
General Management	<p>Strategic management of business and contractual relationships with IT suppliers - partners - subcontractors – clients over extended value chain/ digital ecosystems</p> <p>In-depth understanding of IT offshoring/ outsourcing issues and cost-benefits balance to make informed choices</p> <p>Strategic Management of interaction between CIOs and business line managers</p>	<p>Strategic management of the role of the company in the digital ecosystem with specific attention to SMEs vulnerabilities (insufficient IPR protection, for example).</p> <p>Ability to outsource/delegate necessary IT services and make appropriate buy/train decisions of necessary skills</p>
Hybrid Business/ IT	<p>Strategic management of company information and data flows, including design and development of “data supply chains” to leverage company’s data and partners’ data and make them usable</p> <p>Combination of business analytics skills with industry-specific skills and understanding of IoT issues</p> <p>Strategic management of data protection/privacy issues</p>	<p>Similar demand, since customer expectations will be similar</p> <p>“Native” digital companies (e.g. web entrepreneurs) may have innate e-leadership skills in this area</p> <p>Challenge to source/ maintain scarce specialist skills, particularly data analytics and data scientists skills</p>
Industry Specific	<p>In-depth understanding of industry-specific business development opportunities driven by IT innovation</p> <p>Combination of business analytics skills with industry-specific skills and understanding of IT innovation implications for business processes</p> <p>Ability to use IT for customer-centred apps and services (CXIT) within specific industry</p>	<p>Similar demand, since customer expectations will be similar</p> <p>Risk of missing e-leadership skills necessary for competitive advantage; relative relevance linked to business model</p>

The main drivers of demand are the following:

- With the diffusion of cloud, IoT, CXIT the enterprise perimeter is no longer clearly defined. Therefore, the e-leader must have strategic management skills of business, technical, operational and contractual relationships with IT suppliers, partners, clients over extended value chain/ digital ecosystems, as well as with other business line managers in their organization. The key word is strategic management: the e-leader action must build on a strategic vision of the business evolution and transformation.
- The demand for hybrid business/IT skills is driven by the need to exploit IT for business growth opportunities, including in particular the ability to grow and nurture an apps system, to build a “data supply chain” with the organization’s data flows, and to manage in the appropriate way data and privacy protection issues.
- The demand for industry-specific e-leadership skills is focused on the in-depth understanding of sectorial business development opportunities driven by IT innovation, particularly for customer-centred IT systems and processes.

Looking closely at the implications for high-tech and high-growth SMEs the following considerations emerge:

- High-tech and high-growth SMEs will have similar e-leadership skills needs than large enterprises, because customer expectations and requirements will be similar, but at a different scale level and with different viewpoints. For example, they will also need to manage relationships in the digital value chain, but from the point of view of a junior partner.
- Depending on their size and business model they may not need a CIO: the e-leadership skills may be those of the entrepreneur himself. Actually, “native” digital enterprises (web entrepreneurs) may have “innate” e-leadership skills and leapfrog

other companies with a creative use of IT innovation. But they still may not have the full range of e-leadership skills needed.

- SMEs will face harsher choices in terms of sourcing their needed e-leadership skills: buy, hire or train existing employees? Given their limited resources, they will have to be careful and invest well in the priority skills most functional to their business model.

1.2.5 Policies and Multi-Stakeholder Partnerships

Policies

The topic of e-leadership is touched upon – more or less explicitly – in a whole range of policy fields. Our analysis identified the following key policy approaches to the topic of e-leadership skills in Europe:

- Policies on higher & vocational education
- Research & innovation policies
- SME policy
- Entrepreneurship policy.
- Employment policy
- Digital Agenda
- Cohesion policy.

At the intersection of these policies, the topics related to e-leadership skills attract increasing interest in many Member States. Only in Ireland, Italy and Scotland, however, are measures for strengthening e-leadership skills *explicitly* mentioned in policy strategies. The general impression from our analysis is that the need for providing SMEs and entrepreneurs with the skills for e-leadership is treated as a secondary objective, with limited need for concerted action once the more well-established objectives of policy intervention (such as take-up of present-day ICTs; basic ICT user skills; adoption of e-government and e-business; access to venture capital; start-up subsidies) have been taken care of.

Multi-Stakeholder Partnerships

The policy actions described above provide the framework for a large number of stakeholder initiatives that address promotion of e-leadership skills, either explicitly or – as is most often the case – by implication. Our analysis suggests that these stakeholder initiatives can be clustered according to their main focus and approach in the following groups:

- Development of dedicated course programmes on e-leadership
- New types of education programmes for extra occupational learning
- e-Learning and MOOCs for e-leadership training
- e-Leadership education provided in the context of university spin-off programmes:
- e-Leadership excellence schemes:
- Subsidised or free provision of e-leadership training to SMEs
- Voucher schemes
- Self-assessment tools
- Business plan contests, start-up awards and the like
- e-Leadership education in the context of business incubator and accelerator schemes
- Promotion of e-leadership skills to students
- Insight and awareness raising

- Initiatives focussing on women

Numerous examples of each of these groups have been identified and can be found in the body of this report.

Previous analysis has established evidence that the multi-stakeholder partnership (MSP) is a highly useful if not necessary approach towards preparation and operation of successful initiatives in the e-skills domain. MSPs represents a strategic cooperation between private-sector partners (industry, employers from the private sector) and partners from the traditional education system, where the former take over responsibilities which traditionally have been held more or less exclusively by public sector institutions. MSPs build on the idea that the private sectors can complement, supplement and extend services provided by the public sector by increasing the available resources.

Our analysis suggests that multi-stakeholder partnerships are not as well developed yet in the e-leadership field when compared to the other segments of the e-skills domain, i.e. digital literacy and ICT practitioner skills. This appears to be a case for policy intervention, as Member State governments could urge key stakeholders to join forces and agree on effective actions which will help promote awareness of the e-leadership skills topic and implement measures for boosting supply of and participation in related training programmes.

	National policy and stakeholder initiatives on e-Leadership Skills for SMEs	National policy and stakeholder initiatives on Skills for Digital Entrepreneurship
Austria	●	●●
Belgium	●●●	●●●
Bulgaria	●●	●●●
Croatia	●●	●●●
Cyprus	●	●●
Czech Republic	●	●
Germany	●●	●●●
Denmark	●●●●	●●●
Estonia	tbd	tbd
Greece	●●	●●
Spain	●●	●●●
Finland	tbd	tbd
France	tbd	tbd
Hungary	●	●●
Ireland	●●●●●	●●●●
Italy	●●●●	●●
Lithuania	tbd	tbd
Luxembourg	●●	●●●
Latvia	●	●●
Malta	●●●	●●●●
Netherlands	●●●	●●
Poland	●●	●●
Portugal	tbd	tbd
Romania	tbd	tbd
Sweden	●●	●●
Slovenia	tbd	tbd
Slovak Republic	tbd	tbd
United Kingdom	●●●●	●●●●

Note: The assessment of national policy and stakeholder initiatives are first drafts as basis for further discussion and must not be quoted or published without permission.

1.2.6 European Landscape of e-Leadership Higher Education Courses and MOOCs

A Europe-wide data collection survey was carried out to obtain further insight into the e-leadership education landscape in each Member State. Already existing activities in universities and business schools were identified. The survey explored the extent to which the country's education system already supplies training in e-leadership, covering information both long programmes at a Master's level or similar and shorter courses, which targeted e-leadership skills. The criteria applied included:

- Professional orientation
- ICT content included is significant both in scope and depth
- Focus on SMEs and/or entrepreneurs

In total, 66 programmes met all three criteria. They are included in a table at the end of chapter 8.

Some conclusions can be drawn from the picture of the landscape as it has been researched:

- Programmes on offer are mainly rather "long" programmes, i.e. take more than one year to complete
- There is very little on offer for SMEs. Cooperation relationships with SMEs still seem to be the exception for most business schools.
- Where programmes with a focus on SMEs are offered, they often (also) target consultants, a strategy that seems to be in line with our results from SME interviewing.

Entrepreneurship has found its way into IT and business combination programmes, at least when compared to the SME topic. This may be an issue of entrepreneurship being perceived as a more promising career avenue by prospective learners.

1.2.7 Demonstration plans

Demonstration of e-leadership training measures is planned to meet the criteria and requirements found especially through the SME consultation and research, the emerging technological trends analysed and will complement the existing education landscape by filling some of the gaps that the current education landscape on offer leaves when comparing it to the requirements that are a primary result of this present work programme. Our requirements capture via interviews and surveys of SMEs and assessment of technological trends most likely to affect the e-leadership skills needed in SMEs and entrepreneurial companies can be summarised as follows:

- Very strong, also practical, hands-on, ICT skills
- Cloud computing
- Big data/data analytics and data tools such as SQL, Hadoop, Python and Django
- Mobile application development
- Software development and web development including skills in PHP, Flash, Java, JavaScript etc., also 3D animation
- ERP systems
- ICT Security
- ICT management / ICT governance
- Enterprise Architecture
- Outsourcing skills
- Leading qualified interdisciplinary staff *and consultants, contractors and vendors*

- Communication skills
- Understanding of the customers and the market, business development and sales and marketing
- Change management, and
- Project management.

Regarding the format of the e-leadership education, we have found that there is a need for both professional oriented long programmes (MSc. /PhD, MBA/Exec. Ed. Programmes), and shorter, targeted, affordable trainings, with flexible schedules.

The demonstration plans at the five academic institutions cover a significant share of the above list. They are described in more detail in chapter 9. Thought will be given to carrying out a rigorous mapping of requirements captured to learning outcomes of demonstrations planned later in the project.

Organising the demonstrations of e-leadership courses for SMEs involving at least 20 SMEs from at least 5 EU Member States will be a major part of the remaining work of this service contract.

2 Introduction

2.1 Background

The programme of work under the service contract “*e-Leadership Skills for Small and Medium Sized Enterprises*”, commissioned by the European Commission, develops targeted actions for start-ups and fast growing SMEs to provide them with relevant e-leadership skills and qualifications for entrepreneurs, managers and advanced ICT users that are recognized trans-nationally.

2.1.1 The Work Programme in a Nutshell

The aim is to sharpen the e-leadership definitions and metrics, specify data requirements for establishing monitoring mechanisms based on data collected from enterprises, universities and business schools, identify and analyse secondary sources for suitable data to extract information on demand and supply for e-leadership to specify a monitoring mechanism which can be used as a basis for policy making and to improve monitoring of demand and supply of these skills and increase the effectiveness of policy decision making (WP2). A technology trend analysis is conducted to analyse the main technology trends and their impact on new business models and organisation of companies and e-leadership requirements, map the main trends on the current typologies of skills and correlate them with the potential demand for new skills and e-leadership skills and competences emerging (WP3). Further activities include the development of an overview of the European e-leadership policy landscape for the different target groups in which these above activities are embedded (WP4), development of the present European landscape of e-Leadership courses and MOOCs (WP5). In addition, a search and analysis of initiatives from industry, education and training organisations has been carried out.

For its entire work programme, we engage with stakeholder groups from education and the labour market, associations representing SMEs, start-ups and gazelles and others to take into account the target groups evolving requirements for e-leadership (WP1).

2.1.2 E-Leadership as an Evolving Business Need and Policy Concern

The discussion about the skills and in particular e-leadership skills Europe needs in order to become more innovative and competitive has only just started. The European Commission was first when organising the European conference on ‘e-Leadership: Skills for Competitiveness and Innovation - Focusing on identifying the needs of Europe in terms of high-level skills for the global digital economy by 2020’ which took place on 5 February 2013 at the INSEAD Europe Campus in Fontainebleau. This led to the e-leadership initiative of the European Commission with its foundations laid in the e-skills service contract on ‘e-Skills for Competitiveness and Innovation: Vision, Roadmap and Foresight Scenarios’ which was concluded earlier in 2013.

In the meantime the topic is also featured by many influential experts including those from prestigious consulting companies. The authors of a recent McKinsey report⁶ for instance quoting the results from a survey which ran in April 2013 state that C-level executives “are stepping up their own involvement in shaping and driving digital strategies” and that “senior executives are now supporting and getting involved in digital initiatives”. They also make clear that “the success (or failure) of these programs ultimately relies on organisation and

⁶ Brown, B., Sikes, J., Willmott, P.: Bullish on digital: McKinsey Global results. McKinsey & Company, 2013

leadership” and that “leadership is the most decisive factor for a digital program’s success or failure”. However, survey respondents indicate concerns about finding the talent their companies need to realize their digital goals. What is required according to the C-suite executives is the right combination of skills: “technical, functional and business skills are all critical for digital programs”. This corresponds to what the European Commission has termed ‘e-leadership skills’.

It is against this background that the service contract ‘e-Leadership Skills: for Small and Medium Sized Enterprises’ aims to develop targeted actions for start-ups and fast growing SMEs to provide them with relevant e-leadership skills and qualifications for entrepreneurs, managers and advanced ICT users that are recognized trans-nationally.

The initiative is specifically aiming at implementing the recommendations of the report on “e-Leadership: e-skills for competitiveness and innovation – vision, roadmap and foresight scenarios” coordinated by empirica and released in April 2013.

The two main target groups are:

- People: entrepreneurs, managers and advanced ICT users (professionals who need to acquire e-leadership skills);
- Enterprises: SMEs, start-ups and gazelles in all sectors (enterprises with fast growing potential seeking to develop cross-border business and/or competitive advantages with ICT)."

Technological trends such as cloud computing, mobility based business and operating models, social technology, the internet of things and big data require new e-leadership skills of business leaders as we begin to understand the impact on new business models.

As specified in the Terms of Reference “the main focus of this service contract is on e-leadership which is defined as the accomplishment of a goal that relies on information and communication technologies (ICT) through the direction of human resources and uses of ICT. It is a type of leadership, distinguished by the type of goal that needs to be accomplished and what resources a leader must coordinate and align. In the case of e-leadership, both the goal and the resources involve using ICT. An e-leader is both business and ICT-savvy.”⁷

Effective organisations are demanding e-leaders with a T-shaped portfolio of skills, representing expertise in both using ICT and developing organisations. Having a T-shaped portfolio of skills means that a leader has the following skills:

- A horizontal set of skills that represent “transversal skills” (e.g., negotiation; critical thinking; design and systems thinking, business and entrepreneurship, etc.) that enable collaboration across a variety of boundaries;
- Both vertical and horizontal sets of skills require at least an advanced level of ICT user skills.

Each set of activities demands either strategic understanding (knowing what is possible) or practical understanding (knowing how to do the possible) of a set of skills. Depending on what sets of activities an e-leader is responsible for, s/he will need to have a strategic understanding of some areas of expertise and a practical understanding of other areas of expertise.”

⁷ Originating from Fonstad, Nils 2013: Chapter “e-Leadership skills” in Hüsing et al.: e-Leadership: e-Skills for Competitiveness and Innovation Vision, Roadmap and Foresight Scenarios. Report: “Vision, Roadmap and Foresight Scenarios for Europe 2012-2020”.

The focus of the present service contract is on e-leadership skills for SMEs and entrepreneurship (start-ups). It is the direct continuation of the currently running European Commission precursor service contract on 'Curricula Guidelines and Quality Labels fostering e-leadership skills' (www.eskills-guide.eu) where the focus is on large corporations and enterprises and where CIOs and business executives have been selected as the 'leader' so start with and as the target groups of e-leadership programme and course development and demonstration.

2.1.3 Objectives

The objectives of the service contract are:

- To sharpen the definition and metrics of e-leadership through intensively engaging and interviewing relevant stakeholders and establish monitoring mechanisms based on data collected and analysing secondary data sources for suitable data to extract information on demand and supply required as a basis for policy making;
- To develop new and better approaches to deliver e-leadership skills including specific e-leadership courses and programmes for SMEs and Massive Open Online Courses (MOOCs) with the latter to encourage far more people to enrol in e-leadership skills courses.
- To demonstrate the e-leadership programme(s) for SMEs in five business schools and universities in five countries in phases two and three of the service contract;
- To develop an overview of the European e-leadership policy landscape;
- To organise a competition for the 10 best e-leadership courses (also for MOOCs);
- To carry out further dissemination activities including the
 - development of business and academic publications,
 - documentation of lessons learnt from best practice,
 - organisation of regional cluster events,
 - promotion activities using social networks and media and a
 - promotional brochure developed and produced in 24 official languages of the European Union with the English version being printed;
- To organise five expert workshops in the course of the service contract and
- To organise a high-profile conference towards the end of the activity.

2.2 Objectives of the Present Report

This report presents the **main findings from the first phase of the project (months 1-6)**, which has been dedicated to collection and analysis of information and data in Europe regarding e-leadership skills for the target groups as defined above and the impact of the four technological trends identified in the Technical Specifications (Cloud computing; Mobile; Social technology; Big data).

In operational term, the first phase consists of the following activities:

- Engaging with stakeholder groups, associations etc. representing SMEs, start-ups and gazelles to sharpen the definitions and metrics for e-leadership skills for the target groups and taking into account the technological trends;
- Engaging with leading experts from the ICT industry and academics to gather information regarding the impact of the four technological trends on new business models and organisations designs and e-leadership requirements;

- Specifying data requirements for establishing monitoring mechanisms based on data collected from enterprises, universities and business schools; and analysing secondary data sources for suitable data to extract information on demand and supply required as a basis for policy making;
- Collecting in each EU Member States the most recent information on policies and initiatives for the development and the promotion of e-leadership skills for the target groups;
- Identifying and analysing relevant and new e-leadership courses (including online courses on the Internet, MOOCs) and initiatives from industry, education and training organisations;
- Interviewing at least 200 experts from the target groups and relevant stakeholders, complemented by an online survey (target: 500 respondents) – List of stakeholders and experts to be interviewed not to be restricted to Europe but also to include relevant experts from other parts of the world, especially the USA;
- Identifying and selecting the SMEs to be retained for the demonstration activities and the elaboration of business cases; delivering a report presenting the organisation of the demonstrations. The demonstration activities should involve at least 20 SMEs (to be identified and selected by the Contractor in agreement with the Commission before the end of the first phase) from at least 5 EU Member States.
- Organising two workshops (month 3 and 5) with at least 20 experts to gather their views, contributions and feedback on progress.
- Analysing and assessing the information gathered with a view to describe the situation and deliver a synthesis report on the state-of-play in Europe and presenting the results of the above-mentioned tasks (these findings will be further elaborated during the second and third phases). This report should be validated by the Steering Committee.

3 e-Leadership Skills: Definition, Metrics and Monitoring

There is a need for more precise definitions and metrics of e-leadership skills for entrepreneurs, freelancers, SMEs, start-ups and gazelles to demonstrate what kinds of e-leaders are associated with these specific kinds of businesses, which the service contract is supposed to develop and deliver.

New metrics will help to improve monitoring of demand and supply of these skills and thereby increase the effectiveness of policy decision making.

e-leadership skills act as enablers of successful entrepreneurial activity. Among e-leaders, young entrepreneurs (not only digital entrepreneurs) and freelancers play an increasingly important role.

The objectives of this section are to present the results of our work on:

- Sharpening e-leadership definitions and metrics;
- Specifying data requirements for establishing monitoring mechanisms based on data collected from enterprises, universities and business schools; enhanced by an
- Identification and analysis of secondary data sources to extract information on demand and supply for e-leadership in general but also – and where the statistical data will allow for it – differentiated by company size to separately analyse data relating to SMEs.

This activity culminates in the specification of a monitoring mechanism which can be used as a basis for policy making and to improve monitoring of demand and supply of e-leadership skills and increase the effectiveness of policy decision making.

3.1 Defining e-Leadership Skills

An early (2004) definition of e-business skills, which were later renamed into e-leadership skills, was that by the European e-Skills Forum⁸, naming e-Business skills:

The capabilities needed to exploit opportunities provided by ICT, notably the Internet, to ensure more efficient and effective performance of different types of organisations, to explore possibilities for new ways of conducting business and organisational processes, and to establish new businesses. e-Business skills are strategic and related in particular to innovation management, rather than technology-management, skills - which are part of ICT practitioner skills.

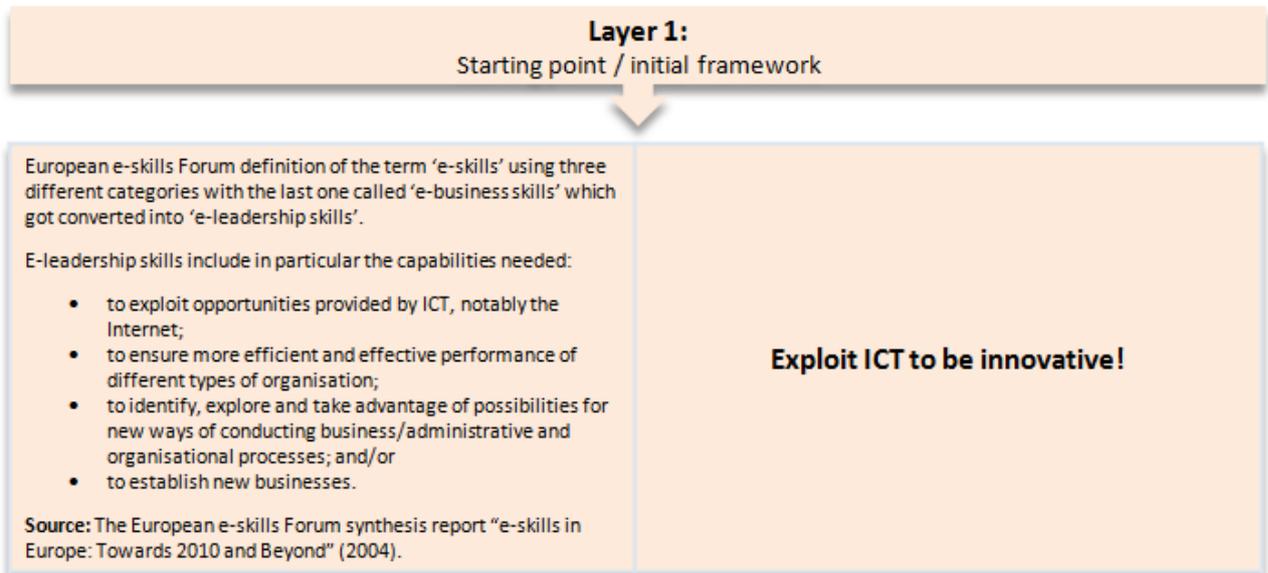
This definition is at a meta-level as it lacks the definition content of the skills and replaces this solely by the goals or reasons why these skills are necessary. This kind of definition is very useful in giving a rationale for defining the term, but needs to be further elaborated to be operationally useful. We have therefore tried to define e-Leadership skills in four layers, with each layer becoming more concrete in the specification of skills.

3.1.1 First Layer

The first layer is represented by exactly the e-skills forum definition, which can be even further simplified to a slogan representing the goal such as “Exploit ICT to be innovative”.

⁸ http://ec.europa.eu/enterprise/sectors/ict/files/e-skills-forum-2004-09-fsr_en.pdf

Figure 3-1: e-Leadership definition layer 1



3.1.2 Second Layer

E-leadership has⁹ been described as

E-leadership is the accomplishment of a goal that relies on ICT through the direction of human resources and uses of ICT.

E-leadership is thus a type of leadership that is distinguished by the type of goal that needs to be accomplished and what resources a leader must coordinate and align. In the case of e-leadership, both the goal and the resources involve using ICT. Who and how many take on the role of an e-leader within an organization depends on the size of the organization, the extent to which an organization depends on ICT for operating its business processes and for developing and provisioning new products and services, and how the senior management team has decided to allocate key responsibilities that involve ICT, such as managing ICT services, operating enterprise-wide business processes; and innovating with external customers and partners.

e-Leaders are thus both business and ICT savvy. They might be ICT leaders who are also business-savvy or business leaders who are ICT-savvy. E-leadership will involve leading and managing e-skilled professionals as well as other professionals.

This has led to the notion of e-leaders being leaders with a T-shaped portfolio of skills: both business and ICT-savvy. We argue that the T-shaped portfolio should be broken down into two sets of vertical expertise skills, namely ICT and market skills and one set of horizontal/transversal expertise, namely that of developing organizations, which requires strategic and tactical skills

⁹ Fonstad, Nils 2013: Chapter "e-Leadership skills" in Hüsing et al.: e-Leadership: e-Skills for Competitiveness and Innovation Vision, Roadmap and Foresight Scenarios. Report: "Vision, Roadmap and Foresight Scenarios for Europe 2012-2020".

Figure 3-2: e-Leadership T-shaped portfolio of skills

	Literacy & basic skills	Using ICT (Vertical Expertise)				Developing Organizations (Horizontal/Transversal Expertise) Global Knowledge Economy Talents			
Key sets of activities	Reading, writing, math, digital literacy, etc.	ICT expertise	Function expertise	Product expertise	Customer & Sector expertise	Managing change and inventing	Developing a compelling vision	Building and aligning relationships across boundaries	Making sense of a situation
Business development, sales and marketing	+++	+	+	+	+	+++	+++	+++	+++
Business process management	+++	+	+	+	+	+++	+++	+++	+++
Program and project management	+++	+	+	+	+	+++	+++	+++	+++
Global sourcing management	+++	+	+	+	+	+++	+++	+++	+++
Enterprise architecture	+++	+++	+++	+++	+++	+	+	+	+
Solution development and implementation	+++	+++	+++	+++	+++	+	+	+	+
Information management and security	+++	+++	+++	+++	+++	+	+	+	+
IT services management and delivery	+++	+++	+++	+++	+++	+	+	+	+

Source: Fonstad 2013

The above picture as a representation of the T-shaped portfolio was developed in a service contract for the European Commission¹⁰, stating “to be accomplished well, each key set of activities requires a different mix of strategic and practical understanding of the vertical and horizontal expertise.”

Although all e-leaders require a T-shaped portfolio of skills, the distribution of expertise may vary, depending on what sets of activities an e-leader is responsible for. The following figure shows how, in general, each set of activities demands either strategic understanding (knowing what is possible) or practical understanding (knowing how to do the possible) of a set of skills. For example, enterprise architects need to have a practical understanding of ICT systems and how to define and manage interdependencies (e.g., between ICT, business processes and data) as well as functional, product and sector expertise to ensure

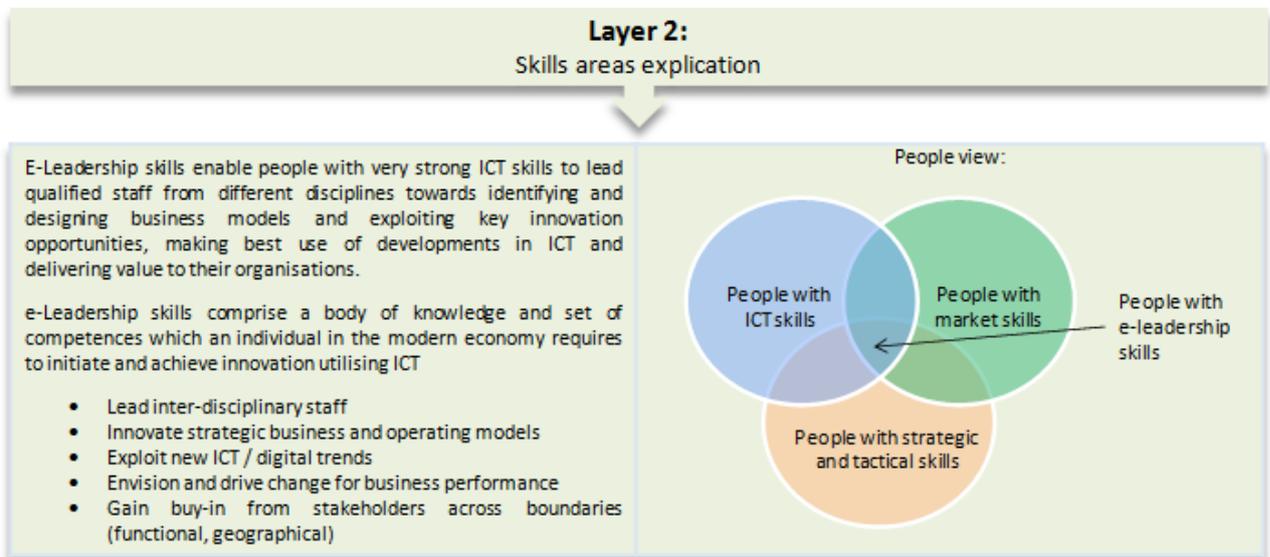
¹⁰ Fonstad, see above

that the enterprise architecture supports an operating model that is best for the organization, given its strategy and the environment it is working in. The Chief Enterprise Architect of a large enterprise is also a critical e-leader, leading a team of enterprise architects and generally ensuring that all projects are in compliance with the enterprise architecture (and any exceptions are under control).

While we generally agree with the concept, in educational practice, however, the vertical expertise tends to be separated into business management skills (function expertise, product expertise, customer & sector expertise as taught in management studies) and ICT skills (as taught in computer science). The vertical set of skills¹¹, especially developing a compelling vision, building and aligning relationships across boundaries and making sense of a situation are typically taught in MBA studies (and less so in masters in management programmes).

We therefore would define e-leadership skills as a combination of three (rather than two) sets of skills, as is shown in the following picture, representing layer 2 of our definition.

Figure 3-3: e-Leadership definition layer 2



3.1.3 Third Layer

The third layer of defining e-leadership skills will be an explication of actual skills that together define e-leadership.

For this, three lists of skills need to be produced that exemplify e-leadership in the areas of ICT skills, market skills and strategic/tactical skills. Using this approach, e-leadership skills would be combination of a sufficient number and level of skills from all three domains. As skills requirements to be an e-leader differ according to the job role of their incumbent, as well as by industry and service or product, by size of enterprise and its life-cycle stage, there is not one definite set of e-leadership skills to be attained by anyone who wants to be an e-leader.

Also, due to both a) the diversity of e-leadership skills needs across industries, enterprise sizes and life-cycle stages and b) the dynamics of technological developments in ICT (and, although perhaps to a lesser degree, in entrepreneurship and management science) we do

¹¹ We argue that “managing change and inventing” can better be understood as a functional expertise and therefore should be filed under market skills.

not claim to produce complete lists of skills but rather view our approach as discussion basis, which can be continually honed and updated by parties interested and involved.

Because e-leadership skills need to be attuned to the goal to be achieved, it follows that, on a conceptual level, the combination of skills from these lists has degrees of freedom in its composition.

In the following, we try to enumerate these tentative, necessarily evolving lists of skills by domain.

ICT Skills

An e-leadership ICT component skills index was developed based on the e-CF and its job profiles. The top 23 e-skills according to this index (above an arbitrary threshold of 20) are depicted in the following, the full list and methodology can be found in the Annex.

Competences on the top of this list can be regarded as core components of the ICT leg of e-leadership skills, while towards the bottom e-leadership specialisations can probably be found.

Figure 3-4: e-Leadership component e-CF e-skills

Rank	e-CF skill	e-CF 3.0 location	
1	IS and Business Strategy alignment	Plan	A.1
2	Technology Trend Monitoring	Plan	A.7
3	Business Plan Development	Plan	A.3
4	Business Change Management	Manage	E.7
5	Project and portfolio management	Manage	E.2
6	Risk management	Manage	E.3
7	Architecture Design	Plan	A.5
8	IS Governance	Manage	E.9
9	Relationship Management	Manage	E.4
10	Information Security Management	Manage	E.8
11	Process improvement	Manage	E.5
12	Problem management	Run	C.4
13	Information and Knowledge Management	Enable	D.10
14	Component integration	Build	B.2
15	Systems Engineering	Build	B.6
16	Personnel Development	Enable	D.9
17	Needs Identification	Enable	D.11
18	Information Security Strategy Development	Enable	D.1
19	ICT quality management	Manage	E.6
20	Product/Service Planning	Plan	A.4
21	Service delivery	Run	C.3
22	Innovating	Plan	A.9
23	Sales Management	Enable	D.7

Source: empirica

It has to be noted that this is a purely mechanistic approach to enumerating the ICT components of e-leadership skills, based on existing profiles. It is apparent, e.g., that A.9

“Innovating” is seriously underweighted by this approach, with innovation being the main rationale for defining and pursuing e-leadership¹².

Market/Business Skills:¹³

Market/business skills will include

- specific knowledge of the domain and industry the company operates in and its requirements as well as its capability to provide functional expertise based on deep and broad knowledge and understanding of business processes, flows and related concepts
- coupled with a profound understanding of the product features, technology and emerging markets,
- deep sector expertise grounded in a thorough understanding of customers and the
- ability to identify the right strategic direction that builds value and acquires businesses and the
- ability to manage technology-driven challenges and opportunities
- taking advantage and making best use of ICT developments and trends by
- exploiting innovation in identifying and designing new business models that deliver value to the organisation.

Strategic and Tactical Skills

Strategic and tactical skills:

- are a set of intrapersonal and interpersonal skills that effectively drive tactical actions, strategic thinking and decision making towards an organisation’s improved performance and value built upon exploiting innovation using ICT;
- represent a combination of forward looking strategic skills with here-and-now tactical ones gained through past experiences.¹⁴
- denote the ability to chart the course and make agile alterations in line with the organisation's long-term purpose and goals (strategic skills) in combination with the
- aptitude to effectively deploy actions and tactics leading to a successful implementation of the right strategy targeting the desired objective (tactical skills) and the

Strategic and tactical skills include *intrapersonal skills*:¹⁵

- Capable of developing a compelling vision

¹² It has to be noted that „Innovating“ has been a recent addition to the e-CF, appearing first in version 3.0 and is for the time being only mentioned in the profile of the Systems Architect. It can probably be argued that innovating should be included in more leadership related job profiles.

¹³ Groysberg, B., McLean, A. M, and Nohria, N. (2012): Are Leaders Portable? Harvard Business Review, May 2006: 93-100; and Prastacos, G., Söderquist, K., Spanos, Y., and Wassenhove, L. V. (2002): An Integrated Framework for Managing Change in the New Competitive Landscape. European Management Journal Vol. 20, No. 1, pp. 55–71, 2002

¹⁴ Cooper, C.D., Scandura, T.A., and Schriesheim, C. A. (2005): Looking forward but learning from our past: Potential challenges to developing authentic leadership theory and authentic leaders. *The Leadership Quarterly* 16 (2005) 475–493.

¹⁵ See also: Hogan, R., and Kaiser, R.B. (2005): What We Know about Leadership. *Review of General Psychology* 2005, Vol. 9, No. 2, 169–180;

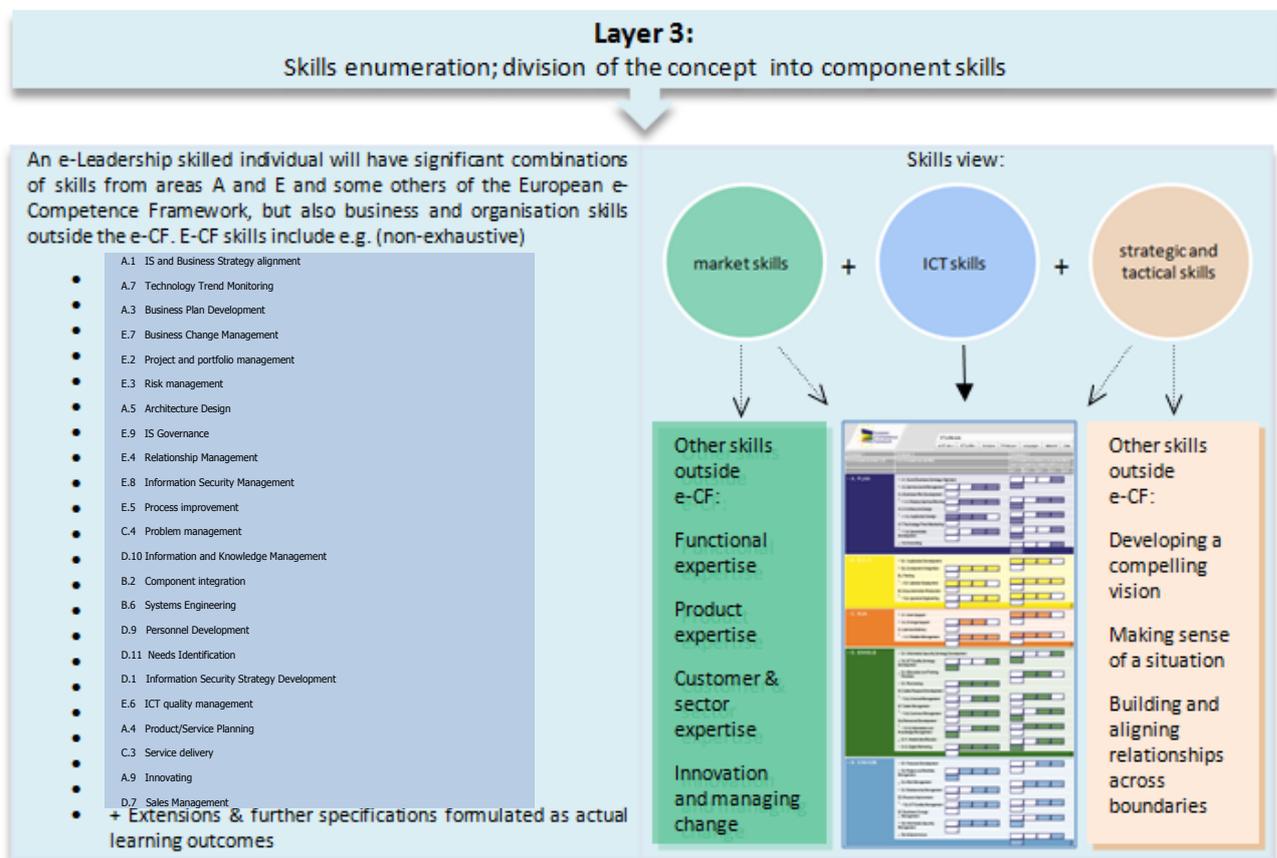
- Making sense of a situation: Determine the deeper meaning/significance of what is being expressed
- Ability to anticipate problems/challenges and seek innovative opportunities
- Novel and adaptive thinking capabilities
- Ability to organise and lead by effectively using past experiences.

Strategic and tactical skills also include interpersonal skills (interacting with and influencing other people):¹⁶

- Effectively communicate an innovation idea, to propose an innovation project and guiding that innovation project to success.
- Ability to lead qualified staff from different disciplines towards identifying and designing business models
- Building and aligning relationships across boundaries: Not so much intra organizational communication across departments, but communication across the boundaries of the firm, in an eco-systems (service providers (IT, non-IT), consortium partners, freelancers, supply chain relations in vertical markets, e.g. relationship to corporate, powerful customers).

In synopsis, layer three of defining e-leadership skills is depicted in the following picture.

Figure 3-5: e-Leadership definition layer 3



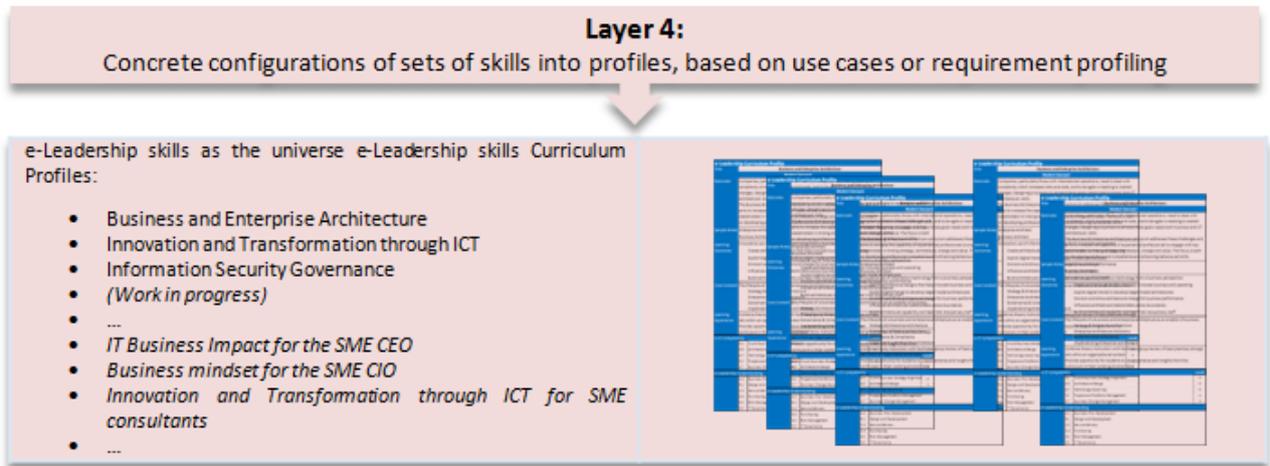
¹⁶ See also: Mumford, T. V., Campion, M. A., and Morgeson, F. P. (2007): The leadership skills strataplex: Leadership skill requirements across organizational levels. *The Leadership Quarterly* 18 (2007) 154–166.

3.1.4 Fourth Layer

Specific sets of skills can be aggregated in job profiles, and accordingly curriculum profiles.

Examples of e-leaders may include a Chief Marketing Officer responsible for using social media to enhance promotion and the customer experience, a Chief Information Officer, a Chief Enterprise Architect, a relationship manager between IT and a business unit, or a founder of an enterprise that relies on ICT to operate and innovate.

Figure 3-6: e-Leadership definition layer 4



We have not yet defined any SME specific e-leadership job profiles or curriculum profiles. Going forward, this may be considered.

4 e-Leadership Skill Requirements Capture from SMEs and Entrepreneurs – Preliminary Results from Interview and Survey Data of SMEs

4.1 Overview

The work contributes much needed insights into e-leaders and SMEs. It has enabled a set of European business schools (“Academic Partners”) to engage with SMEs and co-create important insights into what kinds of leaders SMEs rely on to ensure they can use ICT to develop, grow and compete.¹⁷ There is a dearth of research on how SMEs use ICT to develop, grow and compete, and even less research on what kinds of leaders they rely on to use ICT effectively.¹⁸ What little research does exist on SMEs reveals that SMEs take a distinct approach to running a business and to managing ICT; it cautions assuming that critical success factors for large firms apply in a straightforward manner to SMEs. This work represents an important step forward towards helping business schools and SMEs collaborate and develop insights and a common language for SMEs to access and foster leaders who are both business and ICT-savvy (“e-leaders”) and who ensure SMEs use ICT effectively.

During the first 6 months Academic Partners engaged with and collected data from SMEs in the following two complementary methods.

1. Academic Partners interviewed over 50 successful SMEs to learn about past and future role(s) of e-leaders in those organizations;
2. Based on past research and the insights from the interviews, Academic Partners developed an online survey. While almost 1000 SMEs viewed the survey, to maximize the quality of the results, almost 300 completed surveys were used for comprehensive analysis.

Annex chapters 11.2 and 11.3 describe both methods in greater detail, including the cover letter, the interview protocol and the survey instrument.

- The interview data consist of data collected from over 50 successful SMEs
- The survey instrument was developed based on past research and data from interviews of successful SMEs.
- Although almost 1000 SMEs viewed the survey, survey results were developed less than 300 completed surveys to maximize the quality of results.

¹⁷ The Academic Partners are, in alphabetical order: Aarhus Business School (Denmark); Antwerp Management School (Belgium); Henley Business School (United Kingdom); IE Business School (Spain); and New Bulgarian University (Bulgaria). In addition, during the first 6 months of the project, INSEAD actively participated. During the remainder of the project, the Academic Partners will be designing and conducting training demonstrations to help people from SMEs become more effective e-leaders.

¹⁸ Even as recently as July 2014, an opinion piece published in the *Financial Times* argued the following. “We have to create a space in which the dialogue between business schools and small businesses can take place, because there are genuine and important synergies to be exploited [...] In short, we should be doing everything possible to encourage academics, students and small business owners to co-create knowledge. Business schools and MSEs have much to learn from each other; but at the moment, sadly, we are simply not speaking the same language.” (Greenman, A. (2014). “Business schools thinking big at the expense of small enterprises.” *Financial Times*. 14 July 2014.

The survey was piloted by people at PIN-SME with experience both working in and advising SMEs. The following key insights emerged after analysing the data from both methods.

Key results include:

1. The demands for e-leaders vary significantly along the following dimensions.
 - i. Sector: ICT Services and other
 - ii. Age of SME: less than or greater than 4 years
2. SMEs manage ICT in a much more informal manner than large companies. SMEs do neither necessarily have a formal ICT group nor even an equivalent of a CIO; this is especially true for SMEs that are not in the ICT Services sector.
3. Lack of time, lack of prioritization, and insufficient budget to invest in digital technologies are the 3 most cited factors constraining SMEs from using ICT effectively.
4. SMEs in ICT Services cite ICT Management (including project and program management) as the type of training they would most be willing to invest in over the next 2 years. In contrast, SMEs from other sectors would most be willing to invest in training on Business Development, Sales and Marketing.
5. With regards to constraints in participating in training, content, time, costs, and scheduling are the top 4 constraints cited by ICT service enterprises, whereas cost and content are top factors constraining enterprises not in ICT Services from investing in training offered by local educational institutions.
6. With regards to the minimum amount of time employees would be able to take away to participate in training, all types of SMEs cite significant time constraints.

Going forward, the Academic Partners will incorporate these insights in a variety of ways into the demonstrations they are designing and conducting to help employees from SMEs become more effective e-leaders.

- Regarding the content of the demonstrations, the interview and survey data confirm that both enterprise architecture and ICT governance are relevant areas for e-leaders in SMEs. Academic Partners have both, significant expertise in enterprise architecture and ICT governance, as well as in teaching those topics to SMEs.
- Regarding the format of the demonstration, the interview and survey data underscore the importance of having the demonstration be no more than a day and to provide a balance between theory, such as frameworks that provide an overview of different enterprise architecture stages and different model of ICT governance, and application, such as having participants relate frameworks to their specific situations and discuss and learn from each other and the instructors about ways to implement them.

4.2 Key Relevant Results

An important contribution of this project has been to develop insights into relevant differences between SMEs and large enterprises, as well as differences amongst SMEs, in terms of their approaches to managing ICT strategically and the corresponding roles of e-leaders.

For example, from the interviews with successful SMEs, including representatives of SME organizations, it became evident that there are significant differences with regards to how SMEs manage ICT, depending on the age of an SME. SMEs that are younger than 4 years are significantly more focused on shorter-term issues, such as making sure they have sufficient revenue to last another month or two, rather than longer-term issues, such as whether or not the enterprise should formally assign someone to take responsibility for managing ICT

strategically and whether or not the enterprise should formally set up an IT group. As a result, when collecting survey data from SMEs, we decided to analyse data only from SMEs that are 4 years or older, as ICT governance and enterprise architecture are significantly more likely to be critical success factors, and consequently, key responsibilities of effective e-leadership.

The results included in this section were obtained by analysing data with the following characteristics.

- Size of sample used for analysis: 262
- Size of sample of SMEs used for analysis: 229

Please note, for each question, the sample size will vary, depending on how many participants answered the question.

Further preliminary results of the survey are included in the annex.

Table 4-1: The sample includes a variety of European countries

COUNTRY	% of sample (N=219)
Belgium	6%
Bulgaria	30%
Denmark	24%
Spain	8%
United Kingdom	17%
Other	25%

Source: Survey of SMEs

Table 4-2: SMEs from ICT Services represent over a third of sample

INDUSTRY	% of sample (N=219)
ICT Services	36%
Services (non-ICT)	23%
Industrials & Manufacturing	12%
Other	29%

Source: Survey of SMEs

From the interviews of successful SMEs, it also becomes evident that another important dimension along which there are significant differences in how ICT is managed, and consequently the role of e-leaders, is the sector of the SME. We included questions in the survey to examine this dimension quantitatively. Results from survey data complement results from interviews.

Two important and related differences between large enterprises and small enterprises and between SMEs in the ICT Services sector and SMEs from other sectors are whether or not the SME has a:

- CIO equivalent: Is someone in the organization who is formally responsible for managing ICT?; and
- Formal IT Group: Does the SME have a formal IT Group?

Table 4-3 summarizes the results and presents them in such a way as to facilitate comparison across two dimensions: size of enterprise (i.e., large or SME) and sector (i.e., ICT Services or other).

Table 4-3: Percentage of enterprises that have a CIO equivalent and/or a Formal IT Group – a comparison by enterprise size and sector.

CIO equivalent	Large Enterprises (N=33)		CIO equivalent	SMEs (N=223)	
	Yes	0%		88%	Yes
No	6%	6%	No	29%	4%
	No	Yes		No	Yes
	Formal IT Group			Formal IT Group	

CIO equivalent	SMEs in ICT Services (N=66)		CIO equivalent	SMEs not in ICT Services (N=156)	
	Yes	38%		39%	Yes
No	20%	3%	No	33%	4%
	No	Yes		No	Yes
	Formal IT Group			Formal IT Group	

Source: Survey of SMEs

When comparing survey results of large enterprises with SMEs, it is strikingly evident that SMEs manage ICT in a much more informal manner than large companies. While most large enterprises (88%) have both an equivalent of a CIO and a formal IT Group, just over a third of SMEs (36%) do; this is especially true for SMEs that are not in the ICT Services sector.

Amongst SMEs, about a third (31%) has the equivalent of a CIO yet do not have a formal IT Group. Within this group, there are also significant differences by sector: SMEs in ICT Services (38%) are more likely than SMEs in other sectors (29%) to have a CIO equivalent yet no formal IT Group.

Overall, more than three-quarters of SMEs in ICT Services (77%) have a CIO equivalent, whereas less than two-thirds (63%) of SMEs in other sectors have a CIO equivalent.

When analysing the in-depth interviews with regards to how successful SMEs have obtained the skills needed for their success, two major sources become apparent: **hiring** (including bringing existing skills into the company by its founders) **and informal or semi-informal learning**, e.g. in the form of on-the job self-learning or peer learning and internal workshops. A third major source is **external consultancy**, including from vendors. In some cases a **knowledge transfer from external sources to staff** takes place, in other cases SMEs completely **outsource** tasks which are outside their skills portfolio.

The following table collates most of the answers by SME interview partners as to how advanced e-skills are obtained.

