



# National eSkills Strategy 2019-2021

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# 1

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## Foreword by **Hon. Silvio Schembri** Parliamentary Secretary

The year 2018 has been an important milestone for the Digital Sector. In this year, a number of very important initiatives have been launched by the Maltese government.

On the 4th of July, the Maltese Parliament approved the three bills regulating Distributed Ledger Technologies-based businesses and their service providers. Malta is the first jurisdiction worldwide to have enacted such laws for this sector. The three Acts, namely the Malta Digital Innovation Act (MDIA Act), the Technology Arrangements and Services Act (ITAS Act), and the Virtual Financial Assets Act (VFAA Act) will see the country set out on the correct path to establish the right governance and practice for professionals in this area. This will also instil peace of mind and certainty, for investors and consumers alike.

It was on the 1st November when the government launched the Malta AI taskforce, which is tasked to formulate Malta Government's National Artificial Intelligence Strategy. This is being accomplished through continuous discussions with the relevant stakeholders, to ultimately put Malta amongst the top 10 leading countries which have a strategy for Artificial Intelligence.

The Malta Information Technology Agency (MITA), backed by the Maltese Government, launched its first National Cyber Security Strategy which will provide the relevant framework for protecting systems, networks, information on the internet and indeed society at large. Without proper security, no system nor person would be digitally safe, and the strategy aims to give the right impetus to this.

The Digital Sector, sectorial industry, government and society is highly dependent on having the right digital skills to be able to thrive in the digital economy. All EU countries are facing an uphill struggle in trying to bridge the gap between the digital

skills required by the industry and the training and education available. There is also a substantial gap in the number of ICT practitioners available and the actual number required by each country. Basic digital skills are also lacking. Currently, 44% of European citizens and 37% of people in the labour force do not have basic digital skills. Therefore, the launch of a National Digital Skills Strategy by the eSkills Malta Foundation is very important and crucial for Malta.

We are giving our full support to the Foundation to be able to implement as far as possible this strategy, especially when one notes that technology and skills are always changing. After ample consultation with the relevant stakeholders, the National eSkills Strategy brings to light a number of recommendations and actions that the country should implement.

As in previous years, I am confident, through cooperation and collaboration with its founding members, and the other relevant stakeholders, the eSkills Malta Foundation will continue its important mission of developing and up-skilling our human capital with the right competencies.



Hon. Silvio Schembri

Parliamentary Secretary for Financial Services, Digital Economy and Innovation  
within the Office of the Prime Minister.

# 2

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## Message from **Carm Cachia** Chief Administrator

The eSkills Malta Foundation was launched in February 2014 as an autonomous national coalition with various stakeholders coming from education, industry and government with the collective objective of creating the skills base and life-long quality growth required for a digitally enabled knowledge economy.

As part of the New Skills Agenda for Europe, the European Commission set up the Digital Skills and Jobs Coalition to tackle the growing digital skills deficit. The Member States were also invited to develop comprehensive national digital skills strategies. On February 2016 the Digital Single Market strategic group of the European Commission set up an expert group on digital skills to come up with recommendations in this context. By the end of 2016, this expert group came up with a strategic blueprint to help members states. The eSkills Malta Foundation was an active member of this group.

It was, therefore, an opportune moment for the eSkills Malta Foundation to come up with a national strategy. As a result, in 2018, the Foundation embarked on the formulation of a concrete National eSkills Strategy through a services contract with PricewaterhouseCoopers (PwC). The eSkills Malta Strategy 2019 -2021 also complements the Digital Malta Strategy launched in 2014.

Since its inception, the eSkill Malta Foundation has been at the core in the contribution towards the increase of digital skills and the development of the ICT profession. Indeed, the Foundation has been visible not just locally but also at a European level. Its

coalition model has also been considered as a European best practice. This is a feather in our cap and it is therefore of no surprise that Malta is one of the first countries to have invested in a specific national eSkills strategy.

As detailed elsewhere in this document, a considerable number of workshops, one-to-one meetings, surveys and desk studies were undertaken with considerable success across the identified digital economy pillars including the ICT Professionals, all Industry, Education and Society. An extensive study regarding the existing and emerging digital skills situation was also carried out. All this has been funnelled into a set of recommendations for a way forward to continue with the development and expansion of digital skills and the IT Profession in Malta. It is essential that these recommendations are given their due importance and support so that these are implemented effectively by the eSkills Malta Foundation. The success of these recommendations will also depend on the continued collaboration with the many stakeholders.

In the digital sector, and especially when it comes to digital skills, we must be agile, flexible and quick to adopt changes and innovation. The eSkills Strategy sets clearer trajectory in achieving this, giving us a strategic direction, helping us to identify solutions for challenges being faced and those ahead by the ICT professionals, industry workforce, educational sector and the information society. The Foundation is looking forward to this challenging journey.

A handwritten signature in black ink, appearing to read 'Carm Cachia', written in a cursive style with a long horizontal stroke underneath.

Carm Cachia

Chief Administrator, eSkills Malta Foundation.

# 3

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## Executive Summary

Emerging information and communications technologies are assuming increasing importance in our lives. This importance is not connected solely to our professional life but also our quality of life in its entirety. Whilst ensuring that society at large develops the right competence and capability to secure a better future, the need to revisit the effectiveness of strategies leading to acquisition digital skills by individuals, society and Malta as a nation state is clear.

This strategy aims to complement initiatives at both local and EU level to address the need for existing and new digital skills that shall be required by nearly all jobs in the medium term. The digital market shall completely transform a number of business models that we are accustomed to. This is expected to bring major changes within the labour market in a relatively short time. Despite general positive developments in the digital literacy, the need for a continued effort to narrow the digital gap further is key to the Malta eSkills Foundation.

This report builds on field work, surveys, workshops and one-to-one meetings with key players in the field. The report builds on four key pillars namely, the ICT professional, the Education system, the local industry and the citizen within society. Addressing these four pillars within the local ecosystem provides a balanced approach in terms of identifying the business needs in a balanced and representative manner.

The digital skills strategy is formed of twelve main recommendation areas, summarised here and developed in more detail throughout the document. The strategy recommendations aim to support the business needs development of the Foundation to match the rapid pace of change led by market needs. The strategy aims also to develop a number of measures to support a decision-making process that is more evidence-based. In addition, the strategy puts forward a number of specific recommendations aimed at addressing a number of current developing market trends identified as part of the fieldwork done over the past year.

To support a strong strategic direction, the Foundation shall be developing a 3-year

rolling plan to ensure that the strategic direction pursued retains full relevance on an annual basis. To ensure this effort is adequately governed the Foundation shall be establishing an eSkills Strategic Consultation Committee that brings together all relevant parties that could contribute to the strategic process. This committee would also serve as a key annual focal point for all invited participants in relation to the digital skills domain.

Communicating in a digital environment within the context of technology and innovation has changed public expectations and the way that individuals communicate with one another. In an environment that is increasingly more accessible by everyone but at the same increasingly bombarded by a stronger digital presence by companies and individuals. To communicate successfully with individuals across all sectors, the Foundation needs to ensure that its communications plan is effective and addresses the various online mediums that are also being used by trainees, individuals, businesses and industries.

Another recommendation relates to aspects of economic growth in the context of future technology also referred to emerging and enabling technologies. New technologies require new capabilities and digital skills to unlock and improve productivity and efficiency in existing industries. The report identifies a number of leading market technologies and recommends that an online reference technology board is published to serve as a benchmark for technology adoption and corresponding market usage.

Funding sustainable initiatives business models is a recommendation area that takes into account aspects of project continuity as well as incorporates a triple bottom line approach taking into account stakeholder interest, the environment and society. The Foundation has a key educational role to play in this regard especially with the current strong drive in implementing innovative ideas. Embedded sustainability models in terms of purpose and processes are a key driver towards competitive advantage.

A key aspect that is increasingly assuming added value is the quality of ICT teaching professionals and guidance at the local level. The recommendations in this field aim to provide students at an early stage with a fuller industry experience by inviting experts to the classroom. This initiative can provide the educational system with relevant industry input to expose the use of applied technology. In addition to the learner's experience, it is being suggested to set up a project with guidance practitioners to

enable a better understanding of the evolving pervasive characteristics of technology in today's market.

The strategy looks into the evolution of the quality in curriculum design, more specifically the aspect of digitisation by design. From a digital skills perspective, the Foundation has a stake in supporting the introduction of ICT changes in curriculum across all educational structures, particularly to ensure harmonisation of new curricula across public, private and independent education organisations. In addition, the report considers the use of EU-based self-reflection tools that can support the measurement and rating of digital preparedness within local educational structures.

In relation to continuous professional development (CPD), the strategy points towards sustained industry collaboration and the development of industry-based CPD toolkits. The development of such toolkits could assist various industries in establishing the relevant core skills that shall be required in the coming years. It is understood that like previous industrial revolutions many jobs in the market today will be sacrificed with new jobs being created. A lot of these new jobs don't even have a name as at today and therefore the need to address skills gaps through continuous training assumes added importance.

Another element that this strategy highlights related to the upskilling and specialisation of the workforce leading to improved retention of the existing industry workforce. In this regard, it is being suggested that the Foundation supports initiatives at national level leading to the provision of short-cycle specific training. This short-cycle training is intended to support agile upskilling of the workforce in specific areas of business. Such training should be aimed at providing a more flexible workforce through broadened skill set.

