e-SKILLS IN EUROPE

MALTA

COUNTRY REPORT

JANUARY 2014

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1 Overview

There is strong consensus in the country that there is today a good talent pool locally of ICT practitioner skills. The gap between supply and demand is present, but not dramatic if one considers only the pure local requirements. The public policies executed throughout the years have opened up various opportunities for individuals to train and up-skill the ICT practitioner skills. The political championing for the development of the ICT industry has provided focused efforts for the creation of the talent pool. The roles of the eMalta Commission, the various ministerial structures, the MCA, the MITA and the eSkills Alliance have been recognized as important developments since 2003. National projects such as the vertical strategic alliances with blue-chip companies, the myPotential/Get Qualified, the development of the eGovernment activity, the setting up of the Faculty and Institute in the public higher-educational institutions, SmartCity Malta, and the recent opening of the Microsoft Innovation Centre have all contributed to continuous private sector investment and market development.

The work of the eSkills Alliance and the recent curricular changes that have been set in motion by this forum were recognized as important responses to the changing qualitative requirements for ICT practitioner skills. The Alliance managed to instigate a closer co-operation between the educational institutions and the ICT industry. In parallel a new wave of young academics and field experts have been recruited by the educational institutions that are closer to the industry and open for joint collaborations.

Actions by the University of Malta such as the setting up of the Knowledge Transfer Office and the Centre for Entrepreneurship are viewed as very important milestones that pave the way for further joint programmes between academia and businesses in creating the future ICT workforce and research.

There have been challenges as well, though. If one factors in the demand for ICT practitioner skills the capacity required to attract important foreign investment in areas such as digital games production, servicing of gaming platforms, and/or ICT within the financial sector than the local eSkills gap increases to problematic levels. The recent development in a specific area – such as the Digital Games Strategy by ME and the corresponding drive that increased the availability of degree-level courses across the public and private educational institutions – is commendable and this should serve as a best-practice model for replication for other niche areas that Malta wants to excel in.

If the local ICT industry wishes to embark onto complex international projects in the new forces driving ICT adoption, such as: mobile computing, business intelligence, cloud services, the digital single content market, exploitation of social media, or other niche ICT servicing, then the quantum and the profile of the local ICT practitioner skills are not sufficient.

There is an over-supply of the lower levels of ICT certifications – EQF 3, 4 and 5 – and these technician-types of levels do not provide the human capital for innovation. This is not to say that there are particular worrying levels of unemployment of ICT practitioners in Malta of these levels, because these individuals are absorbed into both the ICT sector and the ICT-using sectors. However, more graduates and trained individuals are required in the higher levels – degree, post-graduate and research levels.

Another negative development that is perceived is the limited availability of ICT practitioner skills at an executive business level across various industries. This limits the level of maturity in the exploitation of ICTs in vertical industries such as tourism. The work being done by MCA such as the eBusiness awards, the Networked Enterprise strategy and the eCommerce Forum are commendable but more policy and action is required to enable micro and SMEs to change or adapt their business models using technology.

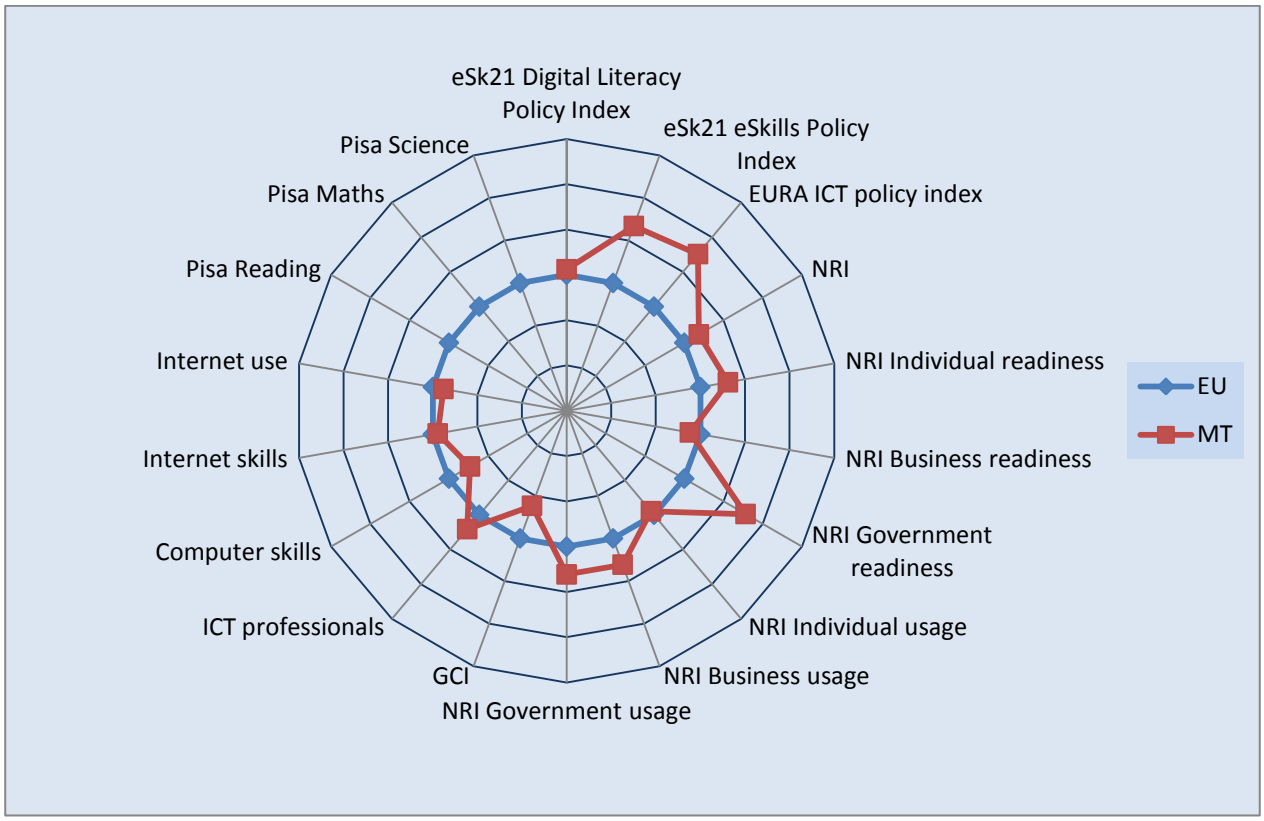
To be able to master the challenges of coming years, a stronger emphasis on e-leadership skills is required. Focused efforts must be co-ordinated for the provisioning of educational programmes and other support measures across the public and private sector to instigate the widespread availability of e-leaders. There needs to be a strategic and concerted programme shared by the various stakeholders where the emphasis shifts from the pure practitioner level onto the business e-leader levels. This is necessary for Malta to produce more transformational leadership skills. These skills would be able to direct the purely technical human capital to create new technology products and services that enable improved business decision-making.