Table 4-4: SME interview result snippets – how were advanced e-skills obtained

<p style="text-align: center;">Interview result snippets How were advanced skills obtained?</p>		
<p>The product manager was key for the success of the project, this profile was very hard to find (highly educated person). -> Hiring The rest of the employees involved in the project were self-taught. The company offers a training budget that employees can use freely on their own.</p>	<p>In the initial phase the advanced ICT skill were brought by the founders of the company who possess senior expertise in ICT with experience in management acquired in leading ICT companies. In the next phases they transferred their knowledge to the new members of the team, mainly through coaching and internal trainings.</p>	
<p>The company hires and trains internally the needed professionals</p>	<p>Self-educated. They use trial and error strategies.</p>	<ul style="list-style-type: none"> • Internal coaching and training • external trainings (1 or 2 days) • conferences • free online courses • recruitment of experts • None of the interviewees has mentioned a university as a lifelong learning knowledge provider.
<p>Advanced ICT skills obtained internally only (no external consultancy or buy skills).</p>	<p>Internally through interaction between co-founders</p>	
<p>We consider training as very important for our employees. If we have the required knowledge available in-house, then the education is provided by one of our colleagues. Otherwise, we look for external institutions to get the training.</p>	<ul style="list-style-type: none"> • All required skills for the innovation were internally available, because the core products/services of the SME are IT enabled. • The CRM/ERP tool development and customisation was executed by the external party who provides the tool cloud-based. --> Vendor • Interesting fact: the proximity of the ICT supplier for the fundamental CRM/ERP tool was very important, both psychological and physical. If some problem would occur, they can have a quick follow-up. 	
<p>They already had the necessary skills to develop the course. They integrated java development (outsource).</p>		
<p>Use of external providers. Trial and error strategy.</p>	<p>The company obtains the demanded ICT skills through external service providers and the providers of the exploited tools for market research (--> Vendor.)</p>	
<p>Internal training, self-education, participation in special trainings, conferences, invitation of expert talks etc.</p>	<p>The most difficult skills that the company considers crucial to exploit are related to the awareness of the trends in digital marketing and market research.</p>	
<p>The company obtains advanced ICT skills mainly using the internal resources and hires, following the method “learning by doing”. The company organizes internal talent (HR) development through courses, content development and sharing, mentor groups etc. The most difficult knowledge and skills are related to the ability of IT and engineering professionals to provide adequate consultancy services to the clients considering the business impact of the offered technology, usability design, communication and understanding of the cross-point between client requirements and application of the specific technology, technical communication. The main reason for this difficulty is that the focus in the IT-related education system is oriented more to the technical knowledge and skills and very little attention is devoted to the business aspect and application of the technology/ engineering knowledge and skills.</p>	<p>Development skills were acquired via an external service provider.</p>	
	<p>Trainings for special types of software (e.g. CAD) when necessary</p>	
	<p>External and internal trainings, hiring juniors and developing them.</p>	
<p>Hiring of developers with app-development skills, participation in conferences, external talks by experts on certain topics</p>	<p>Most skills were internally available, but additional expertise and capacity on infrastructure had to be attracted via an external party.</p>	<p>For obtaining advanced skills for using any of the aforementioned technology the company organizes internal knowledge sharing events, hires new professionals, merges and acquires other companies and teams.</p>
<p>The company develops content for internal trainings and organizes self-learning groups. The management adopted a policy that states that each employee should share 20 % of its working time for training. It is difficult to find the demanded ICT skills for emerging and non-industrialized technology.</p>		
<p>The company provides training of its employees how to use the custom ICT solution. All ICT skills that are not used in everyday operational work are outsourced.</p>	<p>FTEs at the company were employed even before these technologies come out. They do it in house. Specific technologies obtained via KTP with university of Sheffield on semantic technology (1 person involved). Project managers do mostly external, Developers technical expertise usually internal, self-study. Use of IT in house they also work with associates (freelancers) on developing the resource. This is more for technical development, design. Workers decrease and increase depending on market demand. They also use apprenticeships and contractors , members of team working together with product developers. Own FTE lead the projects.</p>	
<p>The company offers SAP training, use of SAP learning Hub. Also, Realtech Institute of Knowledge.</p>	<p>A few research findings, SCRUM and project management practices.</p>	<p>Self-taught in the area of marketing. They follow a calendar with courses of technological nature.</p>

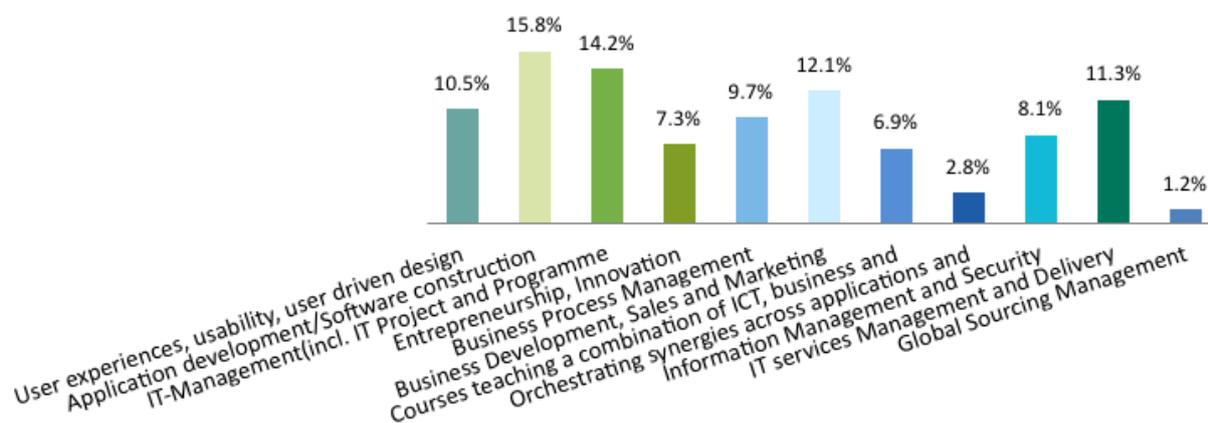
They already had the necessary skills to develop the innovation.	External service provide possessed all necessary skills	They already had the necessary skills to develop the course
One app developer was hired , web-site agency integrated app with website, internal departments provided support (project management, design etc.)	Internally within FTEs .No partners, consulting services or other external service providers. Four IT directors (owners of business). It was not difficult for a firm to find an advanced ICT skills as Mobility and Mobile Apps Development Cloud Computing and data analytics (Hiring)	
Advanced IT skills are outsourced to external providers, for example, Mobile Apps (Magic Eye app for iPhone and iPad) development to support a product. There is an app that support lighting and filming, did it with German institute of technology, spend about 40K, over a period of time, developing various platforms on iPod and iPad also using external expertise (-> research cooperation). We are looking at commercial approbation of the products and surround ourselves by people who have knowledge and expertise on the side about the product. First it's a market research on skills then contact techies with idea may transform and evolve.		Hiring staff from universities
Internally within FTEs. Recruitment (HR) managers recruit necessary staff for skills needed.	The technical director was specially trained	Some skills were internally available , but others were obtained via the external service provider . We learned during the investment project that it was critical to retain the project responsibility in-house and not at the service provider.
Self-taught skills , help from partner , who is photographer but has IT skills. Partly IT skills were outsourced - template of the blog and a shop. It's a mix of partnership knowledge and	In-house with Managing director coordinating platform development with other team members. Everything is inside the company group. IT support consultancy not used.	IT company external service provider was used to create innovation, however more basic IT maintenance and operationalization is done by IT specialist within the company.

Source: Semi-structured interviews with SMEs

4.3 Insights Regarding Content

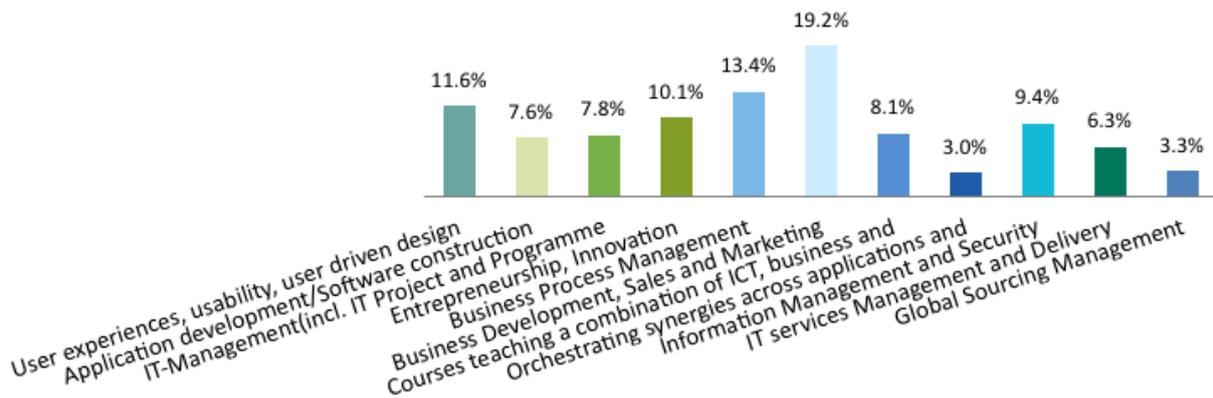
When SMEs were asked what kinds of training they would be most willing to invest in over the next 2 years, SMEs in ICT Services cited Application development and ICT Management (including project and program management) as the 2 types of training they would most be willing to invest in over the next 2 years. In contrast, SMEs from other sectors would most be willing to invest in training on Business Development, Sales and Marketing.

Figure 7: In what type of training would SMEs be most willing to invest?



SMEs from ICT Services sector

Source: Survey of SMEs



SMEs from other sectors

Source: Survey of SMEs

Analyses of interview and survey data also reveal the importance of enterprise architecture, IT governance, and project management as key responsibilities of e-leaders of SMEs.

These topics were examined in two fundamental ways. First, by assessing the enterprise architecture maturity of an organization's digitized platform which consists of the accumulation over time of the following three types of inter-related components, as constituents throughout an organization invest in information and communication technologies (Ross et al. 2006; Tanriverdi and Uysal 2011).

- 1 *IT applications and infrastructure*, such as a customer relationship management (CRM) systems to help analyse customer behaviour and develop more relevant services for more specific customers;
- 2 Business processes that depend on applications and infrastructure for execution ("*digitized business processes*"), such as the process by which a business unit uses a CRM to handle and track specific engagements with customers, such as subscriptions to new services, complaints, and termination of services; and
- 3 *Data* that are generated and used by applications during the execution of digitized business processes, such as customer data generated and used by a CRM system that a business unit invested in to improve the way it engages with customers. Large complex information systems such as enterprise resource planning systems are increasingly serving as a platform to which other tools can be added in order to take advantage of shared data resources.

Digitized platform maturity refers to the degree with which the components of a firm's digitized platform have been accumulated in a coordinated manner, with sufficient standardization and sharing of technologies, digitized business processes and data across business units (Fonstad et al. 2014). Organizational integration via a firm's digitized platform (see Barki and Pinsonneault 2005) can be a fundamental IT-enabled resource. This is supported by research on enterprise architecture (Bradley et al. 2011; Bradley et al. 2012; Ross 2003; Ross et al. 2006); and cross-business information technology integration (Tanriverdi and Uysal 2011).

Organizations transform their digitized platforms in stages, due to the complexity of and learning related to changing systems of technologies, business processes, and data (Bradley et al. 2011; Bradley et al. 2012; Ross, 2003; Ross et al. 2006). Ross (2003) has identified four stages of digitized platform maturity (shown in Table 1).

In order to manage their digitized platforms, organizations rely on enterprise architecture to logically organize its IT infrastructure and business process capabilities to address its needs for IT and business process integration and standardization (Bradley et al., 2011). A

fundamental role of enterprise architecture is to guide an organization through the process of transforming a digitized platform from its current state to a platform that supports its target operating model (Tamm et al. 2011). Within this role, enterprise architecture provides a “definition and representation of a high-level view of an enterprise’s business processes and IT systems, their interrelationships, and the extent to which these processes and systems are shared by different parts of the enterprise” (Tamm et al. 2011:147). Enterprise architecture maturity has been found to be highly correlated with CIO assessments of firm profitability (Ross 2004) as well as CIO assessments of firm performance relative to competitors on dimensions such as process efficiency, process innovativeness, and driving value from IT (Ross and Beath 2011).

Table 4-5: The Stages of Maturity of a Digitized Platform (Ross et al. 2006)

Stage of enterprise architecture maturity (from least to most mature)	Key additional capabilities for achieving and sustaining this stage of maturity
Business Silos (least mature)	IT resources are focused on effectively and efficiently developing applications that meet specific needs of business teams
Standardized Technology	Organizations focus their efforts and IT resources on the development of IT standards and a shared IT infrastructure. IT group is sufficiently coordinated to provide economies of scale with regards to investments in IT without limiting independence of business units
Optimized Core	Organizations shift their focus from shared infrastructure and local applications to enterprise systems and enterprise-wide data sharing. There is also an attempt to identify and define core business processes and the data on which they rely.
Business Modularity (most mature)	Firms build on the already standardized processes and data in order to incorporate plug-and-play capabilities, built internally or externally. ¹⁹ Organizations can focus their efforts and resources on attaining strategic agility through reusable business process modules.

Survey data reveal there are a significant number of SMEs struggling to achieve a sufficiently mature digitized platform and develop new applications. Over a third of participating SMEs reported that they are both struggling with developing new applications effectively and are struggling with enterprise architecture (which is how an enterprise achieves and sustains a sufficiently mature enterprise architecture). The success of both depends on effective enterprise architecture, project management, and IT governance.

Table 4-6: Amongst SMEs, there is a significant demand for enterprise architecture, project management, and IT governance (N=216).

Develop new applications effectively	above average	15%	26%
	average or below	36%	23%
		average or below	above average
Enterprise Architecture/ Digitized Platform Maturity			

Source: Survey of SMEs

¹⁹ Once firms have implemented large packaged systems, firm-wide portals, or other tools enabling enterprise-wide sharing of data and processes, they become concerned with standardized interfaces so that they can readily adopt customized or industry-standard components.

In summary, both interview and survey data confirm the importance of enterprise architecture, project management, and IT governance as content for the demonstrations.

4.3.1 E-skills Content Insight from Interviews

We asked about e-skills that successful SMEs found particularly hard to find, considering especially the following technologies:

- Mobility and Mobile Apps Development
- Cloud Computing
- Data Analytics (e.g.; “Big Data”)
- Social Media Technologies
- The Internet of Things (IoT) (incl. Wearable Computing)

Cloud computing, big data/data analytics and mobile apps development were mentioned by about one in three companies to be very difficult to hire. Other skills, not explicitly asked for were mentioned as well, including the need for **technology educated** employees who are **business savvy, understand the needs of the customers** or the business implications of their work. The following figure contains most of the usable answers from this question.

Table 4-7: SME interview result snippets – e-skills most difficult to find

Interview result snippets Which skills were the most difficult to find? Why		
R&D (mobile app work and Internet of things) is the hardest to fill in. Data analytics is mostly done in house. The easiest to find is social media skills which is also done in-house, analysis of tweets, feedback from the customers.	Problems finding a good fit with external service providers that cater to their needs, no standard products with lots of overhead	Cloud computing technology most difficult to find, then data analytics (this includes working with big amounts of data, writing reports combining various sources and choosing a write formula, filler for information that further gets customised). Data analytics. Still difficult but much easier to find mobile applications and technology skills. Easiest social media tech specialist. Internet of things is not used, no comments on it.
Data analytics.	Mobility / Data analytics.	
Lack of expertise in social media. Big Data.	Mobility and Cloud	
Cloud computing and Big data.	They have not encountered any difficulties.	
Knowledge and skills related to provision of adequate consultancy services regarding the business impact of the technologies offered to the clients, usability design, communication and understanding of client requirements, technical communication. The focus in the IT-related education system is on the technical knowledge and skills and very little attention is devoted to the business aspect and application of the technology/ engineering knowledge and skills.		The company has tried to create a team for mobile technologies but it was extremely difficult to find employees Technical skills with business knowledge
The most difficult to find is structure based technology together with cloud computing ; then follow Mobile Apps development; data analytics (big data). The easiest - social media tech.	The most difficult are “ Internet of Things ”, data analytics (Big data, analysis of customers, market and business analysis), Cloud Computing , then follow Mobility and Mobile Apps Development. The easiest - social media tech.	The most difficult is Data Analytics (e.g., “Big Data”) followed by Mobility and Mobile Apps Development and Cloud Computing altogether. The easiest is Social Media Technologies. The Internet of Things (incl. Wearable Computing) is not used by enterprise but is not considered hard to get skills on the market.
The most difficult to find is cloud computing ; then follow data analytics (SQL - data programming language); Mobile Apps development.	If looking at skills harder to find IT development - mobile application development is harder, Internet of things is hard to find and is desirable for this business. The easiest to find data analytics and social media tech	Social media is the easiest, then more difficult to find are cloud tech and mobile app development specialists as well as the data analytics.
Cloud computing.	The skills that the company has difficulties finding are related to the digitalization of a specific domain of activities like market research.	Social media technologies (“everybody is community manager”). Combination of business and IT knowledge, easy to find technicians without a commercial/economic background
Cloud Computing was difficult to find at the beginning, but is not anymore. Data analytics.	Otherwise the new hired employees have	

Mobile applications and technology - most difficult to find, then cloud computing and data analytics . Easier social media tech specialist. Internet of things could not answer.	to learn how to work with specific tools and systems for market research. In general ICT knowledge is considered as an advantage when new staff is hired.	Most difficult is to find a person to bring him / her as a co-founder (entrepreneurship) . Mobile app development is harder to find, social media is much easier. Data analytics is used on a basic level but more in depth - more challenge.
Scrum , good developers (easier to find in eastern European countries)	Mobility and Mobile Apps Development + web development, System architecture	Mobility and Mobile Apps Development
It is difficult for the company to find qualified and ready to work people in all the areas including trivial coding . The most difficult knowledge and skills to acquire are Cloud Computing and Data Analytics .	Research and development engineers. Cloud solutions developers, image processing and big data experts	The company has difficulties to find: <ul style="list-style-type: none"> • Project managers for game development. • Usability managers. • Combination of ICT and business skilled people.
Analytical Skills Professional attitude towards confidential information	- Developers with PHP skills - (Young) Developers that possess the capacity to understand the business problem and request of the client, and to transform this request to our solution expertise (business savvy developers).	
- It is very difficult to find the right security savvy people, especially with (project) experience. - Technical people that go beyond their technological responsibilities for development and can understand the business context of customers.	<ul style="list-style-type: none"> • Finding the right external service provider for the ERP package was very difficult • We are now very dependent on the external IT consultant and as a freelancer he can go whenever he wants. To date, this has not been an issue yet. • We are also dependent on the small ICT company for the app developments, but we purposefully made this choice. 	Semantic modelling, Business Analysis with semantic technology, Semantic query languages, Optimization, Cloud based applications, Multi-tenancy, SOA servers and integration, Usability for complex models like semantic.
PHP/Oracle development skills Combination of IT skills and being business savvy	Core professional skills - web technologies, design skills Interpersonal skills and teamwork	Not so difficult, two people were recruited last year and the search process went relatively easy.

Source: Semi-structured interviews of SMEs

Finally, interview partners were asked about future demand for e-leaders in their SMEs. Several interview partners gave answers that confirm the core of the definition of e-leadership skills, namely to have a good understanding of both the business and IT, and to use IT to find creative solutions and be innovative.

A perhaps surprising finding is how many interview partners name rather technical (development, data) skills as a requirement of e-leaders. This reflects a requirement for SME e-leaders different probably from corporate e-leaders, where **e-leaders in SMEs are much more engaged in actual development and operational processes**.

Among the technical demands of e-leaders, we find e.g. software development, mobile application and web development including skills in PHP, Flash, Java, Java Script etc.; 3D animation; ERP systems; (Big) data tools such as SQL, Hadoop, Python and Django.

Another requirement mentioned concerns **security skills**

4.3.2 E-Leadership Skills Content from Interviews

Table 4-8: SME Interview result snippets - Future demand for e-Leaders

Interview result snippets Future demand for e-Leaders		
Managers including in IT who could understand the problems that students and lecturers face and appropriately transfer it into new features of our product (market understanding). Managers who can approach people and are flexible, good communicators , but also work closely with product developers.		Leaders, who could take on more responsibilities, should be ready to organisational change . It is more about personality , who is competent, could learn enough about the technology to lead. Not necessarily an expert in semantic technology, not necessarily hands on but independent learner . Leaders with technology experience. Managers who get creative at work finding solutions , expertise, knowledge, be alerted at all times, thinking who can they talk to at customers.
Globally all businesses gravitate on “how do I have effective conversations” - this is not transient, putting things on Facebook, but proper communication with customers is needed. It happens through multiple channels of technology and IT. For e-leaders it is important to be able to communicate and utilize technological change effectively within the business profile of a company. Future e-leaders understand how technology help them to have a better conversation with customers (including digital tech), capturing the marketing that customers do for you themselves via technology, webinars, digital online to go. E-leaders need to think of a problem with different prospective and application to market needs, new opportunities from different prospective. Creativity will play a bigger role and technology will foster creativity and they will interact as technology affords to do this. Creative e-leaders will adjust technology be used for a more efficient conversation to the customer.		None Leaders who know the main trends in the digitalizing of market research.
YouTube skills partnership with YouTube. Skills to use technology, Google plus, Instagram, Bloglovin as a good tool. (Social media technologies) Mobile app developer, linking computers with other blogs skills like mobile app development	Java and other engineers 12-15 years of experience in IT. Will anticipate needing leaders in “Internet of things”, Data Analytics (e.g., “Big Data”) , much tailored specific technological Applications. Specific skills helping customers to identify a problem (opposite to lean innovation) and solve it using technological creativity, experience and less education. Skills that can count on potential clients are prioritized.	
All kind of leaders, but it is not so important because the work flow is distributed among the people and teams. Anyway the combination between business and ICT skills is needed	Team leading	Development of mobile apps and big data
	The E-leader should allow the development of the company without losing what makes them unique ("their essence"). Technical skills for developers	3D, 2 and 3 D animators, mobile apps developers, web developers, flash developers, interdisciplinary skills – combination of ICT and business knowledge and skills.
Very small demand , only the external IT consultant needs to be very IT savvy as project manager and responsible for the IT operations. All management directors could be made a little more IT savvy, but this will come automatically. Future training is foreseen for internal employees to learn how to use the ERP system efficiently and appropriately. This will be performed and organised internally by one Managing Director and the external IT consultant.	We train our employees on the job with the competence to understand a customer's business and context and to translate this onto our products and services . The competence to be really prepared for an interview and to challenge the customer in their own context, product and culture. For the future years, we need e-leaders to exploit our investment from the previous years (sales). We have multiple training opportunities in-house and external to educate our employees: - executive education at management schools - PhD research by CEO - engagements with research institutions - monthly knowledge sessions on a specific topic (governance, audit) - half year knowledge evaluations and reflections for the future (lessons learned, gap analysis...)	
First, we need to acquire the capability to run projects more structured and professional so a training on-the-job and formal will be provided on project management . Second, we need to be more able to scan the ICT market for technologies and trends , and to understand their potential for our business opportunities and services. Third, we need to think about how this company should embrace and use the opportunities provided by the internet for our daily business. Today, we lack these competences.		Data Analysis SW Development – mobile and Java Script None
The company will need knowledge and trainings in Cloud Computing, Data Analytics (e.g., “Big Data”). Possible demand in Mobility and Mobile Apps Development. Will need to strengthen and further develop knowledge in virtualization .	IT architects, business analytics skills, knowledge of complex business systems, web development and market analysis . People who speak 2 languages and know UK market (economists +ICT; creative sector +ICT; marketing +ICT) and who can make right decisions to change value.	Leaders capable of understanding other cultures (Internationalization) . Moreover, leaders who are trained in marketing. Also in Mobility. Skilled people that know about business with an IT background
In technological aspect: innovative development methods and languages (Python, Django, Hadoop), integration of the possessed knowledge and skills with the client's requirements to the products and solutions. In process management aspect – knowledge and skills related to the transition from waterfall method of programming and administration to agile methodology . In business aspects – knowledge and skills related to provision of adequate consultancy services to the clients, usability design , communication of	Leaders who have sector experience and information, including customers' relations , who can better engage with traders to understand their need, but even further be able to foresee the demand for new products and features of the product. They should be able to predict future needs for information both with data-processing and risk development reports (another innovation product of the company). This also relates to the ability of process optimisation and development and implementation of more detailed more specific information solutions for clients.	<ul style="list-style-type: none"> • Senior expert in strategic marketing of specific ICT products • Senior expert in partnership establishment with retailers, resellers • Senior platform architect • Senior PM • Senior interaction designer • Security and performance manager (in terms of the design of the products) • Strategic marketing • Partnership establishment • Platform architectures

<p>client requirements, technical communication. If I have to generalize: Interdisciplinary leaders, flexible, tailor made according the current need, business assessment and technology application according the business requirements and needs of the client.</p>	<ul style="list-style-type: none"> • For operational use: PHP skills • Our developers would become more e-leaders if they would possess the capacity to understand the business problem and request of the client, and to transform this request to our solution expertise 	<ul style="list-style-type: none"> • PM • Interaction design • Security and system/ product performance
<p>IT architects more rather than software architects, E-leadership will go hand in hand with HR management and specific attention to line managers. Managers are needed who can get the best out of their employees, control delivery, and put peer-pressure. Specialists that know cloud technology, not only writing codes and programming, but IT architecture, which comes with experience.</p>		<p>Need for specialized courses.</p>
<p>Future e-leaders need to be able to work with and embrace tools for social collaboration and interaction through digital channels.</p>	<p>Big data processing, cloud services, mobile application development</p> <p>Big data processing, image processing, mobile application development</p>	<p>Future e-leaders will be product developers, with a degree and a proven experience, evidence of professionalism, mobile app technology development, especially in the office, cloud platform ("VMWARE"); SQL skills.</p>
<p>Technical skills for APP/Website development, PHP developers</p>	<p>Have leaders that are able to internalize the essence of the company.</p>	<p>They need people that specialize in the security area, in cloud data storage. Also trained in management.</p>
<p>Cloud will change the way of doing things</p>	<p>Demand for data analysis, need for tools and experts.</p>	<p>Cloud services, mobile application, social media developers</p>
<p>Need for leadership training, also communication skills to improve communication between departments (through a consultancy). ICT: training in mobility.</p>		
<p>Conscious of the need of e-leaders in the future, but the profile is still unclear. Skills needed: decision making and the ability to cope with risk.</p>	<p>More focus for e-leaders will be turned into higher experience but looking at marketing (10-15 years of experience). Financial skills are missing, and in particular marketing skills that are needed to promote the product and doing analysis of marketing data, real-world experience. Good data from medical studies available, demographics of people, they know who are the market, selling B to C way how do you get the product out there. More interaction of leaders with private medical care, apps direct to consumer, selling strategies (incl. to occupational health).</p>	

Source: Semi-structured interviews of SMEs

4.4 Insights Regarding Format of Demonstrations

Lack of time, lack of prioritization, and insufficient budget to invest in digital technologies are the three most cited factors constraining SMEs from using ICT effectively.

With regards to constraints in participating in training, content, time, costs, and scheduling are the top four constraints cited.

With regards to the minimum amount of time employees would be able to take away to participate in training, all types of SMEs cite significant time constraints.

- An important insight from the interviews was that SMEs that were younger than 4 years were still so focused on surviving the next month that they were not ready to consider longer-term issues related to ICT, such as enterprise architecture and ICT governance. As a result, we decided to only have SMEs that had been founded four years or more ago.
- Although we had anticipated that getting SMEs to participate in an online survey would be extremely challenging, we nonetheless under-estimated how difficult it would be.
- One recommendation for future surveys of SMEs is to plan and budget to collect survey data either by telephone or (ideally) face-to-face. Estimate that each survey would take at least 45 minutes of an SME's time (including introducing the project, having the SME answer survey questions, and then discuss any additional points the SME may want to make).
- While almost 1000 SMEs viewed the survey, more than half of them either did not qualify, did not believe they had much to contribute to the topic,²⁰ or decided that participating in the survey was not worth taking 15 minutes. In the end, to develop insights that were as rigorous as possible, slightly less than 300 completed surveys were used in the analysis. Specifically, the survey findings were developed from 229 SMEs and 33 large enterprises.

4.4.1 Existing Interaction with Universities and Business Schools

SMEs have been partly recruited through the Business Schools' and Universities' networks, therefore these results may have a severe selection bias and should not be generalised. However, patterns of interaction may be helpful in understanding SME needs and expectations.

Even given the likely selection bias, many SMEs interviewed state they do not engage in interaction with Higher Education institutions at all.

Some SMEs state engagement through founders or employees doing **MBA / MSc. or PhD Studies**. However, much more often there is engagement through founders or employees doing **shorter programmes** such as Master Classes or **training courses of only a few days duration**.

Some SMEs also engage in extra-curricular events such as **job fairs** or **giving talks** and attending **conferences**.

²⁰ For example, the team from Bulgaria noted that several SMEs explained that they did not participate because they felt "this is not our case we have to fill in all zeroes." The team from Bulgaria noted that unfortunately, "it was a real struggle to convince them that 'all zeroes' is just as useful from research point of view as any other case."

Table 4-9: SME Interview result snippets –engagements with educational institutions

Interview result snippets	
Existing and plans for engagements with educational institutions	
B-Able has engagements with two management schools for research (Netherlands and Belgium), a professionals' college university for teaching in business information security, architecture and auditing (Netherlands), and the CEO is doing a PhD study .	None so far None None
No MOOC, professional courses or Higher education . E-leader may consider executive education In International business. Educate people in SMEs is luxury . Need a clear vision how this education / training investment should make a difference to business, increase sales and profits and save time. Cooperation in a form of KTP allows a flow of very specific knowledge but does not change business, it may lower costs through job placement and collecting some data (exploitation). First we would be looking for the type of cooperation that changes business (exploration). Firms sell to survive. Educational institutions should think of how their programme will change value?	We actively participate in job events at educational institutions . No further engagements No Prone to use
FTEs may consider doing MSc in Finance and HR management, executive education (e.g. MBA), MOOCs are less useful because of lower interaction level and it is not well-planned over time. Perhaps more useful if planned in parts, blocks, and distributed across time with assessment independently structured in slots . Professional courses engagement with Henley accelerator with Vitalsix (1 FTE). Higher education - no. Executive education and professional courses help to understand how enterprise works	Yes No. Participation in Master classes, flexible possibilities for employees to choose what helps the most in individual cases Interest to collaborate with academic institutions for acquiring specific technical education and skills. The firm work in close cooperation with the universities in Varna and Ruse providing qualified instructors, curricula update, etc.
No	For business staff (consultancy-business) MBA is considered; for IT developers short term training by the large IT operators (e.g. Microsoft, Cisco) performed by the authorized third party as 4-5 days training seminars. Training on the development and use of Mobile App technology would be welcomed and more cloud based technology and data analytics
No	- Partnership with a business school for education of internal staff
No	- All developers of the SME attend a yearly PHP conference
No	- At the start of 2014, all business analysts and project managers have attended a required project management training
No	- Additional education can be provided when necessary on individual request
Most engagement is with professional bodies and courses for professionals . For example, training by data-providers (e.g. traders, trading platforms, stock exchanges on products, precious metals, etc.). They are not educational establishments but educate professionals. Conferences with traders are one of the most useful sources to get engaged with traders and get new ideas what is needed. Individual engagement with educational institutions through networking (project participation, guest lectures, etc.)	Mixture of professional training, executive training and using external information providers. Couple of FTE go out for a day programmes , including Henley business school "accelerator programme", conferences are used as a source of information which allow you to obtain additional skills, including IT
In-house training for new employees. Professional conferences , formal and informal community meet-ups. Online trainings, evening or weekend trainings, conferences	Firm cooperates with Roehampton University who received a grant on the app developing and running RCTs experiment if this helps improvement of mental well-being. . Leader attended Royal College meetings , psychiatrists conferences , going more international conferences, the engagement with educational institutions and conferences is limited as they want to make sure funds are invested wisely, as they are tight on it. Start-up is mostly self-funded.
- Multiple employees and external consultants have followed management courses at varying management schools - short term management or operational courses are also facilitated by way of management school, professional educators, seminars and conferences - In consulting services, we also want to have certification for our consultants (ITIL, BPM, PRINCE2...)	Head of Digital is pursuing PhD studies in IS, many internal trainings for online marketing etc. There are plans for partnership with universities in the future. Software academy of Telerik Online training, conferences . Looking for cooperation with Universities' research centres but at the moment the regulation of Intellectual property is not clear enough for a business to be eager to share with an University Unlikely engagement with education institutions to address skills gaps. They would engage if Professional Courses and if it is free of charge , flexible (evening hours) and provide value for time. Main aim- furthering existing knowledge and new contacts (networking with e-Finance and IT firms)
The CEO is executive at a University College and closely connected to an association around a Belgian university, which provides a rich network. Co-founded 15 years ago the VIGC (Flemish Innovation centre for Graphical Communication). One of the biggest challenges is how SMEs can attract such network opportunities and especially how they can capitalise on them. We don't capitalise on these structurally.	London Business school, UCL, Henley business school in the UK to co-create, design the prototype product as a customer . Further promotion of the product to the market is also supported by LBS and UCL where this platform is used. Internet of things training, mobile app development, and data analytics training as well would be needed. You could teach entrepreneurship to mid-level managers to think bigger, more strategically. There are courses as SWAT analysis, business skills for technologists course. University of Sheffield on further explore semantic technology via KTP, apprenticeships. Professional conferences overseas, helpful in terms of learning. Training on lean innovation is what they already do.
The company has traditions in organizing and implementation of internship programs, Hackathon contests organized for the company staff. The company also provides support for the development of content for technological courses, provided to the company staff, support of participation of the employees in Hackathon communities.	The company prefers professional training services , subject area conferences and 1 or 2 day trainings . The CEO is a guest lecturer in some universities but the company does not rely on universities as life-long-learning training providers.

Source: Semi-structured interviews of SMEs

4.5 Exemplary Cases

ABC Design & Communication

ABC Design & Communication is a leading Bulgarian web design and development agency, established in 1992. Its current headcount of ~25 makes it one of the largest local companies on the Bulgarian web development market, dominated by micro-enterprises. Even throughout the 2008-2013 economic downturn ABC Design & Communication maintained a steady annual growth of 10%, and the number of FTEs gradually increased.



In 1999 the company founded the most prestigious Bulgarian Web award (BGSite.org). In 2003-2006 the administration of the award was handed over to the Bulgarian Web Association (of which ABC Design and Communication is a key member) in cooperation with PriceWaterhouse Coopers Bulgaria and M3 Communications group; in 2006 the award and the associated events were spun off into a separate non-profit, headed by the founders of ABC Design & Communication.

In 2013 a Facebook application, developed by ABC Design & Communication for a large international bank, won first prize for online efficiency and marketing – Webit Awards Bulgaria in category “Personal Finances”.

The management team has authored over a dozen books on digital marketing, web design, social media marketing and online business incl. “Tools for Social Networks”, “Successful Online Marketing in 65 Real World Examples” and “Basics of Successful Business – Here and Now”. They are widely

recognized as leading experts and preferred lecturers in prestigious local and regional professional events and academia modules such as the annual Bulgaria Web Summit, Digitalk, the annual educational camp and web competition for pupils “I Can – Here and Now”, M3 Communications College, New Bulgarian University Innovation Academy.



Every year ABC Design & Communication organizes between four and seven seminars as part of ongoing “Workshop on Online Marketing” focused on Web

entrepreneurship for young people, corporate online marketing and internet presence, online marketing trends, web success indicators, etc.

Through its professional and social activities and its successful business practices, the company is a trendsetter with significant influence in the Bulgarian Web industry. ABC Design & Communication follow their mission - they are “taking care of the Bulgarian web from the very beginning”.

B-Able

B-Able is a successful Dutch SME located in the Utrecht region (www.b-able.nl/en), which offers a variety of services and related advice on business information security. While SMEs are regularly focused on the daily operations to keep the lights on, B-Able looks ahead to innovate with in-house developed services. It starts from a partnership mentality to serve customers with insight and understanding on their level of business information security. Although projects are mostly initiated with an improvement of the resilience against business and technological risks, the partnership mentality becomes crucial in the long run. Business information security is an ongoing process that should be captured by the organisation’s daily routines and operations. Besides a strategic awareness, the customer’s processes to detect potential threats should be sharpened. Once a risk

has been escalated, a quick intervention is critical. This can only be achieved if business information security is an integral part of the business and if the right capabilities are in place.

The innovativeness of B-Able is characterised by their generous investment of time and financial resources in the development of new services. Although B-Able is classified as a consultancy firm offering business information security, most of their services are IT enabled. Next to business skills and security knowledge, the company thus requires an important set of IT skills. In 2013, B-Able has added another service to its portfolio. A cloud-based tool, named "Securimeter", has been developed in-house, which helps to identify risks based on predefined measures, and to ensure the process of securing these risks. The technical development has been preceded by a considerable period of academic research on the issue of information security and risks. A simplified maturity assessment has been developed first and additional functionalities have been added afterwards, such as ISO norms. This way the tool can support data analytics and social media assessment nowadays.

Securimeter is marketed as a security-as-a-service for risk identification, security incident management and assessment aims. Short term value has already been created through its internal use at B-Able and to assist consultants and auditors, yet the large return is expected in the coming years with targeted organisations of 200 to 2000 employees.

The attitude towards innovation has delivered B-Able an impressive growth over the past years. With a high satisfaction rate of their customers, this success story has not been neglected in the Dutch media. The Financieel Dagblad, a Dutch newspaper spending a lot of attention on entrepreneurship and innovation, and KPMG, an international consultancy firm, have nominated B-Able as Gazelle in the Utrecht region for two years in a row, i.e. 2012 and 2013.

An important role in this success story is attributed to the CEO and his team. They possess an endless drive to stimulate the passion for innovation, success and growth based on an IT enabled service portfolio. Combining the necessary business knowledge and the appreciation for IT to create new services, these people qualify to the definition of e-leaders. The CEO sets and monitors the strategic vision to integrate IT in business critical services and to outsource more supporting applications. Some applications cannot just be outsourced due to sensitivity and privacy issues on the data stored. The B-Able crowd has also been closely involved in the research to develop the Securimeter, while the CEO has activated his personal network to ask field experts for advice and to let them review temporary versions of the tool.

Besides their focus on innovation, B-Able is convinced that education plays an important role in its success. It has invested plenty of resources in the training and development of their people. The company holds multiple engagements with academic institutions for instance. These institutions support the B-Able team to conduct academic research on business information security, and one institution accommodates the PhD research of the CEO. B-Able also organises in-house sessions to update internal employees with state-of-the-art knowledge on basic principles and upcoming trends. On a half-year basis, so-called knowledge evaluation sessions are held to reflect on current knowledge gaps within the organisation, to share an update on lessons learned, and to discuss trends they are willing to capitalise on in new services.

BeAligned

BeAligned is a medium-sized competitor in the business/IT consultancy landscape, serving customers in the Flanders region of Belgium with satellite offices in the Netherlands and Luxemburg. With the aim to differentiate from the mainstream business/IT consultancy practice, they focus on four pillars: 'Enable innovation', 'Improve interaction', 'Increase efficiency', and 'Be in control'. These pillars can be integrated to offer a unique and complete service portfolio to national and international organisations that are active in the public and private market. BeAligned has been launched by three partners in 2006 and has rapidly grown to a stable workforce of thirty five people. The core team possesses a generalist perspective on the opportunities of combining business and IT, associated with more specific skills to apply these opportunities in practice. Besides, BeAligned complements the core team with a pool of committed yet self-employed consultants delivering reliable services within the company's vision. This approach enabled BeAligned to be ranked within the top 125 consultancy firms in Belgium, and to achieve a customer satisfaction rate of more than 90 per cent accredited by a Qfor certificate (consultancy quality certification).

The success of BeAligned can be attributed to a consequent application of its four pillars within the company's strategy and operations, in which IT plays a significant role. The IT strategy follows a visionary and operational cycle. The visionary cycle is defined every three to five years and is translated into operational activities on a yearly basis. For instance at the start of the company, the IT strategy was directly focused on cloud-based solutions for the internal IT applications. This created an efficient way to support the internal IT applications by one person for one day a week. For the operationalization, BeAligned has selected cloud-based software from the start to support customer relationship management, accounting processes and timesharing. In 2011, Office 365 was added to this application portfolio to put the desktop applications in the cloud and to pay for it as a software-as-a-service. A renewal of the IT strategy focuses now on efficient and effective communication between internal employees, the network of consultants and peers, and customers enabled through online applications. The interaction and collaboration between these groups should stimulate the value creation by cost efficiency, product/service innovation and customer intimacy. The company website should in this respect be perceived as an important instrument to not only support corporate communication, but also to enable customer interaction and collaboration. Social media is today also explored to communicate through different channels and expand the targeted audience.

In order to keep pace with the drive for innovation and to differentiate from its closest competitors in the market, BeAligned is forced to develop new products and services on a recurrent basis. In 2013, it has successfully developed a quick-win investment to enrich its website by accommodating rich video streaming. The investment aimed at including start-ups from within the company's network, with customers from other business services, and as such promoting cross-fertilisation. As it is often the case in an SME, the investment approach has been very lean and pragmatic, and the necessary technical knowledge was acquired through an external service provider. In line with the strategic vision on IT, the service is a cloud-based plug-in on the website and requires little ongoing maintenance. Being positioned within the 'Enable innovation' pillar, the investment is an example of 'talking-your-walk' and should enable BeAligned to enhance the customer intimacy and the company's reputation and competitiveness.

Keeping a continuous eye on education supports the high standard of consultancy services. Multiple employees and associated self-employed consultants have followed management courses at national and international business schools. These courses are mostly oriented towards broadening the generalist perspective. A combination of business schools, conferences and seminars facilitate more specific skills and operational courses, whereas individual professional educators may also be invited to develop a company specific trajectory. Examples in this area include today social media skills for instance. In the consultancy business, professional certification is necessary on practices such as ITIL, BPM and PRINCE2.

In line with the new IT strategy defined for the next three to five years, BeAligned wants to develop consultants with an e-leadership mentality. This means that the future workforce needs to be able to work with and embrace tools for social collaboration and interaction. All internal employees and associated consultants should develop the necessary e-skills to communicate with customers and each other through social media and related digital channels. Another principle that will likely be installed in the upcoming period is the 'zero-email' policy. This should enable employees to work with the available digital channels and as such to support the realisation of the e-leadership mentality.

'farfetch.com'²¹

Farfetch (<http://www.farfetch.com>) is a very successful and innovative e-commerce company that brings together over 350 independent fashion boutiques from around the world and provides their range of unique products, representing over 1000 fashion labels, to fashion lovers globally. Customers can shop from any boutique within Farfetch's network and then have their orders

²¹ This vignette was developed by Nils Olaya Fonstad and was adapted from De Meyer, F. and Fonstad, N.O. (2014). "Accelerating local innovations while boosting global synergies: The 2014 Digital Leadership Report." available at: [http://www.cionet.com/Data/files/groups/Digital leadership report 2014.pdf](http://www.cionet.com/Data/files/groups/Digital%20leadership%20report%202014.pdf)

delivered directly to their door, wherever they are in the world. Launched in 2008 by Jose Neves, Farfetch rapidly became a global company backed by investors such as Advent Venture Partners, Index Ventures, and Condé Nast International. By October 2013, the site had 4.3 million visits a month and an average order of around 500€.

As an e-commerce marketplace, Farfetch's sales depend totally on its websites uptime. If a website is down or faces a performance issue for even a couple of minutes, visitors won't buy goods and Farfetch must contend with a non-recoverable loss of sales and decrease in customer satisfaction. IT is fundamental to Farfetch's operations and growth. About a fifth of Farfetch's 370 employees are in the IT group.

In 2011, when Nuno Miller became Farfetch's first Chief Information Officer, he discovered that most of its servers were inadequately serviced. Miller and his team reorganized and transformed the company's storage services in two different data centres. The most critical services and tools, such as those supporting Farfetch's transactions and payments were given to one of most robust and advanced hosting companies based in London. All other services and tools, regarding product creation, order fulfilment and other internal processes, were hosted at a different hosting company, in a private cloud model, with lower yet sufficient service level. The entire project – from creating a service catalogue, defining each service's impact on the business, defining the required architecture, and implementing both types of solutions – took just over a year.

During the process, Miller and his team also transformed several processes that were using internal tools into processes that could be accomplished with cloud-based software services. For example, they changed how incidents, problems and change requests were reported and tracked; how customer service tickets were handled, how their web servers' uptime, load and performance were monitored, as well as how the Business Development team managed potential business partners.

As a result of the changes, the new e-commerce platform was able to support an average increase of daily visits by 300%, with peaks around 1000% and the availability of key services increased from 99.5% to 99.95%. The increase in availability and speed led to an increase in productivity of the back office teams (mostly production, operations and boutique management), resulting in an estimated savings of 200K€ per year. The enhanced digital platform helped support a significant increase in volume of sales, from 27,5M€ in 2011 to 75M€ in 2012 and 140M€ in 2013.

Miller and his team were also instrumental in streamlining Farfetch's product management process. Product creation process is done jointly by Farfetch and the boutiques. All of the products are catalogued, categorized and photographed by Farfetch. Until a product is photographed and its attributes are catalogued it remains offline. With each season, around 50,000 products were catalogued. However, due to process inefficiencies, there are several duplicates – products that have already been photographed by one boutique and are re-photographed by another. Farfetch wanted to reduce the resources (including time) necessary to get products online. Miller helped develop a process to identify duplicates and avoid reprocessing, by introducing a series of checkpoints and features to the product creation process. As a result, around 25% of products are being identified as duplicated in early stages, resulting in 20% productivity increase in the production team.

While upgrading and improving the reliability of Farfetch's digital platform and streamlining operational processes, Miller and his team were also helping Farfetch manage its yearly growth rate of over 100%. In a 3-year period, the total number of employees at Farfetch increased from 150 to 370, as the company added new functions, teams and managers.

Miller ensured he and Farfetch had the necessary skills by hiring new people with the skills he was seeking. To address the corresponding growth of demands on IT, the IT team increased its size from 13 to 75 people. This fast pace required a change on the IT governance model and on project management methodologies. Miller organized the IT group into different teams and areas of expertise and adopted agile methodologies, such as SCRUM and test-driven-development. To better align priorities with the company strategy and operational needs, Miller introduced a yearly roadmap, with quarterly reviews, for all strategic projects. All projects have prioritization meetings every 3 weeks, with main business stakeholders, in order to define the cross-team priorities. Each sprint lasts for 3 weeks, meaning that every 3 weeks they deliver a set of new features (designed, developed, tested and approved). In this manner, Miller and his team have ensured that Farfetch can continue grow and respond rapidly to new opportunities while improving the effectiveness and efficiency of its core operations.

During an interview, Miller emphasized that “critical to sustaining growth of more than 100% a year

has been balancing the need to respond rapidly to new opportunities with the need to have an effective and efficient global platform.” To develop a global platform that was sufficiently robust to support rapid growth, Miller applied key principles of enterprise architecture, IT governance and project management to Farfetch, such as introducing technology, business process and data standards to ensure sufficient integration across individual efforts to achieve key synergies, such as economies of scale and a coherent and unified customer experience. Without an e-leader to help put those principles into practice at Farfetch, the company would not have been able to support such rapid growth and maintain competitive levels of operations and customer service.

Hispania Escuela de Español

Innovation: Teaching Methods

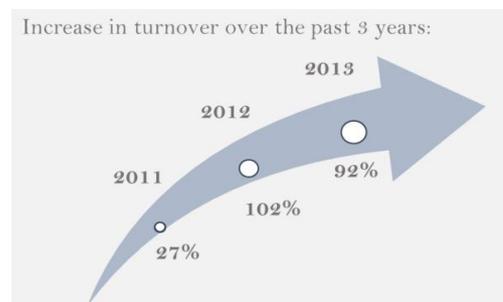
About the company

Hispania Escuela de Español is a Spanish language school (www.hispania-valencia.com). The company was founded in 2002, in Valencia. Its sector of activity is training services. They have developed their own teaching method. As their CEO says: “We created the method we use. It’s exclusive and it works. Out of need, we invented ourselves, we didn’t have a handbook.”



Hispania Escuela de Español’s website

Hispania Escuela de Español has changed their recruitment procedure from temporary contracts to full time contracts since 2012 which is quite unusual in Spain in the current economic situation. Since its foundation it has constantly been growing in number of students and popularity. It has been voted best language school in Spain in 2013 by students and is the most popular school in Valencia.



Hispania Escuela de Español’s growth of turnover

E-leader: key in the company's development

The company’s e-leader is responsible for the technological strategy.

Innovation: software that combines three areas:

- Marketing: great improvement of the web site.
 - Live Beep: interactive chat which provides great flexibility and enhances communication.
- Education: Once again, more flexibility and constant communication with students.

- For example, students can book or cancel classes 24 hours a day, 7 days a week.

- Administration: improvement of internal processes.

Insights:

- No formal CIO. One of the cofounders is responsible for the ICT strategy.
- Outsourcing: the leader designs the project and communicates what has to be done to achieve company goals but the development is done externally.

Learning Company

The company acquires knowledge and is able to innovate rapidly. This allows the organization to grow in a changing environment.

- Use of technology to innovate.
- Acquire knowledge: mainly by self-learning.

Self-learning: both founders are self-taught.

- Strategies: observation and trial and error based learning

Official accreditations:

- In order to maintain the accreditations, they have to take training. For example, attending conferences.
- They pass on to their employees everything they learn.

Employee Profile:

- Native university graduates.
- Specialized in teaching Spanish as a foreign language.
- Personalized training in the unique teaching method.

Role of Coordinator:

- The coordinator is constantly training the staff.
- CEO: *"The daily training of our staff is extremely important. This differentiates us from other language schools".*

Insights:

- Again, self-training has an important role.
- Phenomenon of Replication: the trainee becomes the trainer.
- SMEs don't always know where to find training resources:
 - CEO: *"In the future I would like to invest in learning leadership skills. To be honest, if you asked me where to train e-leaders I would not know where to look."*
- What SMEs are looking for is not always what academic institutions offer.
- An SME may know what needs to be done and at the same time, not be able to explain their vision.
 - CEO: *"Although this is a very important ICT project there are still some issues for its implementation. The computer specialist should spend some time at our school to understand what we want to communicate."*

KOMFO

KOMFO is a global company producing social media marketing IT products with headquarters in Denmark and a development centre in Bulgaria.