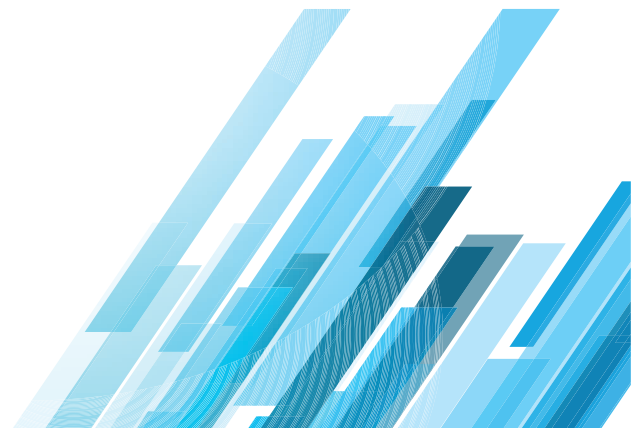
The strategy also suggests that a framework for grading and evaluating digital competence is developed. Such a scoreboard is to bring together relevant data sets from representative industries, local educational structures and available statistical and market data into a focused analytical portal. This initiative can assist the Foundation in planning out strategic committee meetings and allows for improved digital skills measurement and evidence-based evaluation.

The strategy also looks into the Foundation establishing initiatives that support a shift

of youth focus from the consumer type towards a more participative use of technology and online systems. In other words, this initiative aims to address culture in which whole sections of society act as consumers only and do not engage with technology to make effective use. This aspect limits the knowledge and competence element within society, more particularly at a younger age. In this respect, it is being recommended to promote collaboration projects with local and EU networks to support participative projects.

Reducing the mismatch between the skills available and those demanded for the digital transformation of the economy is one of the key objectives of this strategy. At society level, combatting digital divide assumes a greater importance particularly in emerging economies with the use of internet being one of the most fundamental and vital infrastructures at national level. Fostering stronger relationships between public and private organisations is necessary to address digital gaps. The digital divide in today's knowledge economy is no longer about access to technology, but the ability of individuals entering the labour market using technologies intelligently and creatively to become part of a society that flourishes in an increasingly digital world.

One final recommendation as part of this strategy relates to the opening up to a professional structure in the domain of ICT. As a result of the field work undertaken, a structure that supports the recognition for IT professionals at local level, was favourably considered. It is being recommended that the Foundation rolls out a campaign to introduce a framework for ICT professionals already in existence at EU level to the local market and individual professionals. Through the recommendations presented in this strategy the Foundation aims to establish a renewed way of addressing stakeholder engagement in relation to digital skills.



# 04

## Definitions, Metrics & Monitoring

### An introduction

Information and communications technologies (ICT) play an increasingly important role in our professional and private lives, and digital competence is of growing importance for every individual. In the future, nearly all jobs will require digital skills. However, European Commission figures in 2017 show that two-fifths of the EU workforce have little or no digital skills. In addition, despite continued high levels of unemployment, there could be 756,000 unfilled jobs in the European ICT sector by 2020 due to the skills mismatch.

This situation is even more challenging in certain geographical areas such as south-eastern Europe, among socially vulnerable groups (in particular, the unemployed and the disabled) and the elderly. Despite favourable developments in the digital literacy of citizens, the digital skills gap needs to be narrowed further. Digitalisation has several impacts on the labour market. On the one hand, new business models, products and machines create new jobs; while on the other hand, automation contributes to the elimination of jobs or their relocation to countries with lower labour costs. To remedy this situation, developing the digital skills of the EU workforce is essential and reducing the mismatch between the skills available and those demanded for the digital transformation of the economy has been a key EU-level priority over the past decade<sup>1</sup>.

### Definitions

There are various definitions for digital skills. Several terms, such as 'digital literacy', 'digital competence', 'ICT-related skills' and 'e-skills' are often used synonymously to describe digital skills.

### E-Skills

The European e-Skills Forum adopted a definition of the term "e-skills" covering three main categories.

- **ICT practitioner skills:** the capabilities required for researching, developing, designing, strategic planning, managing, producing, consulting, marketing, selling, integrating, installing, administering, maintaining, supporting and servicing ICT systems.
- **ICT user skills:** the capabilities required for the effective application of ICT systems and devices by the individual. ICT users apply systems as tools in support of their own work. User skills cover the use of common software tools and of specialised tools supporting business

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<sup>1</sup>Kiss, M. 2017, 'Digital skills in the EU labour market'.

functions within the industry. At the general level, they cover “digital literacy”.

- **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 /administrative and organisational processes; and /or to establish new businesses. <sup>2</sup>

## Digital skills

In general, digital skills encompass a range of basic to highly advanced skills that enable the use of digital technologies (digital knowledge) on the one hand, and basic cognitive, emotional or social skills necessary for the use of digital technologies, on the other hand. In its background report on skills for a digital world, the Organisation for Economic Cooperation and Development (OECD) distinguishes four types of ICT-related skills necessary at the workplace.

These skills are:

- **ICT generic skills** which are related to the use of digital technologies for professional purposes, such as accessing information online or using software;
- **ICT specialist skills** which are skills needed for the production of information technology (IT) products and services (such as programming, developing applications, managing networks);
- **ICT complementary skills** which are skills for performing tasks associated with the use of ICT, such as information-processing, self-direction, problem-solving and communication;
- And, **Foundation skills** (digital literacy, emotional and social skills enabling the use of digital technologies).<sup>3</sup>

## Digital competence

Digital competence includes not just digital skills, but a set of skills, knowledge, and attitudes concerning the nature and role of information technologies and the opportunities they offer in everyday contexts, as well as the related legal and ethical principles. It also includes critical and reflective attitudes towards the information available and its responsible use. <sup>4</sup> The European Council defined digital competence as follows:

‘Digital competence involves the confident and critical use of information society technology (IST) for work, leisure, learning, and communication. It is underpinned by basic skills in ICT: the use of computers to retrieve, access, store, produce, present and exchange information, and to communicate and participate in collaborative networks via the Internet.’

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<sup>2</sup> ‘User guide for the application of the European e-Competence Framework 3.0’ 2016, A common European Framework for ICT Professionals, in all industry sectors. <sup>3</sup> ‘Skills for a Digital World’ 2016 <sup>4</sup> Kiss, M. 2017,

The IEA International Computer and Information Literacy Study (ICILS) explicitly recognized the two contributing elements (technology and information literacy) that are evident in most definitions of ICT literacy. It defined computer and information literacy as “an individual’s ability to use computers to investigate, create, and communicate in order to participate effectively at home, at school, in the workplace, and in society”.<sup>5</sup>

## Analysis of former studies

In the European Commission’s report ‘Measuring Progress and moving ahead’ evidence suggests that Europe’s Public Employment Systems (PES) do not perform well when it comes to job matching for ICT practitioners. There are a number of reasons for this, including lack or low uptake of occupational and competence frameworks in the e-skills area. Member States have embarked on policy actions, at national and sub-national level, to establish coherent systems to steer relevant professional skills to where there is demand for ICT practitioners and to set up the infrastructure for counselling job seekers in issues concerning re-skilling and certification.<sup>6</sup>

A survey conducted by the European Commission in 2016, ‘ICT for work Digital Skills in the workplace’ shows that digital technologies are widely used by workplaces in the European Union. The vast majority of European workplaces use desktop computers (93%), broadband technology to access the internet (94%), portable computers (75%) and other portable devices (63%). Much smaller proportions of workplaces use an intranet platform (22%), CNC machine or tools (8%) or programmable robots (5%). Specific sector-based trends, with the use of certain technologies concentrated in specific sectors, can be observed. Large-sized workplaces report the highest use of all the digital technologies listed.

Nevertheless, 15% of workplaces report the existence of digital skill gaps in their workforce, indicating that a proportion of their employees are not fully proficient in carrying out tasks involving the use of digital technologies. Large workplaces and workplaces in the manufacturing or construction sectors are more likely to report digital skill gaps. Overall, the density of the digital skills gap varies greatly according to the type of digital skills in relation to the different occupations. Larger digital skills gaps are more likely to be found in the high-skilled (managers, technicians) and in medium-skilled (clerical workers, sales workers) occupations, and to a lesser extent in the low-skilled occupations, with the exception of workers in elementary occupations.