Government, industry and the educational institutions must address the new demands for ICT practitioner skills because of the new forces driving market development – such as business, market and Human Resource intelligence or the apps market. There is a requirement for a new breed of data scientists as the demand in the local market matures in this area and if Malta wants to exploit the off-shoring opportunities in these areas.

The local perception is that the future development of technology will be driven by increased levels of connectivity and Internet adoption, the proliferation of e-services and the demand for e-commerce activity. Demand exceeds supply in these areas and this is not going to change in the immediate future.

2 Indicators on innovation, competitiveness and ICT skills

Malta						
	Score 2009/2010	Rank 2009/2010	Score 2011/2012	EU27 Rank 2011/2012	Change (Rank)	Comment
eSkills21 study: 'e-skills' index 2010	**4**	**4**				Max.: 5.0
eSkills21 study: 'Digital literacy' index 2010	**3**	**10**				Max.: 9.0
EuRA e-skills index	**5**	**1**				Max.: 5.0
ICT practitioners in % of total employment 2012			**3.89%**	**9**		EU average: 3.43%
Digital literacy skills of the population 2009/11:						
• Individuals with high level of computer skills	**20%**	**20**	**24%**	**20**	→	EU average: 28.52%
• Individuals with high level of Internet skills	**5%**	**22**	**13%**	**11**	↑	EU average: 13.67%
• Individuals using the Internet (last three months)	**58%**	**20**	**68%**	**11**	↑	EU average: 71.33%
Global Competitiveness Index (GCI) 2010/12	**4.3**	**21**	**4.33**	**21**	→	Max.: 5.61 EU median: 4.52
Networked Readiness Index (NRI) 2010/12	**4.8**	**13**	**4.76**	**11**	↑	Max.: 5.6. EU median: 4.5
• Individual readiness	**5.95**	**15**	**5.32**	**9**	↑	
• Business readiness	**4.64**	**19**	**4.41**	**16**	↑	
• Government readiness	**5.32**	**5**	**5.37**	**1**	↑	
• Individual usage	**3.47**	**18**	**4.95**	**12**	↑	
• Business usage	**4.95**	**16**	**4.14**	**9**	↑	
• Government usage	**5.32**	**5**	**4.59**	**9**	↓	
PISA scores (2009) in:						
• Mathematics	**:**	**no data**				EU median: 493
• Science	**:**	**no data**				EU median: 498
• Reading	**:**	**no data**				EU median: 489


eSk21 Digital Literacy Policy Index
eSk21 eSkills Policy Index
EURA ICT policy index
NRI
NRI Individual readiness
NRI Business readiness
NRI Government readiness
NRI Individual usage
NRI Business usage
NRI Government usage
GCI
ICT professionals
Computer skills
Internet skills
Internet use
Pisa Reading
Pisa Maths
Pisa Science
EU
MT

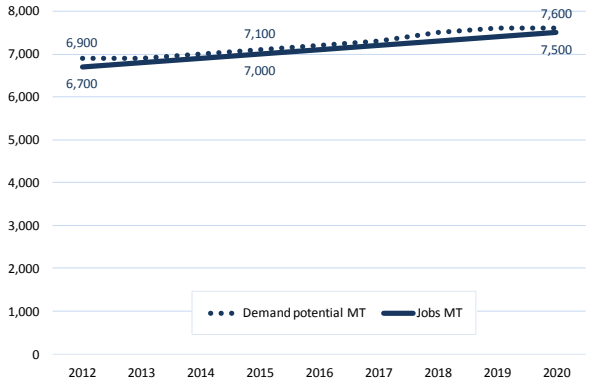
3 E-skills demand and supply forecasts 2012 – 2015 – 2020

Malta			
	MT	Rank EU27	EU27
ICT practitioner workforce 2012	6,700	27	7,403,000
ICT practitioner workforce 2012 as percent of total workforce	3.9%	9	3.4%
Assumed excess demand 2012	200	26	274,000
Forecast excess demand 2015	200	26	509,000
Forecast excess demand 2020	200	27	913,000
Forecast ICT practitioner jobs 2015	7,000	27	7,503,000
Forecast ICT practitioner jobs 2020	7,500	27	7,950,000
Workers 2012 - Management, business architecture and analysis level	1,500	27	1,477,000
... as percent of total workforce	0.9%	8	0.7%
Workers 2012 - ICT practitioners, professional level	2,500	27	3,393,000
... as percent of total workforce	1.5%	13	1.6%
Workers 2012 - ICT practitioners, technician and associate level	2,600	26	2,532,000
... as percent of total workforce	1.5%	7	1.2%
Growth core ICT workforce 2001-2010	n/a	n/a	3.0%
Growth core ICT workforce 2008-2010	-0.9%	22	2.6%
Growth core ICT workforce 2011-2012	8.6%	8	3.9%
Growth broad ICT workforce 2011-2012	11.4%	4	1.8%
ISCED 5A/B first degree graduates in Computer Science, 2011	147	26	113,000
... graduates per 1000 population aged 20-24	5.0	3	3.6
... graduates 2011 as percent of 2006 (= peak EU)	123%	7	88%
Vocational training graduates in Computer Science, 2011	363	13	67,000

Sources and notes: see annex.