In 2008 KOMFO was established by two Bulgarian IT professionals and two Danish marketing specialists and started providing services related to social media. Around 2010 the company decided to valorise its service experience into its own products. In 2012 the global software company Sitecore took a minority stake in KOMFO. Now the company is widely recognized in the niche of social media marketing tools.



Awards	Success in figures
<ul style="list-style-type: none"> Award of Foundation "Evrika", Category: Young manager (2013) Bulgarian Web Awards (2013), Category: Complex projects Annual award for CSR (2011), Category: Investor in knowledge Nomination in the European Digital Communication Awards, Category: Innovation of the year 	<ul style="list-style-type: none"> Employees growth from 15 FTE in 2010 to 45 FTE in 2013 More than 20% revenue growth in since establishment

Komfo helps four of five of the largest B2C companies in Denmark.

Komfo has created a large network of Certified Komfo Partners - integrators, consultants and design houses that act as mediators in the area of their professional expertise between the technical solution and the customers' business needs. Komfo Customer Relations Team ensures that their partners and customers get the most successful outcomes from working with the company, from product support and training to technical consulting and business optimization services. Komfo support is rated 99% - high above the industry average in Zendesk's customer satisfaction survey.

Komfo is an e-Leader in the social media marketing field, creating tools that utilize other businesses to benefit from advanced ICT technologies as social networks, cloud and mobile applications.

Surus Inversa

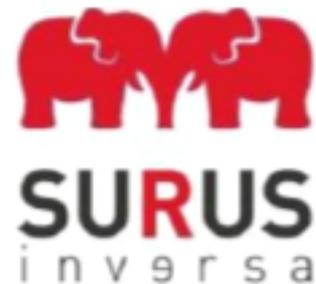
Surus Inversa (<http://www.surusin.com/>) started its journey in 2011 with the goal of offering a solution to the market that didn't exist. From the beginning the company offered something different and unique.

The company was founded by two associates, Gonzalo Herranz, cofounder and Financial Manager and Adolfo Cancelo, cofounder and Head of the Department of Business Development. The company's headquarter is located in Madrid, in Pozuelo de Alarcón. They also have other offices and a transit warehouse in Móstoles.

The SMEs main activities are the settlement of industrial assets through an online auction portal, also reverse logistics and environmental management. All their activity revolves around the client. They change and expand their services according to the client's demand.

The company operates in a non-ICT sector that focuses mainly on the industrial, energetic and defence sector.

What is their key to success? They have a different approach. As was mentioned before, all of their



development revolves around the client. The client is the centre of their business. An example of a client that can sustain the success of this company is a large organization like Cepsa. At present, Surus Inversa is carrying out environmental management for this company.

The market in which they operate is rapid and fast changing. Therefore, their way of doing business is very particular. Adolfo Cancelo commented during the interview that two months makes a lot of difference in a company like theirs.

Based on the increase in turnover over the past three years, Surus Inversa can be considered a Gazelle.

Despite being the Development Director, Adolfo Cancelo is in charge of the management of ICT in the organization which means he is considered CIO of the company. Because of the changing nature of their business it is very difficult to establish long-term strategies. Projects are developed and carried out rapidly, nothing is planned that cannot be in operation in less than a month. Long-term projects do not exceed four months.

As there is not a defined strategy in the development of a project, the usual process would be: to put everything in motion and as the project unfolds, make modifications if need be. In this specific scenario it is logical not to have formal budgets.

The number of employees has also grown since the foundation of the company. At present, there are seventeen employees. They are young, highly educated and with little experience. They are also strongly motivated and committed to the project, always eager to learn. Currently, the organization is looking for more experienced people in specific skills, but for small businesses this is an issue. People with such profiles are much more expensive and most of the time SMEs can't afford to hire them.

Both founders are fervent supporters of outsourcing. In fact, the development of the online auction portal was possible thanks to outsourcing. Bitedian, a company based in Barcelona, which has great experience in the development of this type of application assisted them. It is interesting to note that the majority of the conversations that took place between both companies were held via audio-conference.

The most important innovation carried out during last year was the development of the online auction portal. Quoting Adolfo Cancelo: "without the online auction portal, our company would not be valuable". This innovation will never end because it is fundamental for the company.

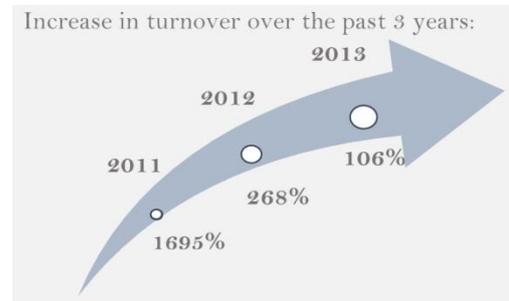
Why is this innovative? Although in other countries like the United States this is a common practice, in Spain it is totally new.

Both founders were completely involved in the process and were responsible for monitoring it. Once again they used an on-the-go strategy.

The skills required to develop the online auction portal were self-acquired, which means that both co-founders used self-learning. Moreover, if we focus on the methodology used in the innovation process, we would be talking about a procedure of trial and error. Gonzalo Herranz mentioned "I don't believe in a procedure to create ideas". Along these lines, the important thing is to be proactive and take risks. If a mistake is made, change direction and learn from it.

If they had to outline the kind of leader needed for the future, it would be as follows: Leaders capable of making decisions and taking risks. They consider that people who work in Information Systems are more distanced from the executive side of things, and that above all they control the most technical side of things. (Adolfo Cancelo: "Technical knowledge exists, but when it comes to business, it is more complicated").

An interesting fact is that Surus Inversa takes part in training activities in several Universities, for example, The Complutense University in Madrid. However, they have never considered any training in Educational Institutions.

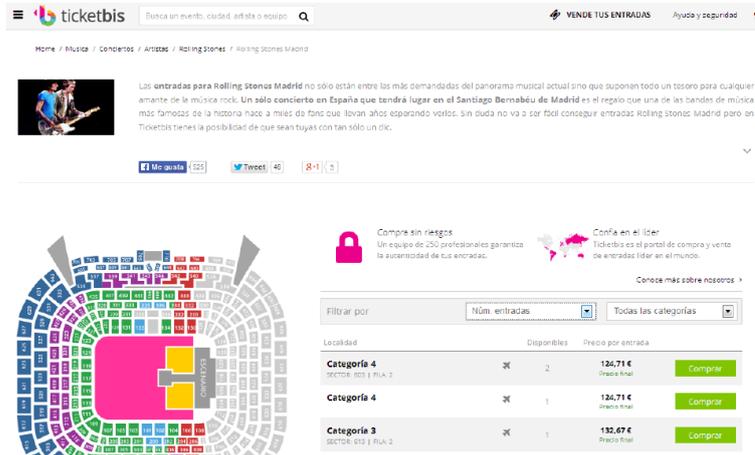


Surus Inversa's growth of turnover

Ticketbis

Young and dynamic

Ticketbis is a platform of sale and purchase of tickets (<http://ticketbis.com/>). The company was founded in 2010, in Bilbao. It is a non ICT-sector company in the service sector). It is a successful gazelle with an over 100% increase of revenue over the past three years.



Ticketbis' website

E-leader: important piece of the puzzle

E-leadership skills are key elements for creating ICT-based innovation. An E-Leader has the needed skills to initiate and guide this type of innovation. At ticketbis, the Product Manager has an important e-leadership role and has contributed to the company's success.

He can be considered as E-leader:

- Competent and resourceful.
- ICT knowledgeable.
- possessing managerial skills.

The Product Manager is responsible for creating innovation through ICT. For example: change of the web site to make it mobile responsive, improving customers experience.

Self-learning in Ticketbis

Employee profile:

- Young employees, around 30 years old.
- Motivated and looking forward to learning new skills.
- Highly educated (graduates)

Training budget constraints lead to a preference for self-taught learning, through:

- Conferences, use of Internet to learn, Blogs, etc.
- Responsible for being up to date on their area of expertise.

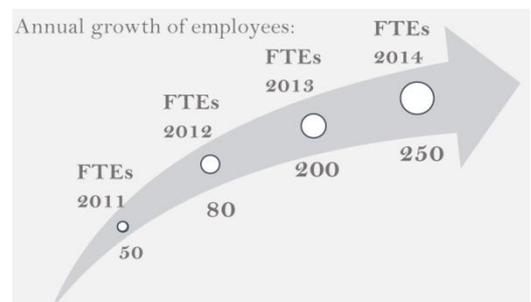
Mentor figure:

- It is important to note this person is a work colleague.

Argentina, Australia, Brazil, Canada, Chile, China, Colombia, France, Germany, Hong Kong, India, Ireland, Italy, Japan, Mexico, New Zealand, Peru, Portugal, Russia, Singapore, South Africa, South Korea, Spain, Sweden, Switzerland, Taiwan, Turkey, United kingdom, United States, Uruguay, Venezuela.



News coverage of ticketbis



Ticketbis' growth of number of employees

Insights:

- Self-training has an important role in SMEs.
- Training as a case of “recompense” for good performance.
- Bonus usually includes access to training courses or buying learning material.

External training in Ticketbis

External Courses:

- Every 6 months, the company offers a course for its employees through a consultancy.
- The type of course is very specific, for example:
 - Managerial skills.
 - Communication between departments.

Also Executive Education

- Current Marketing Director studied an Online Marketing Master. Although this is not a common event in the company.

Insights:

- Interest mainly in short and focused courses.
- Internal courses bringing the trainer to the company.
- Executive-Education type: partial-time over weekend.

4.6 Preliminary Summary and Conclusions for Designing the Demonstration

It should be noted that the following rests on an as yet superficial analysis of the interviewing and survey work carried out. The analysis will be refined during the project lifetime and final results be made available with the Final Report.

SMEs and entrepreneurs requirements of e-leadership education appear very diverse, yet some patterns emerge from the analysis so far.

Content

e-Leadership can be simplified as a combination of business and ICT savvy, whereby the traditional separation between ICT and other business functions entails that specialisation often means leaders have deep skills in one area and savvy in another. Our surveys show, regarding **content** of potential e-leadership education offers to be developed, that many SMEs actually need leaders with **very strong, also practical, hands-on, ICT skills**. Whereas in the corporate world, the ICT skills requirements of leaders often can be described as an excellent understanding of ICT capabilities (knowing what is possible, being able to budget, source and allocate work to be done), leaders in (some) SMEs tend to be more closely involved in the production of their ICT based product or service (or ICT supported other business function such as finance, marketing, accounting etc.).

Another significant finding is that many SMEs rely heavily on **outsourcing** for their ICT needs. These may be consultancies, vendors or other partner enterprises in the value chain. While the e-leadership definition claims that being able to lead qualified interdisciplinary staff to exploit ICT best, an eminent finding for e-leadership requirement in SMEs therefore is to **lead qualified interdisciplinary staff and consultants, contractors and vendors** and other partners.

In terms of technical content needed most, **Cloud computing, big data/data analytics** and **mobile apps** development have been mentioned as those technology trends that result in increased training and education needs for SMEs. Other more technical skills mentioned included **software development, mobile application and web development** including skills in

PHP, Flash, Java, Java Script etc.; 3D animation; ERP systems; (Big) data tools such as SQL, Hadoop, Python and Django.

ICT management trainings that were found most useful include **Enterprise Architecture, ICT governance and ICT Management.**

Regarding other **e-leadership skills** required, answers were quite diverse and trainings could cover a full range of topics. **Communication skills** were mentioned, an **understanding of the customers and the market**, as well as **change management** and **project management, business development and sales and marketing.**

Format

Regarding the **format** of the e-leadership education, it is useful to look at how e-leadership skills have so far been acquainted by the SMEs interviewed.

There is, obviously, a need for a basis of deep technical and business skills that, however, is usually not attained by sending current employees to training, but that the founders and key staff bring to the enterprise as they start or enter the company. These e-leadership skills may have been obtained through **MSc./PhD and/or MBA programmes** and **previous work experience**. This needs to be mentioned so as not to give the impression that e-leadership for SMEs could rely solely on shorter, focussed trainings, which many SMEs have reported to favour over longer programmes when up-skilling their staff.

e-Leadership skills are usually not gained through learning alone, but require learning that builds on previous professional practitioner and management experience. Therefore long programmes, such as MBA and MSc. programmes are usually offered to people with work experience and as part-time studies for workers who typically already have at least a first academic degree. There is a need for these kinds of programmes even for SMEs. Our scanning of the education market and landscape that is presented in chapter 8 has found quite a number of these **“long” professional oriented combination programmes capable of providing e-leadership skills.**

On the other hand, SMEs have expressed, in our interviews and surveys, the need for **short, targeted, affordable and sometimes even ad-hoc trainings**. These trainings can be technical or business skills related, which makes the *programmes* not per-se “e-leadership type” programmes (i.e. combining ICT and business) but can contribute to a *person’s* e-leadership skills nevertheless by adding missing e-leadership skills components to an existing individual skills portfolio.

5 Towards an e-Leadership Scoreboard and Index

5.1 European e-Leadership Scoreboard

E-leadership scoreboard development builds upon our objectives and scope. Within this context, the scoreboard attempts to offer an approach to monitoring and assessing issues related to e-leadership skills development, such as: education offers, workforce potential, exploitation opportunities, and enabling policies or other driving mechanisms. It looks at the EU level situation, as well as at the national level, allowing for a comparative assessment of e-leadership performance of EU28 Member states. Also, it allows for overall analysis and comparisons on relative strengths and weaknesses of e-leadership ecosystems among countries, with the major goal of informing and enabling policy discussions at national and EU level.

The analytics of the conceptual model the scoreboard hinges on is straightforward, practical and looks to offer a comprehensive framework for measuring determinants which add information to the situation about demand and supply for e-leadership skills in each country. It offers insights on how countries are performing on e-leadership depicted domains, which, in the context of this study, would translate into abilities to exploit innovation opportunities for business growth.

The scoreboard comprises a series of indicators captured using data from both primary and secondary sources collected mainly through the following three means:

- Literature research: the study team has conducted a careful and systematic review of existing relevant literature;
- Secondary data sources: Collection of secondary data from official statistics as well as a number of studies carried out by empirica. Also, other organisations were searched and included into the scope of the scoreboard when appropriate.
- Primary data sources: Data on indicators that could not be fed from secondary sources was collected by means of national correspondents from each county.

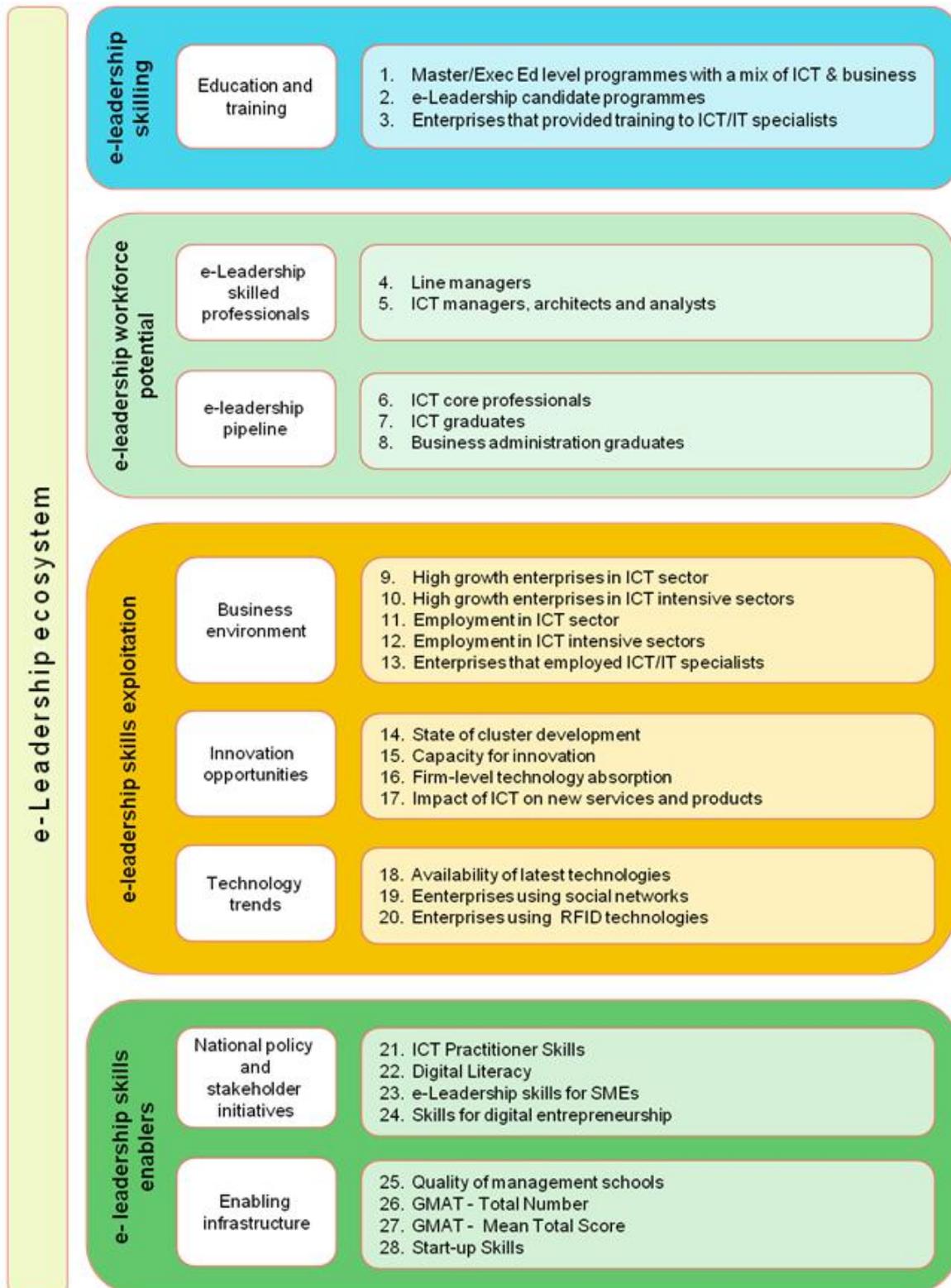
The e-leadership scoreboard is an evolving model to be further refined through input from academic / experts debates and feedback from other interested parties. Consequently, approach and results presented at this stage will be subject of refinement at the second iteration process.

5.1.1 Conceptual Framework

The e-leadership scoreboard comprises four levels:

1. **28 indicators**
2. **8 building blocks**
3. **4 dimensions**
4. **1 overall e -leadership Index (eLI)**

Figure 5-1: Draft Framework of an e-Leadership Scoreboard



Note: Both the scoreboard framework and its results are first drafts as basis for further discussion and must not be quoted or published without permission.

Each of the four dimensions of e-leadership scoreboard aims to capture factors / elements engaged and playing a prevalent role in the ecosystem of e-leadership skills development.

First dimension: e-leadership skilling

The e-leadership skilling dimension consists of one building block, namely *Education and Training*. Based on the argumentum that competences and skills are constituted through education and lifelong learning / training, this building block aims to capture measures on e-leadership education / training landscape in each Member State through three indicators: Master's/Exec Ed level programmes with a mix of ICT & business, e-leadership candidate programmes, enterprises that provided training to ICT/IT specialists:

- Master's/Executive Education level programmes with a mix of ICT & business - refers to the number of combination programmes that have as target group specialist or junior / middle management are professional-oriented and have a mix of business and IT. Such programmes are either at regular consecutive MSc level, or are aimed at specialist subjects only (e.g. new media, marketing, logistics, communications, e-health etc).
- E-leadership candidate programmes - shares information on the number of programmes that are clearly aimed at experienced professionals with leadership roles, they usually already expect a high level of IT skills and significant business experience. In their mission statement, these programmes make clear that the future role of alumni is to transform business and innovate.
- Enterprises that provided training to ICT/IT specialists – captures aspects of further learning and importance of vocational and continuous training on-the-job, to ensure regular upgrades of workers' skills.

Second dimension: e-leadership workforce potential

Within this dimension, the *e-Leadership Skilled Professionals* and *e-Leadership Pipeline* building blocks aim to gauge elements which provide insights into the extent of e-skills/ICT practitioners and e-leadership in each of the EU28 Member States. The expectation is that e-leadership competences, as defined in the context of this study, prevail mostly among these two selected categories, without wanting to fade away other indicators of potential relevance which have not been considered in this case. Overall this dimension of the scoreboard looks to offer a proxy for the potential estimates of e-leaders in each country.

E-Leadership Skilled Professionals – provides insights into the shares of Professional level jobs (ISCO level 2) in business management and ICT within the total workforce listing two variables, line managers and ICT managers, architects and analysts.

Line managers - The relevant ISCO codes are as follows:

Line managers positions	
1221	Sales and marketing managers
1222	Advertising and public relations managers
1223	Research and development managers

ICT managers, architects and analysts - The relevant ISCO codes are as follows:

Management, architecture and analysis positions	
1330	Information and communications technology service managers
2421	Management and organization analysts ²²
2511	Systems analysts

²² According to the ISCO code 2421 "Management and organization" includes non-ICT consultants as well as ICT consultants. Our estimation based on limited empirical evidence for Germany is that at least 50% are ICT consultants; therefore the number of jobs is multiplied with 0.5.

E-Leadership Pipeline – has a dual focus on industry and higher education, looking at two other major potential inflows into e-leadership potential workforce such as ICT core professionals and ICT / Business graduates. The rationale for including these two parameters under this dimension is that the set of core competencies that these groups possess is in line with those depicted in the definition of e-leadership skills in this report. Although measures on the number/ shares of ICT / Business graduates may not lead to a robust scenario for estimating e-leadership workforce potential, they should not be excluded as incipient indicators for the later on formation of e-leaders. An increased number of e-leaders might also result from an increase of the number of ICT / business graduates.

ICT core professionals (ICT practitioners – professional level) - The relevant ISCO codes are as follows:

ICT core professionals	
ICT practitioners, professional level	ICT practitioners, technician or associate level
2152 Electronics engineers	3511 Information and communications technology operations technicians
2153 Telecommunications engineers	3512 Information and communications technology user support technicians
2356 Information technology trainers	3513 Computer network and systems technicians
2434 Information and communications technology sales professionals	3514 Web technicians
2512 Software developers	
2513 Web and multimedia developers	
2514 Applications programmers	
2519 Software and applications 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 graduates:

- First degrees in ISCED 5A, and
- First qualifications in 5B

Business administration graduates:

- First degrees in ISCED 5A, and
- First qualifications in 5B

Third dimension: e-leadership skills exploitation

This dimension attempts to assess the friendliness of a country's business framework and extent of its preparedness in exploiting opportunities provided by ICT. It contains three building blocks capturing aspects from *Business Environment*, *Innovation Opportunities* and *Technology Trends* in each country.

Business environment – measures the role information and communication technologies (ICTs) play to support economic growth, looking into presence of high growth enterprises as well as employment rates in both ICT and ICT intensive sectors. In addition, it also provides overall insights into market demand for ICT practitioners / IT professionals measuring the percentage of enterprises that employed ICT/IT specialists.

ICT sector:

NACE Rev.2	Industry
J61	Telecommunications
J62	Computer programming, consultancy and related activities
J63	Information service activities

ICT intensive sector:

NACE Rev.2	Industry
C18	Printing and reproduction of recorded media
C26	Manufacture of computer, electronic and optical products
C27	Manufacture of electrical equipment
C28	Manufacture of machinery and equipment n.e.c.
C29	Manufacture of motor vehicles, trailers and semi-trailers
C30	Manufacture of other transport equipment
J58	Publishing activities
J59	Motion picture, video and television programme production, sound recording and music publishing activities
J60	Programming and broadcasting activities
M	Professional, scientific and technical activities

Innovation Opportunities – measures preparedness of a country in establishing and maintaining a new competitive environment to exploit emerging advances in ICT, including four indicators: state of cluster development; capacity for innovation; firm-level technology absorption; and impact of ICT on new services and products.

Technology Trends – at the moment, because of data limitations, this pillar focuses on measuring availability of latest technologies in a country as well as extent to which firms make use of social networks and internet of things (RFDI) for adding value to their businesses.

Fourth dimension: e-leadership skills enablers

Countries with efficient enabling mechanisms (policies, infrastructure, etc.) are well positioned to produce the right mix of e-leadership skills in line with the dynamics of the job market demand and talent requirement. Within this context, this dimension looks to provide insights into e-skills / e-leadership skills enablers, differentiating between two building blocks: *National policy and stakeholder initiatives* and *Enabling Infrastructure*.

National policy and stakeholder initiatives – provides insights into existing policies and multi-stakeholder partnerships (MSPs) with a propensity to e-leadership which aim at alleviating development or deployment of e-leadership in each of the EU Members States. This building block assesses the level of national policies and stakeholder activities on: ICT Practitioner Skills; digital literacy; e-leadership skills for SMEs; and skills for digital entrepreneurship.

Enabling Infrastructure – contains four indicators which measure concepts of broadcasted knowledge through assessment of the quality of the management schools. In addition, it also measures knowledge and entrepreneurship skills captured from GMAT test and Start-up skills indicators.

5.1.2 Selection Criteria

Results on the country profiles are built upon data from a number of primary and secondary data sources. The present section describes the main selection criteria applied for collecting e-leadership scoreboard indicators:

- Usefulness and relevance: The indicators should be an appropriate instrument to inform about e-leadership skills ecosystem in each country and address related

aspects. They should provide clear and useful insights into how countries are performing, particularly important for policy makers and future steps of their policies and programmes.

- Availability and accessibility: The data for constructing indicators should be readily available. In order to not impose further burdens, relevant micro and macro data should be publicly available or feasible to be collected at modest costs.
- Timeliness: available information should refer to the event or phenomenon it describes. When not possible, the latest available data should be considered, within a time lag no longer than 4 years.
- Comparability: In order for collected indicators to allow for relative / absolute comparisons they should be relatively uniform in terms of the population surveyed, method of data collection, timeliness, etc.

5.2 Scoreboard Country Examples

The following are draft examples of the analysis and results of the Scoreboard which is being carried out for all Member States. The final analysis will become part of a 28 Country Briefs combining findings from several work packages.

Country briefs will be submitted to the Commission as non-contractual deliverables

5.2.1 Belgium

Belgium

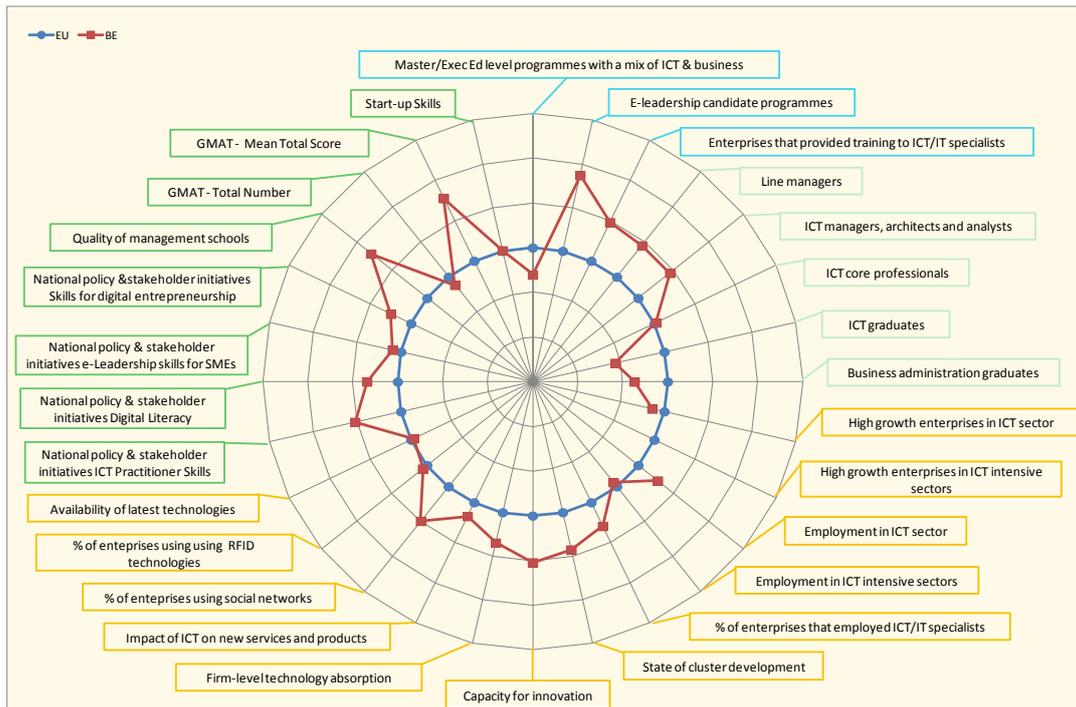
Rank: **7**

Index score **5.31**

	Value	Score (0-10)	EU 28 Rank	EU 28 avg.	Comment	
e-leadership skilling	Education and training					
	Master/Exec Ed level programmes with a mix of ICT & business	18	0.86	15	40	EU28 total: 1,091
	- per 100,000 population aged 20-59	0.3	1.07	19	1	
	E-leadership candidate programmes	2	1.43	9	1	EU28 total: 27
	- per 100,000 of workforce with potential e-leadership skills	1.63	5.83	3	0.004	
Enterprises that provided training to ICT/IT specialists	13%	7.33	4	9.6%		
e-leadership workforce potential	e-leadership skilled professionals					
	Line managers	31,818	0.9	6	31,589	EU28 total: 884,492
	- as % of total workforce	0.7%	6.0	7	0.4%	
	ICT managers, architects and analysts	55,863	1.3	9	61,249	EU28 total: 1,714,972
	- as % of total workforce	1.2%	5.9	5	0.8%	
	e-leadership pipeline					
	ICT core professionals	96,124	0.9	11	161,903	EU28 total: 4,533,291
	- as % of total workforce	2.1%	4.5	12	2.08%	
	ICT graduates (per 1000 population aged 20-24)	2	2.3	24	3.52	
	Business administration graduates (per 1000 population aged 20-24)	15	2.0	21	22.14	
e-leadership skills exploitation	Business environment					
	High growth enterprises in ICT sector	135	0.7	10	235	EU28 total: 5,881
	- as % of total number of high growth enterprises	5%	3.9	9	4.7%	
	High growth enterprises in ICT intensive sectors	n/a	n/a	n/a	771.17	EU28 total: 18,508
	- as % of total number of high growth enterprises	n/a	n/a	n/a	13.3%	
	Employment in ICT sector	100,654	1.2	9	154,090	EU28 total: 4,314,510
	- as % of total employment	4%	5.7	8	0.03	
	Employment in ICT intensive sectors	397,145	0.7	13	789,975	EU28 total: 22,119,304
	- as % of total employment	15%	4.9	15	0.15	
	Percentage of enterprises that employed ICT/IT specialists	28%	7.7	10	23.8%	
	Innovation opportunities					
	State of cluster development	5	7.2	6	4.17	Min: 1; Max: 7
	Capacity for innovation	5	7.8	5	4.22	Min: 1; Max: 7
	Firm-level technology absorption	6	7.1	9	5.18	Min: 1; Max: 7
	Impact of ICT on new services and products	5	6.4	13	4.88	Min: 1; Max: 7
Technology trends						
Availability of latest technologies	6.3	9.1	5	5.65	Min: 1; Max: 5	
% of enterprises using social networks	31%	4.6	12	29.8%		
% of enterprises using RFID technologies	4%	4.3	12	4.14%		
e-leadership skills enablers	National policy and stakeholder initiatives					
	ICT Practitioner Skills	4	7.1	3	4.53	Min: 1; Max: 5
	Digital Literacy	4	6.7	4	1.67	Min: 1; Max: 5
	e-Leadership skills for SMEs	3	4.3	7	1.67	Min: 1; Max: 5
	Skills for digital entrepreneurship	3	6.7	5	1.67	Min: 1; Max: 5
	Enabling infrastructure					
	Quality of management schools	6	10.0	1	4.81	Min: 1; Max: 7
	GMAT - Total Number	359	0.9	11	665.32	
	- per 100,000 population aged 20-59	6	2.8	18	6.90	
	GMAT - Mean Total Score	591	10.0	1	556.36	Min: 0; Max: 800
Start-up Skills	0.5	4.2	8	0.54	Min: 0; Max: 1	

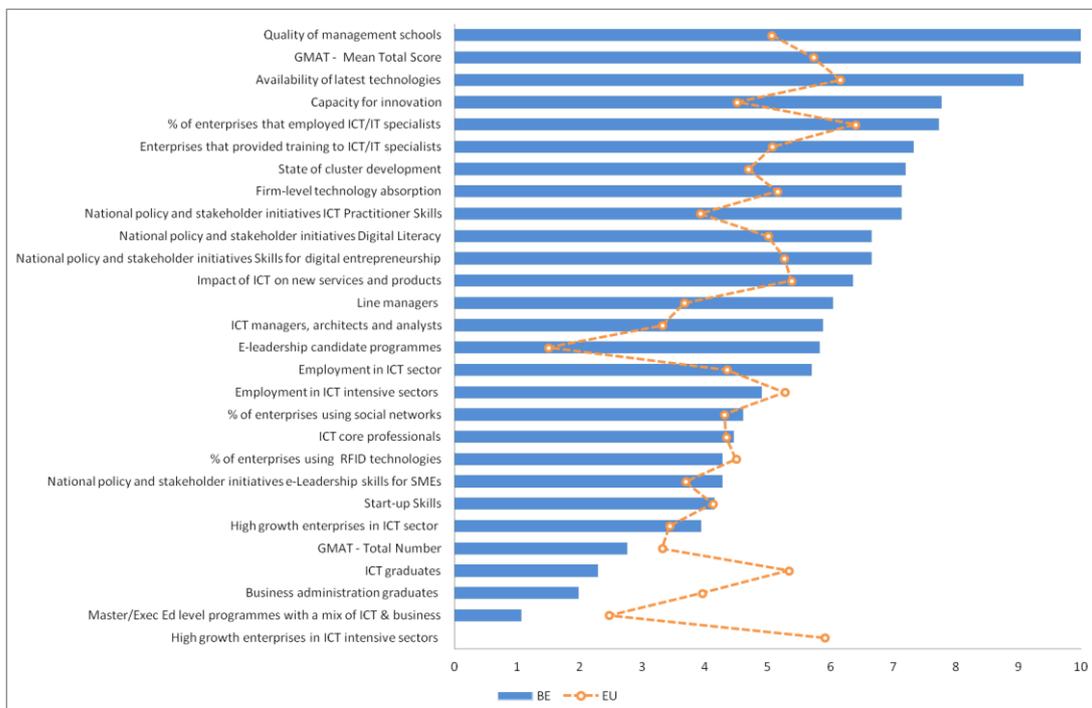
Note: Both the scoreboard framework and its results are first drafts as basis for further discussion and must not be quoted or published without permission.

Figure 5-2: Belgium - e-leadership performance per indicator



Note: Both the scoreboard framework and its results are first drafts as basis for further discussion and must not be quoted or published without permission.

Figure 5-3: Performance-based indicator ranking for Belgium



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5.2.2 Ireland

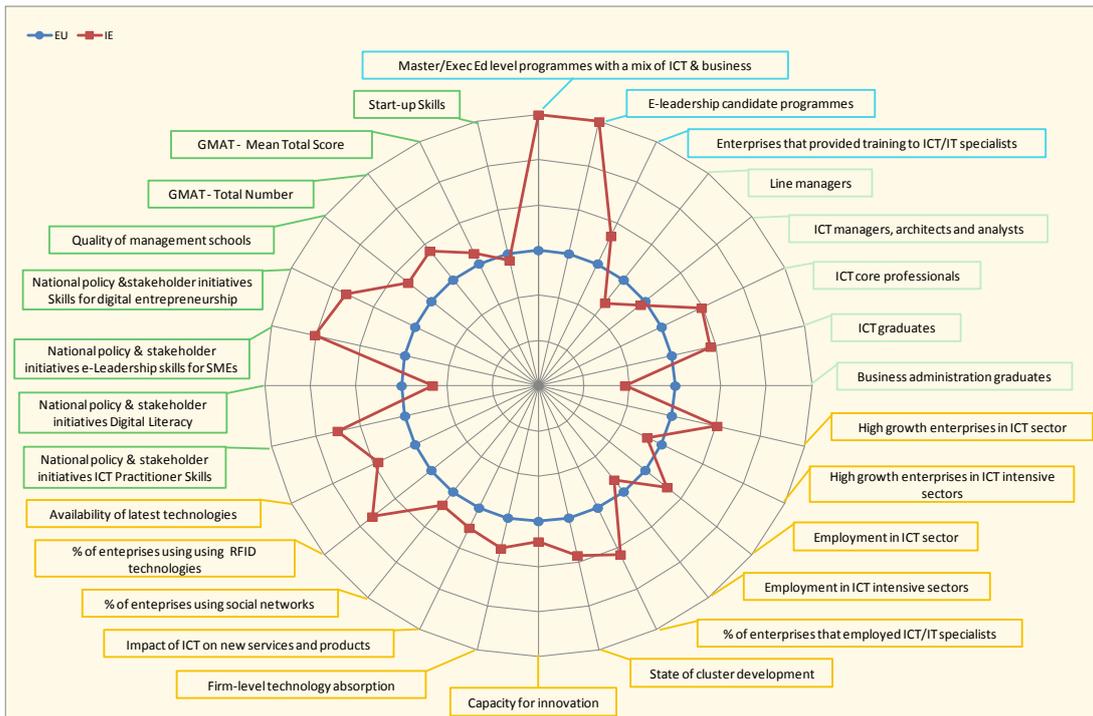
Ireland

Rank: **3**
Index score **5.90**

	Value	Score (0-10)	EU 28 Rank	EU 28 avg.	Comment	
e-leadership skilling	Education and training					
	Master/Exec Ed level programmes with a mix of ICT & business - per 100,000 population aged 20-59	46	2.28	8	40	EU28 total: 1,091
	E-leadership candidate programmes - per 100,000 of workforce with potential e-leadership skills	5	3.57	3	1	EU28 total: 27
	Enterprises that provided training to ICT/IT specialists	2.80	10.00	1	0,004	
		12%	6.67	7	9.6%	
e-leadership workforce potential	e-leadership skilled professionals					
	Line managers - as % of total workforce	4,879	0.1	22	31,589	EU28 total: 884,492
	ICT managers, architects and analysts - as % of total workforce	0.3%	1.9	19	0.4%	
		13,171	0.3	17	61,249	EU28 total: 1,714,972
		0.7%	2.9	13	0.8%	
	e-leadership pipeline					
	ICT core professionals - as % of total workforce	53,377	0.5	17	161,903	EU28 total: 4,533,291
ICT graduates (per 1000 population aged 20-24)	2.8%	7.0	5	2.08%		
Business administration graduates (per 1000 population aged 20-24)	5	7.7	6	3.52		
	11	1.0	26	22.14		
e-leadership skills exploitation	Business environment					
	High growth enterprises in ICT sector - as % of total number of high growth enterprises	77	0.4	16	235	EU28 total: 5,881
	High growth enterprises in ICT intensive sectors - as % of total number of high growth enterprises	7%	5.7	5	4.7%	
		142	0.2	17	771.17	EU28 total: 18,508
	Employment in ICT sector - as % of total employment	12%	5.0	15	13.3%	
		41,223	0.5	19	154,090	EU28 total: 4,314,510
	Employment in ICT intensive sectors - as % of total employment	4%	5.8	7	0.03	
		152,172	0.3	20	789,975	EU28 total: 22,119,304
		14%	4.3	17	0.15	
	Percentage of enterprises that employed ICT/IT specialists	32%	9.0	3	23.8%	
	Innovation opportunities					
	State of cluster development	5	7.2	6	4.17	Min: 1; Max: 7
	Capacity for innovation	5	5.9	11	4.22	Min: 1; Max: 7
	Firm-level technology absorption	6	7.1	9	5.18	Min: 1; Max: 7
Impact of ICT on new services and products	5	6.8	12	4.88	Min: 1; Max: 7	
Technology trends						
Availability of latest technologies	5.9	7.3	12	5.65	Min: 1; Max: 5	
% of enterprises using social networks	46%	8.5	2	29.8%		
% of enterprises using RFID technologies	6%	7.1	6	4.14%		
e-leadership skills enablers	National policy and stakeholder initiatives					
	ICT Practitioner Skills	5	8.6	2	4.53	Min: 1; Max: 5
	Digital Literacy	3	3.3	16	1.67	Min: 1; Max: 5
	e-Leadership skills for SMEs	5	10.0	1	1.67	Min: 1; Max: 5
	Skills for digital entrepreneurship	4	10.0	1	1.67	Min: 1; Max: 5
	Enabling infrastructure					
	Quality of management schools	5	7.1	9	4.81	Min: 1; Max: 7
	GMAT - Total Number - per 100,000 population aged 20-59	257	0.6	16	665.32	
		10	5.3	8	6.90	
	GMAT - Mean Total Score	562	6.4	12	556.36	Min: 0; Max: 800
Start-up Skills	0.5	3.8	12	0.54	Min: 0; Max: 1	

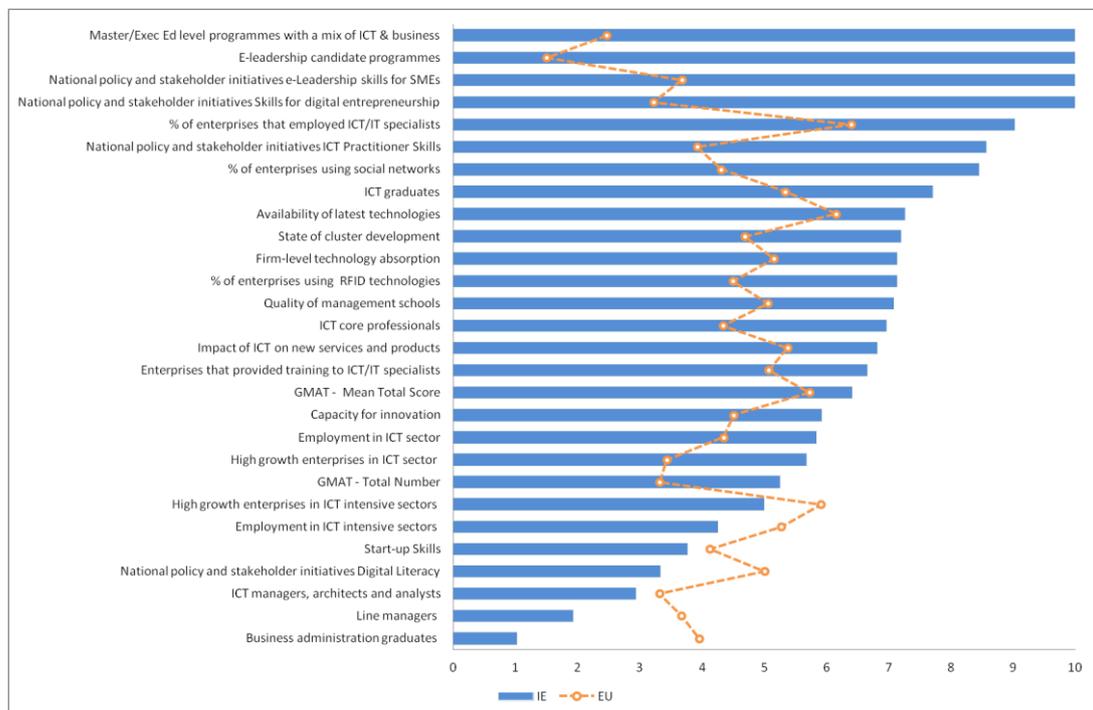
Note: Both the scoreboard framework and its results are first drafts as basis for further discussion and must not be quoted or published without permission.

Figure 5-4: Ireland - e-leadership performance per indicator



Note: Both the scoreboard framework and its results are first drafts as basis for further discussion and must not be quoted or published without permission.

Figure 5-5: Performance-based indicator ranking for Ireland



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5.3 Towards an e-Leadership Index (eLI)

Measuring e-leadership and a number of factors influencing e-leadership skills output is a challenging task, also given the novelty of the notion itself. As presented in this study, eLI aims at providing insights into the climate, infrastructure and related outcomes on e-leadership. Overall results derived from index calculations should not be seen as an ultimate and definitive ranking of nations with respect to e-leadership. Instead, eLI is more concerned with contributing to the development of metrics and identifications of policies and good practices for a better measuring and understanding of e-leadership. Individual countries can use the eLI model to monitor their performance over time or benchmark their development against other countries.

5.3.1 Methodology

The process followed towards developing e-leadership index is detailed below:

- Step 1: Selection of indicators –Conceptual consistency

As also mentioned above, candidate indicators were selected for their relevance to a specific dimension / building block and on the basis of the literature review, expert opinions, country coverage, timelines, etc. To avoid country-size effects as well as to represent a fair picture of country differences, some indicators (as appropriate) were standardised using population data.

- Step 2: Treatment of indicators and data checks

The quality and accuracy of a composite indicator as well as the reliability of the messages it aims at delivering depends not only on the methodology its composition builds upon but primarily on the quality of the framework and the data used.²³ Section 5.1.2 summarizes the selection criteria considered to identify candidate indicators. Proxy indicators have been utilised in cases when desired data have not been available. Considerations have also been given to the data quality assessment for the selected variables as well as to the treatment of outliers, approaches used for the imputation of missing data, normalisation method used, and so on. Detailed information about treatment of indicators and composition of eLI is detailed in the Annex section 11.1.1.

- Step 3: Statistical coherence

A principal component analysis has been conducted to validate the extent to which the statistical approach confirms the conceptual framework. From the analysis it came out that none of the selected variables should be excluded. Overall, the selected principal components explain almost 80% of the total variance.

- Step 4: Calculating composite scores

Prior to calculating a composite index, one may decide on calculating an un-weighted average of the variables included or assigning different weights to their scores. Lacking clear theoretical guidelines in assigning weights to the individual elements, we assign equal weights to each of the building blocks by equally distributing weights to each individual indicator in the building block, based on:

- - The number of indicators available in each building block
- - Data availability for each indicator individually and for each country

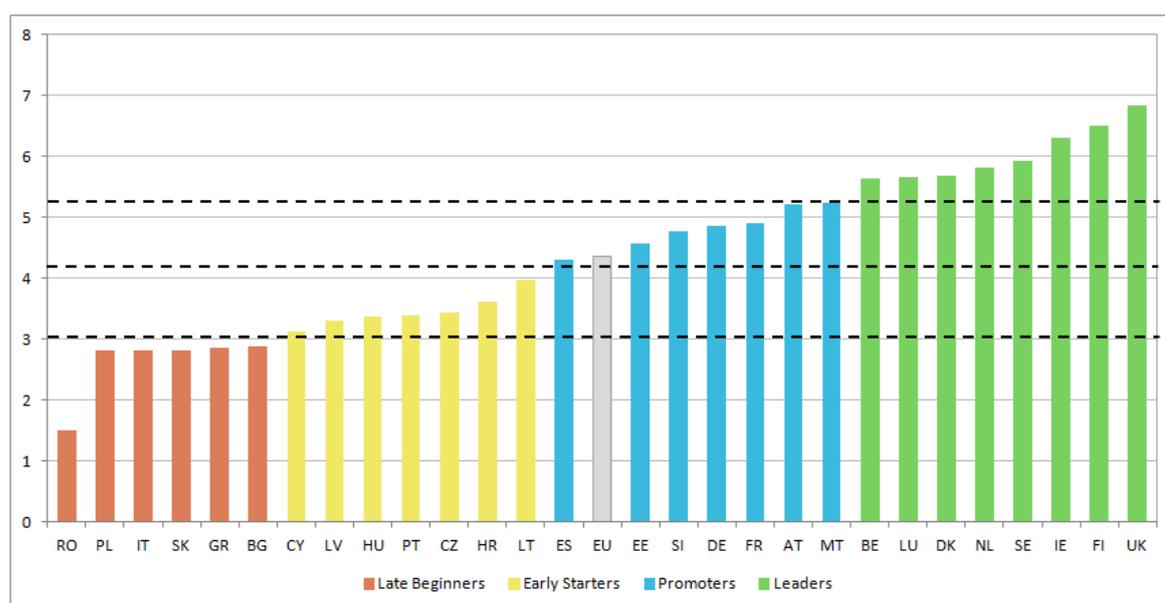
²³ Handbook on constructing composite indicators: methodology and user guide – ISBN 978-92-64-04345-9 - © OECD 2008

5.3.2 Preliminary Findings

The e-Leadership composite indicator has been obtained by a weighted aggregation of the 28 indicators used for assessing e-leadership environment among Member States. Figure 5-6 below summarises index scores and ranks countries accordingly. Based on the overall results, the Member States fall into the following four groups:

- Countries with an overall performance 20% or more above the EU28 average fall into the ‘Leaders’ group. This includes Luxembourg, Belgium, Denmark, Sweden, Netherlands, Ireland, Finland and United Kingdom.
- The ‘Promoters’ show a performance less than 20% above and 5% below EU28. Countries such as Spain, Estonia, Slovenia, France, Germany, Malta and Austria are all e-leadership ‘Promoters’.
- The ‘Early Starters’ show a performance between 70% and 95% of the EU28 average. Cyprus, Latvia, Portugal, Czech Republic, Hungary, Croatia and Lithuania result to be the Early Starters.
- The ‘Late Beginners’ group includes Romania, Bulgaria, Poland, Italy, Slovakia and Greece. These countries’ performance is more than 30% below that of the EU28 average.

Figure 5-6: EU Member States’ e-Leadership Index ranking



Note: Average performance is measured using a composite indicator building on data for 28 indicators going from a lowest possible performance of 0 to a maximum possible performance of 10. The performance of e-leadership ‘Leaders’ is 20% or more above that of the EU28; of e-leadership ‘Promoters’ it is less than 20% above and less than 5% below that of the EU28; of ‘Early Starters’ it is less than 30% below but more than 5% below that of the EU28; and for ‘Late Beginners’ it is more than 30% below that of the EU28.