The study by the European Commission has shown that awareness of the existence of digital skills gaps is frequently not accompanied by initiatives undertaken to address the issue: 77% of workplaces reporting digital skills gaps have not undertaken any actions, while only 12% have done so, and 11% plan to. Micro-sized workplaces have been least active in this respect, with only 9% having taken action to tackle digital skill gaps and 81% having not undertaking any actions

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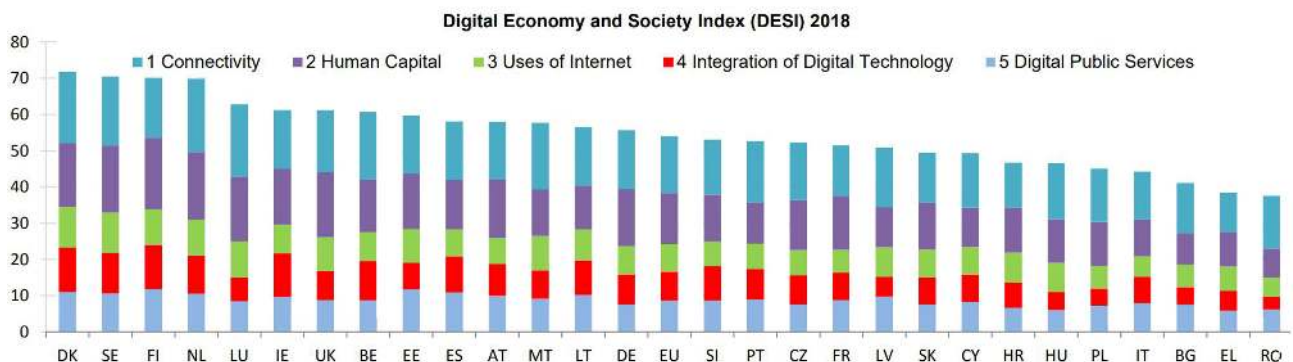
<sup>5</sup> Fraillon, J., Ainley, J., Schulz, W., Friedman, T. & Gebhardt, E. 2013 ‘Preparing for Life in a Digital Age’.

<sup>6</sup> Gareis, K., Hüsing, T., Birov, S., Bludova, I., Schulz, C. & Korte, W. 2014 ‘E-Skills for jobs in Europe: measuring progress and moving ahead’.

at all. Overall, training (both in the form of on-the-job training and development programmes and external training) appears to be the most common action undertaken to tackle the digital skills gaps, while changes to the work organisation and the hiring of new staff appear to be much less common. Excessive cost is the main barrier encountered when undertaking actions to deal with digital skills gaps.<sup>7</sup>

A low level of activity in terms of policy and stakeholder initiatives does not necessarily indicate that the country is not prepared to meet the demand for suitably qualified ICT practitioners in the future or that it does not offer its population the required means to develop their ICT user skills. For example, low index values on digital literacy for countries like Sweden and Finland only indicate that the need for further action, initiatives, and policies in this domain no longer exists or only at a reduced level for minority groups since the vast majority of the population has already achieved high digital literacy levels. This shows that different types and intensity levels of policies and initiatives are needed depending on the stage of digital literacy or e-skills availability and supply in the workforce a country has reached.

The Digital Economy and Society Index (DESI) is a composite index that summarizes relevant indicators on Europe’s digital performance and tracks the evolution of EU member states in digital competitiveness. As shown on the chart below, Denmark, Sweden, Finland, and the Netherlands have the most advanced digital economies in the EU followed by Luxembourg, Ireland, the UK, Belgium, and Estonia. Malta has ranked 12th on the 2018 DESI index. Romania, Greece, and Italy have the lowest scores on the DESI. The DESI Index analyses 5 key components being: Connectivity, Human Capital, Use of Internet Services, Integration of Digital Technology and Digital Public Services.



<sup>7</sup> 'ICT for work: Digital skills in the workplace' 2016.

In 2017, all Member States improved in the DESI index. Ireland and Spain progressed the most (close to 5 points as opposed to an EU average of 3.2). On the other hand, there was a low increase in Denmark and Portugal (below 2 points).

**The Connectivity** dimension in the DESI index measures the deployment of broadband infrastructure and its quality. Access to fast and ultrafast broadband-enabled services is a necessary condition for competitiveness. On Connectivity, the highest score was registered by the Netherlands followed by Luxembourg and Denmark. Greece, Croatia, and Italy had the weakest performance. Fixed broadband is available to 98% of Europeans, and 80% of European homes are covered by fast broadband.

**The Human Capital** dimension measures the skills needed to take advantage of the possibilities offered by digital. Denmark, Sweden, Finland, and the Netherlands obtained the highest scores, and Romania, Bulgaria, Greece, and Italy got the lowest scores on the index. 81% Of Europeans go online regularly (at least once per week), up by 2 percentage points compared with 2016, however, 43% of Europeans still do not have basic digital skills, and 17% have none at all. These figures confirm the growing importance of digital skills in the fight against digital exclusion. Internet users are the most active in Denmark, Sweden, and the Netherlands. On this dimension, Romania, Italy, and Bulgaria are at the bottom of the list. There are proportionally more men than women with at least basic digital skills (respectively, 60 % and 55 %). In addition, only about 31 % of people with low education levels or no education have at least basic digital skills. In 2017, 10 % of the EU labour force had no digital skills, mostly because they did not use the internet. 35 % did not have at least basic digital skills, which are now required in most jobs.

Large disparities across the EU Member States remain in terms of **use of Internet services**. People in the EU engage in a range of online activities – they consume content, communicate, shop, use online banking services and much more. Such activities are captured in DESI's Use of Internet Services dimension. Denmark, Sweden, the Netherlands, and Luxembourg have the most active internet users, followed by Finland, Malta, the UK, and Estonia. Romania, Bulgaria, and Italy are, in turn, the least active. Participation in online social networks increased moderately in the EU in 2017, to reach 65% of internet users. The upward trend in eCommerce continued in 2017, with about 68% of EU internet users now shopping online. Although most EU internet users engage in online shopping, only about 22% of them ordered goods or services from the other Member States online in 2017, which suggests the existence of important barriers. The goods and services most frequently bought online in 2017 were clothes and sports goods, followed by, accommodation services and household goods.

In the dimension of **Integration of digital technology**, businesses are the most advanced in Denmark, Finland, and Ireland, and the least developed are Romania, Poland, and Bulgaria. European businesses are increasingly adopting digital technologies, such as the use of business software for electronic information sharing (from 26% in 2013 to 34% of enterprises in 2017), sending electronic invoices (from 10% in 2013 to 18% of enterprises in 2016) or using social media to engage with customers and partners (from 15% in 2013 to 21% of enterprises in 2017). eCommerce by SMEs also grew slightly (from 14% in 2013 to 17% of SMEs in 2017). Nevertheless, less than half of these companies sell to another EU Member State.

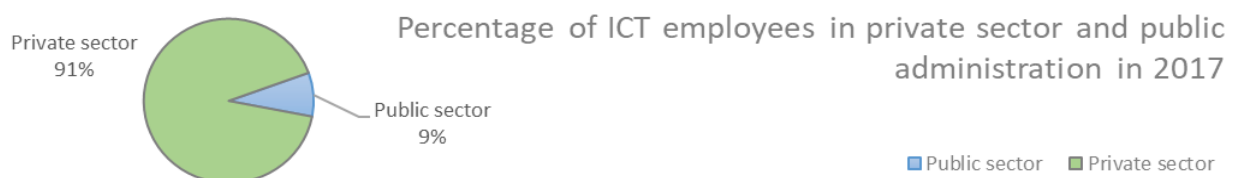
The European champions in **Digital Public Services** are Finland, Estonia, and Denmark with more than 80% of internet users who need to submit forms to the public administration choosing governmental portals. On the other hand, Greece, Hungary, and Romania are lagging behind. 58% of EU citizens who need public services choose to go online. The extent to which e-services reduce the time spent in public administrations encourage citizens to use them. <sup>8</sup>

## Local scenario

On a different note at a local level based on NSO statistics <sup>9</sup> the total number of employees engaged directly in the field of information and communication technology counts 7,381 full-time equivalents in 2017 representing 3.85% of the total gainfully occupied population.

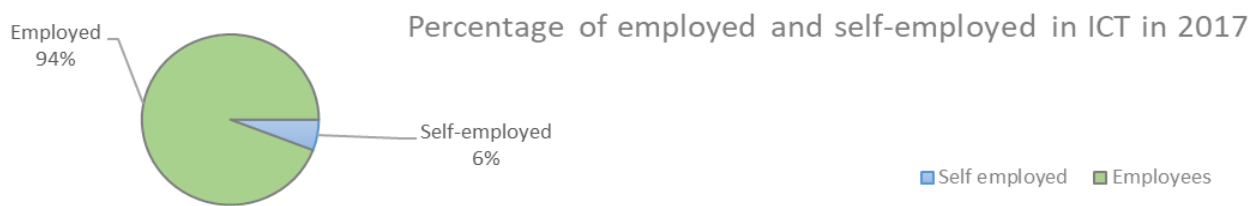
The percentage overall variance between those gainfully occupied across all sectors in 2016 and 2017 is 5.92%. This percentage is however higher when focusing on full-time equivalents working in the Information and Communication industry established at 8.083%.

The employees engaged in the private sector represent 91% of the total population employed in ICT. The remaining 9% of the ICT workforce work within the Public administration.

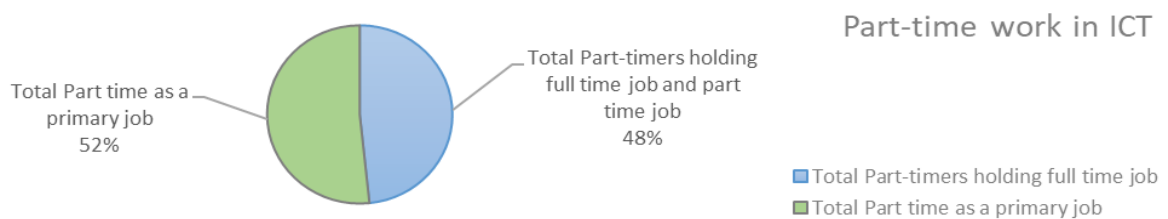


<sup>8</sup> 'The Digital Economy and Society Index (DESI)' 2018. <sup>9</sup> National Statistics Office - NACE codes 58-63 2017.