ICT workforce: Demand and Jobs in Malta 2012-2020

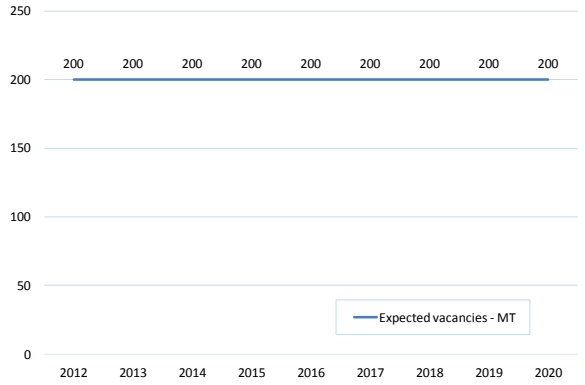
(Main Forecast Scenario)



Source: empirica 2013

e-Skills shortage: Potential vacancies in Malta 2012-2020

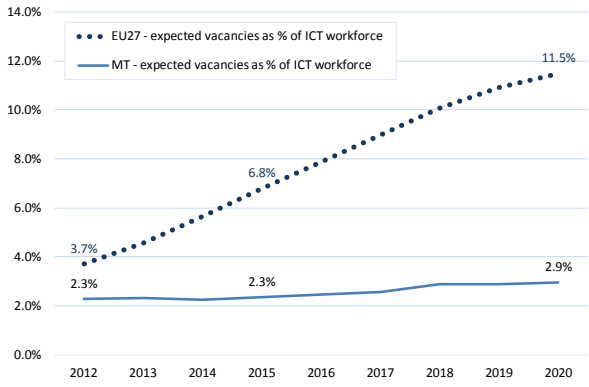
(Main Forecast Scenario)



Source: empirica 2013

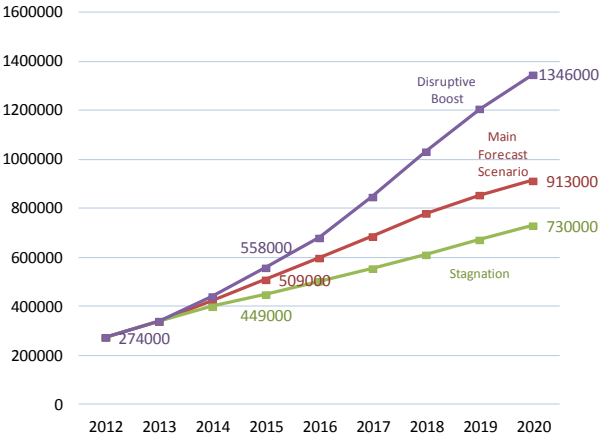
Potential vacancies as percent of ICT workforce Malta 2012-2020

(Main Forecast Scenario)



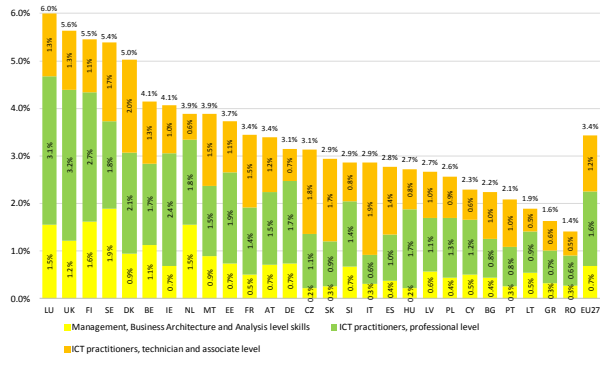
Source: empirica 2013

Potential vacancies in Europe (EU27) by scenario 2012-2020



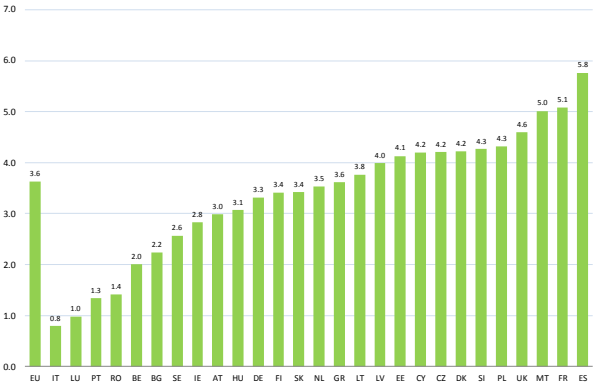
Source: empirica 2013

ICT practitioner workforce as percent of total workforce in EU Member States in 2012



Source: empirica 2013

First degree graduates in Computer Science (ISCED 5A/B) per 1000 population aged 20-24, 2011



Source: empirica 2013

4 Policy and major stakeholders initiatives

Maltese public policies concerning the proliferation of e-skills in Malta have been mainly drafted in the past years by the ministry responsible for the ICT strategy. Within the ministry's portfolio one finds two relevant public entities that have further contributed to the development of the main ICT and e-Skills related policies and programmes. These are the **Malta IT Agency (MITA)**, 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; and the **Malta Communications Authority (MCA)**, the national regulatory authority of the communications sector and responsible for eInclusion, eBusiness and ecommerce, Internet safety and Internet governance.

Recent national documentation that laid out the government's e-skills policy includes two national ICT strategies (ICT National Strategy 2004 – 2006, Smart Island Strategy 2008 – 2010) and an e-learning national strategy (Smart Learning Strategy 2008 – 2010).

The **Smart Island Strategy** was published by MITA (**MITA Strategic Plan 2009 – 2012**). The Plan featured a chapter dedicated to e-skills policy. The Human Capital chapter brings together a series of efforts aimed at realising a skills transformation programme for the ongoing growth of the ICT sector and the knowledge economy. This chapter features the establishment of a multi-stakeholder public-private eSkills alliance (see below), an e-competence framework, a monitoring mechanism of the demand and supply of eSkills, extension of the ICT curricula and training across the educational levels, engaging with the private training industry, instituting vendor-driven training programmes, and incentivising individuals to take-up specialisations, amongst others.