Note: Both the e-Leadership Index framework and its results are first drafts as basis for further discussion and must not be quoted or published without permission.

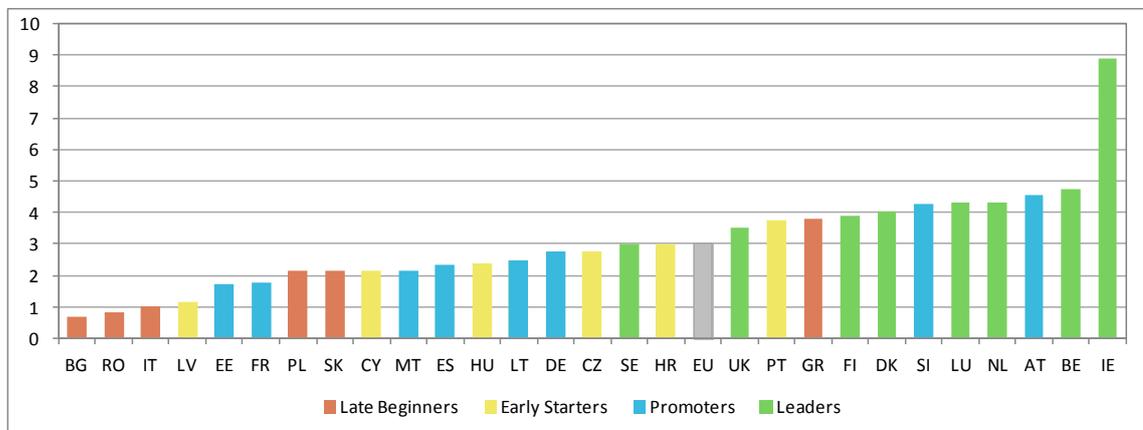
This section provides insights into countries’ performance and rankings across each of the building blocks introduced in the scoreboard, the sub-scores of which compose the compound e-leadership index. Figure 5-7 to Figure 5-14 show country ranking results for each of the building blocks, including EU28 average for benchmarking and comparisons. Performance of e-leadership ‘Leaders’ dominates mainly in ‘e-Leadership Skilled Professionals’, ‘Business Environment’, ‘Innovation Opportunities’, ‘e-Skills Policy Actions’ and ‘Enabling Infrastructure’ and to a lesser extent in ‘Education and Training’, ‘e-Leadership Pipeline’ and ‘Technology Trends’ where their average rank

is relatively lower. Overall, 'Leaders' perform better in each of the building blocks, followed by 'Promoters'.

However, several countries perform much better than expected based on their performance group. For instance, performance of 'Late Beginners' relative to that of the 'Early Starters' differs noticeably depending on the building block. Some of the 'Late Beginners' manage to perform better than the EU28 average in 7 cases: 'Education and Training' (1); 'e-Leadership Pipeline' (1); 'Business Environment' (1); 'Technology Trends' (1); 'e-Skills Policy Actions' (1) and 'Enabling Infrastructure' (2). Also, Portugal, Latvia, Czech Republic, Croatia, and Hungary, all of them 'Early Starters' perform above average in some cases. Portugal performs very well due to its relative high ranking and above average performance in Availability of latest Technologies, % of enterprises that employed ICT/IT specialists and Quality of management schools. Latvia performs above EU average in 'e-Leadership Skilled Professionals' and in 'e-Leadership Pipeline' due to a relatively higher number of Line managers (as % of total workforce) and Business administration graduates (per 1000 population aged 20-24). On the other hand Czech Republic ranks as well as 'Leaders' in 'Business Environment' as a result from having a relatively high Employment in ICT intensive sectors (as % of total employment) and a high share of High growth enterprises in ICT sector, followed by Hungary. Croatia performance dominates in the 'e-Leadership Pipeline' due to high number of ICT and Business administration graduates (per 1000 population aged 20-24) as compared to the average for EU28.

Ireland has the best ranking in 'Education and training' due to its very strong performance in both Master/Exec Ed level programmes with a mix of ICT & business and E-leadership candidate programmes. In comparison to other countries, Ireland offers the highest number of these types of programmes.

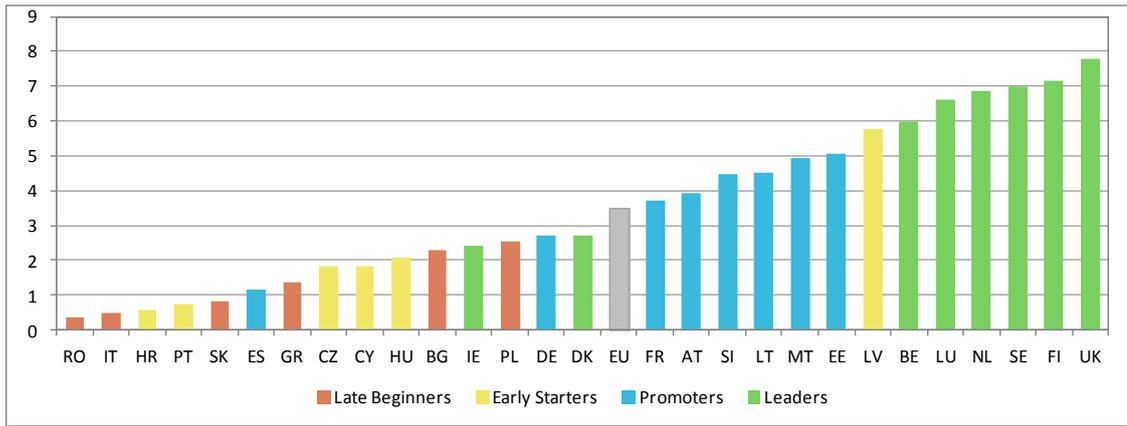
Figure 5-7: Countries' ranking in Education and Training



Note: Both the e-Leadership Index framework and its results are first drafts as basis for further discussion and must not be quoted or published without permission.

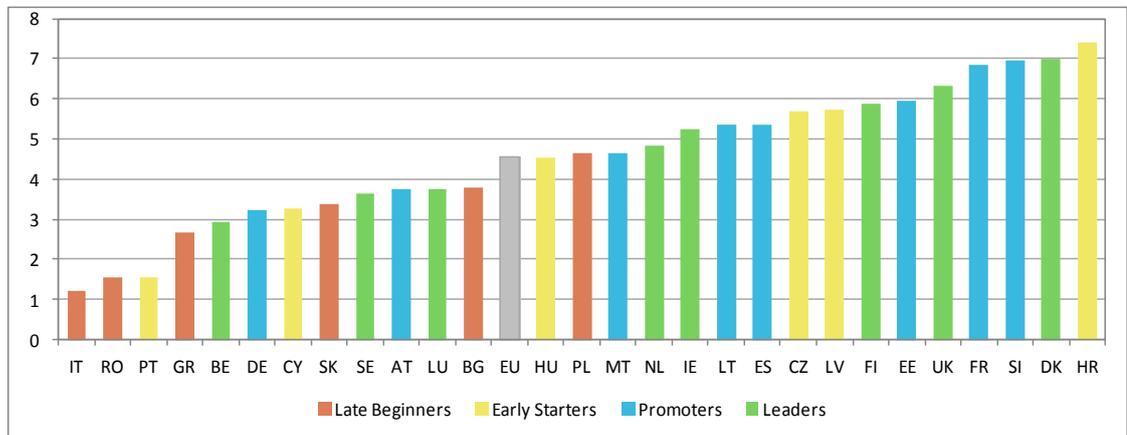
United Kingdom shows the highest ranking in 'e-Leadership Skilled Professionals', 'e-Skills Policy Actions' and 'Enabling Infrastructure'. The number of Line managers and ICT core professionals (as % of total workforce) is the highest in comparison with that from other Member States. The country is very aware of the need to boost the e-leadership skills among the country's SMEs and has demonstrated this through a range of government policies and initiatives dealing explicitly with e-leadership and also a number of public-private partnerships engaged in leadership training for digital entrepreneurs. Other indicators, such as Quality of management schools and GMAT - Mean Total Score rank relatively high in UK compared with EU28 average.

Figure 5-8: Countries' ranking in e-Leadership Skilled Professionals



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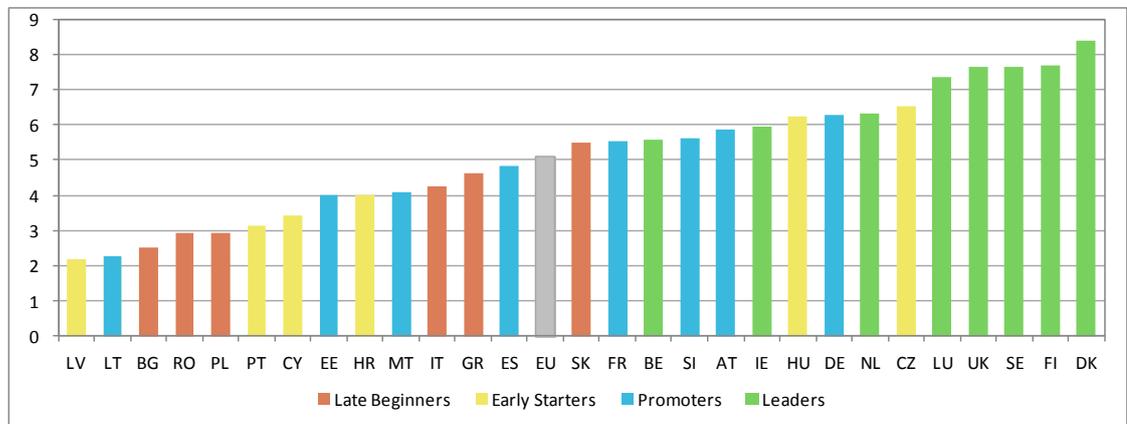
Figure 5-9: Countries' ranking in e-Leadership Pipeline



Note: Both the e-Leadership Index framework and its results are first drafts as basis for further discussion and must not be quoted or published without permission.

Denmark has the highest ranking for 'Business Environment' as result from having the highest share of High growth enterprises in ICT intensive sectors and a relatively high number of people employed in ICT and ICT intensive sectors (as % of total employment).

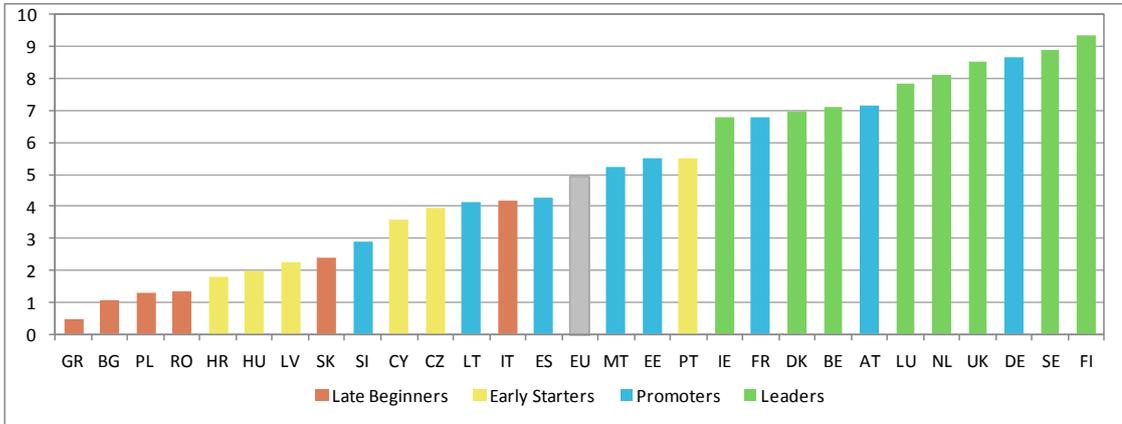
Figure 5-10: Countries' ranking in Business Environment



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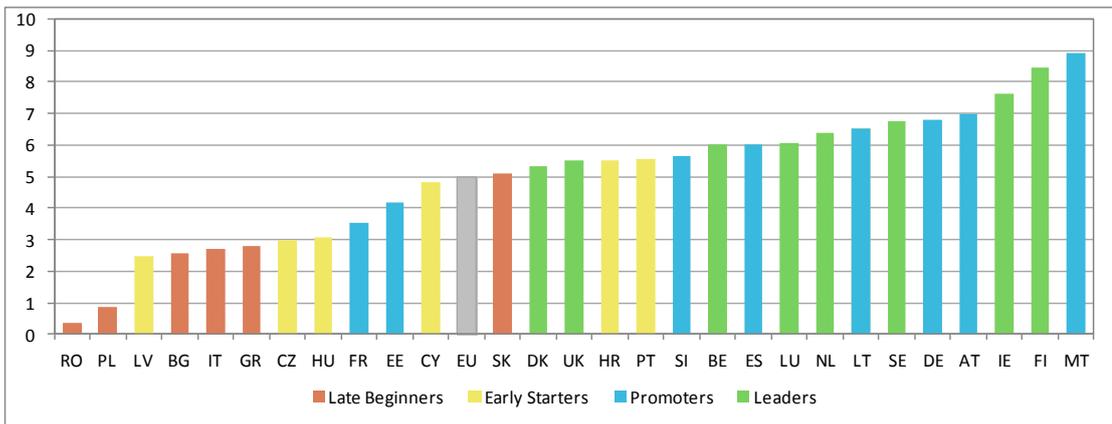
Finland ranks best in 'Innovation Opportunities', demonstrating the highest Capacity for innovation and showing a strong Impact of ICT on new services and products in the country.

Figure 5-11: Countries' ranking in Innovation Opportunities



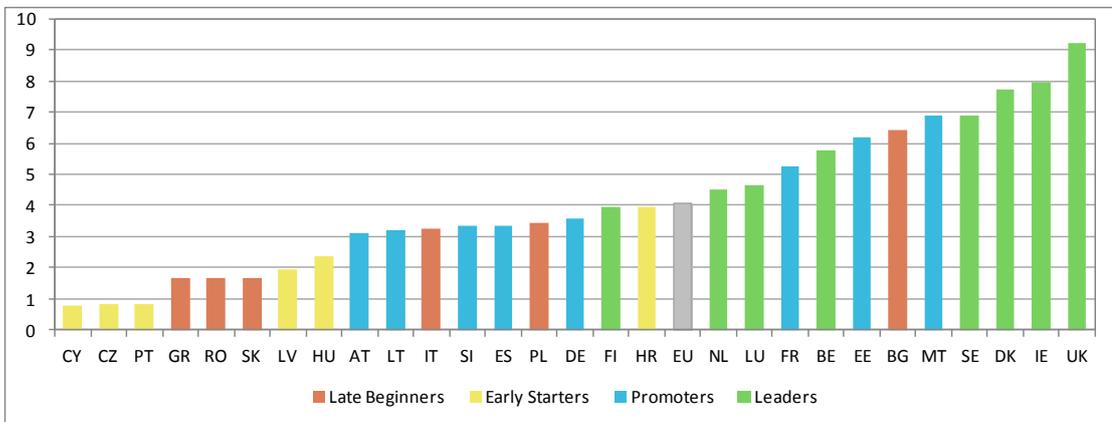
Note: Both the e-Leadership Index framework and its results are first drafts as basis for further discussion and must not be quoted or published without permission.

Figure 5-12: Countries' performance per dimension in Technology Trends



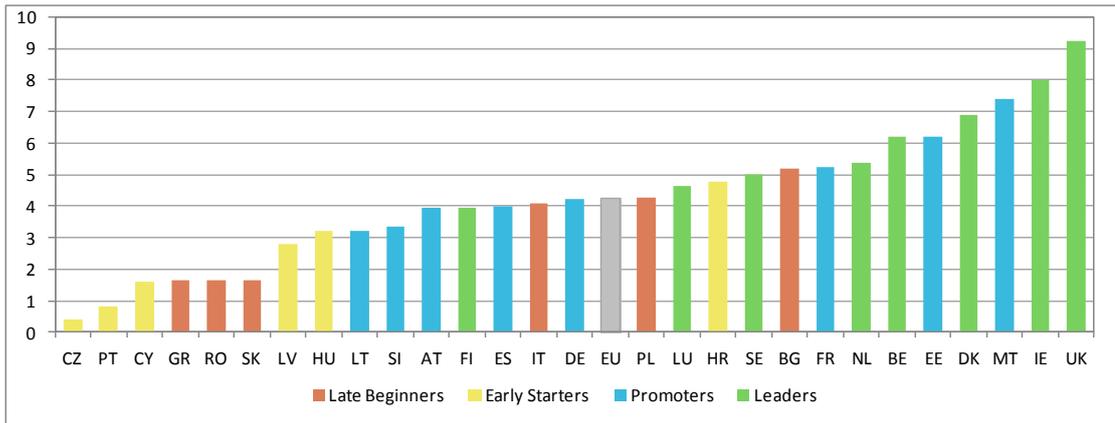
Note: Both the e-Leadership Index framework and its results are first drafts as basis for further discussion and must not be quoted or published without permission.

Figure 5-13: Countries' ranking in e-Skills Policy Actions



Note: Both the e-Leadership Index framework and its results are first drafts as basis for further discussion and must not be quoted or published without permission.

Figure 5-14: Countries' ranking in Enabling Infrastructure



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6 Technology Trends

This chapter summarises the full report produced by IDC for the European Commission in the context of this service contract on fostering of e-leadership skills in Europe with a specific focus on SMEs. The full report, entitled “ICT TRENDS 2020: Main Trends for Information and Communication (ICT) and their Implications for e-Leadership Skills “, by IDC can be found as an Annex to this report.

This chapter highlights the main ICT trends expected to affect the demand of e-skills and specifically e-leadership skills in the next decade, and the evolution of the mix of skills requested by emerging innovation, including SMEs. The main focus of the study is on high tech and high growth SMEs (Gazelles), who particularly need ICT and e-leadership skills to enhance competitiveness and being or continuing to be successful.

There is broad agreement that the ICT world is in the midst of a new wave of innovation characterised by the confluence of social, mobile and cloud technologies, the rise of Big Data and the new kinds of analytics needed to create value in this environment. This vision is the common background of the future technology trends presented by IDC, Accenture, AT Kearney, IBM and the McKinsey Global institute in their most recent reports on innovation up to 2020. In this context it is important to analyse and qualify the specific demand for skills driven by the emerging technologies.

6.1 Approach to the Analysis of Technology Trend Impact on Skills

Within the context of this report, we adopt the definition of e-leadership skills as laid out in the previous chapter. In order to assess the impact of technology trends on skills, we have further articulated the previous definition of e-leadership skills as follows:

- **Strategic management skills:** focused on the general management skills relevant for IT and business affecting the evolution of the CIO's role;
- **Hybrid market-IT skills:** focused on the combination of IT and business skills in order to better exploit IT for business goals;
- **Industry-specific skills:** focused on the understanding and exploitation of IT for business goals in a specific sector, with specific knowledge of the industry and its requirements.

This is complemented by the analysis of technology innovation impacts on ICT practitioner skills, grouped as follows:

- **Infrastructure:** including Information Systems Outsourcing, Network and Desktop Outsourcing, Network Consulting and Integration Services, Hosted Infrastructure Services, Hardware Deploy and Support, and System Integration contracts where the main purpose is implementation of hardware or network solutions;
- **Applications:** including Custom Application Development, Application Management, Hosted Application Management, Software Deploy and Support, and System Integration contracts where the main purpose is implementation of application solutions;
- **General:** including pure IT and business consulting engagements and IT education and training services, and IT management skills that are not specifically attached to applications or infrastructure, including enterprise architects, vendor management skills, data scientists and the emerging role of "chief digital officer".

6.2 Identification and Selection of Main Technology Trends

In order to identify and select the most important trends and their impacts, we have carried out a comparative analysis of main sources, including IDC's Predictions, IBM's Global Technology Outlook

2013, McKinsey Global Institute’s report on “Disruptive technologies” of May 2013, Accenture’s Technology Vision 2014. Each one of these sources builds upon cumulative desk and market research on the most important innovation trends.

The selection of the most important trends was based on the following criteria:

- **They are disruptive technologies**, according to the definition provided by McKinsey, that is they are still rapidly advancing, they have a broad potential scope of impact, may affect significant economic value, and they can dramatically change the status quo of the market;
- **Their development is profoundly changing the mix of skills requested** in the new ICT environment, driving demand for new specialized skills to design, develop and deploy new digital services, decreasing demand for operational and practical ICT skills, particularly in user industries, and stimulating an overarching demand for e-leadership skills, in order to exploit the new technologies for business growth.
- These characteristics are documented by at least two separate sources.

Table 6-1: Identification of main trends based on main sources

Main Trends	IDC	McKinsey Global Institute (MGI)	IBM Research GTO	Accenture Technology Vision	IT 2020 AT Kearney
Mobility	***	***	***	***	***
Cloud Computing	***	***	***	***	***
Big Data analytics	***	***	Focus on Multimedia Analytics	***	***
Social Media Technologies	***	***	***	***	***
Internet of Things	***	***	***	***	***
Customer Experience IT	***			***	***
IT Security	***			***	
Convergence of Main trends	3d Platform	Automation of knowledge work	Focus on: Scalable Services Ecosystems Software Defined Environments Contextual Computing	Every business is a digital business – digital transformation	Build the skills necessary for meshing business needs with IT requirements

All the main sources agree in identifying the following technologies as the most important trends affecting the ICT market and the socio-economic system in the next 10 years:

- **Mobility:** The incredibly rapid penetration of mobile devices and technologies in the market and the broad phenomenon of leveraging mobile solutions in the business environment;

- **Cloud computing:** the disruptive delivery model of software and ICT services, based on flexible and on-demand business models;
- **Big data analytics:** a new generation of technologies and architectures, designed to economically extract value from very large volumes of a wide variety of data, by enabling high velocity capture, discovery, and/or analysis;
- **Social media technologies:** the use of social media within and outside the enterprise, implementing social marketing techniques and facilitating collaboration and knowledge sharing;
- **Internet of Things:** A dynamic global network infrastructure with self-configuring capabilities based on standard and interoperable communication protocols where physical and virtual “things” have identities, physical attributes, and virtual personalities, use intelligent interfaces, and are seamlessly integrated into the information network.

In addition the following trends have been selected for their impact on market dynamics and the demand of skills

- **Customer Experience IT (CIXIT)** refers to the IT-related investments required to manage and optimise the customer's (or a citizen's) experience with an organisation. This is a new concept reflecting the increasing convergence of innovative IT (mobile, social technologies, cloud, Big Data, IoT) into applications and services centred on the customer experience, implemented through investments made by business managers other than CIOs.
- **IT security:** given the increasing dependency of European organizations on ICT systems, and the growing complexity of connected environments, there is strong demand for and diffusion of software and tools to ensure systems security at all levels;

Finally, all these studies underline the relevance of the convergence of these new technologies and their cumulative effect on the market.

6.3 Impacts on the Demand of ICT Practitioner Skills

In 2014, the further growth of the main disruptive ICT trends highlights their convergence in a new emerging paradigm of use of IT for business strategies.

By looking across the analysis of the demand of ICT skills for each main trend we notice several common elements. In summary, these are the main considerations:

- High level ICT practitioner skills are in increasing demand, but this is coupled with lower demand for traditional technical skills, particularly in the infrastructure and traditional IT management area.
- A revival of hardware innovation (driven by hyperscale data centres, storage, and all the new devices connected to the IoT) stimulates demand for highly specific hardware-related and systems management skills particularly in the ICT industry.
- The demand for highly specialized resources tends to move from the ICT users to the ICT vendors, while the profiles required by ICT users become more business-oriented and project-oriented, with a strong focus on the design of new services and apps, and the ability to outsource/ rely on standardized platforms and services;
- The applications skills area is the most dynamic, naturally so given the emergence of the so-called “apps economy”. This builds on software skills but with very innovative demands, including the capability to manage a flexible and never-ending apps process.
- The emergence of highly integrated, automated and scalable infrastructures is driving new demand for standardization and interoperability skills (within the ICT industry) and capability to understand, select and manage standards and interoperability (within the ICT user industry).

Table 6-2: Summary of main demand trends of ICT Practitioners skills

	ICT Industry		ICT User Industries	
	Increased Demand	Reduced Demand	Increased Demand	Reduced Demand
Infrastructure	<p>Design, development and management of data centres and cloud services</p> <p>Integration of fixed-mobile systems (BYOD management)</p> <p>Data protection/ Privacy protection/ new IT security challenges</p> <p>Systems management skills for highly integrated, automated and scalable infrastructures (IoT)</p> <p>Design and management of end-to-end protection of emerging smart networks and cyber infrastructures</p>	<p>Operational skills to manage and maintain corporate IT systems</p> <p>Maintenance and support of legacy systems (PCs, desktops...)</p>	<p>Selection, configuration, combination, orchestration of cloud services, either public, private or hybrid</p> <p>Integration of fixed-mobile systems (BYOD management)</p> <p>Systems management skills for highly integrated, automated and scalable infrastructures (IoT)</p> <p>Data protection/ Privacy protection/ new IT security challenges</p> <p>Implementation and management of end-to-end protection of emerging smart networks and cyber infrastructures</p>	<p>Operational skills to manage and maintain corporate IT systems</p> <p>Maintenance and support of legacy systems (PCs, desktops...)</p>
Application	<p>Development and implementation of apps/ services based on mobility/cloud/Big Data/ Social Media/ IoT</p> <p>Business data analytics, Data scientists, Big Data skills</p> <p>Apps, web, IT service development for customer-centred design and deployment (CXIT)</p>	<p>Maintenance of legacy applications</p>	<p>Development and implementation of apps/ services based on mobility/cloud/Big Data/ Social Media/ IoT + industry knowledge</p> <p>Business data analytics, Data scientists, Big Data skills</p> <p>Apps, web, IT service development for customer-centred design and deployment (CXIT)</p>	<p>Maintenance of legacy applications</p>
General	<p>Skills to design and implement sophisticated identity and access management solutions</p> <p>Skills on standardisation/ IT regulation/ interoperability developments</p> <p>Ownership of skills certification</p>	<p>Traditional IT management skills focused on proprietary systems and custom developments</p>	<p>IT asset management and governance expertise</p> <p>Implementation of sophisticated identity and access management solutions</p> <p>Skills on standardisation/ IT regulation/ interoperability developments</p> <p>Ownership of skills certification</p>	<p>Traditional IT security skills by public cloud users</p> <p>Traditional IT management skills focused on proprietary systems and custom developments</p>
R&D	<p>Sophisticated R&D and development skills (especially for interoperability and standardization challenges)</p>	<p>None evident</p>	<p>Sophisticated R&D and development skills, focused on industry needs</p>	<p>None evident</p>

6.4 Impacts on the Demand of e-Leadership Skills

In summary, the emerging demand for e-leadership skills is driven by the digital transformation process of enterprises and the cumulative impact of main technology innovation trends. In our view, e-leadership skills can be articulated in three main strands, complementary to each other: general management skills, hybrid business-IT skills, and industry specific skills.

Table 6-3: Summary of main demand trends of e-Leadership skills and SMEs implications

	Emerging Demand	Implications for High tech, high growth SMEs
General Management	<p>Strategic management of business and contractual relationships with IT suppliers - partners - subcontractors – clients over extended value chain/ digital ecosystems</p> <p>In-depth understanding of IT offshoring/ outsourcing issues and cost-benefits balance to make informed choices</p> <p>Strategic Management of interaction between CIOs and business line managers</p>	<p>Strategic management of the role of the company in the digital ecosystem with specific attention to SMEs vulnerabilities (insufficient IPR protection, for example).</p> <p>Ability to outsource/delegate necessary IT services and make appropriate buy/train decisions of necessary skills</p>
Hybrid Business/ IT	<p>Strategic management of company information and data flows, including design and development of “data supply chains” to leverage company’s data and partners’ data and make them usable</p> <p>Combination of business analytics skills with industry-specific skills and understanding of IoT issues</p> <p>Strategic management of data protection/privacy issues</p>	<p>Similar demand, since customer expectations will be similar</p> <p>“Native” digital companies (e.g. web entrepreneurs) may have innate e-leadership skills in this area</p> <p>Challenge to source/ maintain scarce specialist skills, particularly data analytics and data scientists skills</p>
Industry Specific	<p>In-depth understanding of industry-specific business development opportunities driven by IT innovation</p> <p>Combination of business analytics skills with industry-specific skills and understanding of IT innovation implications for business processes</p> <p>Ability to use IT for customer-centred apps and services (CXIT) within specific industry</p>	<p>Similar demand, since customer expectations will be similar</p> <p>Risk of missing e-leadership skills necessary for competitive advantage; relative relevance linked to business model</p>

The main drivers of demand are the following:

- With the diffusion of cloud, IoT, CXIT the enterprise perimeter is no longer clearly defined. Therefore, the e-leader must have strategic management skills of business, technical, operational and contractual relationships with IT suppliers, partners, clients over extended value chain/ digital ecosystems, as well as with other business line managers in their organization. The key word is strategic management: the e-leader action must build on a strategic vision of the business evolution and transformation.
- The demand for hybrid business/IT skills is driven by the need to exploit IT for business growth opportunities, including in particular the ability to grow and nurture an apps system, to build a “data supply chain” with the organization’s data flows, and to manage in the appropriate way data and privacy protection issues.
- The demand for industry-specific e-leadership skills is focused on the in-depth understanding of sectorial business development opportunities driven by IT innovation, particularly for customer-centred IT systems and processes.

Looking closely at the implications for high-tech and high-growth SMEs the following considerations emerge:

- High-tech and high-growth SMEs will have similar e-leadership skills needs than large enterprises, because customer expectations and requirements will be similar, but at a different scale level and with different viewpoints. For example, they will also need to manage relationships in the digital value chain, but from the point of view of a junior partner.
- Depending on their size and business model they may not need a CIO: the e-leadership skills may be those of the entrepreneur himself. Actually, “native” digital enterprises (web

entrepreneurs) may have “innate” e-leadership skills and leapfrog other companies with a creative use of IT innovation. But they still may not have the full range of e-leadership skills needed.

- SMEs will face harsher choices in terms of sourcing their needed e-leadership skills: buy, hire or train existing employees? Given their limited resources, they will have to be careful and invest well in the priority skills most functional to their business model.

7 E-leadership policies and stakeholder initiatives in Europe

The present chapter provides a brief summary and an overview of the results from the analysis of policy and stakeholder activity concerning e-leadership skills and skills for digital entrepreneurship. Data collection was carried out in April to July 2014.

Most of the results will be presented in overview and tabular format to allow the reader to easily grasp the key results from and messages for each country. These have been condensed in an overall overview table summarising the results for all 28 Member States along two indices: an "e-Leadership Activity Index" and a "Digital Entrepreneurship Activity Index".

7.1 Policies at Member State level

The topic of e-leadership is touched upon – more or less explicitly – in a whole range of policy fields, such as policies on: higher & vocational education; research & innovation; entrepreneurship; SMEs; cohesion and economic development; and the Digital Agenda, which itself represents a horizontal policy domain cutting across all the ones mentioned before. At the intersection of these policies, the topics related to e-leadership skills attract increasing interest in many Member States. Only in Ireland, Italy and Scotland, however, are measures for strengthening e-leadership skills *explicitly* mentioned in policy strategies. The general impression from our analysis is that the need for providing SMEs and entrepreneurs with the skills for e-leadership is treated as a secondary objective, with limited need for concerted action once the more well-established objectives of policy intervention (such as take-up of present-day ICTs; basic ICT user skills; adoption of e-government and e-business; access to venture capital; start-up subsidies) have been taken care of.

The policy analysis had to take into account that some Member States feature powerful regions with own policy strategies bearing upon e-leadership skills. This applies, in particular, to Belgium, Germany, Spain and the U.K.

Our analysis identified the following key policy approaches to the topic of e-leadership skills in Europe:

Policies on higher & vocational education: The focus is on adapting existing and introducing new programmes in higher and vocational education to provide offers for acquisition of e-leadership skills. Depending on the established governance structures in the area, some governments have joined forces with universities and other education providers to initiate development of course programmes that meet the needs of the business community, mainly in terms of study duration and learning outcomes. In other countries, related developments have taken place without a significant degree of policy intervention, as public universities, business schools and the like strive to develop their competitive edge by offering course programmes that provide a combination of executive management, business innovation and ICT competencies.

Research & innovation policies: These policies often include strategic approaches to improving the capacity of SMEs to invest in product or process innovation. Existing schemes often include the transfer of e-leadership knowledge into SMEs, but this happens more often than not through one-to-one consultancy rather than SME participation in training programmes.

SME policy: Driven forward by the European Commission's "Small Business Act" (SBA) from 2008, the majority of Member States have dedicated policies in place for supporting their stock of existing SMEs and for making it easier to establish a new business. Many of these also include schemes for providing SMEs with more attractive and better suited offers for participation in training about e-leadership, as such training is understood to boost SME competitiveness but often hampered by high barriers to uptake. There is a range of instruments available for this purpose, see the next section. e-Leadership skills are also being provided in the course of

subsidy schemes for ICT-enabled product and process innovation, and as part of support packages for helping SMEs internationalise their operations. Examples include Austria's Go Silicon Valley initiative.

Entrepreneurship policy: Promotion of entrepreneurship has entered the policy agenda in most if not all Member States; the range of policy interventions reaches from establishment of "entrepreneurship education" in school and university curricula²⁴, over business plan competitions and awards, to financial and hands-on support for fledgling start-ups (similar to what is offered to SMEs that seek to innovate). It appears that governments tend to avoid putting a special emphasis on ICT-driven start-ups, but in practice most promising start-ups will require e-leadership skills to be able to grow. Our analysis suggests, however, that most schemes for supporting entrepreneurs give only limited attention to training in e-leadership skills.

Employment policy: The available data suggest that women are significantly underrepresented among both digital entrepreneurs and ICT management positions. In line with the general policy objective to increase the rate of female participation in the labour market, a number of Member States have devised strategies for promoting a stronger role of women in management positions, including female entrepreneurship, as this seems to be an area where a lot of potential remains untapped. Sweden has the "Promoting Women's Entrepreneurship" programme which operates the "Golden Rules of Leadership" initiative. Germany's Go MINT! "National Pact for Women in IT Careers" alliance was formed in 2008 already, while Greece has a brand-new Digital Alliance for the Employment of Women. Another area where employment policy has a bearing on e-leadership skills is the development and provision of tailored education & training targeting graduates at risk of unemployment: In the face of, on the one hand, increasing rates of unemployment also among university graduates and, on the other hand, hard-to-fill vacancies for ICT practitioners who also have advanced business skills, some Member States have attempted to channel graduates and other jobseekers towards ICT jobs in which e-leadership is required. The Republic of Ireland has been especially successful in this area.

Digital Agenda: Following the example of the Digital Agenda for Europe, national policies that address cross-cutting issues concerning ICT take-up and use tend to be called national digital agendas today. While these deal most prominently with the underlying technological infrastructure and how to give everybody full access to it, skills issues related to the digital competences are a key component in the large majority of national digital agendas in Europe. Of particular importance is the development and broad recognition of e-skills frameworks and occupational definitions. These go back to national level efforts in the 1990s already (e.g. SFIA in the U.K.); they received a strong push in recent years with the development of the European e-Competence Framework (e-CF). A large number of schemes for education and certification of e-skills in Europe make use of, or are closely aligned with, the e-CF (e.g. the iTalent standards in Malta). As is mentioned elsewhere in this document, some of the core competences which make up the entirety of "e-leadership skills" have been incorporated in the e-CF, such as A.1. IS and Business Strategy Alignment, A.3. Business Plan Development, A.9. Innovating, E.7. Business Change Management. The process is expected to continue regarding both the e-CF and similar or aligned national e-skills frameworks. Inclusion of e-Leadership skills in competence and e-skills frameworks will boost awareness about possible skills shortages in the area; it is also likely to trigger a public debate among stakeholders about whether adequate education programmes are in place or how they can be established. A good example for this approach is the new Italian Strategy for the Digital Agenda.

²⁴ For instance: Austria's programme for Entrepreneurship Education; Croatia's Strategy for Entrepreneurial Learning 2010–2014; xxx

Cohesion policy: The by far most important policy tool for supporting SMEs and entrepreneurs in Europe's less developed regions (which includes the territory of all East European Member States with the exception of a few mostly capital city regions, plus Croatia and large parts of Slovenia, Portugal, Greece, southern Italy and peripheral parts of the U.K.) is distribution of funding from the European Structural Funds. For each programming period, Member States agree with the European Commission on a Partnership Agreement, which outlines the country's overall strategy for how to invest the funds, and a number of Operational Programmes (OPs). For the upcoming 2014-2020 programming period, each Member State is currently²⁵ engaged in drafting the OPs, which are the outcome of a lengthy process of public dialogue and negotiation. Some of the main beneficiary countries have used this opportunity to include measures for providing e-leadership training and education to SMEs and entrepreneurs. If the measures suggested will be approved and successfully executed, they will represent a significant step forward from the common practice in previous programming periods, where funding was targeted to training in basic ICT user skills and establishment of business development infrastructures such as technology parks and brick-and-mortar business incubators.

7.2 Stakeholder initiatives on e-leadership skills

The policy actions described above provide the framework for a large number of stakeholder initiatives that address promotion of e-leadership skills, either explicitly or – as is most often the case – by implication. Our analysis suggests that these stakeholder initiatives can be clustered according to their main focus and approach in the following groups:

- **Development of dedicated course programmes on e-leadership:** Business schools and public universities have started to experiment with developing and offering courses addressing the need for e-leadership skills, as is demonstrated by the snapshot of up-and-running programmes contained in the present report. Such offers are often the outcome of strong cooperation between business sector and education providers, e.g. in the case of the U.K.'s Tech Industry Gold degrees, the ICS Leadership Development Programme in Ireland, and the Intensive Training and Masters Programmes in Knowledge Based Entrepreneurship in Malta. A partnership approach appears necessary, in particular, to align curricula with employer needs within the scope of what is realistically feasible. Developments are still in their infancy, though, and results about the success of available course programmes are not available yet.
- **New types of education programmes for extra occupational learning:** In response to a perceived lack of education offers which suit the demands of SMEs and entrepreneurs regarding duration and costs, stakeholders in some Member States have established new types of programmes for extra occupational education. Examples include London's Mobile Academy, "a new style of programme intended specifically to address the challenges of teaching a very rapidly changing subject [...] offering a collaborative learning environment to get an overall grounding in business, design and how to work with technology." Other examples include the ILBA business academy in Croatia and THINK, the Amsterdam School of Creative Leadership.
- **e-Learning and MOOCs for e-leadership training:** In the economically less developed Member States, good experience has been made with the use of e-learning platforms dedicated to courses in e-business and e-leadership, e.g. the Start-Up initiative in Greece and the Akademia PARP and e-Business Academy in Poland. Athens University of Economics and Business recently launched a MOOC for training in digital entrepreneurship.

²⁵ Summer 2014

- **e-Leadership education provided in the context of university spin-off programmes:** Many universities now have units or subsidiaries which promote spin-off activity, i.e. the transformation of technological inventions developed from university research into commercially viable products or processes. Their objective is to equip students and staff who have promising business ideas with all the support and infrastructure they need to turn these into fully-fledged start-up operations. In the case of ICT-driven business cases, this of course needs to include training in e-leadership, for which such centres have the advantage of being able to draw upon their parent university's resources. Outstanding examples include the Henley Accelerator in the U.K.
- **e-Leadership excellence schemes:** The only prominent example of this type is Germany's Software Campus, cooperation between government, education and industry that supports young ICT researchers of outstanding promise. Each participant works on an academic project with direct applicability in a major German company, which is fully funded by the academy. Participants also receive high quality leadership training through via mentoring support from an experienced manager, and have access to excellent opportunities for networking and career building. This type of initiative is unlikely to be of direct benefit to SMEs, but it can be expected that some of the participants will, once they have finished their studies, choose starting their own company rather than joining an established "big player".
- **Subsidised or free provision of e-leadership training to SMEs:** Business development bodies have tried to lower the barrier for SMEs to participate in training courses by subsidising part or all of the direct costs. This approach is increasingly used for training in e-leadership skills as well, e.g. in Northern Ireland.
- **Voucher schemes:** Some Member States have set up voucher schemes to make it easy and affordable for SMEs to obtain consultancy and training, e.g. the Innovationscheckar from Sweden's VINNOVA and Enterprise Ireland's Innovation Voucher. Denmark's voucher scheme makes it more affordable for SMEs to engage in a research-based business development project with a public sector research institution, e.g. a university. The objective here is to transfer knowledge from technological research to SME. Voucher schemes in general represent an attempt to ease SMEs' concerns about the administrative hassle involved in obtaining low sums of public funding.
- **Self-assessment tools:** In some Member States SMEs are invited to self-assess their leadership capabilities (including e-leadership skills) through an online tool provided. A good example is Northern Ireland's LMSA online diagnostic tool. The SME IT Capability framework developed by Ireland's IVI allows for a more in-depth assessment of "key IT areas or critical capabilities".
- **Business plan contests, start-up awards and the like:** At both national and international level, and especially in the Member States of Eastern Europe, contests and awards are a much-favoured instrument for addressing the perceived shortage in leadership skills among young, highly educated persons, and for motivating individuals with strong potential to take the first step towards entrepreneurship. More and more of these initiatives focus on digital entrepreneurship and e-leadership. Contests and awards owe their attractiveness to the fact that they are comparatively inexpensive, favoured by sponsors, and easy to promote. On the downside, they are incapable of offering the consistent and comprehensive support needed if a country seeks to equip its digital entrepreneurs with a sufficient e-leadership skills base.
- **e-Leadership education in the context of business incubator and accelerator schemes:** The growing number of start-up incubators and accelerators which focus exclusively or mainly on digital businesses play a key role in the transfer of e-leadership skills to fledgling entrepreneurs. This most often takes place via consultancy and mentoring, but in some cases also through education courses which are offered in cooperation with established providers of management education. Outstanding examples include: : Infopole Cluster TIC in Belgium's

Walloon region; WAYRA, the accelerator programme launched by Spain's Telefonica; Telenet Idealabs in Belgium; and the European Entrepreneurship Foundation in Hungary.²⁶

- **Promotion of e-leadership skills to students:** Some initiatives target students and young employees who are interested in developing their leadership skills, often in the digital domain. Examples include Austria's AWS First, the Bulgarian Young Leaders Program (BYLP) and Finland-based Demola. A particularly interesting case is the Future Leaders Development Program in Greece, which brings together newly graduated students and NGOs to solve a particular leadership challenge. Croatia's eStudent NGO is run by and for advanced university students. Germany's Student2Start-up initiative offers entrepreneurs the opportunity to select a specific challenge from their everyday business and make it subject of a university working group in which students develop innovative solutions.
- **Insight and awareness raising:** We found some initiatives for raising awareness among stakeholders and the wider public about the need for e-leadership skills. Other initiatives seek to gain a common understanding of the definition of e-leadership skills and their relevance in practice: in France, for example, the Pasc@line Association conducted a representative business survey to investigate the issue in much detail.
- **Initiatives focussing on women:** In addition to the policy-driven initiatives for increasing women's participation in the ICT-driven economy, there are also NGOs and industry-driven initiatives for promoting women who seek leadership positions in ICT. Examples include the UK-based everywoman in Technology Leadership Academy, which has evolved into a global membership organisation.

Previous analysis has established evidence that the multi-stakeholder partnership (MSP) is a highly useful if not necessary approach towards preparation and operation of successful initiatives in the e-skills domain. MSPs represents a strategic cooperation between private-sector partners (industry, employers from the private sector) and partners from the traditional education system, where the former take over responsibilities which traditionally have been held more or less exclusively by public sector institutions. MSPs build on the idea that the private sectors can complement, supplement and extend services provided by the public sector by increasing the available resources.

As such, MSPs are closely related to the more well-known public-private partnerships (PPP), which are usually defined as systems in which a government service is funded and operated through a partnership of government and one or more private sector companies. As opposed to PPPs, however, MSPs do not necessarily include the public sector – participating non industry partners can also come from the civil sector (e.g. trade unions). Another difference between more traditional PPPs and MSPs is the latter's emphasis on involving all key stakeholders which are of relevance for a certain e-skills related issue – rather than just a couple of partners who join forces to stem a fixed-term assignment. This is seen as the best way to ensure that progress will be self-sustainable and all-encompassing, as opposed to the piecemeal, uncoordinated approaches which too often dominate the modernisation of systems of vocational education in Europe.

From an industry viewpoint, multi-stakeholder partnerships present the possibility of overcoming the traditional polarisation between the public education system, which is the main factor behind supply of (formalised) skills on the labour market, and private sector employers, which exert demand for particular skills, here: competences in e-leadership.

Our analysis suggests that multi-stakeholder partnerships are not as well developed yet in the e-leadership field when compared to the other segments of the e-skills domain, i.e. digital literacy

²⁶ Since to qualify for being accepted by an incubator or accelerator scheme involves being able to convince evaluators of the quality of one's business idea, there are many similarities and overlaps between this and the previous type of initiative.

and ICT practitioner skills. This appears to be a case for policy intervention, as Member State governments could urge key stakeholders to join forces and agree on effective actions which will help promote awareness of the e-leadership skills topic and implement measures for boosting supply of and participation in related training programmes.

7.3 Summary assessment of national level policies and stakeholders activities on e-leadership

Figure 7-1: Summary assessment of national policy and stakeholder initiatives in the e-skills domain

	National policy and stakeholder initiatives on e-Leadership Skills for SMEs	National policy and stakeholder initiatives on Skills for Digital Entrepreneurship
Austria	<p>●</p> <p>Austria has a well-developed Strategy Research, Technology and Innovation, but it does not address e-leadership skills. The ICT Strategy 2014 to 2018, currently still under public consultation, is not expected to make a difference in this regard. Various initiatives are in evidence for supporting SMEs in the acquisition of knowledge for ICT-enabled business modernisation, e.g. e-business.</p>	<p>●●</p> <p>The Austrian Government at both federal and regional level undertake a range of activities for supporting business generation, reaching from entrepreneurship education at school age to Business Plan competitions and the like for students and graduates. None of these, however, make explicit reference to e-leadership skills or digital entrepreneurship, with the exception of Go Silicon Valley, a scheme which has its roots in business development support for companies that seek to expand abroad, but appears to be an effective programme for equipping high-growth SMEs in the ICT sector with the leadership skills required to flourish internationally.</p>
Belgium	<p>●●●</p> <p>Belgium has some policy initiatives which deal with e-leadership skills in all but name, but the attention the topic receives is still rather small overall. The Walloon Agency for ICT (AWT) and the Flemish Institute iMinds play an important role for creating awareness about e-leadership issues and the need to develop related skills in SMEs. Both are multi-stakeholders partnerships with strong involvement of the key stakeholders in Wallonia and Flanders, respectively.</p>	<p>●●●</p> <p>The regional governments within their major ICT-related institutions, the Walloon Agency for ICT (AWT) and the Flemish Institute iMinds, show some effort to promote digital entrepreneurship in their respective region. Together with Agoria (Federation of the technology industry) these institutions make up a dense support network covering all relevant sectors. Given this infrastructure of promotion, Belgium shows strong potential.</p>
Bulgaria	<p>●●</p> <p>Very little policy initiatives are in place which explicitly deal with e-leadership skills, but the Operational Programmes (OPs) for the 2014-2020 funding period provide ample opportunities to support training and education for e-leadership in SMEs and beyond. The draft OPs demonstrate awareness of the essential role of e-skills and ICT for the future economic prospects of Bulgaria. The great support which the Digital National Alliance has received also signals that Bulgaria is on making good progress. There is a number of partnerships between the</p>	<p>●●●</p> <p>Policy documents such as the National Strategy for SMEs 2014-2020 pay lip service to the need for promotion of entrepreneurship especially in high-tech segments of the economy, but most public sector activity appears limited to traditional tools such as financial support and training in basic ICT user skills. There is a huge number of initiatives by non-governmental stakeholders who seek to fill the apparent gap; many of these activities clearly target nascent digital entrepreneurs. Examples include Start It Smart and the Bulgarian Young Leaders Program (BYLP).</p>

	National policy and stakeholder initiatives on e-Leadership Skills for SMEs	National policy and stakeholder initiatives on Skills for Digital Entrepreneurship
	private-sector (e.g. BASSCOM, the software industry association) and higher education institutes with the goal to better align course programmes with the demands of employers, with positive impact on the availability of training for e-leadership.	The large number of small-budget initiatives bears the risk of fragmentation and lack of visibility, however.
Croatia	●● Croatian policy-making on SMEs is geared towards helping the country's large stock of SMEs to modernise to enable them to survive and prosper now that the country's economy is exposed to the European Single Market. Some of these activities seek to equip SMEs with basic e-business skills. Croatia does have, however, a business academy (ILBA) with a clear focus on e-leadership skills.	●●● Until only a few years ago, entrepreneurship was all but discouraged in Croatia, but the country has undertaken significant efforts in recent years to provide the framework conditions create the attitudes and develop the skills required for a boost to entrepreneurial activity. Universities have set up dedicated units for supporting start-up activity. The Network of Student Business Incubators represents an important initiative in this area. While none of these focus explicitly on digital entrepreneurship yet, the eStudent NGO (run by and for advanced university students) runs an impressive range of projects for nurturing leadership skills among future entrepreneurs mainly in the digital domain.
Cyprus	● Cyprus has a strong governmental role in the field of support to SMEs, but e-leadership has not yet entered the policy agenda. However, the e-Volve initiative of the Cyprus Productivity Centre has since 2009 provided training to SMEs in e-business skills.	●● Boosting digital entrepreneurship is one of the main pillars of the Digital Strategy for Cyprus adopted in 2009. Related initiatives have not advanced very much so far, mainly because of the economic crisis which has hit Cyprus harder than most other Member States. Establishment of the first technology park in Cyprus, the Pentakomo STP, has been planned since 2006, but may finally become reality in the coming months.
Czech Republic	● The Czech government supports SMEs in ICT-heavy parts of the economy with a range of measures, many of which are coupled to funding from the Structural Funds as defined in a number of Operational Programmes. Both the OPs for the 2007-2013 funding period and the new OPs currently being drafted make only very indirect reference to e-leadership training and education. Some of the countries universities, however, have become active in developing course programmes address e-leadership skills.	● The 2014-2020 SME Support Concept lists a range of support measures targeting entrepreneurs, with a focus on ICT-driven, highly innovative start-ups. This opens up opportunities for the funding of initiatives dedicated to training in the skills for digital entrepreneurship. No such measures appear to be in place at the time of writing, though.