94% of the ICT workforce work within an organisation, whilst the remaining 6% are self-employed.



The total number of employees occupied in ICT as part-time in 2017 was 1,508 representing 2.48% of the total gainfully occupied part-time population. The percentage change of those gainfully occupied across all sectors on a part-time basis between 2016 and 2017 is 4.74%. In the case of ICT however, the percentage change of those working in this sector is 11.456%. Worth noting that 52% of those engaged in part-time work within the local ICT industry, do not have a full-time job, whereas the remaining 48% have both a full-time and a part-time engagement.



65% of those having a part-time in the ICT sector are males with the remaining 35% being females. 76% of males have a full-time in addition to the part-time job. 70% of those having a part-time job as their primary job in ICT are males.



# 05

## Establishing policies and initiatives landscape

### An introduction

European policy initiatives and national actions have made a major impact in reducing the digital skills gap. More people are now attracted to these jobs and opportunities to train and upskill in digital skills. In coordination with the “Education and Training 2020”, the European Commission has launched the “Digital Skills and Jobs Coalition” in 2016. The purpose of this was to develop a digital talent pool and ensure that individuals and the labour force in Europe are equipped with adequate digital skills.

### The 2010 digital agenda

In the Commission’s 2010 Digital Agenda for Europe, one of the seven flagship initiatives laid out in the Europe 2020 strategy for smart, sustainable and inclusive growth, was created with the aim of establishing a well-functioning digital economy by 2020. The agenda includes policies and actions aiming to extend the benefit of the digital era to all sections of society and the economy. The agenda focuses on seven priority areas for action: creating a digital single market, increasing interoperability, boosting internet trust and security, providing faster internet access, encouraging investment in research and development, enhancing digital literacy skills and inclusion, and applying ICT to address societal challenges such as climate change and an ageing population.<sup>10</sup>

The European Commission launched the eSkills for jobs campaign which took place during 2015 and 2016. The aim of the campaign was to raise awareness of the need for citizens to improve their command of information and communication technology (ICT) skills for work. The campaign ran through 22 European countries raising awareness for education, training, jobs and other opportunities that are available to people with eSkills knowing effectively how to use digital technologies.

The ‘Digital Skills and Jobs Coalition’ was launched in December 2016 to support cooperation among education, employment, and industry stakeholders with the goal of improving the digital skills of the wider population, not just IT professionals. The commission seeks to further reduce digital skills gaps by fostering the sharing, replication and upscaling of best practices in areas such as training and matching for digital jobs, certification and awareness raising. The Coalition’s activities have so far benefited several million citizens, with over 3.7 million training in digital skills provided, more than a million digital skills certifications, 4,500 events have reached over a

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<sup>10</sup> ‘Digital Agenda for Europe’, 2010.

million people and more than 9,000 job placements and internships offered in 2017.

The European Commission's Digital skills and Jobs Coalition tackles the need for digital skills of four broad groups:

- **Digital skills for all** – developing digital skills to enable all citizens to be active in our digital society
- **Digital skills for the labour force** – developing digital skills for the digital economy, e.g. upskilling and reskilling workers, jobseekers; actions on career advice and guidance
- **Digital skills for ICT professionals** – developing high-level digital skills for ICT professionals in all industry sectors
- **Digital skills in education** – transforming teaching and learning of digital skills in a lifelong learning perspective, including the training of teachers

By 2020, the Coalition hopes to achieve the following higher-level goals:

- Train 1 million young unemployed people for vacant digital jobs through internships/traineeships, apprenticeships, and short-term training programmes.
- Support the upskilling and retraining of the workforce and in particular, take concrete measures to support small and medium enterprises (SMEs) who face specific challenges in attracting and retaining digital talent as well as retraining their workforce.
- Modernise education and training to provide all students and teachers with the opportunity to use digital tools and materials in their teaching and learning activities and to develop and upgrade their digital skills.
- Reorient and make use of available skills and carry out awareness-raising about the importance of digital skills for employability, competitiveness, and participation in society.

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<sup>11</sup> Digital Europe, 'Eskills for jobs', < <http://www.digitaleurope.org/Our-Work/Projects/Past-projects/eSkills-for-Jobs>>. <sup>12</sup> 'The Digital Skills and Jobs Coalition' 2018.

## Women in the digital age

One of the main national and even European concerns is the participation of certain groups of society, both for the participation in the ICT industry and for having access to equal opportunities in taking advantage of the digital opportunities. One of these target groups is the female gender where especially in the ICT industry the numbers are very low. In fact, across 35 European countries, fewer than 1 in 5 computer science graduates are women. The OECD's Programme for International Student Assessment shows that men are far more likely than women to pursue a career as ICT professionals.<sup>13</sup>

A study on women in the Digital Age by the European Commission showed that there is a growing gap between men and women's participation in the digital sector in education, career, and entrepreneurship. The Digital Education Action Plan announced by the Commission is a step towards addressing this gender gap by encouraging men and women to take up ICT related education and be able to adapt to the needs of the digital age.<sup>14</sup> As per the European Network for Women in Digital in 2018, for every 1,000 female tertiary graduates in the EU, only 24 have studied ICT-related courses. Only six of these women go on to work in a related professional role. Male graduates in the field currently outnumber females by almost four times, while those male graduates that go on to pursue a career in ICT make the gap become twice bigger. The same disparity can be seen among STEM teachers, speakers, and panellists at tech events, senior managers in ICT companies, as well as entrepreneurs and digital start-up founders. Increased awareness of this gender gap in the European digital sector has led to notable initiatives, at both local and national levels. The European Commission has launched the Women in Digital initiative that foresees greater involvement of women in the tech sector as a means for boosting the economy and allowing a full participation in the society. If more women were to enter the digital jobs market, it could create an annual EUR16 billion GDP boost for the European economy.<sup>15</sup>

The actions to increase the participation of women in digital, as suggested by the Commissioner in charge of the Digital Economy and Society has put the focus on the three main areas including challenging the existing stereotypes, promoting digital skills and education and finally advocating for more women entrepreneurs.

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<sup>13</sup> 'Empowering women in the digital age', 2018. <sup>14</sup> 'Increase in the gender gap in the digital sector- Study on Women in the Digital Age' 2016. <sup>15</sup> 'European Network for Women in Digital' 2018.

## The Grand Coalition for Digital Jobs

In March 2013, the Commission initiated the Grand Coalition for Digital Jobs, a multi-stakeholder partnership that aims to facilitate collaboration among business and education providers and public and private actors. It has two goals: (i) to tackle the shortage of digital skills in Europe, and (ii) to fill the numerous ICT-related vacancies (estimated, depending on the scenario, to grow across all industry sectors between now and 2020, at 756,000)

For the time being, the Grand Coalition is the largest collaborative effort in Europe, which aims to offer more ICT training in collaboration with the industry, implement job placement programmes, provide more digitally aligned degrees and curricula at all levels and in all types of training and education, and motivate young people to study ICT and pursue related careers. The Grand Coalition, together with the 13 national coalitions, has trained over 2 million people since its launch. It has helped break down silos in the area of digital skills development and has contributed to collaboration between governments, education, and industry.<sup>16</sup>

## The Digital Single market Strategy

The European Union has set as one of its top key strategies the objective to open up to digital opportunities for people and businesses, with an aim to strengthen Europe's position as a world leader in terms of the digital economy. In 2014, the president of the EU commission stated that by creating a connected digital single market, hundreds of thousands of new jobs could be created, notably for younger job seekers. The digital single market will have an enormous impact on the labour market and society in general. In its communication on a Digital Single Market Strategy for Europe, the Commission stated its intention to create a European Digital Economy and society with growth potential. Creating an inclusive digital society where citizens have the right skills to seize the opportunities of the Internet and boost their chances of getting a job is an important aspect.

The Digital Single Market Strategy by the European Commission aims at ensuring access to online activities for individuals and businesses under conditions of fair competition, consumer and data protection, whilst doing away with geo-blocking and copyright difficulties. The Digital Single Market creates opportunities for new startups and allows existing companies to reach out to a market of over 500 million people. It is estimated that the completion of the Digital Single Market Strategy has the potential to contribute annually around Euro 415 billion to Europe's economy, whilst creating jobs and positively transforming public services. The strategy offers also an important opportunity for every citizen, provided that one is equipped with the right digital skills. The increased use of digital technologies is expected to improve that citizens' access to information resulting in better job opportunities.

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<sup>16</sup> Kiss, m. 2017, 'Digital skills in the EU labour market'. <sup>17</sup> 'Shaping the Digital Single Market' 2017.