MITA also reached agreements with blue-chip vendors for the establishment of focused centres at MCAST and the University of Malta for the future provisioning of specific vendor courses, whilst it successfully partnered with Microsoft and motivated the latter to open up an Innovation Centre (see below). MITA successfully co-ordinated the **Second Step** training programme that built on its predecessor and offered free ICT diploma courses through ESF Funding. MITA co-ordinates the **Student Placement Programme** that provides annually hundreds of students the opportunity of a summer work placement. MITA also supports the **Get Qualified** scheme (which replaced the myPotential scheme) in order to continuously increase the portfolio of ICT courses that can be pursued through the fiscal incentive.

The MCA recently developed a National e-Inclusion Strategy (**Networked Society 2012 – 2015**) and an eBusiness strategy (**Networked Enterprise 2012 – 2015**) aimed at supporting the development of a networked society and economy, besides its annual plans that set out the annual priorities and focus. The e-Inclusion strategy has 5 activity thrusts that focus around ICT user skills, eInclusion and eAccessibility. The Networked Enterprise strategy focuses on the micro and small enterprises that tend to lag behind in both web presence and effective use of the Internet. This strategy is focused on 5 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.

One of the main e-skills policy decisions that MITA recently took, in cooperation with the responsible Ministry, was to set-up a multi-stakeholder partnership to shape e-Skills policy – the **eSkills Alliance Malta**. The Alliance published its strategic plan and conducted work from October 2010 up till early March 2013, including a number of priorities that Government had identified earlier already (Smart Island Strategy; MITA Strategic Plan). It 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. The four areas of work of the Alliance were: key stakeholder engagement, labour market intelligence, standards and ICT qualifications and strengthening the career of an ICT professional.

Further developments regarding the national eSkills policy are expected during 2013, in view of a new administration currently forming following the general elections that took place in Malta in March 2013.

The **eMalta Commission** has been responsible for a number of programmes including the **myWeb** training programme which provided digital literacy training to thousands of individuals through public local councils and private firms; the setting up of **Internet Centres** (PIAPs) in local councils; the introduction of technology certifications in the basic education system such as the **ECDL**; the initiation of partnership agreements with HP, Microsoft and Cisco which provided both affordable access to technology for the Maltese as well as the technology for the initiation of **Community Technology Learning Centres** (CTLCs); and finally the Kick-start programme for business aimed at encouraging ICT usage and coordinated various initiatives to encourage SMEs to adopt technology.

The ministry responsible for the education policy has been the main Government arm ensuring access and quality in education, including ICT education at all levels. At a very basic level, the ministry for education is obviously responsible for digital literacy curriculum taught within the compulsory years of schooling. At present this curriculum is based on the European Computer Driving License (ECDL), whilst in the second half of the compulsory years students can also choose Computing as a subject choice that can lead to the basic certification for more advanced acidic or vocational training. At higher levels the ministry responsible provided various scholarships for tertiary-level and doctoral studies in various fields, including ICT.

As part of its wider portfolio the ministry includes the sole public **University in Malta**, the public vocational college **Malta College for Arts, Science and Technology (MCAST)**, the Malta Qualifications Council and the Commission for Higher Education – now merged into a **Commission for Higher and Further Education**. The public and private educational providers in Malta have been active in joint eSkills policy-making with the Government of Malta over the years. The University of Malta has throughout the years strengthened its collaboration with the private industry to conduct joint research projects and networking events and more recently conducted an analysis of supply and demand of ICT practitioner skills. It took the results of this analysis in consideration and re-launched its degrees last October 2012 in the bid of providing aspiring ICT practitioners an educational experience that is closer to the ongoing industry developments.

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 bring ICT professionalism and related competences to the attention of decision makers; the Standards are to help improve the image of the ICT sector by providing a armonised and accepted description of the various domains in the ICT sector whilst making it more attractive and accessible for the next generation. See next section for a description of the initiative.

A number of additional stakeholders have contributed to the development of e-Skills policy and programmes, including the **Malta Council for Science and Technology**, the IT Business Section of the **Chamber of Commerce**, the **Computer Society of Malta**, the **ISACA Malta Chapter**, the **National Council of Women**, the **Foundation for Information and Technology Accessibility** and the **Employment and Training Corporation**.

The **ICT business sector** has been active at an eSkills policy-level through the work conducted by the eMalta Commission and the eSkills Alliance – which conducted various dialogue sessions with the industry so as to shape policy on the basis of industry requirements. On an initiative-level the industry has over the past years invested in the training and development of the workforce, contributed resources to the activities of the eMalta Commission and the eSkills Alliance, and in certain instances invested in specific initiatives that boosted ICT user and professional skills.

With regard to **e-leadership skills and digital entrepreneurship**, the Knowledge Transfer Office (KTO) established by the University of Malta is of special interest. KTO is to become an important stakeholder for the provision of local ICT practitioner and e-Leadership skills. The KTO is offering 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 a **Centre for Entrepreneurship and Business Incubation** has been established. Training is being provided to stakeholders involved in the academic or policy development of e-Leadership and entrepreneurship/incubation. Curriculum is being developed for an intensive programme in Technology Entrepreneurship. A Business Incubator will soon be launched on Campus for early-stage technology ventures.

Another initiative with relevance for e-leadership skills development is the **Innovation Centre** recently set up by Microsoft following an agreement with MITA. The Centre focuses on Cloud-based innovations and entrepreneurship.

Summary Assessment of Malta's e-Skills Activities: ●●●●

Malta has strong policy leadership in the e-skills area. The eSkills Alliance Malta, set up in 2010, has been particularly instrumental in bringing together all stakeholders and developing targeted policy actions. The Alliance is currently be re-established in a new format to increase effectiveness and stakeholder buy-in.