	National policy and stakeholder initiatives on e-Leadership Skills for SMEs	National policy and stakeholder initiatives on Skills for Digital Entrepreneurship
Germany	<p>●●</p> <p>Germany has a range of policies targeting the "Mittelstand", i.e. the large number of medium-sized, often manufacturing companies which are so important to the country's economic prosperity. Few if any of these, however, make explicit reference to ICT-related leadership skills. Some universities have gone ahead and established e-leadership courses, often in cooperation with newly founded affiliate organisations which promote spin-off activities.</p>	<p>●●●</p> <p>The Software Campus set up in 2012 was among the first major initiatives in Europe focusing explicitly on e-leadership skills. It has led to an increased awareness about the need for e-leadership skills and related training and education offers. Beneficiaries of the scheme are unlikely, however, to be established SMEs, but rather large companies plus start-ups created by Academy graduates themselves. Germany has a range of ambitious initiatives targeting entrepreneurs in ICT-driven parts of the economy. Wissensfabrik Deutschland is a prime example of a multi-stakeholder partnership implementing innovative measures for boosting skills for entrepreneurship.</p>
Denmark	<p>●●●●</p> <p>Denmark excels in development and provision of education and training programmes that focus on e-leadership. The policy context is provided by the Innovation Strategy which puts much emphasis on "a change of culture in Denmark's education system", with more focus on innovation and value creation. The new Danish Innovation Foundation is expected to make policy implementation more effective. Both the Innovation Voucher and the Innovation Assistant programme represent interesting approaches to knowledge transfer into SMEs.</p>	<p>●●●</p> <p>Denmark has a well-developed system for entrepreneurship support; more and more of the training and mentoring taking place in this context has a focus on e-leadership. Business incubators, accelerators and clusters are engaged in training for digital entrepreneurship. There is, however, an absence of a major strategy or initiative explicitly addressing skills of digital entrepreneurship.</p>
Estonia		
Greece	<p>●●</p> <p>e-Leadership skills have hardly entered the policy agenda in Greece. Small-scale, non-governmental initiatives such as and Future Leaders and the Microsoft Innovation Centre dominate the area. Training of women in e-skills and e-leadership is expected to receive a boost through the new Digital Alliance for the Employment of Women, and outcome of Greece's commitment to the European Commission's Grand Coalition for Digital Jobs.</p>	<p>●●</p> <p>Greece suffers traditionally from poor conditions for entrepreneurial activities. The government is fully aware of the need to change this. Its Start-Up Greece platform is a promising attempt to support the next generation of entrepreneurs, e.g. by providing access to leadership training also in the digital domain. The Athens University of Economics and Business is an important stakeholder. It has a unit dealing with entrepreneurship and recently launched a MOOC on the skills for digital entrepreneurship.</p>
Spain	<p>●●</p> <p>Most of the policy and stakeholder activities in the area are geared</p>	<p>●●●</p> <p>Spain shows a clear commitment to boost ICT-driven entrepreneurial</p>

	National policy and stakeholder initiatives on e-Leadership Skills for SMEs	National policy and stakeholder initiatives on Skills for Digital Entrepreneurship
	towards less advanced SMEs, which are supported with basic training in strategic use of ICT for modernising their business. More advanced SMEs obtain support mainly through cluster promotion, in the context of which some e-leadership training is offered. In addition, sector specific innovation centres appear to play an important role for acquisition of e-leadership skills such as the Andalucia Lab focusing on ICT driven innovation in the tourism sector.	activity. The country is well equipped with start-up accelerators, business incubators and related schemes for management training, knowledge transfer and internationalisation. Some of the autonomous communities, notably Catalonia with its Digital Agenda "idigital", are somewhat more advanced than the national average.
Finland		
France		
Hungary	<p>●</p> <p>Almost all policy and stakeholder activities in the area are geared towards less advanced SMEs, which are supported with basic training in strategic use of ICT for modernising their business. The Digital Literacy Action Plan (2007), Digital Renewal Action Plan (2010) and the New Széchenyi Plan (2011) all include measures for helping raise the competitiveness of Hungarian SMEs by providing training in ICT-focused business skills. Implementation has often, however, suffered from lack of funding. Moreover, policies and initiatives focusing on more sophisticated skills required for e-leadership have not yet been devised.</p>	<p>●●</p> <p>The strong role of the ICT industry in the export-generating parts of Hungary's economy has had the result that efforts to foster entrepreneurial activity focus on ICT-driven business innovation. Private initiative has been important, too, as exemplified by the European Entrepreneurship Foundation (the very first Accelerator program in Western Europe set up by Peter B. Zábóji in 2005) and the Intel Business Plan Challenge in Hungary.</p>
Ireland	<p>●●●●●</p> <p>The Irish government has a dedicated strategy for addressing future demand for high-level ICT skills including e-leadership skills, namely the ICT Skills Action Plan, last revised in 2014. Implementation is supported by strong multi-stakeholder partnership, e.g. the ICT Ireland Skillnet. Conversion and up skilling programmes are in place for channelling unemployed university graduates into positions at the intersection of business management and ICT (e.g. MSc and Post Graduate Diploma in Innovation & Technology). Many Technology Centres engage in activities for promotion of skills development in e-leadership and digital entrepreneurship, e.g. the Centre for IT Innovation (Innovation Value Institute) which has developed an SME IT Capability framework. The ICS Leadership Development Programme is a prime example for an e-</p>	<p>●●●●●</p> <p>Ireland has a range of policies that seek to support business start-ups and entrepreneurship, with an increasing focus on the digital domain. The policy context is provided by the National Digital Strategy, which explicitly calls for measures to "support digital enterprise development". The New Frontiers Entrepreneur Development Programme based in 14 campus incubation centres across the country is a cornerstone of Ireland's well developed system for provision of digital entrepreneurship skills.</p>

	National policy and stakeholder initiatives on e-Leadership Skills for SMEs	National policy and stakeholder initiatives on Skills for Digital Entrepreneurship
	leadership course programme targeted at the SME market.	
Italy	<p>●●●●</p> <p>The new Italian Strategy for the Digital Agenda gives full attention to the e-leadership skills issue. It foresees measures for definition of e-leadership skills with reference, where possible, to the European e-Competence Framework (e-CF) and calls for e-leadership training programmes especially for public administration staff and SMEs. At the level of the Italian regions, regional digital agendas are currently being drafted. The available agenda for Lombardy also includes dedicated measures explicitly addressing the need for promoting e-leadership skills.</p>	<p>●●</p> <p>The national Strategy for the Digital Agenda and, in particular, the regional digital agendas put some emphasis on the need to support digital entrepreneurship in the country, but there are few concrete actions in operation or planned. Training offers on digital entrepreneurship come mainly from business incubators and start-up accelerators focusing on the digital domain. Universities have set up organisations to promote spin-offs and spin-outs that seek to exploit research outcomes commercially.</p>
Lithuania		
Luxembourg	<p>●●</p> <p>Although there are no policies targeting e-Leadership explicitly, the government acts as an important stakeholder in all relevant initiatives and MSPs in Luxembourg. As a good example the private-public partnership Luxinnovation offers personalised services and training on topics including e-leadership. The Public Research Centre Henri Tudor is well advanced in development and provision of e-leadership course programmes.</p>	<p>●●●</p> <p>Thanks to its compact size, Luxembourg has an outstanding infrastructure for technology based SMEs and start-ups. Because of the growing importance of the ICT sector for Luxembourg the government implemented some policy measures to further improve the business environment. The ICT Cluster and Technoport are examples for successful public-private partnerships offering incubation and promotion services, plus related training in digital entrepreneurship.</p>
Latvia	<p>●</p> <p>Latvia has a general lack of a policy framework in which e-leadership skills would be addressed. The Latvian IT Cluster involves all important stakeholders (including the public sector), but e-Leadership is not an explicit part of their activity yet.</p>	<p>●◐</p> <p>The Latvian government has set up some policies targeting the improvement of entrepreneurship environment. There is a system of technology parks which act as regional incubators. The University of Latvia is engaged in activities for the commercialisation of research results and for developing entrepreneurship skills through education and mentoring programmes targeting university students.</p>
Malta	<p>●●●</p> <p>Skills for e-Leadership and digital entrepreneurship have attracted increasing attention amongst policy-makers and other national stakeholders in recent years. The Digital Malta 2014-2020 strategy provides a solid political foundation for stakeholder activities to boost e-leadership skills. MITA, the Malta IT Agency, is currently working with the</p>	<p>●●●●</p> <p>Support for entrepreneurship, in particular ICT-driven start-ups, enjoys considerable support from government and the other major stakeholders in the country's e-skills domain. Both the Centre for Entrepreneurship and Business Incubation (CEBI) at Malta University and the Microsoft Innovation Centre are active in related education and training. The</p>

	National policy and stakeholder initiatives on e-Leadership Skills for SMEs	National policy and stakeholder initiatives on Skills for Digital Entrepreneurship
	University of Malta to explore the possibility of creating a Master programme focused purely on e-Leadership. The country's National Occupational Standards for ICT related occupations (iTalent) are based on the e-CF and include e-leadership competencies.	Intensive Training Programme and Masters Programme in Knowledge Based Entrepreneurship are prime examples of a course programme focusing on e-leadership in the context of start-up activity.
Netherlands	●● The Dutch Government's policy strategy dealing with e-skills development, Digivaardig en Digiveilig, does not yet make explicit mention of e-leadership skills. There is growing awareness among stakeholders, however, about the need for swift action. Universities have started to develop e-leadership courses, often in collaboration with partner universities from abroad. THINK, the Amsterdam School of Creative Leadership, represents a highly innovative approach to leadership education which stays outside of the formal education system.	●● Regarding to digital entrepreneurship the Netherland initiative landscape is characterised by good regional multi-stakeholder partnerships like the Amsterdam Economic Board and the Brabant Development Agency. Relevant national activities and partnerships, however, appear to be missing.
Poland	●● Poland makes use of some of the substantial funding it receives from the European Structural Funds for providing ICT training to SMEs; while some of this is about strategic use of ICT e.g. for engaging in e-business and internationalisation, most activities deal with basic e-skills combined with efforts to raise awareness about the potential of ICT. The Polish Agency for Enterprise Development (PARP) is the most active national stakeholder, and its Akademia PARP a nice example of how e-learning services can be used for acquisition of e-leadership skills.	●● Nascent entrepreneurs and digital start-ups represent a major target group for business support activities in Poland, e.g. in the context of the Operational Programme "Innovative Economy 2007-2013". Implementation appears to suffer, however, from fragmentation of measures and low visibility of available supports. While the National Entrepreneurship Programme, launched in 2012, is primarily a promotional campaign, the web.gov.pl portal ("We support e-business") has established itself as a major initiative targeting digital entrepreneurs.
Portugal		
Romania		
Sweden	●● Sweden has few if any policies or initiatives dealing explicitly with e-leadership, but the topic is touched upon in a number of strategy papers including the Digital Agenda for Sweden. The Knowledge Foundation takes a key role in bringing together tertiary education providers and business. It has worked on establishment of Industrial Graduate Schools in Sweden, and runs a major programme on "professional development	●● The Swedish government is fully aware of the need to improve conditions for start-up activity in the country, especially with regard to people's attitudes towards entrepreneurship. This is demonstrated in the Swedish Innovation Strategy and the Swedish Strategy for Increased Service Innovation, which also calls for new types of entrepreneurship in the digital domain. Training offers for digital entrepreneurs are often

	National policy and stakeholder initiatives on e-Leadership Skills for SMEs	National policy and stakeholder initiatives on Skills for Digital Entrepreneurship
	for innovation" which represents e-leadership education in all but name. Of greater practical relevance for SMEs is Innovation Check, a voucher scheme that makes it easier for companies to acquire consultancy and training in the context of the implementation of innovative services, products or processes.	coupled with accelerator and incubator type activities. Special emphasis is placed on promoting women's entrepreneurship, but these initiatives make no mention of skills which are specific for digital start-ups.
Slovenia		
Slovak Republic		
United Kingdom	<p>●●●●</p> <p>The UK government has demonstrated with its Information Economy Strategy and a number of other policy initiatives that it is aware of the need to boost the e-leadership skills among the country's SMEs. Responsibility for skills policy is devolved in the UK, and England, Northern Ireland, Scotland and Wales each have their own e-skills policy. Scotland's Digital Future, in particular, makes explicit mention of digital leadership skills. The UK also boasts an ICT skills framework, the IT Professional Standards, which covers e-leadership skills in some detail. In partnership between the business and education sectors, e-leadership training programmes have been developed (e.g. ITMB, Tech Industry Gold degrees, BCS Digital Leader programme), with e-skills UK taking a central position as instigator of progress in the area.</p>	<p>●●●●</p> <p>The UK has a range of public-private partnerships engaged in leadership training for digital entrepreneurs, sometimes combined with accelerator and incubator activities (e.g. Accelerator Academy), sometimes focusing on particular segments of the technology continuum (e.g. The Mobile Academy). Start-up incubators and ICT clusters such as Tech City UK offer e-leadership related training as well.</p>

Note: The assessment of national policy and stakeholder initiatives are first drafts as basis for further discussion and must not be quoted or published without permission.

7.4 Policy and MSP Landscape Country Examples

The following are draft examples of the analysis of the Policy and MSP landscape which is being carried out for all Member States. The final analysis will become part of a 28 Country Briefs combining findings from several work packages.

Country briefs will be submitted to the Commission as non-contractual deliverables

7.4.1 Ireland

Summary

Level of Policy & Stakeholder Activity – Summary Assessment for Ireland

e-Leadership skills for SMEs: ●●●●● (out of 5)

The Irish government has a dedicated strategy for addressing future demand for high-level ICT skills including e-leadership skills, namely the ICT Skills Action Plan, last revised in 2014. Implementation is supported by strong multi-stakeholder partnership, e.g. the ICT Ireland Skillnet. Conversion and up skilling programmes are in place for channelling unemployed university graduates into positions at the intersection of business management and ICT (e.g. MSc and Post Graduate Diploma in Innovation & Technology). Many Technology Centres engage in activities for promotion of skills development in e-leadership and digital entrepreneurship, e.g. the Centre for IT Innovation (Innovation Value Institute) which has developed an SME IT Capability framework. The ICS Leadership Development Programme is a prime example for an e-leadership course programme targeted at the SME market.

Skills for digital entrepreneurship: ●●●●● (out of 5)

Ireland has a range of policies that seek to support business start-ups and entrepreneurship, with an increasing focus on the digital domain. The policy context is provided by the National Digital Strategy, which explicitly calls for measures to "support digital enterprise development". The New Frontiers Entrepreneur Development Programme based in 14 campus incubation centres across the country is a cornerstone of Ireland's well developed system for provision of digital entrepreneurship skills.

Note: The assessment of national policy and stakeholder initiatives are first drafts as basis for further discussion and must not be quoted or published without permission.

Policies of relevance to e-Leadership skills development

An important milestone in policy development in the area is the **National Digital Strategy**, announced by the Minister for Communications, Energy & Natural Resources in 2013. It consists of a range of specific measures which the strategy commits to implementing over the next two years, grouped under the headings: (a) Trading online and Entrepreneurship; (b) Citizen Engagement; (c) Education & Learning; and (d) Cross –Government measures. The first of these is of particular relevance for promotion of e-leadership skills development in the country. It seeks to get 10,000 Irish businesses online for the first time and to achieve a further 2,000 small Irish businesses trading online over a period of two years. Measures include:

- Development of a "trade-on-line" voucher scheme.
- A "Winning With Web" Awareness scheme – highlighting the value for small business of trading online.
- Better Information on online engagement to inform future policy.
- Support digital enterprise development.

e-Skills development and e-leadership education

The Irish **ICT Action Plan and ICT Skills Programme**, launched in 2012, is intended as an "integrated effort by government agencies, professional bodies, academia and employers to address the perceived ICT skill gap up to 2018". The Programme²⁷ was drafted by the Higher Education Authority (Department of Education) and Forfás' Policy Advisory Board in cooperation with ICT Ireland (representative body for the technology sector in Ireland), the Irish Software Association (representative body for the digital and software technology sector in Ireland) and the American Chamber of Commerce Ireland (representing US-based multinationals in the ICT sector with strong activities in the country). The overarching target is to double the annual output from honours degree ICT undergraduate programmes to 2,000 graduates by 2018 (projected output in 2011 is approximately 1,000 graduates). This target is divided into two parts:

- Up skilling and Conversion Actions that will be taken in the short term to increase the domestic supply of high level ICT skills over the period 2012-2014.
- Actions to ensure an increased output of appropriately skilled graduates in the medium term 2015-2018.

In 2013 Forfás and EGFSN published a report under the title "**Addressing Future Demand for High-Level ICT Skills**". The aim of this study was to forecast demand for ICT professionals over the period 2013-2018 for high-level ICT skills arising both within the broad ICT sector and across other sectors of the economy. The authors start from the ambition that Ireland will build up its ICT skills capacity to drive the further expansion and development of the ICT sector and to support innovation and growth across other sectors of the economy. The plan includes a detailed list of suggestions for Actions deemed necessary to address future demand needs, including demand for e-leadership skills. Action 3 "Improve Training and Employability" includes the following recommendations:

- Improve continuing professional development of individuals and employers up skilling of their workforce.
- Utilise Conversion programmes involving the reorientation of people with the right aptitudes from other related disciplines to ICT.
- Improve ICT professionalism, including through certification and accreditation.
- Promote "training of the trainers" to raise the quality of training and update course contents.
- Foster e-leadership skills, combining both business and ICT skills, digital entrepreneurship skills, and strategic and management skills.

Informed by this report, the revised **ICT Skills Action Plan**²⁸ was published in March 2014 by the Department of Education and the Department of Jobs, Enterprise and Innovation. The Action Plan seeks to make progress in the domestic supply of ICT graduate output, with the target of moving from meeting 63% of demand in 2014 to 74% of demand in 2018. The following priorities are particularly relevant for e-leadership skills:

- Priority 1 includes: 3) Launch new rounds of conversion/ up-skilling programmes in 2014; 4) Delivery of Skillnets ICT conversion programmes; 5) Deliver Skillnets ICT programmes to industry; 7) Work placement.
- Priority 3 includes: 22) Run an annual advanced ICT talent management and retention seminar to share best practice among companies in up skilling and HR talent management

The **National Digital Strategy** also includes actions to get Irish businesses trading online. They include training related to e-leadership and digital entrepreneurship, although so far at a rather basic level:

²⁷ http://www.hea.ie/files/ICT_AP.pdf

²⁸ http://www.enterprise.gov.ie/en/Publications/ICT_Skills_Action_Plan_.html#sthash.ZGZvYcyo.dpuf

- **Trade-on-line voucher scheme:** First pilot schemes were rolled out in 2013, with a view to national rollout in 2014. The scheme will make available vouchers valued at up to €2,500 which can be redeemed against the cost of establishing an online trading presence, including access to suitable expertise and training supports to achieve their online objectives.
- **“Winning with Web” Awareness Scheme** highlighting the value for SMEs of trading online. This awareness and promotion campaign will be developed in partnership with industry and community stakeholders and Ireland’s Digital Champion, David Puttnam.

Also to be mentioned here is the **Technology Centre Programme**, overseen by Enterprise Ireland and IDA Ireland. This is a Government-funded initiative to develop the innovation and R&D capabilities of companies in Ireland via establishing a network of technology research centres. These centres are collaborative entities established and led by industry. They are resourced by highly qualified researchers associated with research institutions who are empowered to undertake market focussed strategic R&D for the benefit of industry. This is a joint initiative between Enterprise Ireland and IDA Ireland allowing Irish companies and multinationals to work together in these centres. Currently there are 15 industry-led research centres in the Technology Centres Programme, some of which are just getting started at the time of writing.

Each Technology Centre is eligible for State funding of the order of €1 million per year over a five year period. Continued funding would depend upon a range of metrics such as increasing industry research funding, growing the numbers of companies involved, licences and the revenue from them and spin-offs, new products and processes leading to increased export sales.

Development of skills in e-leadership and digital entrepreneurship plays an important role in the activities of most of these centres, see next section.

(Digital) Entrepreneurship

Ireland has a range of policies that seek to support business start-ups and entrepreneurship, including in the digital domain. The **Department of Jobs, Enterprise and Innovation**, the **Industrial Development Agency (IDA)** and **Enterprise Ireland** have introduced a number of targeted measures including supports for indigenous and FDI companies in the digital space. These are part of the National Digital Strategy and seek to "provide the skills base, research capacity and key financial supports. Support by the **Department of Communications Energy & Natural Resources (DCENR)** through the **Digital Hub Development Agency** and the **National Digital Research Centre** is playing a key role in implementation.

Stakeholder initiatives for the promotion of e-Leadership skills development

e-Skills development and e-leadership education

The **Irish Computer Society** is a key stakeholder in provision of ICT related education in the country. Its **ICS Leadership Development Programme** seeks to "offer a complete package to facilitate the continuous professional development for incumbent CIOs and IT executives with responsibility for strategic decision making". The Programme consists of a two-day course addressing challenges in today’s changing IT environment and a series of quarterly events which present the most up-to-date technologies and gives insight on how to maximise their potential. The Programme was designed based on direct input from prominent industry professionals and experienced academics. Course content relates to maximising business partnerships and driving innovation through the forces of social, mobile, cloud and analytics are addressed. In addition to addressing these needs, the objectives are:

- To create a rounded understanding of the diverse elements associated with senior IT roles;
- To equip participants with the skills necessary to drive innovation, lead organisational improvement and participate strategically within the C-suite;

- To discuss relevant issues with industry professionals and experienced academics with particular focus on the Irish market;
- To allow peer networks to develop and create opportunities for mutually beneficial professional relationships;
- To provide opportunities for participants to create a blueprint for change for implementation in their organisations.

Participation is exclusively reserved for current CIOs or corresponding senior IT executives in SMEs plus next generation CIOs, CDOs, CTOs and senior IT executives from large civil and public service organisations.

The country's leading **Universities** have started addressing the e-leadership challenge, as suggested by the "Addressing Future Demand for High-Level ICT Skills" report (see previous section) which called for "initiatives to develop e-leadership professional skills (persons with deep expertise in ICT with competence in leadership and management) to drive increased business value and innovation from the creative application of ICT within enterprises – in collaboration between third level institutions and enterprise. Draw upon learning at a European level (e.g. The Software Campus in Germany, IT-Vest in Denmark and the UK Cranfield IT Leadership programme)."

To this end, education providers have partnered with **ICT Ireland**, the ICT industry federation, which runs a number of programmes of relevance to e-leadership skills development. Most prominent of these is **ICT Ireland Skillnet**, through which a group of companies in the ICT sector have joined forces specifically to provide advanced training activities for technical and engineering staff in Irish ICT companies. Most of the work is focused on delivering Masters level programmes in Innovation and Technology in collaboration with academic institutions as well as advanced technical training programmes through a variety of providers. The network also supports entry to the sector for unemployed through specialised jobseeker support programmes.

One of the flagship programmes of the ICT Ireland Skillnet, developed in association with DIT, is the **MSc and Post Graduate Diploma in Innovation & Technology**. The initiative has received funding from the Irish Government through Skillnets (itself funded from the National Training Fund through the Department of Education and Skills) and the network member companies who also make a significant financial contribution. See description in the section on candidates for best practice.

Other course programmes which demonstrate a clear focus on e-leadership are:

- The 'Innovation Management' Business innovation Programme at **DCU Ryan Academy for Entrepreneurs**;
- The **Waterford Institute of Technology's** Certificate in 'Digital Marketing and Social Media' – This part-time course can be completed within twelve weeks with one three hour session per week. It combines knowledge about the technological applications and tools needed for digital marketing with the managerial competences needed in this field.
- The university degree programmes 'Management of Information Systems' at the **Trinity College Dublin** and the MSc 'Technology Management' at the **National University in Galway** seek to prepare students to work at the interface of business strategy, management and ICT in senior positions. Furthermore the Trinity College programme also includes a course that addresses 'Innovation and Entrepreneurship' and therefore is also relevant in the (digital) entrepreneurship field.

In addition, many of the **Technology Centres** established under the government's Technology Centres Programme (see previous section) engage in activities for promotion of skills development in e-leadership and digital entrepreneurship. The Centre for IT Innovation (**Innovation Value**

Institute – IVI), for example, has developed an **SME IT Capability framework (SME IT-CMF)**²⁹ to facilitate SMEs to gain maximum value from IT. The Framework seeks to help SMEs understand how they can improve their competency in a number of key IT areas or critical capabilities (CCs). It also targets policy-makers by helping identify the key areas that require support for the SME in an effort at maintaining and promoting economic growth. The framework primarily relates to SMEs within the Knowledge Intensive Business Services (KIBS) Sector and those organizations which are medium sized having in excess of 50 employees. Using the framework, SMEs are expected to be better able to address current business challenges such as Cloud adoption for business value, managing information and big data, effective service management, IT risk management, identifying core capabilities to support emerging digital business strategies, and assessing the business value and impact of IT investments.

(Digital) Entrepreneurship

In the entrepreneurship domain, arguably the most important stakeholder is **Enterprise Ireland**, the state economic development agency targeting Irish-owned business start-ups and established companies. Enterprise Ireland is focused on helping accelerate the development of Irish enterprises. For early stage start-up companies including those in the Digital space Enterprise Ireland administers the **Competitive Start Fund** providing investment of €50,000.

Entrepreneurs seeking to establish a digital business can also benefit from the **New Frontiers Entrepreneur Development Programme**, a national support programme for innovative, early-stage start-ups. It is a three-phased programme, based in 14 campus incubation centres across the country. The programme seeks to provide an integrated and comprehensive set of business development skills, making use of peer-to-peer networking and learning, comprehensive and intensive mentorship and coaching, and access to Microsoft's BizSpark platform for software developers. Each year, New Frontiers funds 150 companies. The New Frontiers Programme is co-funded by the European Regional Development Fund (ERDF) under the National Strategic Reference Framework (NSRF) 2007-2013.

Enterprise Ireland's **Innovation Voucher** initiative was developed to build links between Ireland's public knowledge providers (i.e. higher education institutes, public research bodies) and SMEs. Innovation Vouchers worth €5,000 are available to assist a company or companies to explore a business opportunity or problem with a registered knowledge provider. Innovation Vouchers can be used for any kind of innovation including: new product / process development; new business model development; new service delivery and customer interface; new service development; tailored training in innovation management; innovation / technology audit. A knowledge transfer project is defined as one that transfers knowledge of a scientific, technological or innovative nature that it is new to the SME. The SME is then expected to use the new knowledge to innovate a product, process or service.

Applied Research Enhancement Centres are funded by Enterprise Ireland with the purpose of providing specialised expertise, research and development capabilities and access to state of the art equipment to companies. Companies may engage with AREs under a number of EI funded opportunities including EI vouchers and Innovation Partnerships.

WESTBIC, part of the European Business & Innovation Centre Network (EBN), is the official EC Business & Innovation Centre in the Border, Midland & Western region of Ireland. It provides support, including funding from EU Structural Funds sources, to innovative enterprise through the initial stages, from concept to commercialisation. Established in 1987, WESTBIC is part of the Irish Government's portfolio of supports to indigenous industry, supported under the National

²⁹ <http://ivi.nuim.ie/sites/ivi.nuim.ie/files/publications/IVI%20Exec%20Briefing%20-%20ECIME%20SME%20Paper%20Sept13%20v0%202.pdf>

Development Plan. WESTBIC provides training related to fostering enterprise and entrepreneurship in conjunction with other intermediaries, colleges and private sector partners. Training services include Certified Entrepreneurial Skills Development Programmes; Enterprise Modules on graduate and post-graduate third level courses; Enterprise Development Programmes; and tailored business training and mentoring for SMEs.

The **National Digital Research Centre (NDRC)** is an early stage investor in information technology innovation based in Dublin. The Centre is owned and operated by a consortium of five Irish research universities: Dublin City University, Dún Laoghaire Institute of Art, Design and Technology, National College of Art and Design, Trinity College, Dublin, and University College Dublin. It runs two investment programmes:

- NDRC LaunchPad and
- NDRC VentureLab.

The Centre was founded in 2005. Although criticised for a slow start, the Centre announced in November 2009 that it had completed its first investment tranche and had 17 project investments completed at a value of €12 million. In September 2013, the market value of firms emerging from the Centre was reported to have doubled to €39 million during 2012.

The **Digital Hub Development Agency (DHDA)** in Dublin is the largest cluster of Irish digital media companies in Ireland. The companies based at the Digital Hub employ almost 800 people. The Digital Hub Development Agency model seeks to provide supports in a number of effective ways. It addresses the need of young entrepreneurs who create and run digital start-ups for flexible structures, networking capabilities and mentoring. The DHDA also seeks to provide an effective feed for Enterprise Ireland, into programmes such as New Frontiers and is creating new opportunities for digital enterprise, including the development of an eHealth initiative with St James' Hospital. In 2012 the Government agreed that the DHDA should transition to Dublin City Council. The transition is underway at the time of writing. A renewed vision and strategy for the Digital Hub will be developed focusing on how it can continue to support and grow Ireland's indigenous digital media sector.

High-level assessment of policies and stakeholder initiatives on development of skills in e-leadership and digital entrepreneurship

Exhibit 1: High-level assessment of policies and stakeholder initiatives on development of skills in e-leadership and digital entrepreneurship

No / Type	Title of policy / initiative	Main stakeholder(s)	Stakeholders from:				Assessment:				
			Government	Business	Unions/ NGOs	Education	MSP fit (0-2)	Target fit (0-2)	Policy fit (0-2)	Scope / Continuity (0-2)	Maturity (0-2)
Policy 1	Technology Centre Programme	Enterprise Ireland; IDA Ireland; Ministry for Jobs, Enterprise and Innovation	---	---	---	---	---	01	---	2	2
Policy 2	ICT Action Plan and ICT Skills Programme (2012-2018)	Higher Education Authority	---	---	---	---	---	2	---	2	1
Policy 3	ICT Skills Action Plan (2014-2018)	Ministry of Jobs, Enterprise and Innovation	---	---	---	---	---	2	---	2	1
Policy 4	Addressing Future Demand for High-Level ICT Skills (2013)	Ministry of Jobs, Enterprise and Innovation	---	---	---	---	---	2	---	1	0
Initiative 1	ICS Skills	Irish Computer Society		✓	✓	✓	1	2	1	2	2
Initiative 2	ICS Leadership Development Programme	Irish Computer Society		✓	✓	✓	1	2	0		
Initiative 3	New Frontiers Entrepreneur Development Programme	Enterprise Ireland	✓	✓			2	1	2	2	2
Initiative 4	Digital Hub Development Agency	Irish Government, over 160 technology and digital media businesses	✓	✓			1	1	1	2	2
Initiative 5	Innovation Voucher	Enterprise Ireland	✓	✓		✓	1	1	2	1	2

Candidates for best practice in policy and stakeholder initiatives on e-Leadership skills development

From the policies and initiatives mentioned above, the following have been selected as candidates for best practice.

New Frontiers Entrepreneur Development Programme

Entrepreneurs seeking to establish a digital business can benefit from the **New Frontiers Entrepreneur Development Programme**, a national support programme for innovative, early-stage start-ups. It is a three-phased programme, based in 14 campus incubation centres across the country. New Frontiers is a three-phase programme that is designed to provide an integrated and comprehensive set of business development supports to participants.

The first phase is part-time at evenings over an 8-10 week period to allow participants to continue in their day job. This phase consists of business validation and market research workshops, peer to peer networking and learning.

The second phase, access to which follows a competitive selection process, is reserved for participants who have a strong value proposition and who can demonstrate that their business proposition has potential to grow and create jobs. Phase 2 consists of intensive support for six months to develop both the participant's own skills and to work up their business proposition. This entails full-time participation in workshops, mentoring and regular reviews. Using these supports, entrepreneurs will fully detail and validate their business proposition and identify potential customers, sales channels and funding options. Participants receive a €15,000 tax-free grant subject to satisfactory performance and development reviews. Hot-desk and other incubation facilities as well as Web hosting and support from Amazon worth \$15,000, are provided as well. In addition, participants obtain access to Microsoft's BizSpark platform for software developers worth €100,000.

Finally, businesses emerging from Phase 2 are guided to the most relevant government supports that can best help them at their particular stage of development. Further incubation facilities and support may be available to participants for a limited period, in conjunction with ongoing support from the Incubation Centre Management team. The phase requires 2-3 months fulltime attendance for realising the business plan.

Each year, New Frontiers funds 150 companies. The New Frontiers Programme is co-funded by the European Regional Development Fund (ERDF).

MSc and Post Graduate Diploma in Innovation & Technology

One of the flagship programmes of the ICT Ireland Skillnet, developed in association with DIT, is the MSc and Post Graduate Diploma in Innovation & Technology. This Diploma programme provides opportunities for technical and engineering graduates to develop a broad set of business, management and interpersonal tools. The intention is that over the life of the programme participants will emerge as engineering leaders with a strategic perspective on organisational issues and challenges. The programme has been developed based on the observation that not enough ICT graduates are reaching the higher management ranks in ICT companies because, while they have a solid foundation in technical skills, they also need to develop interpersonal skills, business and management skills. The programme targets participants from within the broad ICT sector, including but not limited to companies in telecommunications, software, manufacturing of computer products and digital media. They will mostly be technical graduates with significant experience in their companies. Participants will span all age groups and disciplines and apart from having a primary degree, or recognised technical qualification, will not be subject to further entry requirements. The initiative has received funding from the Irish Government through Skillnets

(itself funded from the National Training Fund through the Department of Education and Skills) and the network member companies who also make a significant financial contribution.

Factsheets of exemplary e-leadership education offers

Title of study Program	Digital Marketing and Social Media (Part Time)
Title of study degree	Certificate / ECTS
Level of degree	
Name of programme provider	Waterford Institute of Technology
Responsible institution	Waterford Institute of Technology
URL	http://www.wit.ie/courses/type/professional_development/education/digital_marketing_and_social_media
Target group	
Payment / fees	330€
Duration	12 weeks, Monday 7-10pm
Quality assurance & accreditation processes	
Main learning outcomes	<ul style="list-style-type: none"> • Develop an understanding of digital marketing essentials and their importance in marketing • Demonstrate a knowledge of the ways in which organizations may develop and execute digital marketing decisions • Describe the main theories, concepts, techniques and application expertise required to effectively develop plan and implement a social media campaign • Demonstrate the technical skills and knowledge necessary to apply the key technologies, tools and techniques for digital marketing and social media by developing a digital marketing and social media plan for a small business
Specific learning outcomes	
ECTS credits / other credits	10 Credits

Title of study Program	Innovation Management
Title of study degree	Business Innovation Programme
Level of degree	DCU Certificate in Innovation and New Business Development - NFQ Level 8
Name of programme provider	Ryan Academy for Entrepreneurs
Responsible institution	Dublin City University
URL	http://www.ryanacademy.ie/business-innovation-programme/Innovation-Management
Target group	<p><Target group as claimed by the provider></p> <p>The course is designed for unemployed professionals who already have extensive work experience. Participants come from a range of backgrounds including accountancy, engineering, architecture, marketing, teaching, operations, finance, IT and production and will learn how to play a key role in the management of innovation and development of businesses.</p>

	<p><Entry requirements></p> <p>To be eligible for a place on a Springboard 2013 programme a person must be:</p> <p>Unemployed* with a previous history of employment AND satisfy one of the following three criteria:</p> <p>1. Be in receipt of one of the following payments from the Department of Social Protection :</p> <ul style="list-style-type: none"> • Jobseekers Benefit • Jobseekers Allowance • One Parent Family • Disability Allowance • Qualified Adults of Working Age • Carers Allowance • Farm Assist/Fish Assist • Widow(er)s Contributory or Non-contributory Pension • Blind Pension • Deserted Wives Allowance <p>There is no requirement to be in receipt of a payment for a particular period of time prior to the commencement of the programme. Participants in receipt of an eligible payment at the time the Springboard course commences are eligible to apply for a place on that course. However, providers will be required to give priority to applications from people who are long term unemployed.</p> <p>OR</p> <p>2. Be signing for social insurance contribution credits</p> <p>OR</p> <p>3. Be previously self-employed AND Be actively seeking employment</p>
Payment / fees	
Duration	1 Semester - 3 days per week + 40 business project in a host company
Quality assurance & accreditation processes	
Main learning outcomes	<ul style="list-style-type: none"> • To provide participants with the knowledge and skills required to understand innovation • To give participants skills to implement innovation in organisations • To give participants practical experience
Specific learning outcomes	
ECTS credits / other credits	40 ECTS

Title of study Program	Management of Information Systems
Title of study degree	M.Sc.
Level of degree	Master
Name of programme provider	School of Computer Science & Information Systems, Trinity College Dublin
Responsible institution	The University of Dublin
URL	https://www.scss.tcd.ie/postgraduate/mscmis/
Target group	<p><Target group as claimed by the provider></p> <p>The course is designed for information systems/technology professionals in early or mid-career who:</p> <ul style="list-style-type: none"> • have recently been appointed to management positions or • see their long term career in ICT management or • would like to understand key business aspects of ICT better or • are interested in current thinking and research about ICT management. <p><Entry requirements></p> <p>Applicants for this course must normally hold a good honours degree (at least upper second-class level) in computer science, information systems, information technology, business and information technology, computer engineering or a cognate discipline. Relevant professional experience is also desirable.</p>
Payment / fees	4.120 €
Duration	2 years part-time
Quality assurance & accreditation processes	
Main learning outcomes	On completion of the M.Sc., students will be equipped with the professional knowledge, expertise and competencies required to assume more senior roles in IS/ICT management and/or in the IS/ICT industry. The course also provides a platform for those interested in pursuing research, to proceed to a higher degree.
Specific learning outcomes	
ECTS credits / other credits	

Title of study Program	<i>MSc Technology Management</i>
Title of study degree	Master of Science
Level of degree	Master
Name of programme provider	National University of Ireland, Galway
Responsible institution	National University of Ireland, Galway
URL	http://www.nuigalway.ie/courses/taught-postgraduate-courses/technology-management.html
Target group	<p><Target group as claimed by the provider></p> <p>The programme is designed for managers, technical specialists, engineers or those responsible for managing technologies within their organizations. As the programme is delivered on a part-time basis, the majority of students are in full-time employment or actively seeking employment while studying.</p> <p><Entry requirements></p> <p>Applicants are expected to hold a primary honours degree (minimum H2.2 [or equivalent international qualification]), or equivalent, and have at least five years of relevant industrial experience. Candidates who do not meet the minimum entry criteria may apply for the PDip (Innovation Management) or the PDip (Technology Commercialisation). On successful completion of either of these programmes, students may apply for entry to the MSc (Technology Management) with exemptions. Alternatively, candidates who do not meet the minimum entry criteria may be interviewed by the Programme Board.</p>
Payment / fees	
Duration	2 years, part-time
Quality assurance & accreditation processes	
Main learning outcomes	The programme aims to develop students' knowledge of product innovation, technology transfer and R&D processes, enabling students and companies to gain competitive advantage through their technologies. It is offered under the auspices of the Atlantic University Alliance (AUA), which is a collaborative agreement between UCC, UL, and NUI Galway. Delivered on a part-time basis over four semesters, the programme will include 10 taught modules and one year-long research (thesis) module in Year Two of the programme.
Specific learning outcomes	
ECTS credits / other credits	90 ECTS

7.4.2 Malta

Summary

Level of Policy & Stakeholder Activity – Summary Assessment for Malta

e-Leadership skills for SMEs: ●●● (out of 5)

Skills for e-Leadership and digital entrepreneurship have attracted increasing attention amongst policy-makers and other national stakeholders in recent years. The Digital Malta 2014-2020 strategy provides a solid political foundation for stakeholder activities to boost e-leadership skills. MITA, the Malta IT Agency, is currently working with the University of Malta to explore the possibility of creating a Master programme focused purely on e-Leadership. The country's National Occupational Standards for ICT related occupations (iTalent) are based on the e-CF and include e-leadership competencies.

Skills for digital entrepreneurship: ●●●● (out of 5)

Support for entrepreneurship, in particular ICT-driven start-ups, enjoys considerable support from government and the other major stakeholders in the country's e-skills domain. Both the Centre for Entrepreneurship and Business Incubation (CEBI) at Malta University and the Microsoft Innovation Center are active in related education and training. The Intensive Training Programme and Masters Programme in Knowledge Based Entrepreneurship are prime examples of a course programme focusing on e-leadership in the context of start-up activity.

Note: The assessment of national policy and stakeholder initiatives are first drafts as basis for further discussion and must not be quoted or published without permission.

Policies of relevance to e-Leadership skills development

There are three national strategies to consider in the area of e-Leadership:

- Digital Malta 2014 - 2020
- National Research and Innovation Strategy 2020
- Networked Enterprise Strategy 2012-2015

Digital Malta sets out the path for Malta to further advance through technology. In his foreword the Prime Minister states that the strategy will encourage innovation and entrepreneurial ventures and will help all businesses remain competitive and fight for their corner in the global economy. The Strategy outlines 3 strategic themes – Digital Citizen, Digital Business and Digital Government, and 3 strategic enablers that support such themes: Regulation and Legislation, Infrastructure and Human Capital. The Strategy puts forward a number of guiding principles and actions to guide the use of ICTs for socio-economic development. Malta's strategic priorities are guided by Government's strategic priorities and the EU 2020 Strategy; these tie in with the Digital Agenda for Europe and the Innovation Union. The Digital Malta vision for the country in 2020 is for 'Malta to prosper as a digitally-enabled nation in all sectors of society'. The Digital Business chapter contains a number of actions, which aim to encourage and support local firms to embrace ICT and transform into digital enterprises to increase competitiveness and their export-orientation. These measures include 'Supporting entrepreneurship' through the investment of resources to cultivate a widespread entrepreneurial mind-set, for more ICT start-ups and young high-growth ventures; through improved access to capital programmes for start-ups, micro and small firms (for example through the setting up of a business angels network, incentives for crowd-funding and other investor schemes). Chapter 9 of Digital Malta is focused on Human Capital, and describes Government's goal to develop a specialised skills base for spurring business development, amongst others. As part of its Human Capital actions, Government intends to 'Integrate critical skills across

educational and formative experiences' through programmes that impart skills such as e-entrepreneurship.

The **National Research and Innovation (R&I) Strategy** sets out Malta's strategy to embed research and innovation at the heart of the economy to spur knowledge-driven and value-added growth and to sustain improvements in the quality of life. The strategy is not prescriptive in its recommendations and position, but it is framed as an enabling framework for initiatives including incentives, grants, investments on research infrastructure, and research scholarships. The R&I Strategy has 3 main goals: For Malta to strengthen 'A comprehensive R&I support ecosystem'; 'A stronger knowledge base', and 'Smart, flexible specialisation'. The Strategy mentions skill development for e-Leadership and Digital Entrepreneurship in 2 instances: Chapter 6 of the Strategy identifies the broad action streams for Government to 'Achieve a comprehensive R&I support ecosystem'. The Strategy recommends in this Chapter to embed a culture for innovation, creativity, risk-taking and entrepreneurship. Chapter 7 of the Strategy outlines Government's intentions to achieve a stronger knowledge base. It sets out 5 main action lines for Malta to achieve such a base, one of which promotes 'An education system which adequately shapes future capacity in innovation', with reference to the need for creative thinking and other skills and attributes that foster an entrepreneurial culture to pervade the educational system.

The third national strategy that is related to the topics of e-leadership and digital entrepreneurship is the **Networked Enterprise Strategy 2012 – 2015**. The Networked Enterprise strategy focuses on the micro and small enterprises that unlike the large Maltese enterprises are still lagging behind in both web presence and the usage of Internet. This strategy is focused on five activity thrusts that aim to build awareness, motivation and capacity amongst local entrepreneurs to identify available ICT tools and integrate these into business processes to increase profit and business value. As part of its promotional thrust to raise awareness the Malta Communications Authority (MCA) intends to identify and document best practice case studies of local ICT applications to promote entrepreneurship and creative business solutions. In Thrust 2 – Capacity Building, the MCA aims to promote and facilitate training opportunities for vulnerable enterprises, including ICT and entrepreneurship development.

Stakeholder initiatives for the promotion of e-Leadership skills development

The public **Malta IT Agency (MITA)** is responsible for managing implementation of systems to enhance public services, execute programmes to propagate the use of ICTs in Malta, and deliver programmes to enhance ICT education and the use of ICT as a learning tool.

One of the main bodies dealing with e-skills in Malta is the **e-Skills Malta Foundation**, a coalition of various representatives from Government (mainly MITA, the Malta IT Agency, and the Ministry for Education and Employment), industry and education (including Malta Enterprise, Malta Communications Authority, The Lotteries and Gaming Authority, the Employment and Training Corporation and The Chamber of Commerce). Its objectives are:

- To advise Government and stakeholders on matters related to e-Skills policy;
- To contribute to the expansion of ICT educational programmes and related formative initiatives;
- To lead an ICT professionalism development programme;
- To instigate further reform in the ICT educational offerings and contribute to capacity-building in the ICT education community; and
- To champion campaigns and promote the Maltese e-Skills potential locally and internationally.

The Foundation is the successor of the **e-Skills Alliance Malta** (2010-2013) a multi-stakeholder partnership to define and shape a dedicated e-Skills policy for the country. The Alliance focused on developing the parameters of those policy priorities that require a common understanding

between academia, industry and other stakeholders. It consolidated resources that in a small state are always scarce.

With regard for the need for developing ICT professionalism, the Maltese Government together with the local ICT companies and educational stakeholders (University of Malta, MCAST) have set up a pilot project for the implementation of a set of National Occupational Standards called **Standards for iTalent in Malta**. The purpose is to help provide a broader understanding of the industry's e-skills needs, helping to align individual strengths and career aims to the opportunities available in Malta. iTalent standards and e-skill guidelines describe the sectors in the ICT industry, the typical roles and responsibilities in these sectors and the associated skills for a variety of ICT jobs. e-Leadership skills are covered in some detail under the section "Transferable Competencies", which comprises Personal Competencies; Business Competencies; and Leadership Competencies. The Standards are to help improve the image of the ICT sector by providing a harmonised and accepted description of the various domains in the ICT sector whilst making it more attractive and accessible for the next generation. In order to establish the Standards for iTalent, the Maltese Government together with six local ICT companies and educational stakeholders University of Malta and MCAST set up a pilot project in 2011 already. Support came from e-Skills UK, which is to make sure that Malta's standards are not developed in isolation. There is a strong link to European e-Competence Framework (e-CF). In the future, academic institutions, careers guidance counsellors, students and employers are all expected to adopt the Standards for iTalent, which are expected to help provide a common language used in the ICT world, allowing for more clear career pathways and encouraging best practice procedures.

e-Skills development and e-leadership education

The **MITA Innovation Hub** is a most recent initiative at **SmartCity Malta** to turn the township into an hi-tech web-enabled cluster. The Hub, launched in May 2014, will complement and support existing local incubators and innovation centres offering another alternative to students, start-up founders, innovators and ICT companies. The Hub will synergise efforts to show case and implement outstanding innovation in areas of special interest to the national economy and society. The first initial activities for the Hub include competitions for young individuals (students) to develop mobile apps and to propose an innovative idea/project that could be supported and transformed into an entrepreneurial venture.³⁰

MITA is currently working with the University of Malta to explore the possibility of creating a Master programme focused purely on e-Leadership. The programme is being explored with another European University. At the time of writing developments are at an early stage.

(Digital) Entrepreneurship skills

With regard to skills for digital entrepreneurship, the **Knowledge Transfer Office (KTO)** established by the **University of Malta** is of interest. KTO is to become an important stakeholder for the provision of local ICT practitioner and e-Leadership skills. The KTO is attempting to offer tailor-made services to the industry, students and entrepreneurs (including tech-focused) and strengthening industry-academia collaborations. It has enabled a recent signing of a Memorandum of Understanding with the Chamber of Commerce for various initiatives to be conducted jointly by academia, students and the industry.

As part of these developments the **University of Malta's Centre for Entrepreneurship and Business Incubation (CEBI)** has been established. Its curriculum consists of an intensive programme in ICT driven entrepreneurship: The **Intensive Training Programme and Masters Programme in Knowledge Based Entrepreneurship** was introduced in 2012 with the objective to increase the

³⁰ <http://mita.gov.mt/en/mitainnovationhub/Pages/MITA-Innovation-Hub.aspx>

number of Science, Engineering, Technology and Media graduates with a professional grounding in entrepreneurship, and hence lead to an increase in Science and Technology start-ups in the Maltese islands. See description in the section on candidates for best practice.

A Business Incubator has also been launched on University of Malta's Campus – **TAKEOFF** – for early-stage technology ventures. TAKEOFF is in the heart of campus to support enterprising graduates, students and staff as part of its efforts to champion innovation and entrepreneurship on the island. See description in the section on candidates for best practice.

Another initiative with relevance for e-leadership skills development is the **Microsoft Innovation Center** recently set up by Microsoft. It was launched in February 2013 representing a multi-million dollar investment by Microsoft and its partners to support the local IT industry. See description in the section on candidates for best practice.

The **Empowerment Programme for IT Use Outreach for Micro Entrepreneurship (EPITOME)** (ESF2.72) which ran from 2010 to 2013, aimed at ensuring that employers/employees in micro-enterprises and the self-employed acquire skills in ICTs which can be applied to business and entrepreneurship. The curriculum was specifically developed for the needs of the Maltese enterprise. The training was aimed at addressing the skills gaps of owners and employees of these enterprises. Skills provided include: different uses of Internet in business; more effective use of ICT in general for business; and how businesses can use IT for maintaining a positive relationship with the client base. The project equipped individuals with entrepreneurial-oriented ICT skills and covered ICT-related subjects such as customer relationship management, finance and technology management. EPITOME was led by the Malta Communications Authority (MCA) in cooperation with the GRTU Malta Chamber of SMEs and the Employment Training Corporation (ETC).