Whereas the Digital Market Strategy has been successful in increased access to online activity and consequently opening up industry growth potential, in a study by Eurobarometer some thought-provoking information was recorded. The study looked into the attitudes towards the impact of digitisation and automation on the citizen's daily life. Through this study, it emerged that 75% of Europeans think that digitisation has a positive effect on the overall economy and 64% say on the society. The report also highlighted that 74% think that digitisation shall replace more jobs than it would actually create. In addition, 44% of respondents currently in employment believe that their job could as a minimum be partly be done by a robot, some form of automation or artificial intelligence.<sup>18</sup>

The Skills Guarantee was proposed by the European Commission to help low-skilled adults acquire a minimum level of literacy, numeracy and digital skills and progress towards an upper secondary level of education. The resulting initiative, now called "Upskilling Pathways" was adopted by the Council in December 2016<sup>19</sup>. Also related to the New Skills Agenda was a review of the European Qualifications Framework, to ensure a better understanding of qualifications across the EU, and a blueprint for sectorial cooperation on skills, to improve skills intelligence and anticipation in specific economic sectors. Other related actions include creating a tool to help identify the skills and qualifications of migrants, including asylum-seekers and refugees; making a Digital Skills and Job Coalition that would build upon the existing Grand Coalition for Digital Jobs.

<sup>18</sup> 'Shaping the Digital Single Market' 2017. <sup>19</sup> 'Employment, Social Affairs & Inclusion' 2017.

## Local context

Digital technologies can improve the quality of life of all citizens. Every Maltese, irrespective of age, gender, disability, education, economic means or race should grow as a digital citizen with rights, responsibilities, and abilities to access and use ICT. Digital skills empower citizens to seize opportunities presented by technology and digitisation.

The eSkills Alliance Malta was launched in 2010 with the aim to address skills shortages within the ICT industry. The Alliance had an important role in the consultation process for the development of the future ICT workforce and in providing businesses within the industry with the skills they require. The Alliance was made up of the University of Malta, MCAST and the Ministry for Education, Employment and the Family as the main decision-makers in ICT education and skills supply. The Malta Council for Science and Technology and MITA were also part of this body.<sup>20</sup> The Alliance was dissolved in March 2013.

International best practice indicates that Multi-Sectoral Partnerships are one of the key approaches in achieving the synergy of development and sustainability in the right digital skills.

The eSkills Malta Foundation was established by the Maltese Government to introduce a paradigm shift and harness synergy at strategic level. On September 2013, the eSkills Malta Foundation was set up as a multi-stakeholder initiative that recognises synergy of action between Government, education and industry, focusing on enhancing the ICT skills that are fundamental for Malta to sustain a Digital Economy. The Foundation follows and participates in various EU-led policies, guidelines and initiatives. The eSkills Malta Foundation was set with the objectives:

- To advise Government and stakeholders on matters relating to eSkills 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 eSkills potential locally and internationally

<sup>21</sup>

In July 2017, the National Skills Council in Malta set up a sub-committee with the scope of identifying a workable approach to address identified digital skills mismatches and related issues

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<sup>21</sup> eSkills Malta Foundation < <https://eskills.org.mt/en/Pages/Home.aspx>

in Malta, draw a report analysing the situation, and provide a set of recommendations to address the problem.

Digital Malta is a vision for the country in covering 2014 to 2020 when Malta will prosper as a digitally enabled nation in all sectors of society. This goal advances the nation's digital economy to let business prosper and improve the quality of people's lives. Digital Malta will take ICT policy development and implementation to a higher gear, meeting the expectations of all - the Citizen and civil society, business and government.

This vision will be enabled by supportive regulation and legislation, sound infrastructure and productive human capital. These building blocks will empower stakeholders to collaborate both within and across sectors. To pursue this, six strategic themes including Digital citizen, Digital business, Digital Government, Regulation and Legislation, Infrastructure and Human Capital) have been identified and a list of goals and initiatives have been listed, these define the desired outcomes and determine where effort should be directed. The goals have been defined in such a way that everyone can reap the benefits that ICT can bring better education, stronger businesses, efficient Government and much more. Collectively, these objectives amount to a better quality of life for all Maltese Citizens.

The aim of the Digital Malta Strategy is to transform Malta into a digitally enabled nation. The strategy outlines three main strategic themes: **Digital Citizens, Digital Government and Digital Businesses** with three strategic enablers in legislation, human capital, and infrastructure. The approach seeks to promote more start-ups, foreign investment, enable strategic alliances, encourage investment and nurture niche service providers. Business is encouraged and supported to exploit (i) the opportunities of the European Digital Single Market, (ii) Malta's strategic location in the Mediterranean, with ready access to the European and North African markets, (iii) Government's strategic alliances with foreign ICT organisations and (iv) opportunities to expand into new or bigger markets.

The list of initiatives proposed includes creating an education and awareness programme at a community level to boost ICT competences, media literacy and confident, critical and safe use of the Internet with a particular focus on vulnerable groups. The strategy aims to empower the young through a safer internet, by enabling the digital citizenship to become a part of the National Education Curriculum, to equip children and youths with the abilities to interact and use the Internet safely and intelligently.

An ongoing programme to assist citizens, the ageing and the vulnerable will be initiated to support their use of ICT. To address this, equipped ICT access and training centres will be set up within local communities to support the programme. Internet accessibility standards will also be promoted to enable everyone to use and access content online. The Digital Malta strategy aims to promote NGA networks by demonstrating their potential applications and by supporting their introduction in homes, offices and public buildings.

Amongst others, the strategy also supports the provision of free access to wireless internet in public spaces around Malta. Through this strategy, portable devices were also distributed among students, teachers, and LSAs. This is part of the government's vision to transform formal education through the use of digital technologies. Through this strategy, a programme will be initiated to provide and support the development of high-quality online content that is appealing and educational. The Government also aims to develop language tools to support the use of Maltese as a mean for teaching and learning.

Malta's businesses have a greater chance of success if powered by ICT. Local firms will be encouraged and supported to embrace ICT to transform themselves into digital enterprises. This will strengthen their competitiveness. Government working with industry will set a series of initiatives for sectors facing stiff competition. The Digital Malta strategy aims to establish a forum comprising of executives from leading local firms and industry representative bodies. The aim of this forum will be to develop programmes to raise awareness on how ICT will help industries to transform themselves through technology to become more profitable.

Amongst other initiatives, the Government will support enterprises by administering ICT training programmes for their employees. The focus of these programmes will be on unskilled and semi-skilled workers with the objective of improving their productivity, employability, and mobility. Furthermore, ICT up-skilling and re-skilling programmes will be re-introduced. In collaboration with stakeholders, the government will invest its resources to cultivate a widespread entrepreneurial mindset, allowing for the launch of more ICT start-ups and young high-growth ventures exploiting ICTs.

Measures will also be taken to attract foreign ICT companies, which will include corporate packages, structures and business models that target FDI in ICT ventures, start-ups, ICT educational collaborations and niche markets including digital games, mobile apps, and other creative content. This strategy also aims to provide incentive schemes and voucher-based credit lines to enable local SMEs and co-operatives to benefit from free or subsidised consultancy services.

In line with this strategy, the Government with the industry stakeholders will develop measures to sustain and grow the local eCommerce market on both the supply and demand sides. To sustain this the Government will implement initiatives to assist the adoption of eCommerce by business sectors with the potential to capitalise on web technologies and penetrate foreign markets.

The Digital Malta Strategy also aims to promote different forms of electronic transactions and emerging monetisation models to explain business models, technologies, costs, and risks. To support Local ICT companies in taking advantage of pan-European and international R&I funding frameworks and industrial development funding opportunities, the Government will provide logistical and brokerage support and offer incentives to companies to invest their time and human resources in researching and developing innovative products. The Government will also set up a multi-stakeholder Innovation Centre to offer incentives for ICT-themed R&D, idea-generation, incubation and innovation with a view towards co-creation and open innovation. The purpose of this incentive will be to create an environment to enable open collaboration by enterprises, academic institutions and public bodies wishing to engage in R&I activities

Under the Digital Malta strategy, government services will be more user-friendly. Online government services will be accessible through smart devices and mobile-friendly applications as well as websites and social media. The concept of service to the community needs to be expanded so that Government involves citizens and businesses in decision-making processes. In addition, public data, created and managed by Government, should be openly shared across entities and authorities, and externally with third parties for their commercial re-use. This will prevent costly duplication and re-invention.

Amongst other initiatives aimed towards the citizen, the take-up of online services will be encouraged by making them easy to use and available on mobile devices. Citizens and organisations will be able to transact securely with the government using different channels. The use of encouraged services includes online forms, ePayments, and eInvoicing. Citizens will also benefit from a one-stop shop concept. They will be able to access services from their home or office or through agents.

Moreover, the Government will also collaborate with stakeholders to support a digital environment where it will assist departments and entities to adopt a technology that integrates cross-departmental services. This will facilitate the use, management, retention, preservation and archiving of born-digital records so that these remain accessible and usable. It will also protect corporate knowledge, and improve data security, integrity, accessibility, traceability and archiving.

The government will use its position as a major procurer to stimulate demand for innovative ICT. It will encourage collaboration between local players and, as an early adopter, it will act as a showcase for locally produced technology. Through this strategy, a complete ICT infrastructure will also be provided for educators, students, and parents, encouraging a digital mindset and widening learning opportunities.

Educators will be supported to make full use of eLearning platforms and other digital learning technologies. Citizens will be empowered by providing them with secure and easy access to their health records. Similarly, healthcare providers will gain secure and seamless access to the patients' records.<sup>22</sup>



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<sup>22</sup> Digital Malta, National Digital Strategy 2014 -2020 < <https://digitalmalta.org.mt/en/Pages/Home.aspx>>

# 06

## Technology and Industry Developments

### An introduction

Technology is enhancing traditional business models and creating new ones at an unprecedented rate.