Summary Assessment of Malta's Digital Literacy Activities: ●●●●

Malta's actions in the area of digital literacy focus on providing training to the workforce, awareness raising, and infrastructure (Public Internet Access Points), all of which have recently been integrated in a new National e-Inclusion Strategy for 2012-15. Currently, a new National Literacy Strategy for Malta is open for consultation, also including digital literacy as a core priority.

Summary Assessment of Malta's e-Leadership & Digital Entrepreneurship Activities: ●●◖

Skills for e-Leadership and digital entrepreneurship have attracted increasing attention amongst policy-makers and other national stakeholders in recent years. Both the Centre for Entrepreneurship and Business Incubation at Malta University and the Microsoft Innovation Centre have started to provide training in this area.

Like in the precursor study[1] the assessment of the information gathered resulted in two activity indices, one for digital literacy and one for e-skills computed for each country. These were computed based on data from 2009 and 2013. The e-leadership skills activity index was computed only for 2013, as no data had been collected on this topic in 2009. In the following the focus will be on the e-skills activity index; we first mapped the e-skills activity index values against the Networked Readiness Index (NRI)2 for each of the 27 Member States.

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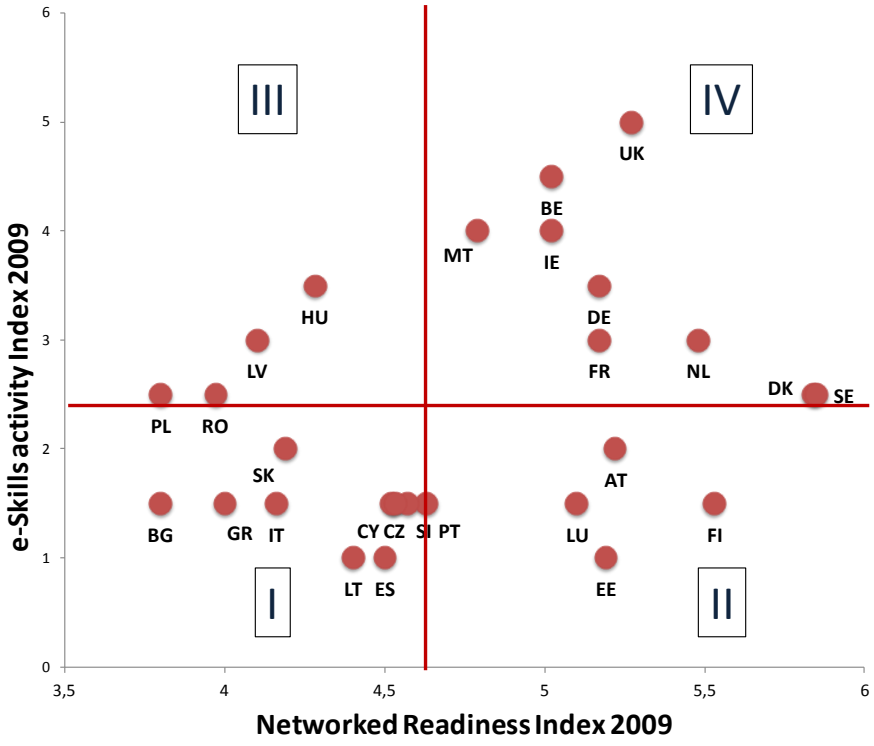
1 Hüsing, T. and Korte, W.B. (2010) "Evaluation of the Implementation of the Communication of the European Commission 'e-Skills for the 21st Century'", URL: http://ec.europa.eu/enterprise/sectors/ict/files/reports/eskills21_final_report_en.pdf

2 The World Economic Forum's Networked Readiness Index (NRI) measures the propensity for countries to exploit the opportunities offered by ICT. It is published annually as part of the Global Information Technology Report. The NRI is a composite of three components: the environment for ICT offered by a given country (market, political and regulatory, infrastructure environment), the readiness of the country's key stakeholders (individuals, businesses, and governments) to use ICT, and finally the usage of ICT amongst these stakeholders. For further information on the NRI see www.weforum.org/issues/global-information-technology.

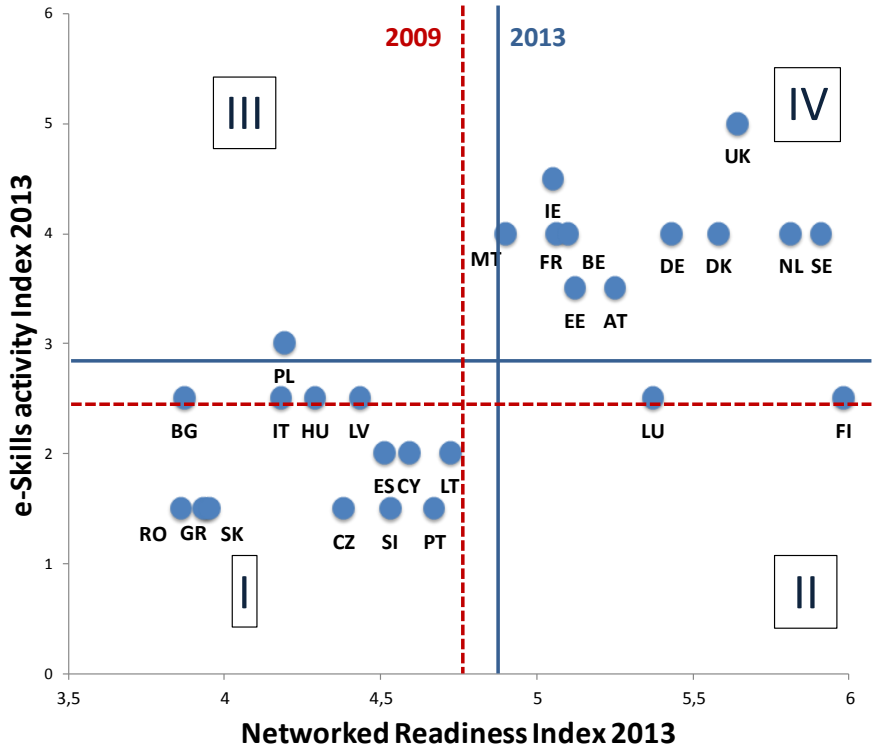
This allows for putting the results of the e-skills policy and activity analysis in the different countries in the wider context of each country's propensity to exploit the opportunities offered by ICT using data which can be obtained from the country values on the Networked Readiness Index (NRI).