Finally, the Malta College for Arts, Science and Technology (**MCAST**), a publicly funded vocational college) has also recently announced the establishment of an **Entrepreneurship and Innovation Center** for its students. Public information on the Centre is very limited, since the initiative is in its infancy.³¹

³¹ <http://www.mcast.edu.mt/mainmenu/newsandevents/upcomingevents/news/tabid/333/id/1036/mcast-and-malta-enterprise-collaborate-to-provide-students-with-access-to-entrepreneurial-world.aspx>

High-level assessment of policies and stakeholder initiatives on development of skills in e-leadership and digital entrepreneurship

Exhibit 2: High-level assessment of policies and stakeholder initiatives on development of skills in e-leadership and digital entrepreneurship

No / Type	Title of policy / initiative	Main stakeholder(s)	Stakeholders from:				Assessment:				
			Government	Business	Unions/ NGOs	Education	MSP fit (0-2)	Target fit (0-2)	Policy fit (0-2)	Scope / Continuity (0-2)	Maturity (0-2)
Policy 1	Networked Enterprise Strategy 2012-2015	Malta Communications Authority	---	---	---	---	---	1	---	2	1
Policy 2	National Research and Innovation Strategy 2020	Malta Council for Science and Technology	---	---	---	---	---	2	---	2	1
Policy 3	Digital Malta	Malta IT Agency Malta Communications Authority	---	---	---	---	---	2	---	2	0-1
Initiative 1	Microsoft Innovation Center	Microsoft and local private sector	✓	✓		✓	2	2	2	2	1
Initiative 2	Knowledge Transfer Office	University of Malta and local private and public sector	✓	✓		✓	2	2	2	2	1
Initiative 3	Technology Entrepreneurship Training Programme	University of Malta, through CEBI	✓			✓	1	2	2	2	1
Initiative 4	TAKEOFF	University of Malta and local/international private and public sector	✓	✓		✓	2	2	2	2	1
Initiative 5	MITA Innovation Hub	MITA and local/international private and public sector	✓	✓		✓	2	2	2	2	1

Candidates for best practice in policy and stakeholder initiatives on e-Leadership skills development

To be selected from the above based on the high-level assessment included in the table in the previous section.

TAKEOFF Business Incubator, University of Malta

The initiative is driven by the University of Malta. It is organic in developing and adapting the business incubation services and support it offers depending on the requirements of the entrepreneurs it is hosting. The initiative is officially operating since January 2014. TAKEOFF was established by the University of Malta whose vision is to commercialise the technology developing on campus and to support aspiring entrepreneurs and technology / knowledge based start-ups based from inside and outside the university. Through TAKEOFF and the Knowledge Transfer Office the university is reinforcing its strategic role as an academic and research institution with commercialisation capabilities. The University of Malta further believes that entrepreneurship is a legitimate career for graduates and through TAKEOFF it is providing tangible opportunities and inroads into entrepreneurship for its graduates.

The University of Malta provides the physical space and the salaries of TAKEOFF staff, ESF funding has been utilised by the Knowledge Transfer Office to build capacity in the knowledge transfer function, the Government of Malta is providing support for example through the Seed Fund award (EUR 100,000), whilst corporate partners are also involved.

TAKEOFF is a University of Malta-based, innovation start-up development space that helps innovators and aspiring entrepreneurs create successful technology and knowledge-based ventures – taking them from idea to investment and to take-off. The training that is delivered by TAKEOFF is experiential: experts and mentors help the start-ups design their business whilst developing the idea/product/service. The TAKEOFF staff and mentors help the start-ups design the business plan, set milestones and achieve independent functioning within 12-18 months. TAKEOFF matches the start-ups with experienced enterprise coaching, and holds guiding workshops for the upcoming entrepreneurs. It holds 'lean start-up development' seminars and organises regular sessions where speakers/domain experts speak at the Incubator every month.

For 2014 TAKEOFF's objectives are to take 2-3 start-ups to procure their first sales revenue; 2-3 start-ups receiving private investment. In the long run TAKEOFF intends to contribute to the growth of the start-up community in Malta, and it aims to attract more entrepreneurs to participate in its programme. In the short timeframe that TAKEOFF has been officially operating, it has managed to contribute to the establishment of a start-up community in Malta. TAKEOFF has actually enrolled 15 teams of entrepreneurs and start-up companies to work with the incubator.

TAKEOFF has also managed to raise awareness about the value of start-up companies with Government and the business community in general. The University of Malta is very practically championing entrepreneurship in Malta. The recent opening of the Seed Fund initiative was 5 times over-subscribed which evidences the heightened awareness of potential entrepreneurs of the service proposition by TAKEOFF.

The main inhibitors identified this far include cultural limitations, whereby more education and awareness-raising is required locally for entrepreneurs to truly understand and value the process of entrepreneurship and the outcomes. Protectionism also exists between young and established entrepreneurs, whereby the Maltese have been observed to be protective and secretive about their ideas. Malta also suffers from a lack of role models in this field, where firms which have grown from successful start-up ventures are available to support and offer experiences to the current start-ups. Finally, there is a limitation of early stage funding and more effort needs to be directed at

encouraging early stage investments, including for example incentives for private investors to consider investing in high-risk tech start-ups.

An important lesson learned is to be inclusive and non-restrictive, where the barriers for participation are not high; where few restrictions are imposed on how seed funding is spent; where freedom is given to the entrepreneurs to influence the support facilities that are provided.

Centre for Entrepreneurship and Business Incubation – Intensive Training Programme and Masters Programme in Knowledge Based Entrepreneurship

The Centre for Entrepreneurship and Business Incubation (CEBI) at the University of Malta in cooperation with the Knowledge Transfer Office at the University of Malta developed an intensive training programme and a Master program in Knowledge-based Entrepreneurship. These are part funded by European Social Funds (Project ESF 1.125 – “Creating a Knowledge Transfer Framework and Technology Entrepreneurship Training Programme”). The Technology Entrepreneurship Training Programme developed aims to increase the number of Science, Engineering, Technology and Media graduates with a professional grounding in entrepreneurship, and hence lead to an increase in science and technology start-ups in the Maltese islands. The course is delivered (i) as a virtual learning environment assisted classroom based programme and, (ii) as a distance learning course. The successful programme (43 students in the first round) has been refined into a full master’s degree that will be offered to the public in the future. The main benefit is being seen in a better knowledge and preparation of students for entrepreneurial activities. Students also claimed they are willing to relate to other initiatives such as TAKEOFF. Main challenges are seen in finding local trainers and the programme would not have been possible without European funding.

Microsoft Innovation Center

The Microsoft Innovation Center is a private-sector driven initiative for the incubation of start-ups. One of central pillars of the Microsoft Innovation Center, is to evangelise technology through regular training workshops, seminars and meetings on a broad range of topics such as office and business tools, programming, and server technology. Idea exchange and collaboration especially for local technology professionals and start-ups is another core pillar. Further to this mission, the Center hosts several events for the whole Maltese community with an emphasis on youth and team building. The Center strives to support start-ups through its mentorship program with benefits such as use of latest technologies, mentorship/consultancy program, provision of IT hosting & hardware, and use of Skyparks facilities. Every start-up can get EUR 155,000 in Software and EUR 10,000 worth of services on an annual basis. The Center started its activities in 2013 and had supported 35 start-ups by June 2014. The partners involved arise mostly from the industry including telecommunication companies, the business side, and technology resellers. Support and collaboration also comes from government and educational institutions as well as student associations. The main benefits can be seen in the creation of a community of tech entrepreneurs and the awareness the centre has gained as a facility supporting students, organisations and start-ups. Challenges are seen in the cautious attitude of the Maltese population towards risk and entrepreneurial activity, the little space entrepreneurship education has in higher education and industry’s hesitant support of and collaboration with start-ups and entrepreneurs. Lessons mainly concern the effort that has to be put in awareness raising and changing the cultural attitude towards entrepreneurial activities. A better and collaboration of important stakeholders in public private partnerships and EU funding that is less bureaucratic could further improve the functioning of the initiative.

8 European Landscape of e-Leadership Higher Education Courses and MOOCs

The objectives of this chapter are to draw a picture of the current European landscape of e-Leadership Higher Education (HE) type courses and MOOCs and to analyse relevant and new e-leadership type courses and initiatives from industry, education and training organisations.

Through desk research and expert dialogue we have identified already existing activities, programmes and courses in universities and business schools which can be considered to incorporate e-leadership education elements.

8.1 Methodology

A Europe-wide data collection survey was carried out to obtain further insight into the e-leadership education landscape in each Member State. Already existing activities in universities and business schools were identified.

Based on experience with the Higher Education landscape from previous projects, the survey explored the extent to which the country's education system already supplies training in e-leadership. For this survey a data gathering guide and template for use by researchers has been developed to cover information on supply and take-up of e-leadership related courses. Programmes could either be long programmes, such as MBA or Master's courses, but also shorter courses targeted at e-leadership skills.

- MBA / EMBA programmes
- Other executive education programmes (except MBA / EMBA)
- Master's and other post graduate programmes (MSc, M.A., M.Eng., other postgraduates) in
 - Computer Science, Informatics and Software Engineering
 - Business Informatics and other hybrids of computer science and management / business administration
 - Management / Business Administration
 - Other programmes in Humanities, Social Sciences, Health or other disciplines if they are related to both ICT and business management.
- Short programmes at a skills level compared to a Master's programme

The major goal of the data gathering was the identification of programmes lending itself to e-Leadership. The selection is based on the criterion that an informatics programme to be selected would need to include a certain share of modules from the business domain and vice versa. The threshold was set at 25%.

The intended result was a clear overview of the national e-Leadership education markets:

- Compilation of MBAs with significant ICT content, oriented towards SMEs or entrepreneurs
- Compilation of programmes of computer science / ICT with a significant share of business (25% roughly) , oriented towards SMEs or entrepreneurs
- Compilation of hybrid programmes, mostly called business informatics or business information systems (all assumed are combined programmes), oriented towards SMEs or entrepreneurs
- Compilation of business management programmes with significant ICT content, oriented towards SMEs or entrepreneurs.

- Compilation of short programmes at a skills level compared to a Master's programme, oriented towards SMEs or entrepreneurs.

Data were collected by visiting the websites of all relevant institutions of Higher Education which offer courses in these areas.

In a first instance, websites were checked for programmes that might fit the criteria based on a superficial scan of programme descriptions. Purely consecutive Master's programmes were already excluded at this stage. This step yielded a total of 594 programmes.

The first filter applied was professional orientation. Professional orientation was assumed when the learner could take part in the programme while continuing working. 293 programmes were found professional oriented.

The second filter, to be checked mainly for business school programmes, is that the IT modules included are significant both in scope and depth. Programmes with less than 25% of IT content were excluded as well as programmes with modules at beginner skills levels.

The third filter relates to the study's focus on SMEs and entrepreneurs and checked that the programme is aimed, if not in focus then at least by mentioning the target group, at either SMEs or entrepreneurs. 241 programmes are aimed at entrepreneurs and 28 at SMEs (18 of which at both).

8.2 Results

In total, 66 programmes met all three criteria. They are included in a table at the end of this chapter.

Some conclusions can be drawn from the picture of the landscape as it has been researched:

- Programmes on offer are mainly rather "long" programmes , i.e. take more than one year to complete
- There is very little on offer for SMEs. Cooperation relationships with SMEs still seem to be the exception for most business schools.
- Where programmes with a focus on SMEs are offered, they often (also) target consultants, a strategy that seems to be in line with our results from SME interviewing.
- Entrepreneurship has found its way into IT and business combination programmes, at least when compared to the SME topic. This may be an issue of entrepreneurship being perceived as a more promising career avenue by prospective learners.

Table 8-1: Scanning the education landscape: potentially relevant combination programmes

	Degree	University	Name of Programme	Prof'nal orient	Short /long	Duration	IT-Module	Entr'ship-Module	SME specialization	online
BE	EM	Antwerp Management School	Executive Master of Enterprise IT Architecture	x	l	2 years - part time	x	x	-	-
BE	EM	Antwerp Management School	Executive Master of IT Governance and Assurance (MITGA)	x	l	2 years - part time	x	x	-	-
CZ	MBA	University of New York in Prague	MBA - Concentration: Information System	x	l	18 months - 2 weekends per month	x	x	-	-
DK	Diploma	IT University of Copenhagen	Diploma in IT	x	l	2 years	x	x	-	-
DK	Master	Aalborg University	Information and Communication Technologies	x	l	2 years -part time	x	x	-	-
DK	M.Sc.	IT Vest	Master of IT	x	l	2 years -part time	x	x	x	-
FR	MBA	Neoma Business School	TEMA	x	l	5 years	x	x	-	-
FR	Master	Télécom Ecole de Management	Integrated Master's in Management	x	l	3 years	x	x	-	-
DE	M.Sc.	Steinbeis School of Management and Innovation	Digital Media Management	x	l	2 years - part time	x	x	-	-
DE	M.Sc.	Steinbeis School of Management and Innovation	Online Marketing	x	l	2 years - part time	x	x	-	-
DE	MBA	Graduate School Rhein-Neckar	MBA IT-Management	x	l	2 years - part time	x	x	-	-
GR	certificate	Athens Institute of Technology	Tech Mini MBA	x	s	5 months - 120h	x	x	-	-
GR	MBA	Athens Institute of Technology	Management of Business, Innovation and Technology	x	l	12 months	x	x	-	-
ES	Master IE	IE business school	Master in Business Analytics and Big Data	x	s	10 months	x	x	-	-
ES	Certificate / ECTS	IE University business school	Advanced Programme in Digital Innovation Management and IT Governance	x	s	6 months	x	x	-	-
ES	Master	Pablo de Olavide University	Cloud Computing	x	l	1 year	x	x	-	-
ES	Master	University of Las Palmas de Gran Canaria	Master in Computer Engineering	x	l	2 years	x	x	-	-
ES	Master	University of Cantabria	Master in Business and Information Technology	x	l	1 year	x	x	-	-
ES	Master	Polytechnic University of Catalonia	Mobile Apps Business and Design	x	l	1 year - evening classes	x	x	-	-
ES	Master	Universidad Católica San Antonop de Murcia	Master Business Innovation and Technology Management	x	l	1 year	x	x	-	-
ES	Master	Polytechnic University of Valencia	Computer Engineering	x	l	1 year	x	x	-	-

	Degree	University	Name of Programme	Prof/nal orient	Short /long	Duration	IT-Module	Entr'ship-Module	SME specialization	online
IE	Certificate / ECTS	Dublin City University Ryan Academy for Entrepreneurs	Innovation Management	x	s	1 Semester - 3 days per week	x	x	-	-
IE	Certificate / ECTS	Waterford Institute of Technology	Digital Marketing and Social Media	x	s	12 weeks (1 day per week	x	x	x	-
IE	Certificate / ECTS	Waterford Institute of Technology	Online Business	x	s	12 weeks (1 day per week	x	x	x	-
IE	M.Sc.	National University of Ireland, Galway	Technology Management	x	l	2 years - part time	x	x	-	-
IE	M.Sc.	Trinity College Dublin	Management of Information Systems	x	l	2 years - part time	x	x	-	-
IT	Certificate	Università Lum Jean Monnet	Information Systems - SME	x	s	80 hours	x	-	x	-
IT	Master	Polytechnic University of Milan	Master in Management	x	l	2 years - part time	x	x	-	-
CY	M.Sc.	Cyprus International Institute of Management	M.Sc. Management - Entrepreneurship and Innovation / E -Commerce	x	l	1-2 years	x	x	-	-
CY	Diploma	CTL Eurocollege	E-Business	x	l	2 years	x	x	-	-
LV	Certificate	Riga Technical University	Fundamentals of Computer Science small Business Management	x	s	32 hours	x	-	x	-
LV	MBA	Riga Technical University	MBA IT	x	l	2.5 years	x	x	-	-
LT	Master	ISM University of Management and Economics	Innovation and Technology Management	x	l	1.5 years	x	x	-	x
LU	Master	Public Research Centre Henri Tudor	Master MIAGE, Specialty Computer and Innovation	x	l	2 years - part time	x	x	-	-
HU	M.Sc.	CEU Business School	IT Management	x	l	1 year	x	x	-	-
NL	M.Sc.	Utrecht University	Business Informatics	x	l	2 years	x	x	-	-
AT	certificate	FH Kufstein	Zertifierter IT-Prozessmanager	x	s	4 days	x	-	x	-
AT	MBA	Donau-Universität Krems	Danube Professional MBA Business Performance Management	x	l	2 years - part time	x	x	-	-
AT	MBA	Vienna University of Technology	Professional MBA Entrepreneurship and Innovation	x	l	2 years - part time	x	x	-	-
PL	Master	University of Silesia	Information Technology in Small and Medium Enterprise	x	l	1 year	x	-	x	-
PT	MSc	University Atlantica	Systems and Information Technologies	x	l	2 years	x	x	-	-
PT	Master	Politecnico do Porto Escola Superior de Estudos Industriais e de Gestao	Business Information	x	l	2 years part time	x	x	-	-
PT	Master	Politecnico do Porto ESTGF	Computer Engineering	x	l	2 years part time	x	x	-	-
PT	Postgraduate	Instituto Superior Autonomo de Estudos Politecnicos	Digital Business	x	l	1 year	x	x	-	-

	Degree	University	Name of Programme	Prof/nal orient	Short /long	Duration	IT-Module	Entr'ship-Module	SME specialization	online
FI	M.Sc.	Aalto University	ICT Innovation	x	l	2 years	x	x	-	-
FI	M.Sc.	University of Turku	Global Information Technology Management	x	l	2 years	x	x	-	-
FI	Master	Laurea University of Applied Science	Information System Management Education	x	l	1.5 - 2.5 years - part time	x	x	-	-
FI	Master	Haaga-Helia University of Applied Sciences	Information Systems Management	x	l	2-3 years part-time	x	x	-	-
UK	M.Sc.	Birkbeck University of London	Business Technologies	x	l	2 years part-time	x	x	-	-
UK	M.Sc.	Cardiff University	Computing & IT Management	x	l	3 years part-time	x	x	-	-
UK	MSc/PgDip/PgCert	University of the Highlands and Islands	E-Marketing	x	l	unstructured (3 hours online and 13 hours self-study per week)	x	x	-	x
UK	MSc/PgDip/PgCert	University of the Highlands and Islands	Enterprise and E-Marketing	x	l	unstructured (3 hours online and 13 hours self-study per week)	x	x	-	x
UK	M.Sc.	University of Kent	Computing and Entrepreneurship	x	l	2 years part-time	x	x	-	-
UK	M.Sc.	University of Kent	IT Consultancy	x	l	2 years part-time	x	-	x	-
UK	M.Sc.	Kingston University London	IT & Strategic Innovation	x	l	2-3 years part time	x	x	-	-
UK	M.Sc.	University of Liverpool	E-Business Strategy and Systems	x	l	2 years part-time	x	x	-	-
UK	M.Sc.	The London School of Economics and Political Science	Management, Information Systems and Digital Innovation	x	l	2 years part-time	x	x	-	-
UK	M.Sc.	London South Bank University	Business Intelligence and Social Media	x	l	16 months	x	x	-	-
UK	M.Sc.	London South Bank University	IT Management for Business	x	l	16 months	x	x	-	-
UK	M.Sc.	The University of Nottingham	Computer Science and Entrepreneurship	x	l	2 years part-time	x	x	-	-
UK	MSc/PgDip/PgCert	Nottingham Trent University	Engineering (Cybernetics and Communications)	x	l	2 years part-time	x	x	-	-
UK	MSc/PgDip/PgCert	Nottingham Trent University	Cloud and Enterprise Computing	x	l	2 years part-time	x	x	-	-
EU	M.Sc.	EIT ICT Labs Master School	Digital Media Technology	x	l	2 years	x	x	-	-
EU	M.Sc.	EIT ICT Labs Master School	Distributed Systems and Services (Cloud Computing..)	x	l	2 years	x	x	-	-
EU	M.Sc.	EIT ICT Labs Master School	Internet Technology and Architecture	x	l	2 years	x	x	-	-
EU	M.Sc.	EIT ICT Labs Master School	Service Design and Engineering	x	l	2 years	x	x	-	-

8.2.1 Example1 - Factsheet for University of Kent's programme "IT Consultancy (MSc)"

Title of study Program	IT Consultancy (MSc) IT Consultancy with an Industrial Placement (MSc)
Contact details	Dr. John Crawford, Director of the Kent IT Consultancy, the MSc in Computing and Entrepreneurship and the MSc in IT Consultancy. Email: J.S.Crawford@kent.ac.uk
Title of study degree	Master of Science in IT Consultancy. Master of Science in IT Consultancy with an Industrial Placement.
Level of degree	Master's
Name of programme provider	University of Kent
Responsible institution	University of Kent (School of Computing and Kent Business School)
URL	http://www.kent.ac.uk/courses/postgraduate/265/it-consultancy#!overview
Target group	<i>Target Group:</i> Those who want to follow a career in IT Consultancy, particularly in relation to small and medium enterprise (SME) clients <i>Entry Requirements:</i> A first, 2.1 or good 2.2 honours degree (or the equivalent) in any subject. Applicants must have a keen interest in, and sufficient prior knowledge of, information technology (which need not have been gained via formal academic study).
Payment / fees	Full-time: UK/EU £5100, Overseas £14865
Duration	Without an industrial placement: 1 year full-time With an industrial placement: up to 2 years full-time
Study language	English.
Quality assurance & accreditation processes	University of Kent Codes of Practice: http://www.kent.ac.uk/teaching/qa/codes/index.html University of Kent Credit Framework: http://www.kent.ac.uk/teaching/qa/credit-framework/
Main learning outcomes	The programme provides opportunities for students to develop and demonstrate knowledge and understanding, qualities, skills and other attributes in the following areas: <ul style="list-style-type: none"> • The way in which SMEs operate and the constraints they are subject to, including aspects such as management, finance, and the organisation of business processes. • The most common roles of IT within SMEs, and of current technologies applicable to those roles, including issues of security, confidentiality and data integrity. • The ability to empathise with clients in understanding their problems and requirements. <p>A range of advanced intellectual skills are also developed and students can choose from</p>

	a wide selection of optional modules according to their background and interests.
Specific learning outcomes	<ul style="list-style-type: none"> • Ability to follow up an initial contact with a client, leading to a mutually comprehensible statement of requirements and a well-formulated contract, taking due account of the interests of all stakeholders. • Ability to carry out a substantial piece of IT consultancy work, with particular emphasis on understanding the whole process of deploying a new IT solution within an SME environment, including the concomitant evolution of business processes. • Ability to deploy project management and team communication tools effectively. • Professional, legal, social, cultural and ethical issues related to computing. • Ability to model problems and their solutions with an awareness of any trade-offs involved. • Ability to deal with complex issues both systematically and creatively. • Ability to work with self-direction and originality in tackling and solving problems. • Ability to make sound judgements in the absence of complete data.
ECTS credits / other credits	<p>Without an industrial placement: 90 ECTS With an industrial placement: 105-150 ECTS depending on placement duration</p>
Subject coverage, ICT; entrepreneurship, other subjects (Please make sure that the number of ECTS equals the total number of ECTS covered. Where choices apply, weight the interchangeable subjects equally)	<p>The programme comprises compulsory modules and optional modules.</p> <p>The compulsory modules include:</p> <ul style="list-style-type: none"> • New Enterprise Development (entrepreneurship: 15 ECTS) • Management of Operations (business: 7.5 ECTS) • Extended IT Consultancy Project (work experience in a real IT consultancy, business and technical: 30 ECTS) • Either Object Oriented Programming or Advanced Programming (ICT: 7.5 ECTS) • One of: <ul style="list-style-type: none"> ○ Computing Law, Contracts and Professional Responsibility (7.5 ECTS) ○ Software Engineering (ICT: 7.5 ECTS) ○ Web-based Information Systems Development (ICT: 7.5 ECTS) <p>Students additionally take optional modules totalling 22.5 ECTS from a selection of about 13 technical topics and 4 business topics. Students can choose any balance between technical and business options according to their interests and background. (For example a business graduate might select mostly technical options whereas a computing graduate might choose more business options.)</p> <p>Students on the Industrial Placement version of the programme undertake a paid work placement for between 10 and 51 weeks which is also assessed for academic credit of between 15 and 60 ECTS depending on the duration.</p> <p>Total sum: without Industrial Placement 90 ECTS with Industrial Placement (105-150 ECTS)</p>
Teaching methods	<p><i>Please tick all that apply:</i></p> <p><input checked="" type="checkbox"/> traditional lecture-room instruction,</p> <p><input checked="" type="checkbox"/> in-situ teaching in a business setting,</p> <p><input type="checkbox"/> e-learning (also partial)</p>

	<p>() <i>blended learning.</i></p> <p>() <i>part-time</i></p> <p>() <i>MOOC</i></p>
Launch & continuity	Since September 2007
Enrolment	Four students are enrolled in this programme during the academic year 2013/14.. Up to 8 students could be admitted within existing resources.
Programme design	The programme was designed by academic staff in the School of Computing with input from the University's Business Hub (since renamed as the Innovation Centre) and Kent Business School, under the leadership of Dr Andrew Runnalls who was at that time Director of the Kent IT Consultancy.
Program Revision cycle	<p>The programme and the individual modules are reviewed and where necessary revised annually.</p> <p>Programmes are typically subject to a more comprehensive review once every five years on average. The last major revision of this programme took place in 2010.</p>
Student feedback	The University of Kent participates in the PTES (a postgraduate version of the National Student Survey run by the UK Higher Education Academy). Additionally, anonymous student feedback is collected for every module.
Employer input	The teaching provision is overseen by a panel consisting of leading employers and industrialists to ensure its curriculum remains up-to-date and relevant to their needs.
ICT industry input	The Kent IT Consultancy, in which the students conduct their Extended IT Consultancy Project, has a full-time non-academic professional manager and a technical developer who act as mentors to the students. It also has a Board of Directors whose membership is drawn from ICT Industry.

Programme modules:

Compulsory/ optional	Title (& content)	ECTS
Compulsory	Management of Operations	7.5
Compulsory	Extended IT Consultancy Project	30
Compulsory	New Enterprise Development	15
Optional	Advanced Java for Programmers	7.5
Optional	Object-Oriented Programming	7.5
Optional	Advanced Object-Oriented Programming	7.5
Optional	Networks and Network Security	7.5
Optional	Computer Security	7.5
Optional	Cloud Computing	7.5
Optional	Web-Based Information System Development	7.5
Optional	C++ Programming	7.5

Optional	Development Frameworks	7.5
Optional	Financial and Management Accounting	7.5
Optional	System Security	7.5
Optional	Advanced Network Security	7.5
Optional	Green Computing	7.5
Optional	Software Engineering	7.5
Optional	Mobile and Ubiquitous Computing	7.5
Optional	Trust, Security and Privacy Management	7.5
Optional	Computing Law, Contracts and Professional Responsibility	7.5
Optional	Strategy	7.5
Optional	Digital Marketing	7.5
Optional	Structure and Organisation of the E-Commerce Enterprise	7.5
Compulsory	Industrial Placement (10 - 51 weeks) (only for the MSc with an Industrial Placement)	15-60

8.2.2 Example 2 - Factsheet for CEU Business School's Programme "IT Management (MSc)"

Title of study Program	IT Management
Contact details	Achilles Georgiu, Program Director, email: GeorgiuA@ceubusiness.org
Title of study degree)	MSc in IT Management
Level of degree	MSc
Name of programme provider	CEU Business School
Responsible institution	Central European University
URL	https://business.ceu.hu/msc-in-it-management
Target group	<p>People who have a bachelor's (or higher) degree in any field from a reputable institution.</p> <p>Participants need a strong command of English, demonstrated by your TOEFL (or equivalent tests) score, a competitive GMAT or GRE score.</p> <p>People who are managers or prospective managers that need to develop the business, finance and leadership skills for advancement or entrepreneurship in tech-related positions and fields.</p>
Payment / fees	8.600 €
Duration	<i>1 year</i>
Quality assurance & accreditation processes	program is accredited in both the US and in Hungary
Main learning outcomes	Identify an organization's business needs and how to align a technology strategy to meet those needs. In order to apply technology properly, students need to be familiar with the processes underlying it. These processes are made automatic by tools, and the tools are used by people in order to follow the processes. Thus, for every technology-dependent company, it is only the knowledge and the operation of this cycle that can ensure the advantages of technology. During the program – keeping the necessary balance – we go over the entire lifecycle, elaborating on the specific areas in the appropriate depth.
Specific learning outcomes	The subjects of the program fully cover the human factors necessary for the activity, and they transmit knowledge regarding tools and processes. The students encounter subjects like IT Service Management, IT Strategy, Technological Innovation, Information Security, IT Project and Financial Leadership, etc. Moreover, students can learn about new and future areas that have come into existence as a result of data explosion, such as the revolution of social media and mobile tools, cloud-based solutions, knowledge management, etc. Furthermore, we work on the development of soft-skills as well, such as the launching of new technological companies or the management of existing companies, the consultative selling and negotiation of technological solutions, or the acquisition of the basics of critical thinking. Some of the subjects overlap with the MBA programs of the Business School so that students could get to know a wider circle of

	Hungarian and international fellow students because we believe that colleagues participating in the program can learn not only from the lecturers, but from each other as well.
ECTS credits / other credits	30 credits
Subject coverage, ICT; entrepreneurship, other subjects (Please make sure that the number of ECTS equals the total number of ECTS covered. Where choices apply, weight the interchangeable subjects equally)	<p><i>Could you roughly estimate what share ICT and Business / Entrepreneurship education respectively have in this programme (in terms of ECTS or % effort, if ECTS not applicable)</i></p> <p>40% ECTS / % ICT education <i>If feasible, please break down</i> 40% of which ICT –technological competences 50% of which ICT –organisational competences 20% of which ICT –design competences 10% of which ICT –other / application specific competences</p> <p>40% ECTS / % Management / business / entrepreneurship education 10 ECTS / % other (specify) Soft Skill Development</p>
Teaching methods	<p><i>Please tick all that apply:</i></p> <p><input checked="" type="checkbox"/> (x) traditional lecture-room instruction, <input type="checkbox"/> () in-situ teaching in a business setting, <input type="checkbox"/> () e-learning (also partial) <input checked="" type="checkbox"/> (x) blended learning. <input checked="" type="checkbox"/> (x) part-time <input type="checkbox"/> () MOOC</p>
Launch & continuity	Offered since 2004 but there was an “interruption for several years” when the financial crisis came.
Enrolment	Average number of students is usually between 12 to 15; maximum was around 20 – 25.
Programme design	The program director in cooperation with Full Time and Adjunct Teachers. The Curricula is always presented to a Curriculum Committee.
Program Revision cycle	Program is revised every second year with slight adjustments on yearly bases. Program revision board consists of the Program Director and the Curriculum Committee of the Business School (including Professors from the school, Program Directors from other programs and the Dean). Alumni and current students are also involved and program is adjusted including their feedback. Industry trends are always considered as part of the lecturers are also industry experts working in the field.
Student feedback	We only have evaluations for each of the course delivered under the program the average evaluation in most of the cases is above 4.5 (out of 5).

Employer input	We do not have written feedback from employers but the overall feedback is always positive. Adjunct Lecturers are also delivering classes coming from these companies making the curriculum more colourful. Our intention is to establish a strong cooperation with those companies on several levels: Bringing their knowledge in class, finding future jobs for our students or even by populating the classes with students coming from these companies.
ICT industry input	<i>Has there been any input or feedback from ICT industry on course content? If so describe.</i> Industry partners are also involved in the program content, providing guest lectures and on-site visits to the corporate environment. Depending on needs and availability common projects are also part of the cooperation.

Programme modules:

Compulsory/ optional	Title (& content)	ECTS
Compulsory	IT for Managers	2
Compulsory	Organizational Behaviour and HR Management	2
Compulsory	Marketing	3
Optional	Boardroom Executive Exercise I: Global Challenge	2
Compulsory	Financial Management (of IT)	3
Compulsory	Project Management	2
Compulsory	Developing IT Strategies	3
Optional	Managing the Digital Firm	1,5
Compulsory	IT Entrepreneurship	2
Compulsory	Best Practices in IT Management	2
Compulsory	Technology Innovation - Current Issues	3
Optional	Developing a New Venture with CEU Inno. Lab	3
Optional	Security and Data protection	1,5
Optional	Knowledge Management	1,5
Optional	Business Intelligence	2
Optional	Effective Selling Skills and Strategies	2
Optional	Consultative Selling and Negotiations	1
Optional	Information Lifecycle Management	1,5
Optional	Mobile Revolution and Cloud Computing	1,5
Optional	Social Networks: Global Impact	1,5

9 Demonstration plans

We have carried out an extensive requirements capture via interviews and surveys of SMEs and an assessment of technological trends most likely to affect the e-leadership skills needed in SMEs and entrepreneurial companies. To recapitulate these **content**-wise in dot-list form:

- **Very strong, also practical, hands-on, ICT skills**
- **Cloud computing,**
- **Big data/data analytics and data tools such as SQL, Hadoop, Python and Django.**
- **Mobile application development**
- **Software development and web development** including skills in **PHP, Flash, Java, Java Script** etc., also **3D animation;**
- **ERP systems**
- **ICT Security**
- **ICT management / ICT governance**
- **Enterprise Architecture**
- **Outsourcing skills**
- **Leading qualified interdisciplinary staff and consultants, contractors and vendors**
- **Communication skills**
- **Understanding of the customers and the market, business development and sales and marketing**
- **Change management, and**
- **Project management**

Regarding the **format** of the e-leadership education, we have found that there is a need for both

- **Professional oriented long programmes (MSc./PhD, MBA/Exec. Ed. Programmes), and**
- **Shorter, targeted, affordable trainings, with flexible schedules**

The following tables describe the demonstration plans at the five academic institutions, which cover a significant share of the above list. Thought will be given to carrying out a rigorous mapping of requirements captured to learning outcomes of demonstrations planned later in the project.

9.1 Aarhus University

9.1.1 Aarhus University Demonstration

Table 9-1: Current state of the demonstration planning at Aarhus University

Institution	Aarhus University
Title of demonstration	LEAD
Envisaged timing of demonstration	November/December 2014
Payment / fees	N/A
Duration	4 * 1 day
Embeddedness into existing degree programmes	Possible integration with existing program in cooperation with a partner university (Master of IT, Syddansk Universitet) - tbd

Certificate	N/A
Teaching / delivery methods	<p>The courses will be designed as a mix of theoretical learning blocks mixed with highly interactive, “hands-on” blocks (case-analysis, problem solving exercises, discussion groups).</p> <p>A focus will be put on best practice cases, so that practitioners can immediately relate to their own situation.</p> <p>External guest speakers (of successful SMEs) will be invited to give presentations about specific topics.</p> <p>Cases will be drawn from the SME environment to make sure they are relevant.</p>
Target group	<p>Entry level / skills requirements</p> <ul style="list-style-type: none"> • No prior education necessary <p>Background role / jobs</p> <ul style="list-style-type: none"> • Managers/IT-Managers/CEOs in SMEs <p>Industries / employer types</p> <ul style="list-style-type: none"> • N/A
Demonstration is planned as	<p>(X) a pilot of a new taught course/programme</p> <p>(?) a pilot of an existing taught course/programme which has been revisited taking into account the results of requirement research</p> <p>() a workshop or other event to demonstrate and feed back into the development of a new course/programme to be taught later</p> <p>() other</p>
Rationale	<p>The course is designed as a modular program with 4 different tracks, of which participants can pick 2. There is no prior knowledge or education needed, nor are the tracks interdependent. Thus, practitioners can themselves flexibly identify what can be most helpful and directly applicable to their situation.</p>
Modules / classes / sessions	<p>The course will consist of 4 tracks, each track is a 1 – day course. The main topics and concepts represented are as follows:</p> <ul style="list-style-type: none"> • Partner management/virtual business networks <ul style="list-style-type: none"> ○ Introduction to the main concepts: SCM, Partner Relationship Management ○ Information flow, trust, power and shared success ○ IS tools to support interaction and collaboration • Social Media Marketing <ul style="list-style-type: none"> ○ Main concepts in communication and collaboration ○ Digital economies and strategies for obtaining sustainable competitive advantages ○ Search engine optimization and marketing ○ Cases studies on specific concepts (e.g. virtual communities, reputation services, social bookmarking) • Business Analytics <ul style="list-style-type: none"> ○ Information systems strategy and organizational change ○ Databases and data warehousing ○ Online analytical processing and reporting ○ Predictive analytics ○ Decision support systems • Planning/Managing for Growth

	<ul style="list-style-type: none"> ○ Risks and pitfalls for fast growing firms ○ Scalable management strategies ○ IS governance and strategy alignment
Learning outcomes	<ul style="list-style-type: none"> ● Partner management/virtual business networks <ul style="list-style-type: none"> ○ Effectively manage and improve a company’s partner network ○ Analyse critical deficiencies and areas for improvement within a network ○ Identify potential risk areas within a company’s network ○ Capitalizing on highly effective internal and external relationships ● Social Media Marketing <ul style="list-style-type: none"> ○ Understand how social media may enable communication and collaboration ○ Design social media strategies for particular organizational objectives and resources ○ Plan responsible social media adoption taking into consideration benefits and risks ○ Explore the potential business applications of other social media tools ● Business Analytics <ul style="list-style-type: none"> ○ Understand the impact of process design and data design on the functioning of an organization ○ Judge the influence of different types of (enterprise) information systems on processes and data ○ Know how to leverage internal and external data to achieve organizational objectives ○ Identify the information needs of organizational decision makers and address them through the selection and deployment of information systems ● Planning/Managing for Growth <ul style="list-style-type: none"> ○ Analyse the dynamic needs of a company in relation to its size and growth expectations ○ Decide on different IS strategies to support organizational growth ○ Create a scalable management model that allows growth

9.2 Antwerp Management School

9.2.1 Demonstration “Executive Master of IT Governance & Assurance”

Table 9-2: Current state of the demonstration planning at Antwerp Management School

Institution	Antwerp Management School
Title of demonstration	Executive Master of IT Governance & Assurance
Envisaged timing of demonstration	Start October 2014
Payment / fees	19500 euro
Duration	Two year, part-time

<p>Embeddedness into existing degree programmes</p>	<p>Very strong embeddedness into the existing Executive Master of IT Governance and Assurance. The applicability for SMEs is ensured through the individual coaching approach in the courses and the development of the master project. This master project needs to address a complex organizational challenge in the own specific environment of the SME, and is to be solved grounded in science and rooted in practice.</p>
<p>Certificate</p>	<p>Master of Science</p>
<p>Teaching / delivery methods</p>	<p>Interactive, focus on sharing experiences and translating knowledge towards the practice field of the SME through coaching, group assignments and master project.</p>
<p>Target group</p>	<p>Professionals who are involved in IT governance and assurance such as: Business process owners, Business consultants, Operational auditors, IT auditors, IT assurance professionals, CIOs, IT managers, IT quality managers, Information security managers, Information managers and Business/IT relationship managers.</p>
<p>Demonstration is planned as</p>	<p>() a pilot of a new taught course/programme (X) a pilot of an existing taught course/programme which has been revisited taking into account the results of requirement research () a workshop or other event to demonstrate and feed back into the development of a new course/programme to be taught later () other</p>
<p>Rationale</p>	<p>Information Technology (IT) has become pervasive in current dynamic and often turbulent business environments. An increasingly educated and assertive set of stakeholders is concerned about the sound assurance and governance of IT, focusing at how business benefits can be realized out of IT-enabled innovation and how IT related business risks are managed. Despite the multitude of models and frameworks available in the professional domain around concepts as IT Governance, Management and Assurance, organizations also face the challenge of putting these ideas into practice. Because there are obviously no simple solutions, many organizations are looking for advanced expertise grounded in research. To meet this demand, the Antwerp Management School and Maastricht University School of Business & Economics have established a unique partnership to offer a state-of-the-art executive master in IT governance and assurance.</p>
<p>Modules / classes / sessions</p>	<ul style="list-style-type: none"> • IT Leadership • Risk and Information Security Management • Change, people and innovation management • Governance, control and assurance • IT Governance and Assurance (COBIT) • Master project
<p>Learning outcomes</p>	<p>After attending this program:</p> <ul style="list-style-type: none"> • You will have broadened and deepened your knowledge of general management and IT governance, management and assurance. • You can identify and communicate the organization's IT related business value opportunities and risks • You are able to prepare and make management decisions in the domains of governance, audit, control and security of IT • You can execute IT related governance, management and audit/assurance projects • You can apply the international IT governance and assurance framework COBIT 5

	<ul style="list-style-type: none"> You will deliver a master project that will be relevant for your day-to-day work and grounded in research
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9.2.2 Demonstration “Executive Master of Enterprise IT Architecture”

Institution	Antwerp Management School
Title of demonstration	Executive Master of Enterprise IT Architecture
Envisaged timing of demonstration	Start October 2014
Payment / fees	19500 euro
Duration	Two year, part-time
Embeddedness into existing degree programmes	Very strong embeddedness into the existing Executive Master of Enterprise IT Architecture. The applicability for SMEs is ensured through the individual coaching approach in the courses and the development of the master project. This master project needs to address a complex organizational challenge in the own specific environment of the SME, and is to be solved grounded in science and rooted in practice.
Certificate	Master of Science
Teaching / delivery methods	Interactive, focus on sharing experiences and translating knowledge towards practice of SME through coaching, group assignments and master project.
Target group	This program is designed for Professionals with experience involved in enterprise IT architecture such as: enterprise architects, business analysts, IT analysts, business architects, IT architects, IT developers and information managers
Demonstration is planned as	October 2014
Rationale	Organizations increasingly recognize the importance of a sound and flexible enterprise design and operation – in which information systems are progressively playing a crucial role – for realizing agility and strategic success. Despite the multitude of models and frameworks available in the professional domain, enterprises still face the challenge of putting these ideas into practice. Because there are obviously no simple solutions, many enterprises are looking for advanced expertise grounded in research. To meet this demand, Antwerp Management School and Maastricht University School of Business & Economics have established a unique partnership to offer a state-of-the-art Executive Master of Enterprise IT architecture. This international program proceeds from where the applied research of the Antwerp Management School, School of Business & Economics, and its international research partners leaves off, with the goal of offering sustainable, innovative and well founded concepts with proven practical applicability.
Modules / classes / sessions	<ul style="list-style-type: none"> IT Leadership Enterprise Architecture IT Architecture Risk and Information Security Management Change, people and innovation management Master project
Learning outcomes	After attending this program

	<ul style="list-style-type: none"> • You will have broadened and deepened your knowledge of general management and IT management • You can leverage information technology to help innovate the enterprise. You can design and implement the enterprise in a unified and integrated manner (including process models) required to realize the enterprise strategy serving its customers well and fluently collaborating with its partners • You can design and implement solid and evolvable IT systems • You are able to integrate enterprise and IT architecture aspects with areas of enterprise and IT governance and value management • You will deliver a master project that will be relevant for your day-to-day work and grounded in research • You can build a professional career as enterprise IT architect • You will receive an official and internationally recognized Antwerp Management master’s degree and a University Certificate of Maastricht University School of Business & Economics. • You will be prepared to successfully obtain professional certifications such as “Certified DEMO Professional” and ISACA’s CISA, CISM, CRISC and CGEIT
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9.3 Henley Business School

9.3.1 Demonstration “Leading your company to high performance growth”

Table 9-3: Current state of the demonstration planning at Henley Business School

Institution	Henley Business School
Title of demonstration	Leading your company to high performance growth.
Envisaged timing of demonstration	November 2014
Payment / fees	4250£ The programme will be supported by Growth Accelerator. Grants of up to 50% of the programme cost to a maximum grant of £2000 per person for all management, decision makers and executives within the SME business. Immediate membership to Growth Accelerator is required to secure this grant
Duration	5 days
Embeddedness into existing degree programmes	The programme will be embedded within The Henley Accelerator programme on Executive education for small to medium sized enterprises (SME) to grow their businesses more quickly in an ever changing competitive environment. SMEs with practical hands on experience having worked with innovative fast growing SMEs for the last ten years. These programmes offer a rewarding, challenging and stretching experience by combining some conceptual skills from an MBA with a practical understanding of how to overcome ever increasing barriers to growth.
Certificate	Yes
Teaching / delivery methods	Sessions, team work, homework, case studies
Target group	<i>Entry level / Bachelor or master degree</i> SMEs <i>Aspired career targets:</i> Leaders in the SMEs typically carrying out more than one

	<p>leadership role. SME leadership is complex and e-Leadership – the integration of a range of new technologies into the business – is often left behind. We challenge it with our executive course.</p> <p><i>Industries / employer types: Any (IT and other)</i></p>
<p>Demonstration is planned as</p>	<p>(X) a pilot of a new taught course/programme () a pilot of an existing taught course/programme which has been revisited taking into account the results of requirement research () a workshop or other event to demonstrate and feed back into the development of a new course/programme to be taught later () other</p>
<p>Sustainability</p>	<p>The programme will become a part of the offered programmes at the Henley Accelerator on Executive education taught jointly by two schools: Leadership, Organisation and Business; Business Informatics, Systems and Accounting School.</p>
<p>Rationale</p>	<p>Develop e-leadership skills, identify the issues that may be a challenge to high-performance growth, gain a competitive advantage through effective ICT management; identify the role of digital and IT strategies in your organisation, use of IT and digital strategies as a strategic vs. survival tool, study and analyse practical applications within the businesses – people, marketing, strategy, finance and ICT</p>
<p>Modules / classes / sessions</p>	<p>The module is divided in 4 sessions (days) and one day case study and a home reading.</p> <p>Day 1 - Introduction & Understanding the SME space in the Digital economy.</p> <ul style="list-style-type: none"> • Is your business talking to you? We introduce participants to the purposes of the programme, outlining definitions of e-leadership and the Digital economy, innovation and entrepreneurship. We focus on issues of systems integration and design - managing risk in a complex environment, giving summary results of the recent EU-funded research programmes on e-Leadership. • Agile thinking in a complex environment. Managing creativity and innovation – leading creative teams, conducive environments for ideas innovation. Leading teams through change. <p>Day 2. E-leadership in business for SME</p> <p>We aim to improve business performance for the SMEs by introducing the key concepts of e-leadership, alignment of business and IT, technology for business with relevant case studies.</p> <p>Day 3: e-Leadership in Innovation</p> <p>This aims to elaborate the understanding of innovation in the SMEs with a heavy focus on implementation of business / IT strategy. A set of competences are reviewed which help e-leader to initiate and drive innovation using ICT</p> <p>Day 4. Process, Systems Planning and Application</p> <ul style="list-style-type: none"> • Business needs – reflection / presentation, mapping the needs of the organization. • Steps to investment readiness. E-commerce, integrated financial feedback for management planning and decision making with key stakeholders. • Conclusion: Effective e-leadership strategies for growth. • Embedding solutions and designs for growth. • Enabling individuals and teams • Leading teams through change
<p>Learning outcomes</p>	<p>This programme seeks to achieve:</p> <p>Develop e-leadership skills: management skills, hybrid market-ICT skills, industry-specific skills; Identify the issues that may be a challenge to growth; Identify the risk to</p>

	<p>the organisation in leaving matters unchallenged; The benefits in gaining competitive advantage through effective ICT management; Identify the role of IT in organisation: Leadership, competitive advantage and Operation effectiveness; Study and discuss practical applications within the businesses – people, marketing, strategy, finance and ICT;</p> <p>Key words: Digital literacy - Information and communication technologies (ICT) in driving productivity, financial readiness & growth.</p>
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9.4 Instituto de Empresa Business School

9.4.1 Demonstration “Digital Innovation: A Strategic View of IT and Innovation for SMEs”

Table 9-4: Current state of the demonstration planning at IE Business School

Institution	IE Business School
Title of demonstration	Digital Innovation: A Strategic View of IT and Innovation for SMEs
Envisaged timing of demonstration	1 full day
Payment / fees	We have not envisaged to charge for the course at the moment. All companies participating in the project interviews and survey will be invited to participate in the course.
Duration	1 Full day
Embeddedness into existing degree programmes	No
Certificate	No
Teaching / delivery methods	The course will be taught at IE Business Schools Campus in Madrid, Spain The course will be taught by three professors from IE Business School: Alvaro Arenas, Jose Esteves and Silvia Leal. The delivery method will be face-to-face, and the language of the course will be Spanish. We plan to transmit the course via Internet, so interested companies in Spain and elsewhere could join in.
Target group	No pre-requisite required for taking the course. The target audience will be SMEs managers and employees in the way to get managerial positions.
Demonstration is planned as	() a pilot of a new taught course/programme (X) a pilot of an existing taught course/programme which has been revisited taking into account the results of requirement research () a workshop or other event to demonstrate and feed back into the development of a new course/programme to be taught later () other
	Please specify plans for continuity
Rationale	IT and innovation as a whole can help a SME become more competitive through changes in strategy and direction, as well as improvements in efficiency and

	effectiveness. In this course, we review the IT value proposition and study how transformation in technology provides value.
Modules / classes / sessions	The course comprises five sessions, each session lasting 80 minutes. Session 1. Welcome to the Digital Economy Session 2. IT Trends and Transformation with IT Session 3. E-Leadership and Skills for Innovating in a Digital World Session 4. Innovation Models Session 5. Innovation in Action
Learning outcomes	At the end of this course, students will be familiar with latest trend in technology and how they can use technology for innovate in their companies.