Against the backdrop of disruption and change, technology has evolved beyond simply being an efficiency instrument and a way to reduce cost, to be a real enabler of growth. Many organisations are discovering that the implications of this shift on people skills and culture is profound.

Europe needs a strong business environment, which brings users digital services that are modern, efficient and easy to use. For this to happen, industries and the public sector should adopt digital technologies to the fullest. Companies that use digital technologies are more innovative, competitive and will grow faster and create more jobs. Europe's challenge is how to get more people to use technologies and how to get more companies - SMEs and start-ups - to reap the benefits of digital transformation.

Digital innovation is causing disruption to traditional business models and business leaders need to move fast to deliver new platforms and applications to meet customer needs. Businesses now operate in a space where the rules have changed dramatically and they need to identify how technology can create new value. Those businesses that embrace the new space and identify innovation opportunities will achieve an advantage over their competition. Technology, and specifically Artificial Intelligence, is a new factor of production and has the potential to introduce new sources of growth, changing how work is done and reinforcing the role of people to drive growth in business.<sup>23</sup>

Malta's businesses have a greater chance of success if powered by ICT. Local firms will be encouraged and supported to embrace ICT to transform themselves into digital enterprises. This will strengthen their competitiveness and make them more export-orientated. As stated earlier, the Digital Malta Strategy to support this, will promote more start-ups, attract foreign investment, enable strategic alliances, encourage investment and nurture niche service providers. By adopting digital technologies, businesses can enhance efficiency, reduce costs and better engage customers and

<sup>23</sup> Moore, R 2017, 'Technology is an enabler for business growth' < <https://www.fin24.com/Tech/Opinion/technology-is-an-enabler-for-business-growth-20170612>>

business partners. Furthermore, the Internet as a sales outlet offers access to wider markets and potential for growth.<sup>24</sup>

## The healthcare industry

Digital technology, including mHealth and eHealth, is an inevitable part of the future of European healthcare. Trying to meet the diverse needs of an ageing population has created an even greater demand for nurses, physical therapists, doctors, and other healthcare specialists to be well trained in emerging technology. An outlook by the Bureau of Labor Statistics reports that more than half of the occupations within the healthcare industry are projected to increase 38% by 2024.<sup>25</sup> As one of the most dynamic sectors of the economy, the healthcare industry has continuously used eLearning to train its professionals with relevant and effective materials and information. eLearning allows medical professionals to learn without disrupting their already demanding schedules. Information about diseases, treatment methods, using new medical technology, and administering helpful drugs is easily and quickly updated. Health professionals can access material anywhere during any time of the day, and health-based government and independent organizations use eLearning systems to educate the public about diseases and necessary health-related services.<sup>26</sup>

The digitisation of healthcare has long been on the European agenda to modernise and improve healthcare across the Member States. The focus has recently shifted from developing the technology to implementation of digital healthcare and eHealth. For the digital health future, it is recommended that greater emphasis is placed on the needs and abilities of the end-users, the health professionals. This should be done through better incentives and improved training:

- Widening digital literacy in healthcare depends on sufficient demand for digital healthcare. This can be achieved through reimbursement schemes that encourage the use of digital solutions in healthcare.
- Continuous education of health professionals in the knowledge, use and application of digital health technology should be central to the European agenda for digitizing healthcare. The health professionals committee of the European health parliament considers digital literacy among health professionals paramount for the successful, effective and ethical implementation of digital solutions in healthcare.<sup>27</sup>

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<sup>24</sup> Digital Malta, National Digital Strategy 2014 -2020 < <https://digitalmalta.org.mt/en/Pages/Home.aspx>>

<sup>25</sup> Bureau of Labor Statistics, 'Healthcare Occupations'.<sup>26</sup> eLearning Industry 2018, 'Top 5 growing industries using eLearning' < <https://elearningindustry.com/growing-industries-using-elearning-top-5>>

<sup>27</sup> European Health Parliament 2016, 'Digital skills for health professionals' < <http://www.healthparliament.eu/digital-skills-health-professionals/>>

## Computer and information technology

The Bureau of Labor Statistics reports that employment in the computer and information technology (IT) industry is expected to increase by 13% within the next decade from 2016 to 2026.<sup>28</sup> This means that over 500,000 new positions including computer programmers, network administrators, and security analysts will need to be filled. The Computer and Information Technology industry contributes to the economic growth and advances in every industry. Therefore, the training and development of current and future professionals within this sector must be seamless to accomplish a number of financial, political, and social objectives.<sup>29</sup>

Computer and IT professionals use eLearning platforms to stay ahead of current technology and to create tomorrow's technology. eLearning not only increases their accessibility to new concepts and designs but also allows professionals within this industry to collaborate with other computer and IT professionals around the world.

## Education

The education industry has changed significantly since the introduction of technology in the classroom. From pre-primary to graduate school, obtaining an education can be done in the comfort of one's home. Opportunities to learn through online academies, podcasts, and live streaming lectures have transformed the way students learn and instructors teach. Investing in educational learning platforms and software technology has become the new norm. As of 2018, it was estimated that the education industry is expected to grow 7% in the next few years, and the introduction of eLearning has allowed this industry to become a commercial enterprise set to reach \$331 billion per year by 2025.<sup>30</sup>

## Construction

Construction is one of the fastest growing industries using eLearning. This is due to the increase in the need for engineers and contractors to access information in external environments and remote locations. The complexity of the construction industry has increased due to architectural design changes, environmental considerations, government regulations, and national building codes. eLearning has allowed construction professionals to cost-effectively increase their knowledge base while exceeding the client's expectations.

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<sup>28</sup> Bureau of Labor Statistics, 'Computer and Information Technology'.

<sup>29</sup> eLearning Industry 2018, 'Top 5 growing industries using eLearning' < <https://elearningindustry.com/growing-industries-using-elearning-top-5> > <sup>30</sup> 'Global E-Learning Market Analysis & Trends - Industry Forecast to 2025' 2017.

The success of a construction company is dependent on its ability to simultaneously deliver information to multiple sites. eLearning solves this unique challenge for training managers so that they can deliver compliance and design information to multiple sites <sup>31</sup>

## Retail industry

Even though technology is very rapidly changing the expectations of shoppers and what it is possible to deliver in terms of the retail experience for consumers very few retailers are taking advantage of the technology that is available to them. Nowadays, we are now starting to see many more self-service point-of-sale tills and the use of contactless and smartphone payments. In some retail outlets, mobile payment systems can be used to scan the barcode on the spot, allowing the consumer to pay for small items and leave the store without visiting the point of sale terminal at all. While the use of payment technologies is growing – driven strongly by customer demand, we are seeing very little use of in-store technologies such as digital shelf-edge displays, where retailers can alter prices of displayed products instantly. Having such a capability would make a tremendous difference to supermarkets, who could respond to market price fluctuations or the competition almost immediately. They could be totally consistent and accurate with pricing and even adjust prices to take advantage of peaks in buying of certain products throughout the daily and weekly cycle. They would also save millions by reducing the amount of time staff have to spend on changing prices all over the store.

## Tourism industry

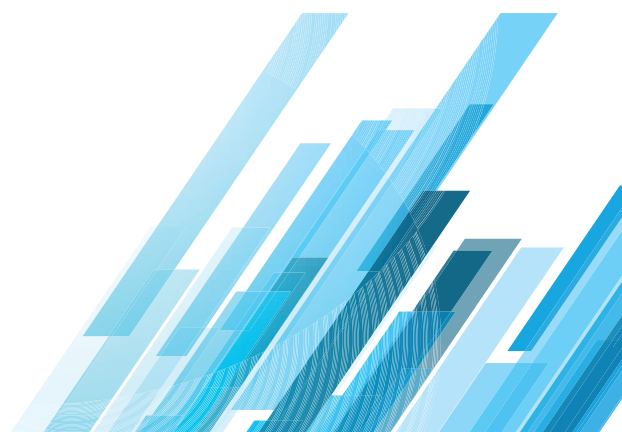
With extensive internet use via the online and mobile platforms, throughout all stages of the travel experience, individuals in the travel and tourism industry are adapting marketing strategies in order to maximise their visibility and to maintain a competitive advantage. Moreover, there is a clear shift in booking patterns toward mobile and tablet booking devices.

Mobile internet potential is expected to intensify with the growth of the younger and more digital-savvy population in the region. Strong growth of the mobile platform is expected to play an important role in the business strategies of travel and tourism businesses throughout the region.

Booking a trip today, and booking a trip 10 years ago were two completely different experiences. Individuals are now able to book a flight and accommodation for their holiday, simply by using their internet. Customers have been able to make use of online

<sup>31</sup> eLearning Industry 2018, 'Top 5 growing industries using eLearning' < <https://elearningindustry.com/growing-industries-using-elearning-top-5>>.

booking sites for quite some time, but the interfaces have become much more user-friendly, not to mention a lot faster. In the past, while customers may have been able to easily purchase tickets online; changing, cancelling, or requesting a refund for those tickets always involved extra steps. Today, many airlines strive to make their booking sites a one-stop shop where customers can make changes just as easily as they purchase tickets.<sup>32</sup>



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<sup>32</sup> Kow, N. 2017 'Travel trends that will drive the tourism industry in 2018 and 2019'.