The following figure allows a comparison of the results from this exercise for 2009 and 2013. In the graphical illustrations four quadrants are shown which are built by using the European averages on the NRI and those on the e-skills policy activity index for the respective years in order to group the countries into four main clusters.

European country landscape on 'e-skills policy activity' versus 'ICT innovation capability' 2009



European country landscape on 'e-skills policy activity' versus 'ICT innovation capability' 2013



Overall and for e-skills related policies and initiatives a strong increase of activity levels over the five-year time span can be identified. The unweighted average e-skills policy index score increased from 2.4 to 2.9 between 2009 and 2013. This is encouraging news.

Our analysis revealed that in 2009 three of the four quadrants are well populated by different countries with only 7 countries belonging to the group of top performers both, in terms of e-skills policy index as well as NRI, and 11 Member States constituting those best described as low activity countries (bottom left quadrant).

Five years later the situation has changed significantly; we are now faced with a situation which can be described as a dichotomy in Europe on these indicators: top performing countries as opposed to countries with low activity levels and NRI performance, with only three countries (Poland, Luxembourg and Finland) in transition phases between these clusters.

The group of top performers has grown from 7 to 11 with Sweden, Denmark, Austria and Estonia entering this cluster to which the United Kingdom, the Netherlands, Belgium, Ireland, Malta, Germany and France already belonged in 2009. However, the group of low activity countries is still substantial in terms of numbers of countries with 13 EU Member States – almost 50% showing a below average performance on the NRI and on the e-skill skills policy activity index.

EU Member States fall into two very distinct groups: 41% of the Member States are top performers, almost 50% are low activity countries, and 11% located between these two clusters.

While the former have been successful on the e-skills front and capable of exploiting ICT to become innovative and more competitive the latter group of low activity countries still has a rather long way to go to achieve both.

A look at the Member States' positions in the NRI ranking (Networked Readiness Index) reveals that again, those countries with high NRI positions also show high e-skills policy activity levels. The countries moving up in terms of migrating into the 'top performers' cluster include Sweden, Denmark, Austria and Estonia, as well as the Netherlands and France which managed to further increase their e-skills policy activity level.

Countries at the risk of losing ground include Hungary, Latvia and Romania which dropped down into the first cluster of countries, i.e. those lagging behind.

European country clusters on 'e-skills policy activity' versus 'ICT innovation capability' 2013

I : low NRI + Low level of e-skills policy activity	II : High NRI + low level of e-skills policy activity
Romania, Greece, Slovakia, Czech Republic, Slovenia, Portugal, Spain, Cyprus, Lithuania, Bulgaria, Italy, Hungary, Latvia	**Luxembourg, Finland**
III : Low NRI + high level of e-skills policy activity	**IV : High NRI + high level of e-skills policy activity**
Poland	**United Kingdom, Ireland, Sweden, Netherlands, Denmark, Germany, Belgium, France, Malta, Austria, Estonia**

5 Selected multi-stakeholder partnerships

The following is a list of multi-stakeholder partnerships of major relevance to the e-skills issue:

- **Get Qualified Scheme (formerly MyPotential programme)**: The scope of this incentive scheme is to support the personal development of individuals who aim to achieve qualifications and certifications required by industry. The incentive is applicable to students following a course of studies leading to a certification, diploma, degree or post-graduate degree courses. This incentive is mainly intended to support persons who have completed formal education and who are seeking to further their education in areas that are relevant to Maltese Industries – including the ICT industry. This programme has proved to be an extremely important action that contributed to an increase in the number of ICT professional skills in Malta. The number of providers enrolling their ICT courses under the scheme has increased on a yearly basis. The courses available today as part of the scheme are varied and provide various options for professional development, including; industry-based training and certification courses, vocational courses and academic degrees.
- **EPITOME**: The "Empowerment Programme for IT Use Outreach for Micro Entrepreneurship" (ESF2.72) is 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 is lead by the Malta Communications Authority (MCA) in cooperation with the GRTU Malta Chamber of SMEs and the Employment Training Corporation (ETC), and runs from 2010 to end of 2013.
- **First Step and Second Step ICT Training Programmes**: The project consisted of two training programmes: The First Step Programme (2006-2008) – an ICT and soft skills training programme – aimed to give foundation skills necessary to gear persons with no IT background to start their study and career path in ICT. The Second Step Programme (2009-2012) – an EQF Level 4 diploma programme – provided individuals the opportunity to undertake a diploma free of charge. Three streams were provided: Information Technology, Information Systems and Computing and Information Systems. 138 successfully finished the diploma programme from an audience including the actively employed (including older workers), inactive and unemployed persons, school leavers, women, semi-skilled persons who risk long-term unemployment and individuals who completed successfully the First Step Training Programme. Provide free ICT practitioner-level training to individuals with limited or no background in technology thus contribute to increasing the eSkills base in Malta. The total budget was € 662,000 for First Step and € 694,000 for Second Step.
- **eSkills Alliance Malta**: This is an alliance of public and private stakeholders that over the period 2010-13 have conducted a number of projects aimed at improving the quality and quantity of ICT practitioner skills with the endorsement of the wider ICT industry in Malta. The objectives of the Alliance included: Contribute to the drafting and promote the endorsement of a Maltese e-Skills competence framework; Shape the incentive framework for the creation of further partnerships between the local ICT training industry and major international ICT educational institutions; Contribute to the expansion of ICT education opportunities within Government's education institutions, etc. The eSkills Alliance brings together government, the employer association, Chamber of Commerce, representatives of the ICT industry, educational authorities, and other public sector stakeholders. After a change in Government in early 2013,

a realignment of the Alliance's format was pushed through, with the objective of making it more effective and more resourceful. It will be re-established as a foundation under Maltese law for the voluntary sector, with strong participation of partners from the industry and other sectors to take co-ownership of a renewed strategic plan.