9.5 New Bulgarian University

9.5.1 Demonstration “Strategy Development for ICT Intensive Organizations”

Table 9-5: Current state of the demonstration planning at New Bulgarian University - Strategy Development For ICT Intensive Organizations

Institution	New Bulgarian University
Title of demonstration	Strategy Development for ICT Intensive Organizations
Envisaged timing of demonstration	Autumn 2014
Payment / fees	Students: included in the M.Sc. fee Business: Standard university fee for 3 credits course
Duration	10 hours lectures + 20 hours project work 3 credits
Embeddedness into existing degree programmes	M.Sc. IT Project Management – I term
Certificate	yes
Teaching / delivery methods	Lectures + project
Target group	IT Professionals Students with industry experience First and second level leaders
Demonstration is planned as	M.Sc. course + 1 video lecture – subject overview
Rationale	Identified need of knowledge and skills about: Business and Strategic management skills
Modules / classes / sessions	ICT enabled Balanced Strategy as a tool for achieving business success Importance of strategy quality and strategy execution Formulating, translating and agreeing on the strategy Align the organization and ICT operations to the corporate strategy

	Balanced Scorecard (BSC) implementation roadmap
Learning outcomes	Strategic business and operating models

9.5.2 Demonstration “Cyber Security And Resilient Business”

Table 9-6: Current state of the demonstration planning at New Bulgarian University - Cyber Security And Resilient Business

Institution	New Bulgarian University
Title of demonstration	Cyber Security And Resilient Business – autumn 2014
Envisaged timing of demonstration	Autumn 2014
Payment / fees	Students: included in the M.Sc. fee Business: Standard university fee for 3 credits course
Duration	30 lectures and case studies 3 credits
Embeddedness into existing degree programmes	M.Sc. IT Project Management – I term
Certificate	yes
Teaching / delivery methods	Lectures + case studies
Target group	IT Professionals Students with industry experience First and second level leaders
Demonstration is planned as	M.Sc. course + 1 video lecture – subject overview
Rationale	Identified need of knowledge and skills about: Information Management and Security
Modules / classes / sessions	Operational risks and resilience management in IT systems and services CERT-RMM model Protect and Sustain. Information Security Attributes – CIA. Anatomy of the cyber-attacks. Risk management and risk policies for BYOD
Learning outcomes	Information Management and Security

9.5.3 Demonstration “IT Marketing”

Table 9-7: Current state of the demonstration planning at New Bulgarian University – IT Marketing

Institution	New Bulgarian University
Title of demonstration	IT Marketing
Envisaged timing of demonstration	autumn 2015

Payment / fees	Students: included in the M.Sc. fee Business: Standard university fee for 3 credits course
Duration	30 hours lectures and case studies 3 credits
Embeddedness into existing degree programmes	M.Sc. Internet Software Technologies – III term
Certificate	yes
Teaching / delivery methods	Lectures + case studies
Target group	Experienced Users Students just after B.Sc. degree Developers and SME IT
Demonstration is planned as	M.Sc. course + 1 video lecture – subject overview
Rationale	Identified need of knowledge and skills about: Sales and Marketing
Modules / classes / sessions	Digital marketing tools Digital media Innovative digital marketing
Learning outcomes	Exploit and innovate digital marketing trends

9.5.4 Demonstration “Cloud Technology”

Table 9-8: Current state of the demonstration planning at New Bulgarian University – Cloud Technology

Institution	New Bulgarian University
Title of demonstration	Cloud Technology
Envisaged timing of demonstration	Autumn 2014
Payment / fees	Students: included in the M.Sc. fee Business: Standard university fee for 3 credits course
Duration	30 hours lectures + 30 hours classroom exercises 3 credits + 3 credits
Embeddedness into existing degree programmes	M.Sc. Internet Software Technologies– I term
Certificate	yes
Teaching / delivery methods	Lectures + classroom exercises + project work
Target group	Experienced Users Students just after B.Sc. degree Developers and SME IT

Demonstration is planned as	M.Sc. course + 1 video lecture – subject overview
Rationale	Identified need of knowledge and skills about: Technology Trends
Modules / classes / sessions	Cloud computing Software as a Service Migration challenges
Learning outcomes	Exploit digital trends.

9.5.5 Demonstration “TSP Executive Strategy”

Table 9-9: Current state of the demonstration planning at New Bulgarian University – TSP Executive Strategy

Institution	New Bulgarian University
Title of demonstration	TSP Executive Strategy – Sofia Business Park
Envisaged timing of demonstration	Autumn 2014
Payment / fees	Students: included in the M.Sc. fee Business: Standard university fee for 1 credits course
Duration	1 day training
Embeddedness into existing degree programmes	No.
Certificate	yes
Teaching / delivery methods	Lectures + case studies
Target group	SME CEOs, CIOs, CTOs – decision makers
Demonstration is planned as	Invitation only course targeting SMEs decision makers
Rationale	Identified need of knowledge and skills about: Business Process Management Strategy, IT Project Management Strategy
Modules / classes / sessions	Strategic perspective of the software business, its problems and possible solutions to those problems Rational management Quality during software development Introducing TSP into an organization
Learning outcomes	Builds capability to ICT business performance

9.5.6 Demonstration “Leading a Development Team”

Table 9-10: Current state of the demonstration planning at New Bulgarian University – Leading a Development Team

Institution	New Bulgarian University
Title of demonstration	Leading a Development Team – Sofia Business Park
Envisaged timing of demonstration	June 2014
Payment / fees	Students: standard fee for NBU/SEI 3 credits course (partially included in the M.Sc. fee) Business: Standard university fee for NBU/SEI 3 3 credits course
Duration	3 days training
Embeddedness into existing degree programmes	No.
Certificate	yes
Teaching / delivery methods	Lectures + exercises + case studies
Target group	SME first and second level managers
Demonstration is planned as	Invitation only course targeting SMEs: : Komfo, GfK, Infragistics
Rationale	Identified need of knowledge and skills about: Business Process Management, IT Project Management
Modules / classes / sessions	TSP Overview Process Discipline Managing the Plan Managing Quality
Learning outcomes	Lead inter-disciplinary staff and build capability to improve ICT business performance. Manage projects to achieve optimal performance conforming to original specifications. Establish and operate an ICT quality approach compliant with the organization’s culture.

10 Next steps

For the remainder of the **second phase** (months 7-12), the following tasks will be carried out as specified:

- To develop key performance indicators concerning e-leadership programmes and benchmarking these against national policy initiatives, industry-led initiatives and multi-stakeholder partnerships in all Member States (including an assessment of their impact);
- To organise demonstrations of e-leadership courses (including MOOCs) for SMEs involving at least 20 SMEs from at least 5 EU Member States;
- To organise a competition for the 10 best e-leadership courses (also for MOOCs) with both, the demonstrations and the competition organised in cooperation with stakeholders groups and associations representing industry and academia as well as the target groups;
- To organise, a survey of the target groups (500 respondents) to gather their views and feedback regarding the best e-leadership courses and MOOCs;
- To develop a dissemination plan for the promotion of e-leadership using social networks and the media (including business and academic publications) involving relevant stakeholders;
- To prepare and deliver an interim report presenting the results of the above mentioned tasks.

For the **third phase** (months 13-18), the following tasks will be carried out:

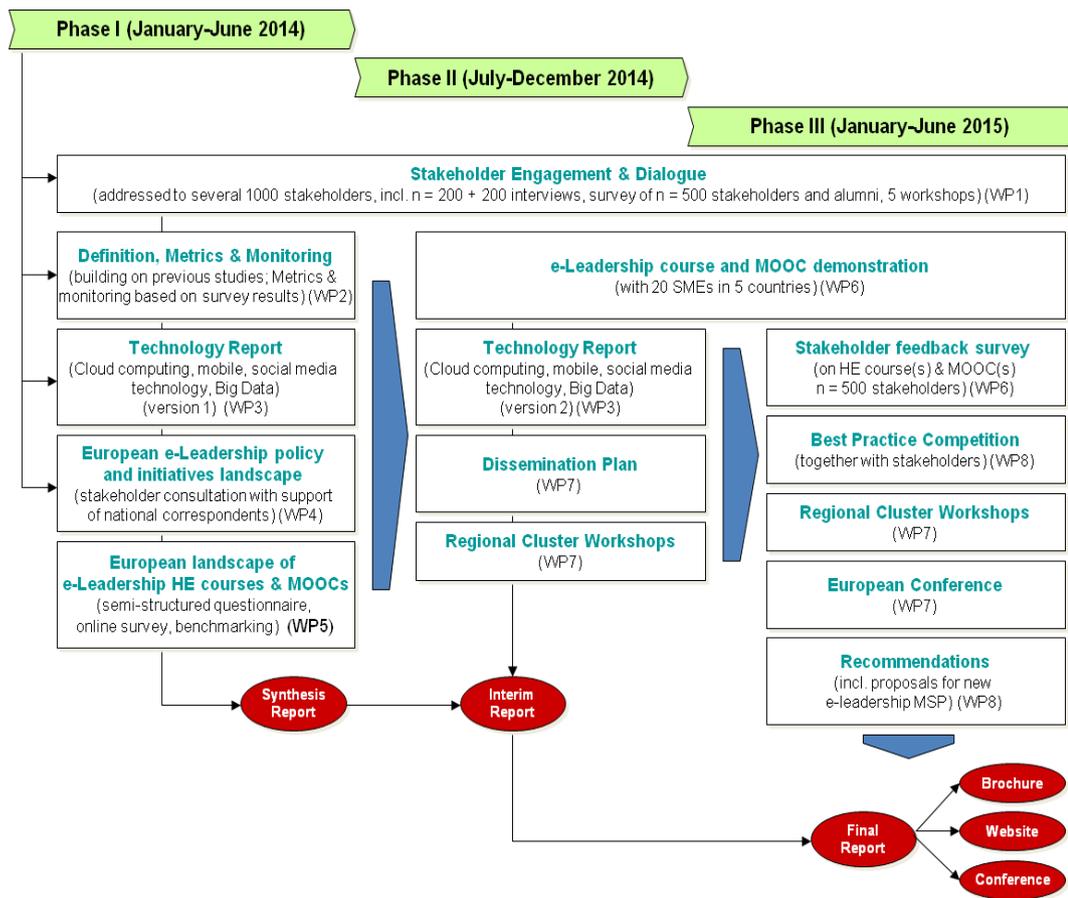
- To continue and complete the demonstrations and the competition and the final assessment, analysis and delivery of results;
- To organise the specified dissemination activities in synergy with the demonstrations and the competition and report on the achievements and the feedback from the participants based on a questionnaire;
- To document best practices and lessons learnt from the demonstration and applications of e-leadership for the target groups to ensure that the definitions cover all relevant cases of e-leadership and are both practical and insightful;
- To formulate recommendations
 - for the development of a European e-leadership competence framework as an extension of the existing European e-competence framework for ICT practitioners developed by the CEN ICT Skills Workshop, and
 - to develop e-leadership skills in cooperation with efforts to foster entrepreneurship across the EU including proposals on how to offer students opportunities to have digital entrepreneurial experiences etc.;
- To propose the creation of new formats and larger multi-stakeholder partnerships for teaching and acquiring e-leadership skills;
- To prepare and deliver the promotional brochures in 24 EU languages;
- To organise a final high-profile conference towards the end of the contract;
- To prepare and deliver the final report including findings covering all the tasks mentioned above for the three phases, conclusions and recommendations.

The final report will provide clear evidence and a solid basis for future follow-up actions at EU and national levels. All reports will be validated by the Steering Committee.

The above activities will be complemented by five expert workshops to be organised with at least 20 experts each to gather their views, contributions and feedback on the (interim) results and achievements.

In the following figure provides an overview of the service contract components and related outputs.

Figure 10-1: Overview of the service contract’s components and related outputs



11 Annex - Methodologies

11.1 European e-Leadership Scoreboard

11.1.1 Methodology

The above described theoretical framework has served as the basis for selecting and combining single indicators into a meaningful way. The overall e-leadership performance in each of the country has been summarized into a scoreboard, and further on into a composite indicator (e-leadership index). These raised a number of challenges related to the quality of the data selected and to their combination into a single indicator. A number of steps were taken to assure the quality of the data and the reliability of the e-leadership index. The steps followed are explained in more details below:

Step 1: *Identifying and addressing outliers*

Mean and standard deviations have been calculated for all indicators among all countries included in the scoreboard. Outliers have been identified as the absolute z-values larger than 3. Relative to the case, the values distorting the variable distribution (positive/negative outliers) have been replaced by maximum/minimum values observed in each single indicator. Beforehand, some indicators have been standardized using population data in order to avoid any country-size effects in the dataset sample.

Step 2: *Setting reference year*

A reference year is set depending on the data availability of each indicator for each of the countries considered. Overall, for most of the indicators the reference year is lagging 1-3 years behind the timing the e-leadership scoreboard refers to. In this case, the reference year for most of the indicators of the 2014 e-leadership scoreboard will be lying between years 2011 to 2013.

Step 3: *Treatment of missing data*

When dealing with the missing values, we distinguish among two different cases which influence data imputation procedure:

1. Missing at random: If data is not available for a year-in-between, we replace data using the value for the previous year / latest year available.
2. Missing completely: For countries which data is completely missing for the entire time series, no imputation is effort carried out. In these cases the indicator is left empty, marked as not available (n/a), and not considered in the calculation of the county scores.

Step 4: *Min-max data normalization*

Step 4: *Calculating re-scaled scores*

Min-max normalisation method was adopted to adjust for differences in terms of units of measurement and ranges of variation. All 28 variables have been normalised into the [0-10] range, with higher scores representing better performance for the indicators.

The following normalisation formula has been applied:

$$X_{i,0 \text{ to } 10} = 10 \times \frac{(X_i - X_{\text{Min}})}{(X_{\text{Max}} - X_{\text{Min}})}$$

Where:

X_i = country score

X_{Min} = sample minimum

X_{Max} = sample maximum

$X_{i, 0 \text{ to } 10}$ = the data point i normalized between 0 and 10

Step 5: Calculating composite e-leadership index

The e-leadership Index for each country is calculated as a weighted average of the rescaled scores for every indicator included in the scoreboard. The weighting approach used distributes equal weights to each of the building blocks. Individual indicators are thereafter given weights relative to the number of overall indicators making up each building block respectively.

11.1.2 Selected indicators - definitions and sources

Indicator	Definition and scope	Latest data available	Source
e-leadership skilling			
Number of Master's or Exec Ed level programmes with a mix of ICT and business	<p>Definition: combination programmes that have as target group specialist or junior / middle management are professional-oriented and have a mix of business and IT. Either at regular consecutive MSc level, or are aimed at specialist subjects only (e.g. new media, marketing, logistics, communications, e-health etc).</p> <p>Measure: per 100,000 population aged 20-59</p>	2013	empirica
E-leadership candidate programmes	<p>Definition: E-leadership candidate programmes - programmes that are clearly aimed at experienced professionals with leadership roles, which usually already expect a high level of IT skills and significant business experience.</p> <p>Measure: per 100,000 of workforce with potential e-leadership skills</p>	2014	empirica
Enterprises that provided training to ICT/IT specialists to develop/upgrade their ICT skills	<p>Definition: Enterprises who provided training to develop/upgrade ICT skills of their personnel: for ICT/IT specialists (NACE Rev. 2).</p> <p>Measure: % of enterprises</p>	2012	Eurostat Information society statistics Code: isoc_ske_ittn2
e-leadership skilled professionals			
Line managers	<p>Definition: ISCO-08 (1220)</p> <p>Measure: as % of total workforce</p>	2013	LFS
ICT managers, architects and analysts	<p>Definition: ISCO-08 (1330, 2421, 2511)</p> <p>Measure: as % of total workforce</p>	2013	LFS

Indicator	Definition and scope	Latest data available	Source
e-leadership pipeline			
e-Leadership pipeline 1: ICT core professionals	Definition: ISCO-08 (2152, 2153, 5356, 2434, 5212, 2513, 2514, 2519, 2512, 2522, 2523, 2529, 3511, 3512, 3513, 3514) Measure: as % of total workforce	2013	LFS
e-Leadership pipeline 2-1: ICT graduates	Definition: Count of first degrees in ISCED 5A and first qualifications in 5B. The number of students entering the labour force in a given year does not equal but is approximated by this number of graduates, as many will go on to second or further degrees (master, PhD). Measure: per 1,000 population aged 20-24	2012	Eurostat Code: [educ_grad5]
e-Leadership pipeline 2-2: Business administration graduates	Definition: Count of first degrees in ISCED 5A and first qualifications in 5B in business and administration. Measure: per 1000 population aged 20-24	2012	Eurostat Code: [educ_grad5]
Business environment (?)			
High growth enterprises n ICT sector	Definition: High growth enterprises (growth by 10% or more) and related employment by NACE Rev. 2 sectors: Manufacture of computer, electronic and optical products (C26), Information and communication (J). Measure: Number of high growth enterprises measured in employment (growth by 10% or more)	2012	Eurostat Code: [bd_9pm_r2]

Indicator	Definition and scope	Latest data available	Source
High growth enterprises in ICT intensive sectors	<p>Definition: High growth enterprises (growth by 10% or more) and related employment by NACE Rev. 2 sectors: Manufacture of electrical equipment (C27), Manufacture of machinery and equipment n.e.c. (C28), Manufacture of motor vehicles, trailers and semi-trailers (C29), Manufacture of other transport equipment (C30), Professional, scientific and technical activities (M).</p> <p>Measure: Number of high growth enterprises measured in employment (growth by 10% or more)</p>	2012	Eurostat Code: [bd_9pm_r2]
Employment in ICT sector	<p>Definition: Number of persons employed in the following NACE Rev. 2 sectors: Manufacture of computer, electronic and optical products (C26), Information and communication (J).</p> <p>Measure: as % of total employment</p>	2011	Eurostat
Employment in ICT intensive sectors	<p>Definition: Number of persons employed in the following NACE Rev. 2 sectors: Manufacture of electrical equipment (C27), Manufacture of machinery and equipment n.e.c. (C28), Manufacture of motor vehicles, trailers and semi-trailers (C29), Manufacture of other transport equipment (C30), Professional, scientific and technical activities (M).</p> <p>Measure: as % of total employment</p>	2011	Eurostat
Enterprises that employed ICT/IT specialists	<p>Definition: Enterprises that employed ICT/IT specialists (NACE Rev. 2)</p> <p>Measure: % of enterprises</p>	2012	Eurostat Code: [isoc_ske_itspen2]
Innovation opportunities			

Indicator	Definition and scope	Latest data available	Source
State of cluster development	<p>Definition: In your country, how widespread are well-developed and deep clusters (geographic concentrations of firms, suppliers, producers of related specialized institutions in a particular field)?</p> <p>Measure: [1 = non-existent; 7 = widespread in many fields] 2012–13 weighted average</p>	2013	World Economic Forum, Executive Opinion Survey
Capacity for innovation	<p>Definition: In your country, to what extent do companies have the capacity to innovate?</p> <p>Measure: [1 = not at all; 7 = to a great extent] </p>	2013	World Economic Forum, Executive Opinion Survey
Firm-level technology absorption	<p>Definition: In your country, to what extent do businesses adopt new technology?</p> <p>Measure: [1 = not at all; 7 = adopt extensively] 2012–13 weighted average</p>	2013	World Economic Forum, Executive Opinion Survey
Impact of ICT on new services and products	<p>Definition: To what extent are ICTs creating new business models, services and products in your country?</p> <p>Measure: [1 = not at all; 7 = a significant extent] 2011–2012 weighted average</p>	2012	World Economic Forum, Executive Opinion Survey
Technology trends			
Availability of latest technologies	<p>Definition: In your country, to what extent are the latest technologies available?</p> <p>Measure: [1 = not available at all; 7 = widely available] 2012–13 weighted average Availability of latest technologies</p>	2013	World Economic Forum, Executive Opinion Survey

Indicator	Definition and scope	Latest data available	Source
Enterprises using social networks	<p>Definition: Use social networks (e.g. Facebook, LinkedIn, Xing, Viadeo, Yammer, etc.)</p> <p>Measure: % of enterprises</p>	2013	Eurostat Code: [isoc_cismt]
Enterprises using RFID technologies	<p>Definition: Enterprises using Radio Frequency Identification (RFID) technologies</p> <p>Measure: % of enterprises</p>	2011	Eurostat Code: [isoc_ci_cd_en2]
National policy and stakeholder initiatives			
ICT Practitioner Skills	<p>Definition: Level of national policy and stakeholder activity on ICT Practitioner Skills</p> <p>Measure: 1 - 5 (1 = "No relevant policy or stake-holder activities of significant scope and size have been identified. Policy debate is non-existent or sketchy."; 5 = "A master strategy is in place. A large number of relevant policies and initiatives is in evidence involving all main stakeholders. In addition to the national level, policy action is also strong at sectoral and regional level. Policies take a medium- to long-term view of the actions to be pursued, and are properly evaluated.")</p>	2013	empirica research

Indicator	Definition and scope	Latest data available	Source
Digital Literacy	<p>Definition: Level of national policy and stakeholder activity on Digital Literacy</p> <p>Measure: 1 - 5 (1 = "No relevant policy or stake-holder activities of significant scope and size have been identified. Policy debate is non-existent or sketchy"; 5 = "A master strategy is in place. A large number of relevant policies and initiatives are in evidence involving all main stakeholders, and these are well integrated at national, regional and local level. Progress in outcomes is evaluated and results are positive. Strong emphasis on long-term sustainability and mainstreaming of digital literacy education.")</p>	2013	empirica research
e-Leadership skills for SMEs	<p>Definition: Level of national policy and stakeholder activity on e-Leadership skills for SMEs</p> <p>Measure: 1 - 5 (1 = "No relevant policy or stakeholder activities of significant scope and size have been identified. Policy debate is non-existent or sketchy"; 5 = "A master strategy is in place and there are not only various relevant policies and stakeholder initiatives, but these are also well integrated at national and sectoral level. Buy-in from all relevant stakeholders has been obtained".</p>	2014	empirica research
Skills for digital entrepreneurship	<p>Definition: Level of national policy and stakeholder activity on Skills for digital entrepreneurship</p> <p>Measure: 1 - 5 (1 = "No relevant policy or stakeholder activities of significant scope and size have been identified. Policy debate is non-existent or sketchy"; 5 = "A master strategy is in place and there are not only various relevant policies and stakeholder initiatives, but these are also well integrated at national and sectoral level. Buy-in from all relevant stakeholders has been obtained".</p>	2014	empirica research
Enabling infrastructure			

Indicator	Definition and scope	Latest data available	Source
Quality of management schools	<p>Definition: In your country, how would you assess the quality of business schools</p> <p>Measure: [1 = extremely poor—among the worst in the world; 7 = excellent—among the 2012–13 weighted average</p>	2013	World Economic Forum, Executive Opinion Survey
GMAT Total Number	<p>Definition: The total number of tests taken recorded in the Graduate Management Admission Council database</p> <p>Measure:</p>	2013	Graduate Management Admission Council (GMAC)
GMAT Mean Total Score	<p>Definition: http://www.mba.com/global/the-gmat-exam/gmat-exam-scoring/your-score-report/what-percentile-rankings-mean.aspx</p> <p>Measure: 0 - 800 (0 = lowest number of points; 800 = highest possible number of points)</p>	2013	Graduate Management Admission Council (GMAC)
Start-up Skills	<p>Definition: SKILL x EDUCPOSTSEC: The percentage of the 18-64 aged population claiming to possess the required knowledge/skills to start business x Gross enrolment ratio in tertiary education</p> <p>Measure: 0 - 1</p>	2013	Global Entrepreneurship Development Index

11.2 SME Interviews

11.2.1 Proposed e-mail of introduction

The following proposed cover letter provides candidate SMEs with a very brief overview, what we would like from the SMEs and what the benefits are to SMEs. Please adapt to the circumstances of your region to make it as attractive as possible for a candidate SME to participate.

Dear [contact at an SME],

My name is [name], and I am [title and URL of department]. I am collaborating with a network of European universities under a service contract for the European Commission “e-Leadership Skills for Small and Medium Sized Enterprises.” The overall objective of the project is to help SMEs access and foster leaders who are both business and ICT-savvy (“e-leaders”) to ensure they can use ICT to develop, compete and grow. More information can be found at: <http://eskills-lead.eu/home/>

We would immensely appreciate interviewing you (and/or someone you recommend) to learn about past and future role(s) of e-leaders in your organization. Your participation will help a variety of stakeholder groups – such as other SMEs, educational institutions, and policy makers – learn about what kinds of leaders successful SMEs such as yours have relied on and expect to need to use ICT to grow and develop competitive advantages. Your participation will also be an opportunity to promote your organization as a success to business leaders, policy makers and the media. We would like to develop a profile of your SMEs and include it in our publications as an example of e-leadership within a successful SME.

We are seeking to interview one or two people with whom we could discuss the following topics (with example questions).

- Overall, how is ICT used strategically in your organization (e.g., for operations; for services and products; etc.) and who is responsible for those uses?
- The role of ICT and e-Leaders in a recent significant innovation
 - What was the process by which a significant innovation from the past year was developed?
 - What role(s) did ICT have in the process?
 - Who were the key leaders involved in the innovation process and what did they do during the process?
- Future demand for e-Leaders
 - Over the next 2 years, what kinds of leaders does your organization anticipate needing, with regards to using ICT to enhance its competitiveness?
- Engagements with educational institutions
 - Has the firm engaged with any education institutions to access or develop e-leaders?

Overall, to ensure we collect sufficient data to develop a 2-3 page profile of your organization, we estimate your participation would entail a total of about 3 hours. Once we collect the data and develop a profile, we will ask you to review the profile to ensure it is accurate and that it does not contain any confidential information. Only once we have received your approval will the profile be made public.

Could we please have a first interview, about 60 minutes, at your convenience, sometime during the next couple of weeks?

I am also happy to address any questions that you may have.

I look forward to talking with you and learning from your organization's success.

Best regards,

[Signature]

11.2.2 Interview Protocol

Background and Overview of the successful SME (about 1 page)

Please note, *before the interview*, the interviewer may be able to gather much of the data for this section from the participating SME. In fact, it is strongly recommended collecting this data as soon as possible, as these data are important for selecting the best candidates.

- When and by whom was the SME founded?
- Where is the SME headquartered? Does it have units elsewhere? (if so, when were they established?)
- How many employees are there in the firm (by year for last 3 years)?
- What are the core products/services of the SME?
- In what sector does the SME provide those products/services?
- Who are the customers of the SME?
- Who would say you are successful and why (name the ‘well regarded third party’)?
- Has the SME’s growth in either employees or in turnover increased by 20+% per annum for three years? (please note: it is OK if the SME has not experienced such growth and the SME is well regarded by others as successful)

Demand for e-skilled professionals (1-2 pages)

Overall uses of ICT

- Overall, how is ICT used strategically in your organization and who is responsible for those uses? Please consider processes related to the following strategic objectives
 - Production/Operational excellence (e.g., using ICT to increase efficiency and reliability, low cost, of operational and administrative processes)
 - Customer intimacy (e.g., using ICT to increase flexibility and responsiveness, customer service, marketplace management)
 - Product leadership/innovation (e.g., using ICT to create new products/services, enter new markets)
- Is there an equivalent to a Chief Information Officer – i.e., someone who is responsible for orchestrating application development, operation and maintenance? Does your organization have an informal or formal ICT or Digitization strategy? If so, what is it and how was it developed?
- How is total spending (capital plus operations excluding depreciation) on ICT distributed across these 3 areas (in terms of percentages)?

Overall investments in ICT

- Overall, during the past year, what percentage of the ICT budget was spent on any of the following ICT and uses of ICT? For each ICT that you relied on, please briefly explain for what purposes your organization relied on it.
 - Mobility and Mobile Apps Development
 - Cloud Computing
 - Data Analytics (e.g., “Big Data”)
 - Social Media Technologies
 - The Internet of Things (IoT) (incl. Wearable Computing)

Roles and responsibilities

- Overall demand
 - How many FTEs or organizations does your organization rely on for developing ICT applications? How many are long-term hires? Contracted for a specific period of time? External service providers?
 - How many FTEs or organizations does your organization rely on for operating and maintaining ICT applications and infrastructure? How many are long-term hires? Contracted for a specific period of time? External service providers?
 - How many FTEs or organizations does your organization rely on for using data to enhance operations, increase sales and/or improve the customer experience? How many are long-term hires? Contracted for a specific period of time? External service providers?
- Which skills were the most difficult to find? Why? Please consider the following technologies.
 - Mobility and Mobile Apps Development
 - Cloud Computing
 - Data Analytics (e.g., “Big Data”)
 - Social Media Technologies
 - The Internet of Things (IoT) (incl. Wearable Computing)

Overview of a significant innovation from the past year (1-2 pages)

- What was the most significant innovation that was realized during the last year? (please note, it could have started several years ago, however it needs to have been completed during the last year) How did it add value to the SME? (e.g., enhance competitively customer service; significantly reduce operational costs)
- What was the process by which the innovation was developed?
- What role(s) did ICT have in the process? Did the innovation rely on any of the following ICT? If so, please explain, including the selection process.
 - Mobility and Mobile Apps Development
 - Cloud Computing
 - Data Analytics (e.g., “Big Data”)
 - Social Media Technologies
 - The Internet of Things (IoT) (incl. Wearable Computing)
- Who were the key leaders involved in the innovation process responsible for managing uses of ICT? What did they do during the process?
- How did your firm obtain advanced ICT skills for using any of the aforementioned technologies? Was it difficult to find any advanced ICT skills? (if so, please explain)
- Did you rely on partners, consulting services or other external service providers to access the ICT skills needed for the innovation? (if so, please explain)

Future demand for e-Leaders

- Over the next 2 years, what kinds of leaders does your organization anticipate needing, with regards to using ICT to enhance its competitiveness?

Engagements with educational institutions

- Over the next 2 years, what kinds of training or education programs would you wish for you and your staff?
- Has the firm engaged with any education institutions to address skills gaps?
 - Do you use Executive Education?
 - Do you use Higher Education (academic)?
 - Do you use Professional Courses?
- In the future, would you invest in training to develop e-leaders? (please explain)

11.3 SME survey

11.3.1 Survey Instrument

The following represents the text of the survey that was conducted online. Online, the survey has a different, much more user-friendly, format.

Survey of Small and Medium-sized Enterprises (SMEs)

Thank you in advance for taking the time to participate in this survey. We have designed the survey to help SMEs such as yours learn from each other about what distinguishes high-performing SMEs from others in terms of their management of ICT. The findings of this survey are expected to help SMEs access and foster e-leaders – i.e., leaders who can guide teams to use ICT to improve operations, innovate products and services, and ultimately, be more competitive.

How long will the survey take?

The survey is designed to take no longer than 15 minutes to complete.

Who should take the survey?

The survey should be taken by the person most familiar with the uses of ICT within your organization.

Your organization should have been founded in or before 2010 (i.e., it should be 4 years or older).

What is the value in participating in the survey?

Participants who complete the survey and provide us with their e-mail will receive a report of the findings and will qualify for a raffle in which 3 winners will each receive a Samsung Galaxy Tab 3 Tablet.

To learn more about the project on e-Leadership skills for SMEs

It is part of the service contract "e-Leadership Skills for Small and Medium Sized Enterprises" launched by the European Commission DG Enterprise to help SMEs access and foster leaders who are both business and ICT-savvy ("e-leaders") to ensure they can use ICT to grow and compete.

More on the project can be found at <http://www.eskills-lead.eu/>.

Your participation in this survey is voluntary, and you may opt not to answer any question(s).

Your identity will be kept strictly confidential. The information you provide will be handled only by INSEAD and empirica and not shared with any other project collaborators. An anonymous version of the data will then be used by the broader research team for aggregate statistics. It will not be used to identify you. If you have any questions, please feel free to contact Nils Fonstad.

Once again, thank you for participating and we look forward to sharing the aggregate results with

you.

Dr. Nils Olaya Fonstad
Associate Director
INSEAD Faculty & Research

Werner Korte
Director
empirica



in cooperation with



INSEAD



IE Business School



Henley Business School



AARHUS UNIVERSITY



New Bulgarian University



Antwerp Management School



European Foundation for Management Development



IDC Europe



PIN_SME



CIONET

Section 1 (out of 4): About your enterprise

Your contact information:

Name:

Title:

Email Address:

How long have you been with the enterprise (number of years)?

In what country is your enterprise based? [drop-down list of countries]

What is the primary industry sector of your enterprise?

- ICT Services
- Government
- Healthcare
- Financials
- Utilities and Energy
- Industrials & Manufacturing
- Consumer Goods & Retail
- Services
- Education
- Non profit
- Other

In one sentence, please describe what your enterprise does (e.g., what products and/or services does it provide to what types of customers?). If you prefer, please write in your native language.

Enterprise revenue

On average, over the past 2 years, by what percentage did your enterprise's total revenue change?

On average, over the past 2 years, by what percentage did your enterprise's total revenue come from outside the country from which your enterprise is headquartered?

Please indicate what industry sector is the greatest source of revenue for your enterprise.

- ICT Services
- Government
- Healthcare

- Financials
- Utilities and Energy
- Industrials & Manufacturing
- Consumer Goods & Retail
- Services
- Education
- Non profit
- Other

In what year was the enterprise founded? [drop-down list of dates]

How many people founded the enterprise?

How many of the founders had experience founding and/or managing a start-up, SME or company before founding the enterprise?

Please consider total number of employees (full-time equivalents, or FTEs) that your enterprise relied on over the past year.

	2 years ago (2012)	Today (2014)
Please approximate the size of the total enterprise by number of FTEs (please include yourself).		
Please approximate the percentage of FTEs who are sub-contracted		
Please approximate the number of people who are responsible for operating and maintaining ICT applications and infrastructure in your organization?		

Does your enterprise have a formal internal IT Group?

- Yes
- No

Please indicate how many people belong to the IT Group.

Does your enterprise have someone who is formally responsible (even part-time) for effectively managing IT (e.g., in some firms, this would be the Chief Information Officer)?

- Yes
- No

Section 2 (out of 4): About ICT in your enterprise

Enterprise investments in ICT

	2 years ago (2012)	Today (2014)
Approximate annual IT Budget, as % of total revenue		
Approximate percentage of the IT Budget that was spent on developing new applications (rather than on operating and maintaining existing applications).		
Approximate percentage of the IT Budget that was spent on external service providers.		
Approximate number of external service providers that were contracted to provide IT services (e.g., application development, operations and maintenance).		

Please estimate what percentage of the total IT budget was spent on projects that involved the following types of ICT.

If you are not familiar with a specific technology, please leave blank
If your enterprise did not invest in a specific technology, please enter “0” (zero)

	2 years ago (2012)	Today (2014)
Cloud-based services		
Mobile devices and apps		
Business analytics		
“Big Data”		
Internet of Things		
Social media technologies		

Please note that the columns do not need to add to 100%

The next two questions are very similar to the previous ones and are shown only if ICT services has been selected as primary sector. Changes are IT Budget → enterprise budget and one option in the first question has been removed

Enterprise investments in ICT

	2 years ago (2012)	Today (2014)
Approximate percentage of the enterprise budget that was spent on developing new applications (rather than on operating and maintaining existing applications).		
Approximate percentage of the enterprise budget that was spent on external service providers.		
Approximate number of external service providers that were contracted to provide IT services (e.g., application development, operations and maintenance).		

Please estimate what percentage of the total enterprise budget was spent on projects that involved the following types of ICT.
 If you are not familiar with a specific technology, please leave blank
 If your enterprise did not invest in a specific technology, please enter “0” (zero)

	2 years ago (2012)	Today (2014)
Cloud-based services		
Mobile devices and apps		
Business analytics		
“Big Data”		
Internet of Things		
Social media technologies		

Please note that the columns do not need to add to 100%

Section 3 (out of 4): Engaging with higher and executive education institutions like universities and business schools

Over the past year, please approximate how many days per employees were spent on trainings?

Over the past year, please approximate how many days per employees were spent on trainings from institutions of higher education, such as universities and technical schools, for training?

Over the next 2 years, what training would your organization be willing to invest in?

- User experiences, usability, user driven design
- Application development/Software construction – deep technical insight
- IT-Management - including IT Project and Programme Management
- Entrepreneurship, Innovation
- Business Process Management
- Business Development, Sales and Marketing
- Courses teaching a combination of ICT, business and strategic management skills (e-Leadership)
- Orchestrating synergies across applications and business units
- Information Management and Security
- IT services Management and Delivery
- Global Sourcing Management
- Others (please specify):

Please rank the top 3 factors constraining your enterprise from investing in training offered by a local university, business school or training institution.

- Employees unable to take time away from work.
- Employees unable to take time away from family.
- Too expensive for employees to cover on their own.
- Too expensive for company to cover.
- Company unwilling to cover expenses.
- No course available with sufficient appropriate content.
- Employees don't need more courses right now.
- Employees are not constrained.
- Format of trainings does not match schedule of the employees.

In the previous question you have selected "employees unable to take time away from work". What would be the minimum amount of time you would be able to take to participate in a course?

- A few hours a month

- A few hours a week
- 1 day a week
- 1 day a month
- A few days per year

In the previous question you have selected "employees unable to take time away from family". What would be the minimum amount of time you would be able to take to participate in a course?

- A few hours a month
- A few hours a week
- 1 day a week
- 1 day a month
- A few days per year

Section 4 (final): ICT Innovation Capabilities

To what extent do you agree to the following statements about your organization?

It is important to our competitiveness to coordinate activities across business teams/units within our enterprise with regards to:

	1 (strongly disagree)	2	3	4	5 (strongly agree)
a. IT applications and infrastructure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Business processes (administrative and operational)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Data (e.g., product, customer, partner)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

To what extent do you agree to the following statements about your organization?

It is important to our competitiveness to coordinate activities with external partners with regards to:

Please choose the appropriate response for each item:

	1 (strongly disagree)	2	3	4	5 (strongly agree)
a. IT applications and infrastructure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Business processes (administrative and operational)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Data (e.g., product, customer, partner)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

To what extent do you agree to the following statements about your organization?

	1 (strongly disagree)	2	3	4	5 (strongly agree)
a. We are effective at developing new applications (e.g., application development projects are on-time, within budget and within scope)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. We have reached an	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	1 (strongly disagree)	2	3	4	5 (strongly agree)
efficient level of technology standardization and infrastructure sharing <u>across business units within our enterprise</u>					
c. We have reached an efficient level of technology standardization and infrastructure sharing <u>with external partners</u>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. We have effectively standardized administrative processes (e.g., HR, finance, purchasing) and operational processes (e.g., supply chain, manufacturing, operations, sales, customer service) <u>across business units within our enterprise</u>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. We have effectively standardized administrative processes (e.g., HR, finance, purchasing) and operational processes (e.g., supply chain, manufacturing, operations, sales, customer service) <u>with external partners</u> (e.g., external service providers, business partners)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. We are effective at sharing standardized data (e.g., product, customer, partner) <u>internally</u> – i.e., among individuals within different parts of the organization	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. We are effective at sharing standardized data (e.g., product, customer, partner) <u>externally</u> – i.e., with key partners (e.g. suppliers, customers, other partners)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h. Business Units Managers and Senior executives are sufficiently involved in IT	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	1 (strongly disagree)	2	3	4	5 (strongly agree)
investment and management decisions					
i. We have sufficient internal staff members who have the skills to exploit new ICT trends.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
j. We have sufficient internal staff members who have the skills to innovate strategic business and operating models and envision and drive change for (better) business performance.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
k. We have sufficient internal staff members who are effective in identifying and successfully deploying innovative IT applications and services to improve competitiveness.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
l. We have sufficient internal staff members who are capable of leading interdisciplinary staff and influencing stakeholders across boundaries (functional, geographical)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
m. At least one of the individuals who drove company growth and development has both formal ICT training and formal training in management and entrepreneurship.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please rank the top 3 factors constraining your enterprise from using ICT

- Insufficient access to skills
- Lack of time
- Lack of understanding of how to use IT strategically
- Insufficient budget to invest in digital technologies
- Lack of understanding of how to work with external service providers
- It is not clear who is responsible and accountable for key ICT decisions
- Lack of prioritization

(Optional) Please explain how you plan to overcome the most important constraint.

Please complete the following for the products and services sold by your organization over the last 2 years.

On average, approximate how long products and/or services last before they are removed or changed significantly (in months)

Last year, approximate what percentage of customers changed (e.g., lost or replaced) relative the previous year (%)

Last year, what percentage of sales came from products or services launched in the last 2 years?

THANK YOU for completing the survey!

If you have any questions, comments, or recommendations, please leave them, below, or contact

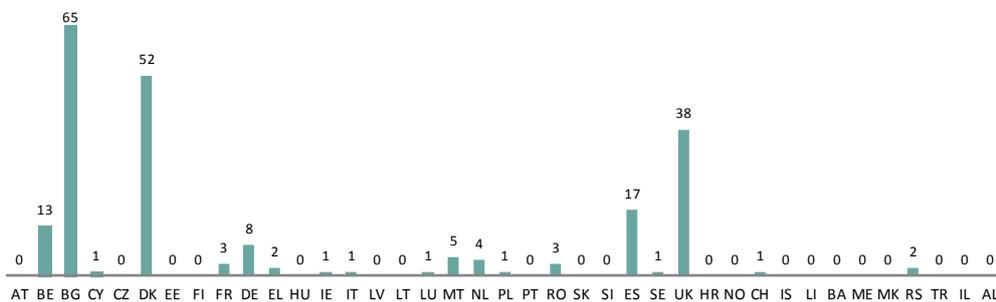
Nils Fonstad (nils.fonstad@insead.edu).

Once again, Thank You and Best Regards,
Nils

11.4 SME survey results

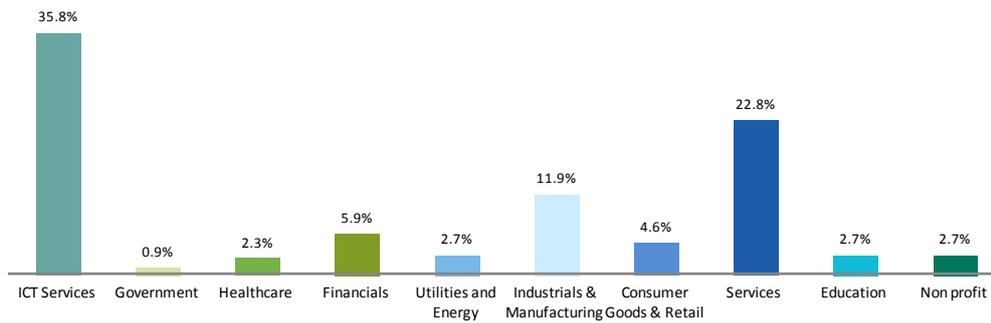
Please note that the following tables are raw data based and therefore to be understood as preliminary.

Country



N = 219

Primary industry sector



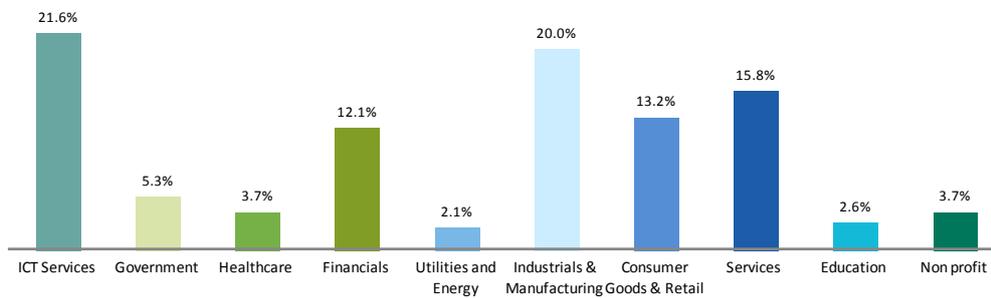
N = 193

Enterprise revenue

On average, over the past 2 years, by what percentage did your enterprise's total revenue change?	Average	27
	Median	10
	Highest value	500
	Lowest value	-100
On average, over the past 2 years, by what percentage did your enterprise's total revenue come from outside the country from which your enterprise is headquartered?	Average	29
	Median	10
	Highest value	100
	Lowest value	-25

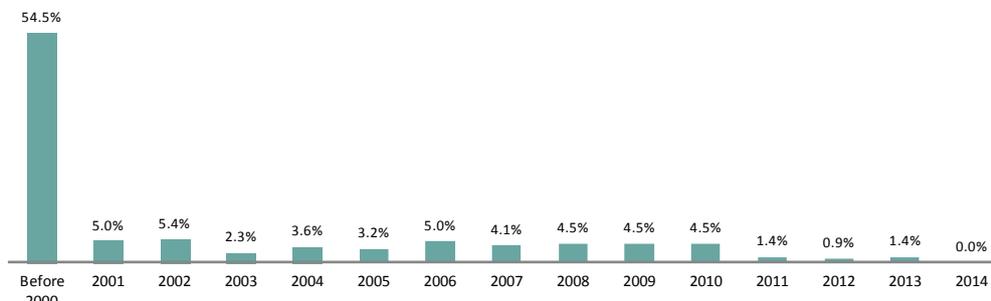
N = 191

Industry sector with greatest source of revenue



N = 190

Foundation year



N = 204

Number of founders

Average	7
Median	2
Highest value	300
Lowest value	0

N = 207

Number of founders with experience in founding and/or managing a start-up, SME or company before founding the enterprise

Average	2
Median	1
Highest value	120
Lowest value	0

N = 201

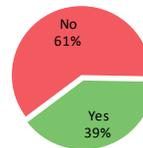
Number of founders with experience in founding and/or managing a start-up, SME or company before founding the enterprise

		2012	2014
Size of the total enterprise by number of FTEs	Average	41	50
	Median	15	18
	Highest value	250	550
	Lowest value	0	0
Percentage of FTEs who are sub-contracted	Average	9	11
	Median	0	1
	Highest value	100	100
	Lowest value	0	0
Number of people responsible for operating and maintaining ICT applications and infrastructure	Average	11	11
	Median	2	2
	Highest value	100	100
	Lowest value	0	0

N = 195

Formal internal IT Group

Yes	88
No	135



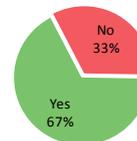
N = 223

Average	15
Median	3
Highest value	500
Lowest value	1

N = 86

Does your enterprise have someone who is formally responsible (even part-time) for effectively managing IT (e.g., in some firms, this would be the Chief Information Officer)?

Yes	149
No	73



N = 222

Formal internal IT Group and formal responsibility

Formal responsibility	No	8	65
	Yes	79	70
		Yes	No
		Formal IT Group	
		N = 223	

Enterprise investments in ICT

		Primary sector is not ICT Services		Primary sector is ICT Services	
		2012	2014	2012	2014
Approximate annual IT Budget, as % of total revenue	Average	8	8		
	Median	3	5		
	Highest value	80	95		
	Lowest value	0	0		
Approximate percentage of the IT/enterprise Budget that was spent on developing new applications (rather than on operating and maintaining existing applications).	Average	15	18	20	21
	Median	1	5	10	10
	Highest value	100	100	91	90
	Lowest value	0	0	0	0
Approximate percentage of the IT/enterprise Budget that was spent on external service providers.	Average	42	60	12	13
	Median	30	40	5	5
	Highest value	100	1001	100	100
	Lowest value	0	0	0	0
Approximate number of external service providers that were contracted to provide IT services (e.g., application development, operations and maintenance).	Average	3	6	2	3
	Median	2	2	1	2
	Highest value	80	315	15	15
	Lowest value	0	0	0	0

N = 127

N = 56

Please estimate what percentage of the total IT budget was spent on projects that involved the following types of ICT.

		Primary sector is not ICT Services		Primary sector is ICT Services	
		2012	2014	2012	2014
Cloud-based services	Average	3	11	7	15
	Median	0	0	0	5
	Highest value	80	100	100	100
	Lowest value	0	0	0	0
Mobile devices and apps	Average	8	9	5	7
	Median	0	1	0	3
	Highest value	80	100	80	70
	Lowest value	0	0	0	0
Business analytics	Average	8	8	5	6
	Median	0	0	0	2
	Highest value	100	100	40	40
	Lowest value	0	0	0	0
"Big Data"	Average	6	6	2	4
	Median	0	0	0	0
	Highest value	100	100	40	30
	Lowest value	0	0	0	0
Internet of Things	Average	9	9	5	8
	Median	0	0	0	0
	Highest value	100	90	90	90
	Lowest value	0	0	0	0
Social media technologies	Average	4	7	3	6
	Median	0	0	0	1
	Highest value	60	85	100	80
	Lowest value	0	0	0	0

N = 114

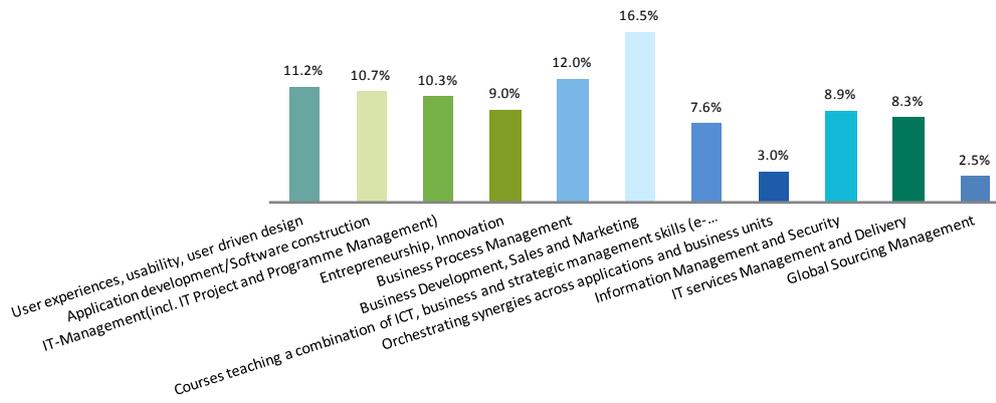
N = 51

Training

Approximate days per employees spent on trainings	Average	7
	Median	5
	Highest value	50
	Lowest value	0
Approximate days per employees spent on trainings from institutions of higher education, such as universities and technical schools	Average	5
	Median	0
	Highest value	120
	Lowest value	0

N = 209

Over the next 2 years, what training would your organization be willing to invest in?