The methodology adopted for this research project takes into account four main tiers, namely 'the ICT professional', 'education', 'industry' and 'the citizen'. The methodology adopted to address the business objectives set out by this project establishing a strategy for the years 2019 and 2020 are the following:

- Online questionnaires targeting the following cohorts:

- › ICT professionals

- The IT professional
- Proficient knowledge worker
- Basic IT user

- › Industry

- Employer
- Employee
- Self-employed

- Targeted intensive workshops for:

- › The education sector
- › The citizen

- One-to-one meetings held with:

- › Social partners representing:

- Industry
- Employers

- › Academia

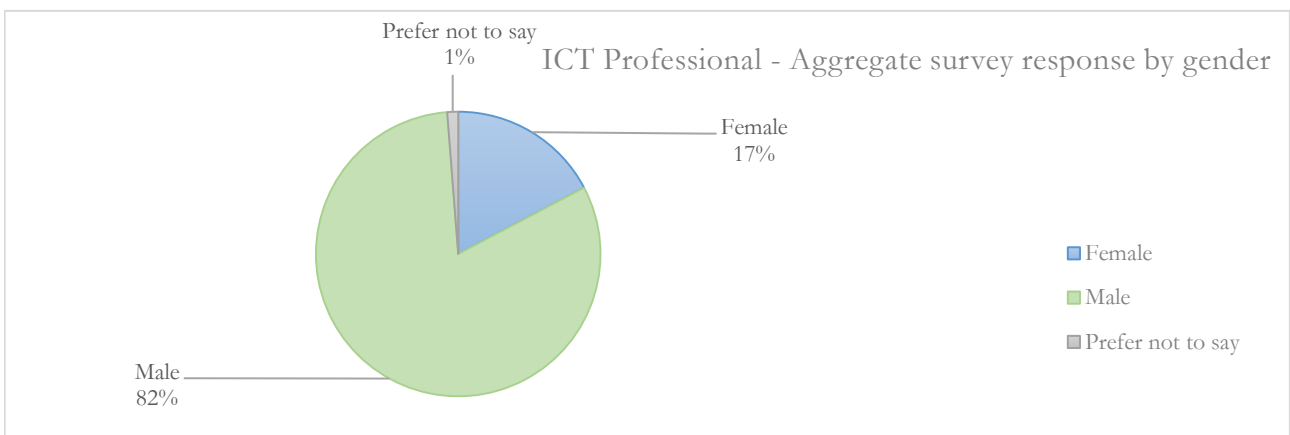
- › Educational institutions

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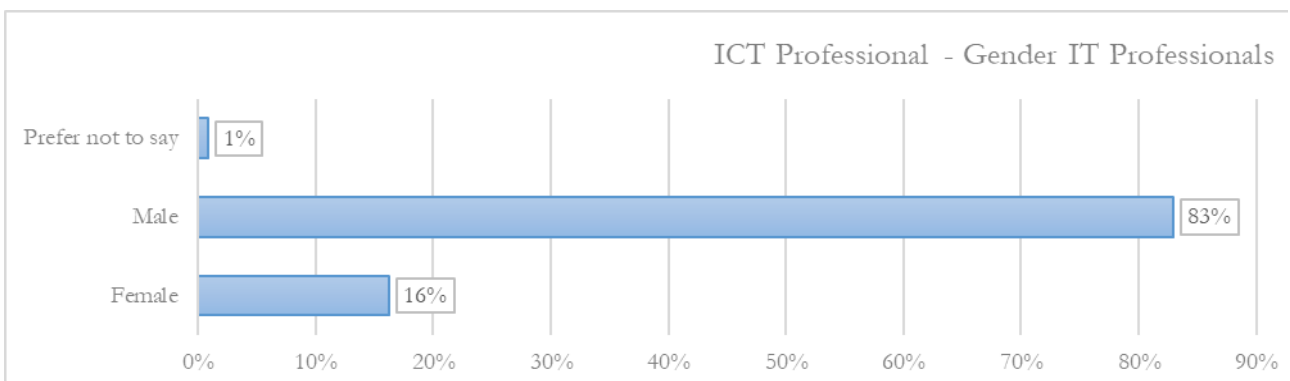
## Data Analysis

The data analysis section provides information about the profile and the respondents' preferences with respect to digital skills. The online questionnaires were targeted towards ICT professionals and the Industry workforce.

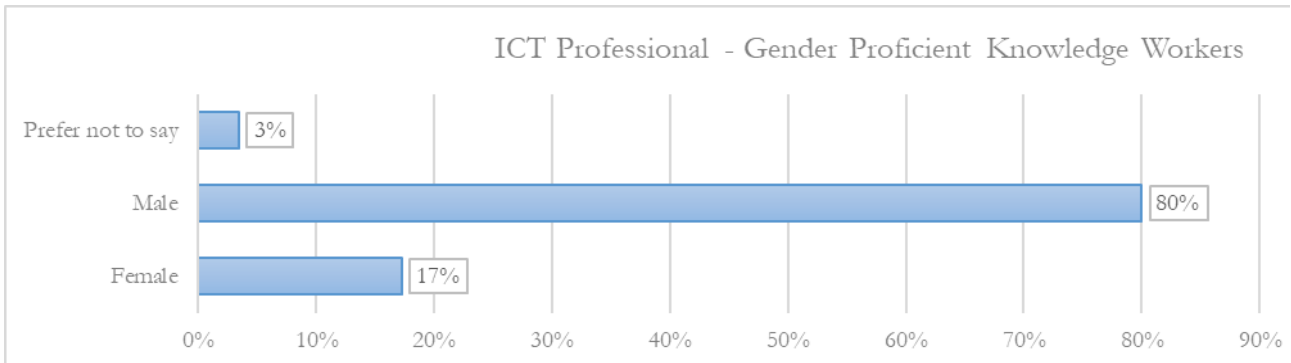
The initial data element that was evident from the replies received was the clear gender imbalance registered across all data subjects that replied to the online ICT Professional survey.



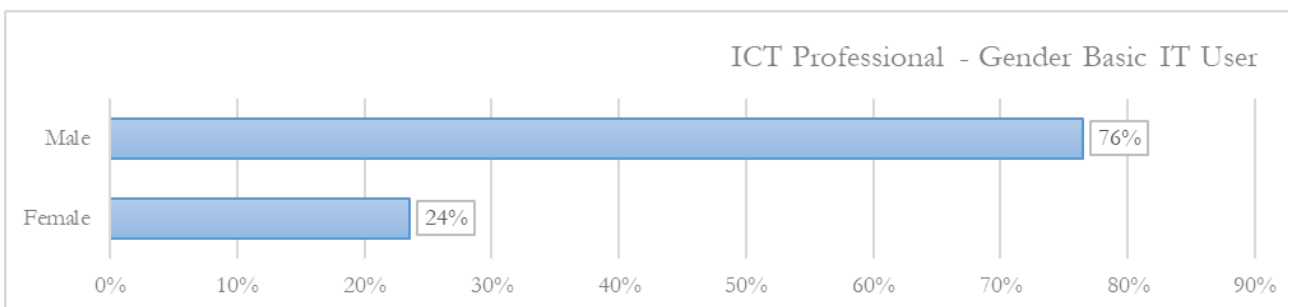
When analysing the gender balance registered by ICT Professionals, it was noted that the same gender balance issue between all three streams was present. The overall aggregate values for IT Professionals indicate clearly a male-dominated environment with a representation of 83% against 16% female.



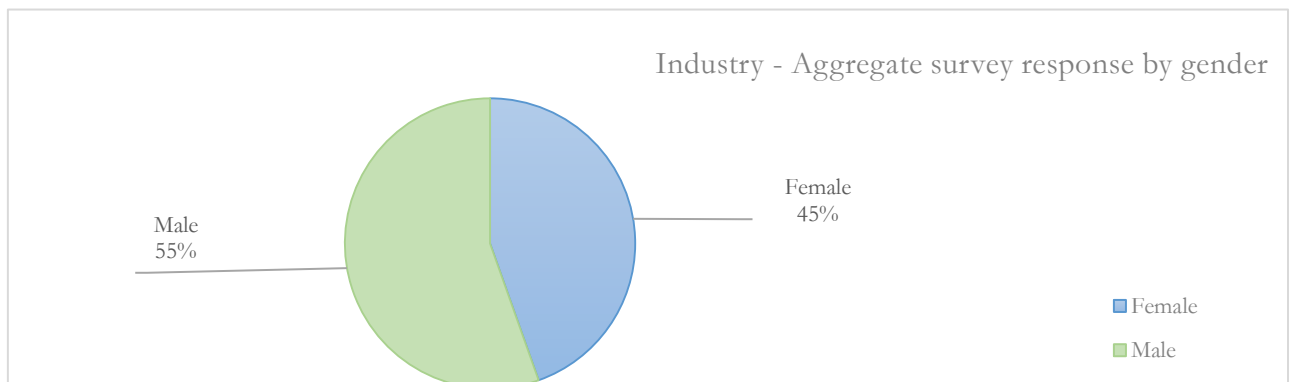
In case of Proficient Knowledge Workers, the gender balance is also close to the IT Professional response having 80% males and 17% females responding to the survey.