- **Technology Entrepreneurship Training Programme**: The Intensive Training Programme and Masters Programme in Knowledge Based Entrepreneurship was introduced in 2012 by the University of Malta's Centre for Entrepreneurship and Business Incubation (CEBI). The objective behind the programme has been 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 Intensive Training Programme (i) as a virtual learning environment assisted classroom based programme and, (ii) as a distance learning course; Build a postgraduate degree programme by re-using the ITP modules.
- **Standards for ITalent**: These is the official set of Maltese ICT occupational 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. 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. 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. 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.

6 Success of e-skills policies and activities in meeting the objectives of the EU e-skills agenda and other relevant European initiatives

The extent to which policies, initiatives and multi-stakeholder partnerships have been successful in helping meet the objectives of the EU e-Skills agenda and other relevant European e-Skills initiatives as seen by national experts is further described below along key actions and action lines of the EU e-Skills strategy and other relevant EU initiatives.

"Longer term cooperation"

The setting up of the eSkills Alliance Malta has been the main policy undertaken by Government to strengthen the co-operation between the relevant Maltese stakeholders involved in the eSkills Agenda. Co-operation does take place between separate entities, but the Alliance provided an important channel with focused resources to nurture and scale the co-operation. It has put ICT education in focus. The joint initiatives that have been co-ordinated emanating from the discussions and the stakeholder engagement through the Alliance have been recognised as extremely valuable. These initiatives have provided a solid basis for continued work in the future to monitor the supply and demand of ICT practitioner skills, adapt curricula and promote ICT education. The Alliance has provided the forum where the different stakeholders converged on mainly the following areas: basic ICT and Computing curricula and education, ICT higher education, monitoring the supply and demand of ICT practitioner skills, workforce development programmes such as an e-competency framework, the context for an ICT professional body, and the local eco-system for the attraction of foreign students.

The cooperation that MCA has managed to orchestrate with civil society, with community representatives and non-governmental organisations has been the main vehicle for addressing the digital divide. These intermediaries have been very effective in reaching various target audiences and increase ICT user skills.

"Human resources investment"

There is a good level of investment in human resources and eSkills. Higher education in Malta is free whilst stipends are also provided for students to have a basic form of monthly allowance during their higher education. The University of Malta also applies a maturity clause that enables mature students to follow a course with less stringent entry requirements.

The developments within the public sector educational provisioning have been recognised as important milestones and investments by Governments in order to service better the ICT industry as it progressed. These developments refer to the establishment of the Faculty and Institute for ICT in the University and MCAST respectively.

Recently there have been the first structured efforts to provide mobility between public ICT vocational and academic tracks in Malta. The discussions are still in the initial phases, but it is thought that this development in itself is very positive.

The financial incentives that have been made available – including the myPotential/Get Qualified scheme, the scholarships and the ETC's TAF – have been important fiscal measures to assist the individuals and the employers to continue investing in ICT professional development. As a result of these measures the local ICT private training sector has developed and consolidated.

It is thought that there is a high dose of willingness by the industry to explore further and develop the e-competency framework as a basis for the development of the ICT workforce. It must be recognised that ICT as a field poses various challenges, including defining what the ICT profession is and therefore it is important to have a reference point such as an e-competency framework.

However it is difficult to rigidly de-compose the knowledge and the competencies required, so the stakeholders must understand the limits of such a framework.

"Attractiveness of ICT jobs"

The eSkills Alliance's work on promoting ICT careers has been important to raise further general awareness on eSkills and career opportunities. The co-ordination of eSkills Week 2012, training delivered to career counsellors, various sessions organised for parents, national competitions on fun computing, a national ICT job exposure scheme for young students, and a series of ICT company visits for educators and students have been important actions in this regard. The participation of the industry in these activities has been very encouraging, where ICT companies have provided time and human resources for these activities, and therefore the response from the private sector should be duly acknowledged.

But there is more work to be done. Defining ICT, computing and addressing mis-conceptions and mis-perceptions amongst the students, the parents and even educators. The career advisors require more training and pressure should be kept up in order increase female participation in the field. The curriculum at a basic level in schools needs to change – we are not attracting enough students to the subject because of this curriculum.

National experts point out that more training programmes for career guidance professionals, in particular at seconday level of education, are needed to promote and educate on ICT careers, especially to attract female students to the sector and address a number of misconceptions.

There is also the need for adequate training of teachers (professionals) at primary and, in particular, at seconday school levels in the teaching of ICT skills. Some insiders claim that the lack of adequate methods of teaching is a serious obstacle in attracting young students to take up ICT as a career, to specialise and to go into research. Attracting more female students requires particular focus.

"Employability and e-inclusion"

With respect to the development of digital literacy, it is believed that there has been a clear political message through the investments in ICTs in schools – the upcoming generations have to be digitally literate. However, an improved definition and understanding of digital literacy is necessary. It should comprise skills such as critical analysis, a critical understanding of online communication, knowing how to productively apply the ICT tool and being safe online. Digital literacy must also mean that a user is self-sufficient in the basic trouble-shooting of the various devices and taken a notch higher than the current perceptions that e-literacy is Internet surfing and using basic applications. This understanding and emphasis must also take place at a European level.

The future e-Inclusion policy will feature the promotion of local community materials and online activities that are tailored to the Maltese users and updated by the community intermediaries. This is due to the current difficulties to attract mature individuals online to use ICTs and the Internet.

Digital literacy and e-competencies are being presented locally as an opportunity for job mobility; however there are difficulties to attract certain segments of the workforce who do not feel the need to train in ICTs. Actions such as the eBusiness local awards, Epitome and the eCommerce Forum are important projects that are contributing to an improved adoption of ICTs by businesses and raising awareness. But these are not pushing ICT maturity across the economy to high and ambitious levels.

Other projects that have contributed to the inclusion of disadvantaged groups such as the First Step and the Second Step have been recognised as important.