N = 626 (multiple choice)

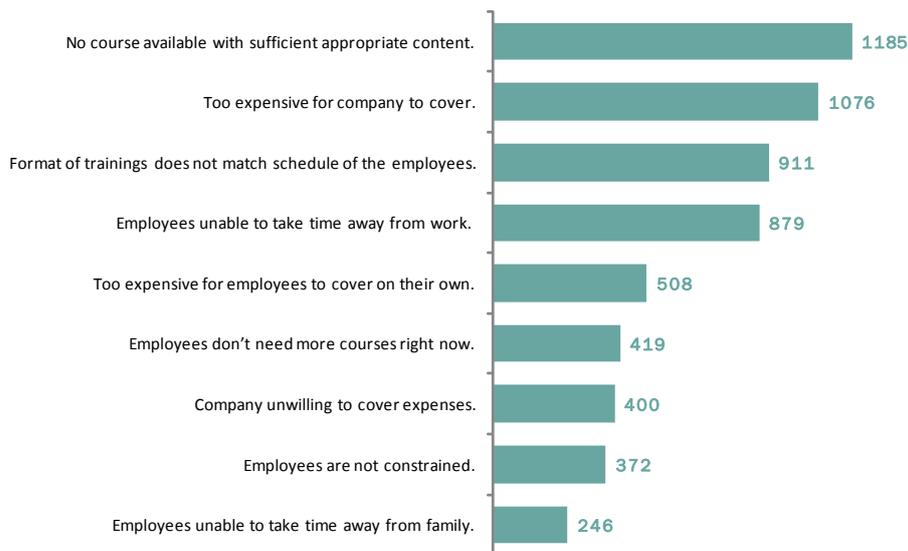
Please rank the top 3 factors constraining your enterprise from investing in training offered by a local university, business school or training institution.

Ranking calculation

Each ranking position is awarded points based on the number of explored statements, in this case 9 statements (9 points for rank 1, 8 points for rank 2, 1 point for rank 9). These points are multiplied by the number of participants who have rated a statement with 'rank 1'.

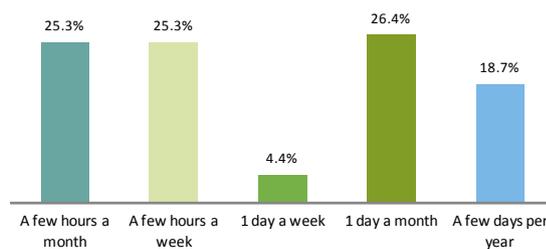
The sum of all points for a given statement can be compared with the other statements and ordered to represent the aggregated rank positions for each statement.

Example: Rank 1 is awarded the most points - 9. Each statement is analysed, e.g. statement A1 "Employees unable to take time away from work." was ranked No. 1 by 11 participants (11 x 9 points), No.2 by 8 participants (8 x 9 points), ..., and least important, rank No. 9 by 0 participants (0 x 1 point).



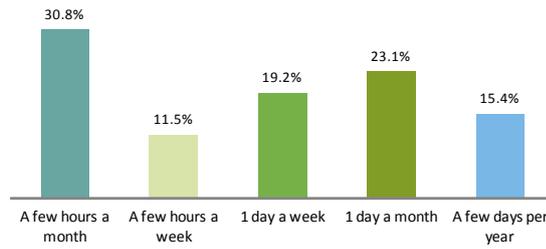
N = 208

In the previous question you have selected "employees unable to take time away from work". What would be the minimum amount of time you would be able to take to participate in a course?



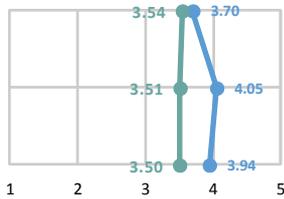
N = 91

In the previous question you have selected "employees unable to take time away from family". What would be the minimum amount of time you would be able to take to participate in a course?



N = 26

It is important to our competitiveness to coordinate activities **across business teams/units within our enterprise** / **with external partners** with regards to: a. IT applications and infrastructure

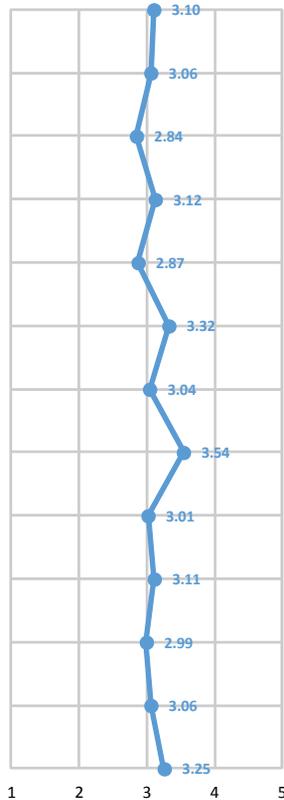


a. IT applications and infrastructure

1 = Strongly disagree
5 = Strongly agree

b. Business processes (administrative and operational)

c. Data (e.g., product, customer, partner)



a. We are effective at developing new applications (e.g., application development projects are on-time, within budget...

b. We have reached an efficient level of technology standardization and infrastructure sharing across business...

c. We have reached an efficient level of technology standardization and infrastructure sharing with external ...

d. We have effectively standardized administrative processes (e.g., HR, finance, purchasing) and operational processes (e.g., ...

e. We have effectively standardized administrative processes (e.g., HR, finance, purchasing) and operational processes (e.g., ...

f. We are effective at sharing standardized data (e.g., product, customer, partner) internally – i.e., among individuals within...

g. We are effective at sharing standardized data (e.g., product, customer, partner) externally – i.e., with key partners (e.g. ...

h. Business Units Managers and Senior executives are sufficiently involved in IT investment and management ...

i. We have sufficient internal staff members who have the skills to exploit new ICT trends.

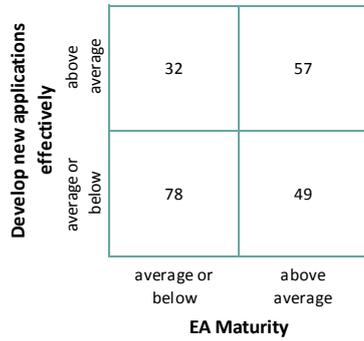
j. We have sufficient internal staff members who have the skills to innovate strategic business and operating models and...

k. We have sufficient internal staff members who are effective in identifying and successfully deploying innovative IT...

l. We have sufficient internal staff members who are capable of leading inter-disciplinary staff and influencing stakeholders...

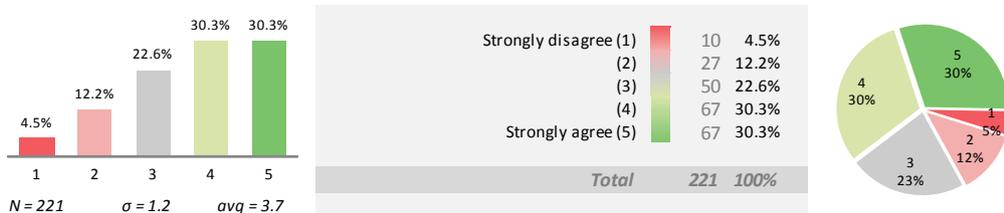
m. At least one of the individuals who drove company growth and development has both formal ICT training and formal...

EA Maturity



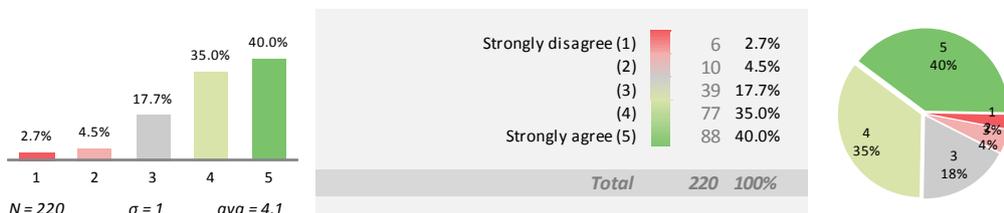
N = 216

It is important to our competitiveness to coordinate activities across business teams/units within our enterprise with regards to: a. IT applications and infrastructure



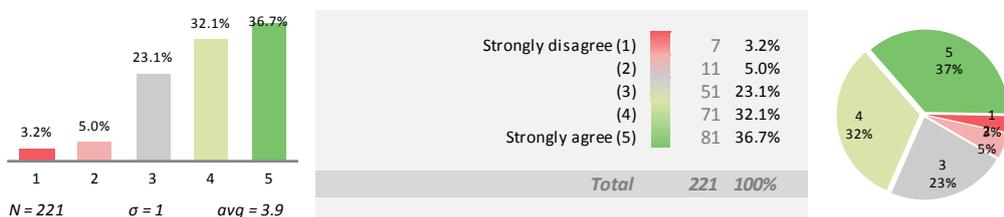
It is important to our competitiveness to coordinate activities across business teams/units within our enterprise with regards to:

b. Business processes (administrative and operational)



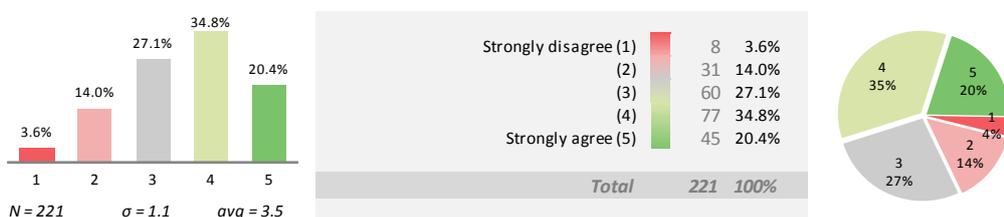
It is important to our competitiveness to coordinate activities across business teams/units within our enterprise with regards to:

c. Data (e.g., product, customer, partner)

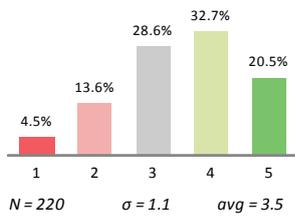


It is important to our competitiveness to coordiante activities with external partners with regards to:

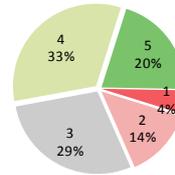
a. IT applications and infrastructure



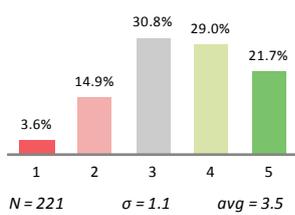
It is important to our competitiveness to coordinate activities with external partners with regards to:
 b. Business processes (administrative and operational)



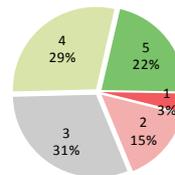
Strongly disagree (1)	10	4.5%
(2)	30	13.6%
(3)	63	28.6%
(4)	72	32.7%
Strongly agree (5)	45	20.5%
Total	220	100%



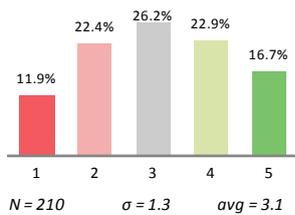
It is important to our competitiveness to coordinate activities with external partners with regards to:
 c. Data (e.g., product, customer, partner)



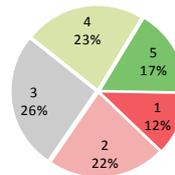
Strongly disagree (1)	8	3.6%
(2)	33	14.9%
(3)	68	30.8%
(4)	64	29.0%
Strongly agree (5)	48	21.7%
Total	221	100%



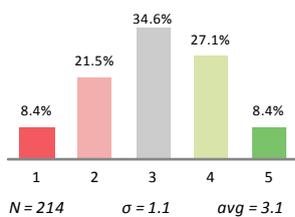
a. We are effective at developing new applications (e.g., application development projects are on-time, within budget and within scope)



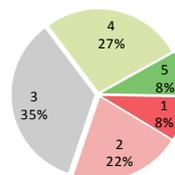
Strongly disagree (1)	25	11.9%
(2)	47	22.4%
(3)	55	26.2%
(4)	48	22.9%
Strongly agree (5)	35	16.7%
Total	210	100%



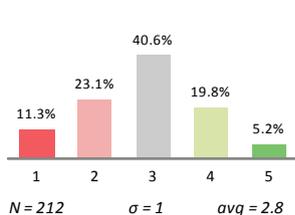
b. We have reached an efficient level of technology standardization and infrastructure sharing across business units within our enterprise



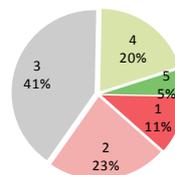
Strongly disagree (1)	18	8.4%
(2)	46	21.5%
(3)	74	34.6%
(4)	58	27.1%
Strongly agree (5)	18	8.4%
Total	214	100%



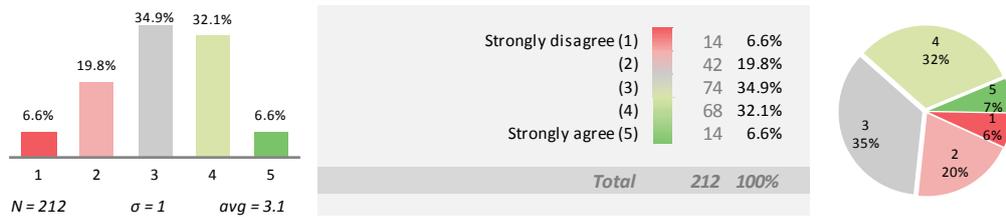
c. We have reached an efficient level of technology standardization and infrastructure sharing with external partners



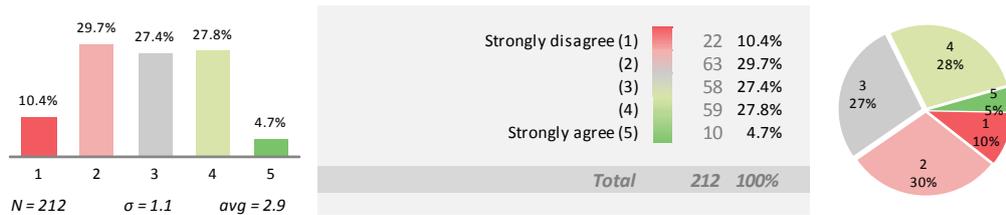
Strongly disagree (1)	24	11.3%
(2)	49	23.1%
(3)	86	40.6%
(4)	42	19.8%
Strongly agree (5)	11	5.2%
Total	212	100%



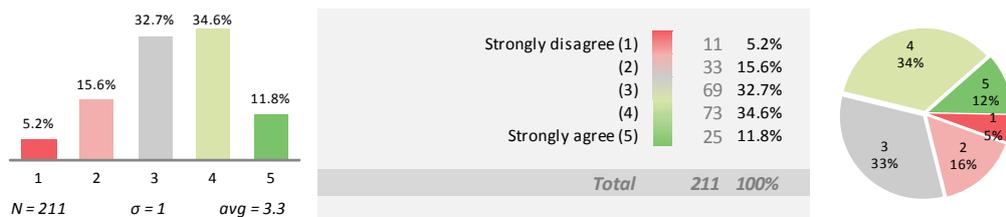
d. We have effectively standardized administrative processes (e.g., HR, finance, purchasing) and operational processes (e.g., supply chain, manufacturing, operations, sales, customer service) across business units within our enterprise



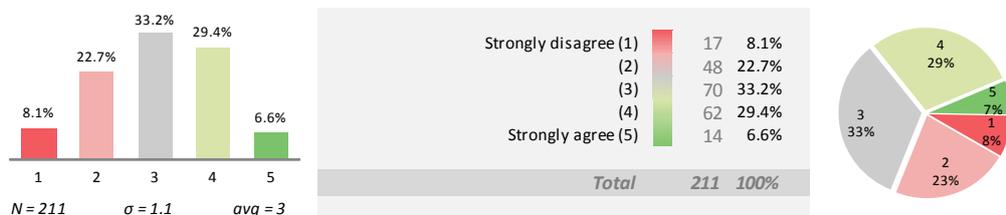
e. We have effectively standardized administrative processes (e.g., HR, finance, purchasing) and operational processes (e.g., supply chain, manufacturing, operations, sales, customer service) with external partners (e.g., external service providers, business partners)



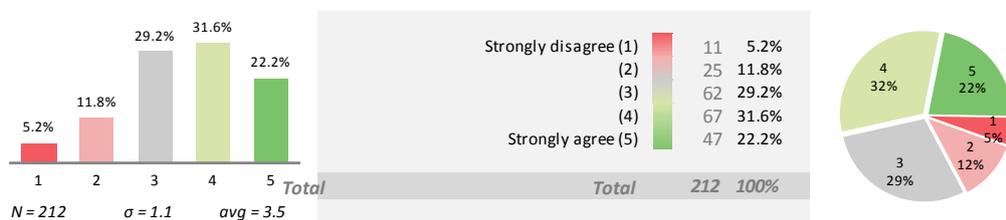
f. We are effective at sharing standardized data (e.g., product, customer, partner) internally – i.e., among individuals within different parts of the organization



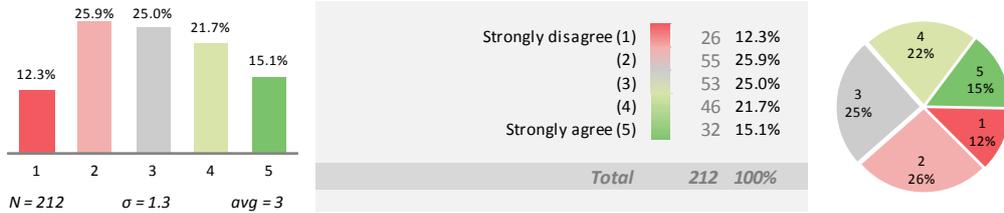
g. We are effective at sharing standardized data (e.g., product, customer, partner) externally – i.e., with key partners (e.g. suppliers, customers, other partners)



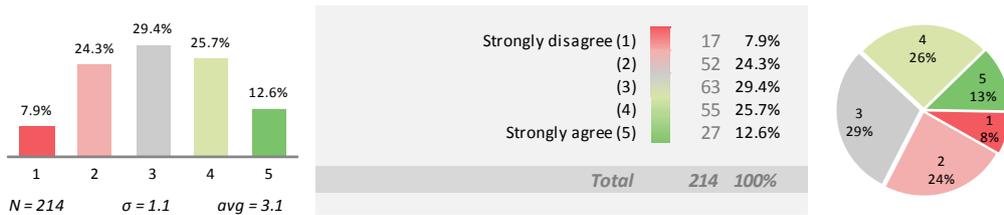
h. Business Units Managers and Senior executives are sufficiently involved in IT investment and management decisions



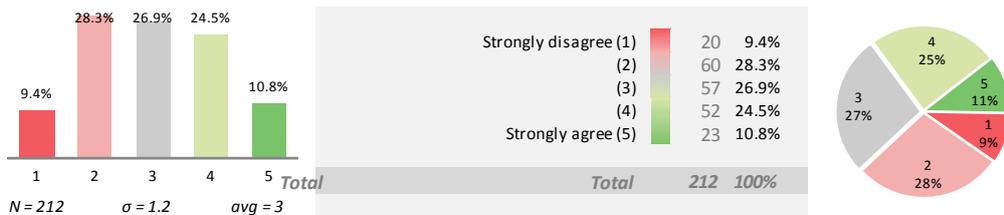
i. We have sufficient internal staff members who have the skills to exploit new ICT trends.



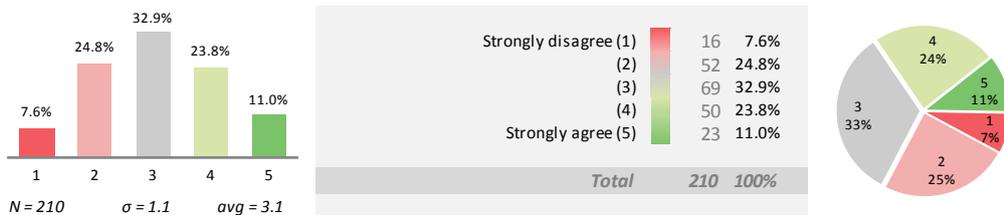
j. We have sufficient internal staff members who have the skills to innovate strategic business and operating models and envision and drive change for (better) business performance.



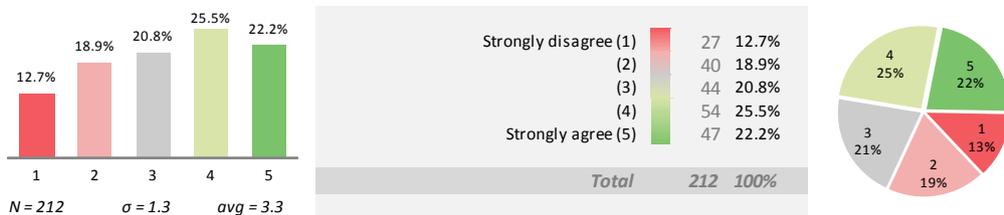
k. We have sufficient internal staff members who are effective in identifying and successfully deploying innovative IT applications and services to improve competitiveness.



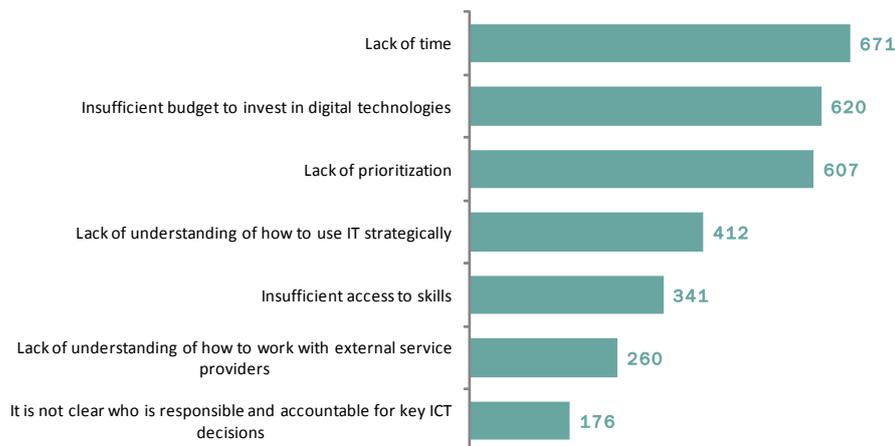
l. We have sufficient internal staff members who are capable of leading inter-disciplinary staff and influencing stakeholders across boundaries (functional, geographical)



m. At least one of the individuals who drove company growth and development has both formal ICT training and formal training in management and entrepreneurship.



Please rank the top 3 factors constraining your enterprise from using ICT



N = 183

Please complete the following for the products and services sold by your organization over the last 2 years.

Length of time products and/or services last before they are removed or changed significantly (in months)	Average	30
	Median	24
	Highest value	240
	Lowest value	0
Percentage of customers who have been changed (e.g., lost or replaced) relative to the previous year	Average	20
	Median	10
	Highest value	100
	Lowest value	0
Percentage of sales from last year that came from products or services launched in the last 2 years	Average	40
	Median	30
	Highest value	100
	Lowest value	0

N = 178

11.5 e-Leadership role requirement ranking of e-CF component skills

ICT skills include the capabilities required for researching, developing and designing, managing, the producing, consulting, marketing and selling, the integrating, installing and administrating, the maintaining, supporting and servicing of ICT systems.³² ICT skills have been elaborated in much detail by the European e-Competence Framework for ICT professionals. The European e-Competence Framework is structured around four dimensions reflecting different levels of business and human resource planning requirements in addition to job/ work proficiency guidelines:

- Dimension 1: Five e-Competence areas, derived from the ICT business processes: PLAN, BUILD, RUN, ENABLE and MANAGE
- Dimension 2: A set of reference e-Competences for each area, with a generic description for each competence. 40 competences identified in total provide the European generic reference definitions of the e-CF 3.0.
- Dimension 3: Proficiency levels of each e-Competence provide European reference level specifications on e-Competence levels e-1 to e-5, which are related to the EQF levels 3 to 8.

³² European e-Skills Forum definition on 'ICT practitioner skills'

- Dimension 4: Samples of knowledge and skills relate to e-Competences in dimension 2. They are provided to add value and context and are not intended to be exhaustive.

The following table represents a mapping of ICT profiles to the e-CF competences³³. Where numerical skills ranges were given (e.g. 3-4) the mean of this range is displayed (in that case 3.5).

³³

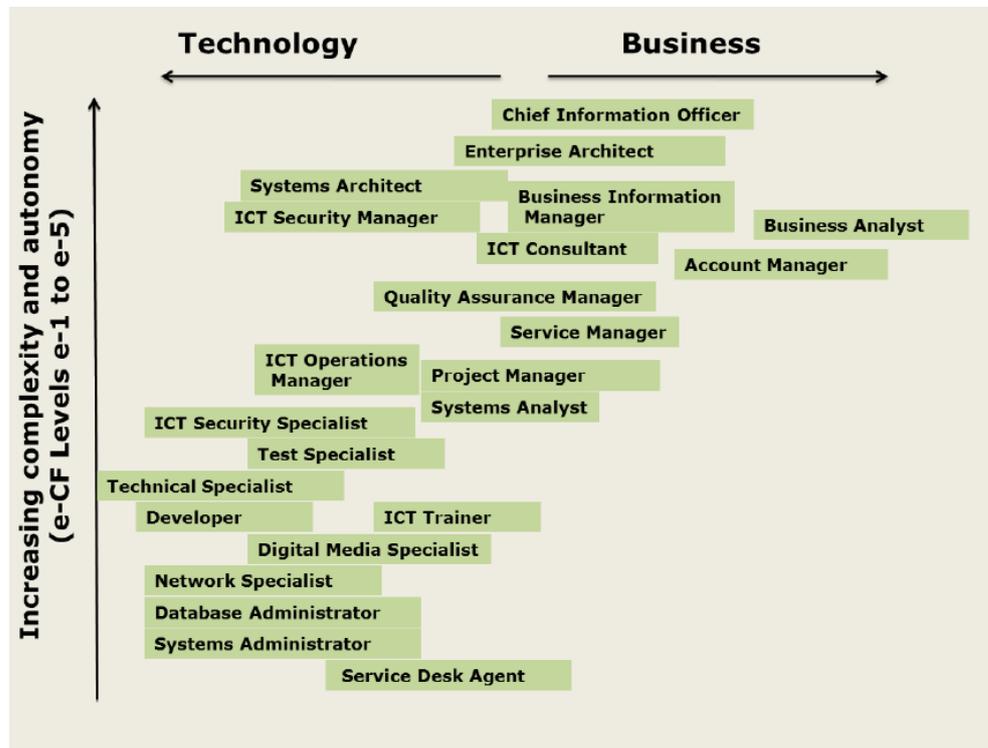
http://relaunch.ecompetences.eu/wp-content/uploads/2013/12/EU_ICT_Professional_Profiles_CWA_updated_by_e_CF_3.0.pdf

Table 11-1: e-CF e-competence – e-CF Job profile mapping and e-leadership proximity

e-Competences	ICT Profile titles	Chief Information Officer	Enterprise Architect	Systems Architect	Business Information Manager	ICT Security Manager	Account Manager	ICT Consultant	Service Manager	Project Manager	ICT Operations Manager	Business Analyst	ICT Security Specialist	Quality Assurance Manager	Test Specialist	Developer	Database Administrator	Digital Media Specialist	Network Specialist	Systems Administrator	Systems Analyst	Technical Specialist	ICT Trainer	Service Desk Agent
A.1 IS and Business Strategy alignment		5	4.5		4				4			4												
A.2 Service Level Management									4															
A.3 Business Plan Development		5	3.5		4							4												
A.4 Product/Service Planning								3		4														
A.5 Architecture Design			4	4																				
A.6 Application design																	1	2				3		
A.7 Technology Trend Monitoring			5	4.5		4		5																
A.8 Sustainable Development																								
A.9 Innovating				4																				
B.1 Application development															3.5	3	3	3	2.5					
B.2 Component integration				4											2.5	2	2.5		2.5	2				
B.3 Testing															2.5	2		2		2				
B.4 Solution Deployment															3			3	2.5					
B.5 Documentation Production																3								
B.6 Systems Engineering				4.5																	3.5			
C.1 User support																				2.5				2
C.2 Change Support													3									3		
C.3 Service delivery									3				3									2		1
C.4 Problem management									4						2.5	3	3		2.5	2.5		3		2
D.1 Information Security Strategy Development						5																		
D.2 ICT quality strategy development														4.5										
D.3 Education and Training Provision																							2.5	
D.4 Purchasing																								
D.5 Sales Proposal Development							4																	
D.6 Channel Management							4																	
D.7 Sales Management							5																	
D.8 Contract Management									4															
D.9 Personnel Development									3		4		3										3	
D.10 Information and Knowledge Management					5								3				3							
D.11 Needs Identification								4				4												
D.12 Digital Marketing																		2						
E.1 Forecast Development							3																	
E.2 Project and portfolio management		5			4					4														
E.3 Risk management						3		3		3	3			3										
E.4 Relationship Management		4					4			3														
E.5 Process improvement												4		3							3.5			
E.6 ICT quality management											3			4										
E.7 Business Change Management			4.5		4			4.5		3	4													
E.8 Information Security Management						4					3								2	2				
E.9 IS Governance		5				4					3		3.5											
Plan		10	17	12.5	8	4		8	4	4		8					1	2			3			
Build				8.5											11.5	10	5.5	8	7.5	4	3.5			
Run									7				6		2.5	3	3		2.5	5		8		5
Enable					5	5	13	4	7		4	4	6	4.5			3	2					5.5	
Manage		14	4.5		8	11	7	7.5		13	13	4	3.5	10					2	2	3.5			
Sum		24	21.5	21	21	20	20	19.5	18	17	17	16	15.5	14.5	14	13	12.5	12	12	11	10	8	5.5	5
e-leadership proximity (1-6)		6	6	5	5	5	4	4	4	3	3	4	2	4	2	1	1	1	1	1	3	1	1	1

Within this approach to defining e-leadership skills, the ICT part of e-leadership skills can be deduced from the skills needed by ICT professional roles at the border between technology and business, as have been defined in the following picture through the e-competence framework:

Figure 11-1: The 23 European ICT Profiles positioned against increasing Autonomy and Complexity (e-CF levels) and Business – Technology orientation³⁴



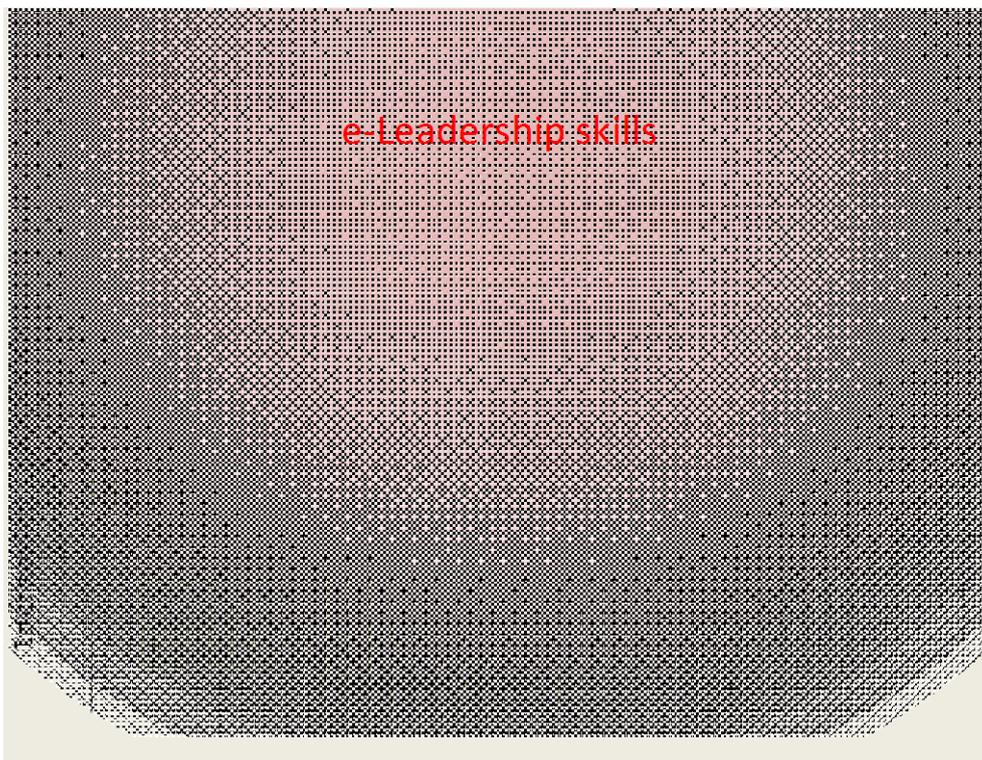
Source: CEN Workshop ICT Skills

It should be noted that this picture only covers the ICT role dimension of e-leadership skills. Similarly, occupational roles that would have traditionally been located at other business departments, such as marketing, sales, HR, purchasing, managerial accounting, operations, R&D or logistics, require e-leadership skills as well. Unfortunately no skills framework comparable to the e-CF exists for other business functions.

For ICT job profiles, however, e-leadership skills requirements can be found most likely in job descriptions as highlighted in the following picture

³⁴ p.57 in CEN Workshop ICT Skills: „CWA - European ICT Professional Profiles based on the e-CF -updated by e-CF version 3.0 competences“, http://relaunch.ecompetences.eu/wp-content/uploads/2013/12/EU_ICT_Professional_Profiles_CWA_updated_by_e_CF_3.0.pdf

Figure 11-2: e-Leadership proximity of 23 European ICT Profiles positioned against increasing Autonomy and Complexity (e-CF levels) and Business – Technology orientation³⁵



Source: The e-leadership overlay is added by the authors and not part of the CEN Workshop ICT Skills figure.

Looking closer at the skills descriptions of highly skilled profiles at the border between technology and business, we can deduct a list of e-leadership component skills. This is done in the previous table, where those roles marked in a darker colour have a closer propensity to e-leadership. We have assumed e-Leadership weights to be applied to the respective skills sets, which are depicted in the following table.

Table 11-2: e-CF Job profile e-leadership proximity weights

Job Profile	e-Leadership weight
Chief Information Officer	6
Enterprise Architect	6
Systems Architect	5
Business Information Manager	5
ICT Security Manager	5
Account Manager	4
ICT Consultant	4
Service Manager	4
Business Analyst	4
Quality Assurance Manager	4
Project Manager	3
ICT Operations Manager	3
Systems Analyst	3
ICT Security Specialist	2
Test Specialist	2
Developer	1
Database Administrator	1
Digital Media Specialist	1
Network Specialist	1

³⁵ For the source of the mapping see previous footnote. The e-leadership overlay is added by the authors and not part of the CEN Workshop ICT Skills figure.

Systems Administrator	1
Technical Specialist	1
ICT Trainer	1
Service Desk Agent	1

By multiplying e-skills levels pertinent to a profile with a profile’s proximity to e-leadership (from 1-6, as in the table above), one can derive a simple ranking of e-CF component e-skills regarding these being required for e-leadership roles.

Table 11-3: Index of e-CF e-competences as e-leadership component e-skills

Rank	e-CF Competence	Index value
1	A.1 IS and Business Strategy alignment	93
2	A.7 Technology Trend Monitoring	92.5
3	A.3 Business Plan Development	87
4	E.7 Business Change Management	86
5	E.2 Project and portfolio management	62
6	E.3 Risk management	57
7	A.5 Architecture Design	53
8	E.9 IS Governance	50
9	E.4 Relationship Management	49
10	E.8 Information Security Management	40
11	E.5 Process improvement	38.5
12	C.4 Problem management	37
13	D.10 Information and Knowledge Management	34
13	B.2 Component integration	34
15	B.6 Systems Engineering	33
15	D.9 Personnel Development	33
17	D.11 Needs Identification	32
18	D.1 Information Security Strategy Development	25
18	E.6 ICT quality management	25
20	A.4 Product/Service Planning	24
21	C.3 Service delivery	21
22	A.9 Innovating	20
22	D.7 Sales Management	20
24	B.1 Application development	18.5
25	D.2 ICT quality strategy development	18
26	A.2 Service Level Management	16
26	D.5 Sales Proposal Development	16
26	D.6 Channel Management	16
26	D.8 Contract Management	16
30	E.1 Forecast Development	12
31	B.4 Solution Deployment	11.5
32	B.3 Testing	11
33	C.2 Change Support	9
34	C.1 User support	4.5
35	A.6 Application design	3
35	B.5 Documentation Production	3
37	D.3 Education and Training Provision	2.5
38	D.12 Digital Marketing	2
39	A.8 Sustainable Development	0
39	D.4 Purchasing	0

11.6 Assessment of policies and stakeholder initiatives addressing e-leadership skills development (focus: SMEs and entrepreneurs)

11.6.1 Approach

To gather information on and evaluate the current e-leadership skills policy and initiative landscape and try to assess the impact of relevant policies at EU and national level, a significant amount of information needed to be systematically collected. The challenge has not only been that the

information owners are heterogeneous (including actors in the public sector, the private sector, e.g. the IT industry, and educational organisations), but also the geographic scope of the exercise, as the study focused on activities in all 28 Member States (and major regions, if relevant). The collected information included, in particular, factual information about ongoing and completed activities at the European level and in EU Member States (e.g. information about the types of initiatives, the stakeholders involved and the governance model applied), as well as views of stakeholders and experts that have been involved in such activities regarding the outcome of these activities.

Our activities consisted mainly of:

- a survey of relevant **national policies** in the e-leadership skills domain, and
- a survey of **initiatives and multi-stakeholder partnerships (MSPs)** at Member State level in this domain, with the focus as before.

The data was collected with the support, where found appropriate, of a network of national correspondents covering all 28 Member States of the EU.

Information gathering using templates where appropriate is divided into three steps.

In a **first** step it focused on the **general policy context** in the different countries. The aim has been to give a brief overview of the overall structure of the policy system and programmes and the key stakeholders active in this area. In this section, national correspondents were guided to refer to and mention the policy programmes of relevance for e-leadership skills and to provide an overview of how these are embedded and integrated in the overall policy context.

The work built on already existing literature and studies available from previous projects, statistical sources and the proposers' expertise and experiences gained in the precursor and previous projects and service contracts. The analysis was enhanced by most recent literature and studies.

In a **second** step, more in-depth data has been gathered on the **major policies and initiatives** targeting creation of e-skills and e-leadership skills which had been identified in the previous step. The template was brief, with the following points to be addressed:

- Name of policy, programme, initiative
- Overall objectives
- Specific objectives
- Targets
- Main characteristics
- Policy evaluation: Monitoring and measurement system in place
- Results achieved (versus objectives and targets)

The output of this activity included descriptions of the respective policies and initiatives on the basis of a standardised **template**, consisting of about 5 pages of text in tabular format and a preliminary assessment with regard to some benchmarking indicators (see below for a description of the benchmarking approach).

At an early stage of the project (Phase I) empirica developed a data gathering guide and template for use by national correspondents to gather the relevant information. This was followed by contacting national correspondents and providing them with a Guide / Toolkit containing background information, guidelines and instructions for how to conduct the research, and the data capture instruments (description templates and questionnaires, as applicable). National correspondents in each Member State were asked to identify key actors and experts in the fields of e-skills and e-leadership skills and to interview them, as well as to undertake desk research.

In order to avoid work duplication and to achieve best value for money, national correspondents were supplied with **pre-filled data templates** wherever available based on the instruments used for precursor studies, which they were then asked to validate, update and complement as appropriate.

11.7 e-leadership skills policy benchmarking and impact assessment

11.7.1 Assessment

Indices for Member States' level of policy activity

National policy activity was explored through an investigation on national policy and stakeholder initiatives that have a bearing on skills development in the e-leadership and digital entrepreneurship area. Findings are summarised in the form of two indices for policies & initiatives addressing e-leadership skills of SMEs and skills for digital entrepreneurship, respectively. Index values have not been mechanistically derived using checklists but rather through a qualitative assessment of the significance and importance of each policy and activity.

Index values are to be interpreted as follows:

Exhibit 3: Scoring format for assessment of national policy and stakeholder activities

Score	National policy and stakeholder initiatives on e-Leadership Skills for SMEs	National policy and stakeholder initiatives on Skills for Digital Entrepreneurship
●	No relevant policy or stakeholder activities of significant scope and size have been identified. Policy debate is non-existent or sketchy.	No relevant policy or stakeholder activities of significant scope and size have been identified. Policy debate is non-existent or sketchy.
● ●	There are little policy or stakeholder activities which <i>explicitly</i> deal with e-leadership skills, but related topics have entered the policy debate. Measures are in place, e.g. training of SMEs in strategic use of ICT for innovation. Education providers show clear signs of awareness.	There are little policy or stakeholder activities which <i>explicitly</i> deal with skills for digital entrepreneurship, but related topics have entered the policy debate, e.g. in the context of efforts to boost entrepreneurial skills and attitudes. Education providers show clear signs of awareness.
● ● ●	Some major policy and stakeholder activities, but coordination/integration, scope and sustainability are limited. Policy debate is well developed but still limited to insiders rather than the main target groups. Education providers offer relevant courses/programmes.	Some major policy and stakeholder activities, but coordination/integration, scope and sustainability are limited. Policy debate is well developed but still limited to insiders rather than the main target groups. Education providers offer relevant courses/programmes.
● ● ● ●	Training for e-leadership is fully embedded in policy strategies (e.g. e-skills or SME strategies) and action plans are in place. The policy debate is well developed and involves all key target groups. SME demand for training courses is met by supply. Some shortcomings e.g. in terms of sustainability, monitoring, scalability, coverage.	Training for digital entrepreneurship is fully embedded in policy strategies on entrepreneurship, and action plans are in place. The policy debate is well developed and involves all key target groups. Entrepreneur demand for training courses is met by supply. Some shortcomings e.g. in terms of sustainability, monitoring, scalability, coverage.
● ● ● ● ●	A master strategy is in place and there are not only various relevant policies and stakeholder initiatives, but these are also well integrated at national and sectoral level. Buy-in from all relevant stakeholders has been obtained.	A master strategy is in place and there are not only various relevant policies and stakeholder initiatives, but these are also well integrated at national and sectoral level. Buy-in from all relevant stakeholders has been obtained.

Preliminary results, as reproduced in the present document, will be validated through a major online survey using a sample of >300 stakeholder representatives and experts covering all 28 EU Member States.

11.7.2 Methodology for Benchmarking policies and initiatives

For identification of existing policies and initiatives that are of relevance to the e-leadership issue we have made use of a **SWOT analysis** approach (strengths – weaknesses – opportunities – threats). A SWOT analysis combines the assessment of *external developments* that cannot be directly influenced by the organisation in focus (e.g. the overall market development) with an analysis of its *internal specific situation* (e.g. its capabilities, product quality and price, market position). Factors specific to the firm are classified as strengths (S) or weaknesses (W), depending on how the situation is in comparison to key competitors with regard to the selected evaluation criteria. *External developments* (e.g. market trends) are then matched with the organisation's specific strengths and weaknesses, which leads to conclusions on opportunities (O) or threats (T). A SWOT analysis helps organisations allocating their resources and capabilities to the competitive environment in which they operate. As such, the instrument is often used for (longer-term) strategy formulation.

The **unit of observation** in the present study is **policies and stakeholder initiatives**. The methodology for benchmarking these is described below. The analysis of strengths and weaknesses was conducted in a **multi-step process** for which various sets of criteria are being applied.

First step: In order to arrive at a shortlist of candidates from the initial total set of up-and-running policies and stakeholder initiatives identified by the National Correspondents, an evaluation scheme based on the following preliminary model has been used:

Exhibit 4: Criteria for selecting outstanding policies and stakeholder initiatives for shortlisting

Selection criteria	Evaluation scheme
Partnership approach of the policy or initiative ("MSP fit")	To what extent does the policy or initiative make use of a "multi-stakeholder partnership" approach? Each case is given a score on a scale of 3 values:
	HIGH (2) The policy or stakeholder initiative fully complies with the MSP definition, i.e. it engages all main stakeholders that are of relevance for a certain e-leadership skills related issue. The partnership involves all or most of the following: government (at national, regional and/or local level), business, education providers, social partners and possibly the civic sector (e.g. NGOs).
	MEDIUM (1) The policy or stakeholder initiative has some involvement of several partners from the government, business, social partners and/or education sector, but not all main stakeholders which are of relevance for a certain e-skills related issue are engaged.
	LOW (0) The policy or stakeholder initiative is initiated and operated mainly by one / only a few partners from only one, at most two sectors (government, business, social partners, education) and it appears that some key stakeholders who are of relevance for the e-skills related issue in question are not involved.

Selection criteria	Evaluation scheme	
Target and approach of the policy or initiative (“Target fit”)	To what extent does the policy or stakeholder initiative target skills development in the e-leadership and digital entrepreneurship area³⁶? Each case is given a score on a scale of 3 values:	
	HIGH (2)	The policy or stakeholder initiative has a clear focus on skills development in the e-leadership and/or digital entrepreneurship area
	MEDIUM (1)	The policy or stakeholder initiative addresses skills development in the e-leadership and/or digital entrepreneurship area, but its main focus is more traditional (e.g. on general leadership or entrepreneurship skills).
	LOW (0)	The policy or stakeholder initiative deals with “digital literacy” of the general population or subgroups hereof (e.g. unemployed, disabled people), but does not address ICT practitioner skills and/or e-Leadership skills.
Embeddedness in the general policy context (“Policy fit”)	To what extent is the policy or stakeholder initiative embedded in a broader policy context? Each case is given a score on a scale of 3 values:	
	HIGH (2)	The policy or stakeholder initiative is strongly embedded in a relevant national or regional policy context (such as a skills strategy or an innovation action plan).
	MEDIUM (1)	There are some links of the policy or stakeholder initiative to general skills and innovation related policy programmes.
	LOW (0)	The policy or stakeholder initiative is poorly embedded, i.e. links to general skills and innovation related policy programmes are very limited. It is likely to remain a one-off activity of limited duration.
Size and scope of the policy or initiative (“Scope and continuity”)	Are the size and scope of the policy or stakeholder initiative sufficient to make it relevant to national skills development in the e-leadership and digital entrepreneurship field? Each initiative is given a score on a scale of 3 values:	
	HIGH (2)	The policy or stakeholder initiative has a size (in terms of budget, number of stakeholders involved, target group reach, or similar) and scope (e.g. sectors and occupations covered) which makes it highly relevant to related developments in the whole country. Its duration is not limited to a one-off project, but there is (planned to be) a continuity of activities over many years.
	MEDIUM (1)	The policy or stakeholder initiative has a size and scope which means it is of some relevance to related developments in the whole country. Its duration may be limited to a one-off project, but its goals are continued through other means.
	LOW (0)	Size and scope of the policy or stakeholder initiative are too limited to make it relevant to related developments in the whole country, or its duration is limited to a one-off project without any continuation or follow-on activities.

³⁶ Rather than entrepreneurship skills in general, or leadership skills in general

Selection criteria	Evaluation scheme	
Level of experience with the policy or initiative ("Maturity")	Has the policy or stakeholder initiative been in operation for long enough to make it possible to assess performance and to learn from its experience?	
	Each case is given a score on a scale of 3 values:	
	HIGH (2)	The policy or stakeholder initiative has achieved a major part of its operational goals already, i.e. it has been in operation for long enough to allow for assessment.
	MEDIUM (1)	The policy or stakeholder initiative has commenced already but is at an early stage of implementation.
	LOW (0)	The policy or stakeholder initiative is still at the planning stage, i.e. no experience is available yet.

Second step: The selection of good practice cases from the shortlist requires a more extensive list of criteria, see below.

Exhibit 5: Benchmarking criteria for selecting good practice policies/initiatives

Benchmarking criteria and indicators		Weight	The statement applies ... to the policy/initiative					
			5	4	3	2	1	3
			exactly	largely	somewhat	rather not	not at all	unknown
1	Relevance	15%						
1.1	"The rationale and objectives are explicitly and precisely specified."	5%						
1.2	"The objectives reflect issues that are of specific relevance for skills development in the e-leadership and digital entrepreneurship field."	5%						
1.3	"The expected results and benefits are particularly relevant for skills development in the e-leadership and digital entrepreneurship field, and they have been clearly described."	5%						
2	Concept	10%						
2.1	"The stakeholders involved demonstrate a long-term commitment to the policy or initiative."	5%						
2.2	"The policy or stakeholder initiative goes beyond awareness raising etc. and has become an operational service aimed at skills provision or similar."	5%						
3	Concrete targets	25						
3.1	"The policy or stakeholder initiative has clearly specified, measurable targets."	20%						
3.2	"Implementation of the policy or stakeholder initiative has advanced sufficiently to make it possible to assess achievement of targets."	5%						
4	Implementation & communication strategy	45%						
4.1	"The policy or stakeholder initiative follows a clearly	15%						

Benchmarking criteria and indicators	Weight	The statement applies ... to the policy/initiative					
		5	4	3	2	1	3
		exactly	largely	somewhat	rather not	not at all	unknown
	structured implementation plan, describing tasks, schedule and responsibilities of actors involved."						
4.2	"The resources budgeted appear adequate to achieve the proposed objectives and targets."	5%					
4.3	"The policy or stakeholder initiative is implemented in a broad partnership of stakeholders from the public, private and civic sector."	10%					
4.4	"The policy or stakeholder initiative is effectively addressing its target audiences; means of communication and dissemination appear adequate for the purpose."	10%					
4.5	"The policy or stakeholder initiative has achieved strong visibility in the whole country."	5%					
5	Evaluation	5%					
5.1	"The results of the policy or stakeholder initiative have been evaluated / will be thoroughly evaluated. To this end, an evaluation scheme has been defined."	3%					
5.2	"The evaluation scheme is based on quantitative indicators related to the policy targets."	2%					

The purpose of this evaluation exercise will not be to provide an overall ranking of best practice policies / initiatives but to highlight those that perform best towards specific dimensions.

Good or Best Practices are **not** understood in the present study as practices which indicate best performance and which should act as yardsticks by others who should strive to emulate them as closely as possible. Rather, they are defined as examples of practice in policy / initiative design and implementation, i.e. methods, tools, types of organisation, stakeholders involved and governance model used, type of integration with policy contexts that were used to achieve the excellent performance observed. Such examples might **imply ease of transfer** to other situations where users have similar objectives; mainly, however, good practice examples should facilitate others to learn and to adapt such lessons learned to their own specific implementation context and their own policy goals.

Validation: The following measures will be applied to validate the methodology (selection, benchmarking and evaluation criteria, benchmarking approach):

- Validation with Steering Committee: The European Commission will appoint external reviewers for quality assurance who constitute the study's Steering Committee. These experts will be asked to offer comments and suggestions on the overall approach and benchmarking methodology as described in this document and on the draft Benchmarking Framework, reports, the executive summary and brochure text.
- Validation with DG ENTR: DG Enterprise and Industry provide comments on the draft Benchmarking Framework, reports, the executive summary and brochure text.
- Validation with the Stakeholder Group through various channels.