Further policy and actions are of course required – by both the public and private sector. The monitoring of ICT and STEM education across all the levels of education requires specific focus. More "noise" about the sector and the opportunities offered should be co-ordinated to attract

more numbers. Parents, guidance teachers and other influencers must be addressed further because more students will be attracted to ICT if this is done.

"Lifelong acquisition of e-skills"

Regular updating of e-skills takes place particularly within ICT companies – training, professional development and experiential learning takes place at a firm level because it is an industry standard. The ETC TAF scheme has been of support to ICT companies in the provisioning of training opportunities for their staff. More and better marketing of these schemes must take place. There is not a particular emphasis being done by Government on e-learning, it is a route that is utilised by firms where relevant and available for cost-efficiencies.

More should be done to instigate a wider culture of life-long learning and raise the general public aptitude towards continuous development. More workplaces should be supported to embrace continuous professional development and support employees to pursue higher education programmes alongside a full-time job.

The Department of Lifelong Learning within the education system is also offering a range of courses at different levels, with free basic ICT skills for individuals who are not in education as well as other courses against payment. There is a demand for specific ICT training which should also be offered by the Department and if possible at reduced fees and other incentives. There is the need to ensure that professionals are continuously trained through adult learning programmes.

"Closing the e-Skills gap"

The eSkills gap in Malta is present. The exercise conducted by the Chamber of Commerce as part of its contribution to the work of the eSkills Alliance has been an important activity. Together with the initial statistics explored through the eSkills Demand and Supply Monitor it has provided the opportunity to discuss and take initial actions to address the gap and the eSkills mismatches. The re-structuring of the academic degrees at the Faculty of ICT has been a tangible outcome of this work. There are many more activities that have been identified that must be continued.

Researched and prepared by:

empirica Gesellschaft für Kommunikations- und Technologieforschung mbH, Bonn, Germany
Oxfordstr. 2
53111 Bonn, Germany
e-Mail: info@empirica.com

For the European Commission
DG Enterprise and Industry

Annex: data sources

	Source
eSkills21 study: 'e-skills' index 2010	eSkills21 study carried out by empirica. Report available at http://goo.gl/WKV7r
eSkills21 study: 'Digital literacy' index 2010	
EuRA e-skills index	EU-RA 2009: Financial and fiscal incentives for e-Skills: State of play in Europe. Synthesis report. http://www.e-skills-funding.com/images/stories/PDF/synthesisreport.pdf
ICT practitioners in % of total employment 2012	LFS data made available by Eurostat
Digital literacy skills of the population 2009/11:	Eurostat, database "isoc_ski"
• Individuals with high level of computer skills	
• Individuals with high level of Internet skills	
• Individuals using the Internet (last three months)	
Global Competitiveness Index (GCI) 2010/12	The Global Competitiveness Report 2011-2012: http://www.weforum.org/reports/global-competitiveness-report-2011-2012
Networked Readiness Index (NRI) 2010/12	The Global Information Technology Report 2011-2012: www.weforum.org/issues/global-information-technology
• Individual readiness	
• Business readiness	
• Government readiness	
• Individual usage	
• Business usage	
• Government usage	
PISA scores (2009) in:	OECD, http://www.oecd.org/pisa/
• Mathematics	
• Science	
• Reading	

Indicator	Source	Further remarks
ICT practitioner workforce 2012	Eurostat Labour Force Survey. Some imputations and assumptions not in the original data but done by empirica apply	The definition can be looked up in the final report, Gareis et al. 2014: E-SKILLS: MONITORING AND BENCHMARKING POLICIES AND PARTNERSHIPS IN EUROPE.
ICT practitioner workforce 2012 as percent of total workforce		LFS based, number of ICT practitioners / number of workers in all occupations
Assumed excess demand 2012	Empirica, IDC	This is calculated using the percentage of vacancies per existing job and is based on a survey carried out in 2012. As some countries were not covered, several assumptions apply
Forecast excess demand 2015		Forecasts are scenario based and the methodology can be found in the final report (see above). Forecast of demand in the six largest countries (DE, UK, FR, IT, ES, PL) is based on country specific economic scenarios, for the 21 smaller countries only an aggregate scenario was developed and figures allocated according to ICT employment shares.
Forecast excess demand 2020		
Forecast ICT practitioner jobs 2015		
Forecast ICT practitioner jobs 2020		
Workers 2012 - Management, business architecture and analysis	Based on Eurostat Labour Force Survey, some definitions and	LFS based, definitions can be looked up in the final

level	calculation by empirica. Some imputations and assumptions not in the original data but done by empirica apply.	report.
... as percent of total workforce		
Workers 2012 - ICT practitioners, professional level		
... as percent of total workforce		
Workers 2012 - ICT practitioners, technician and associate level		
... as percent of total workforce		
Growth core ICT workforce 2001-2010	Based on Eurostat Labour Force Survey, some definitions and calculation by empirica. Some imputations and assumptions not in the original data but done by empirica apply.	ISCO-88 groups 213 and 312. Due to the break in series in 2010/11 only partly comparable to later data.
Growth core ICT workforce 2008-2010		
Growth core ICT workforce 2011-2012		ISCO-08 groups 25 "ICT professionals", 35 "Information and communications technicians".
Growth broad ICT workforce 2011-2012		Equals the "ICT practitioner workforce"
ISCED 5A/B first degree graduates in Computer Science, 2011	Eurostat, database "educgrad_5"	This figure represents a count of first degrees in ISCED 5A and first qualifications in 5B. See discussion of this indicator in the final report.
... graduates per 1000 population aged 20-24	Eurostat, databases "educ_grad5" and „demo_pjangroup"	Graduates as above. The denominator is used to make data comparable but there is no age restriction in the number of graduates. Some imputations and assumptions may apply.
... graduates 2011 as percent of 2006 (= peak EU)		
Vocational training graduates in Computer Science, 2011	Eurostat, database "educ_grad5"	Number of Computing graduates in Upper secondary education (level 3) - pre-vocational and vocational programme orientation and Post-secondary non-tertiary education (level 4) - pre-vocational and vocational programme orientation. Some imputations and assumptions may apply.