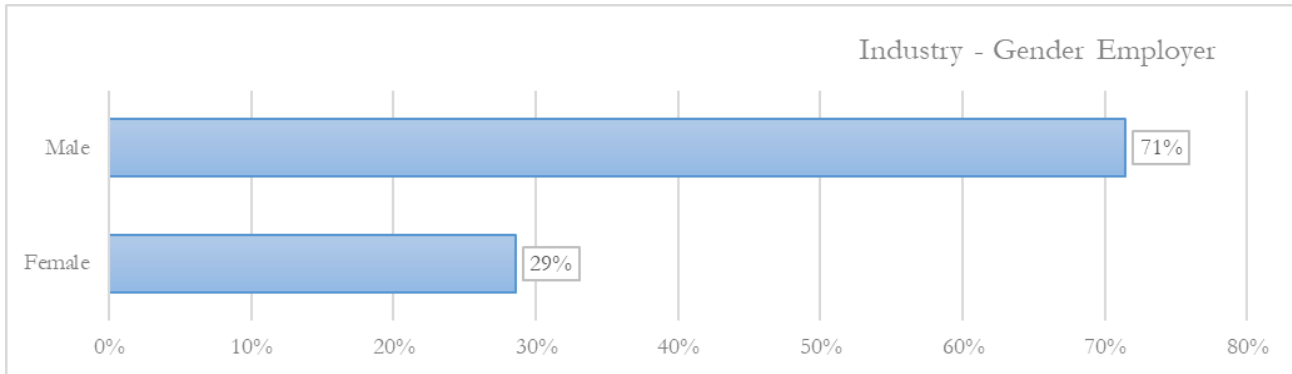
When analysing the gender balance in case of basic IT users, however, it was noted, however, that one of every four participants was female, registering the highest participation out of all three streams with 24%.



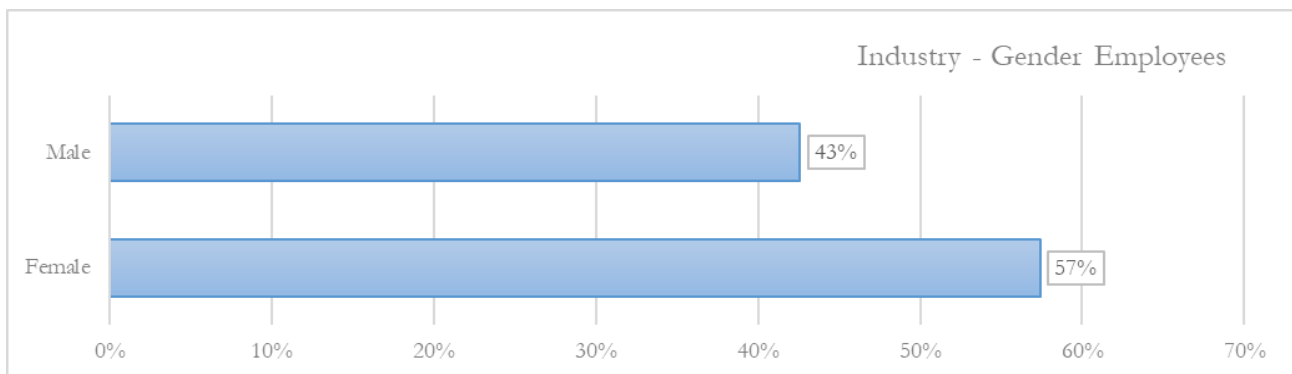
On the other hand, it was noted that within the industry workforce the gender balance was more present.



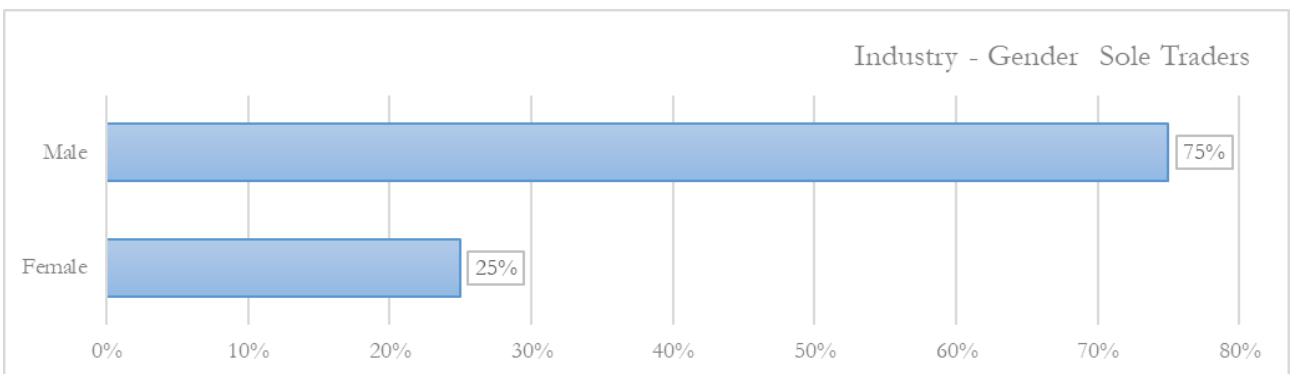
In case of Industry, there is a substantial gender imbalance amongst the employer respondents. The employer respondents were made of 71% of males against 29% of females.



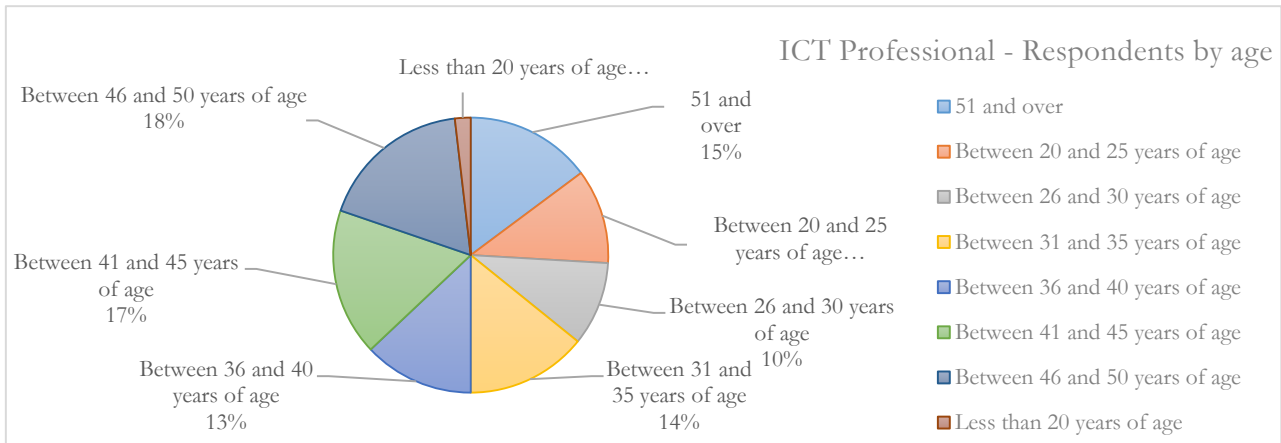
On the other hand, in case of employees, the respondents were made mostly of females representing 57% of the total responses by employees.



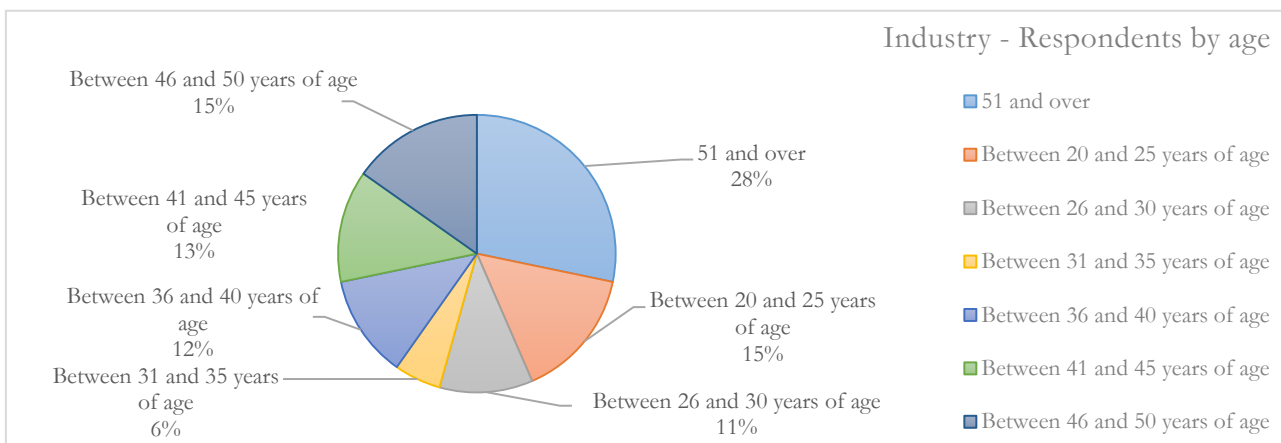
A gender imbalance was noted amongst Sole Traders, where 75% of the respondents were males and 25% were females.



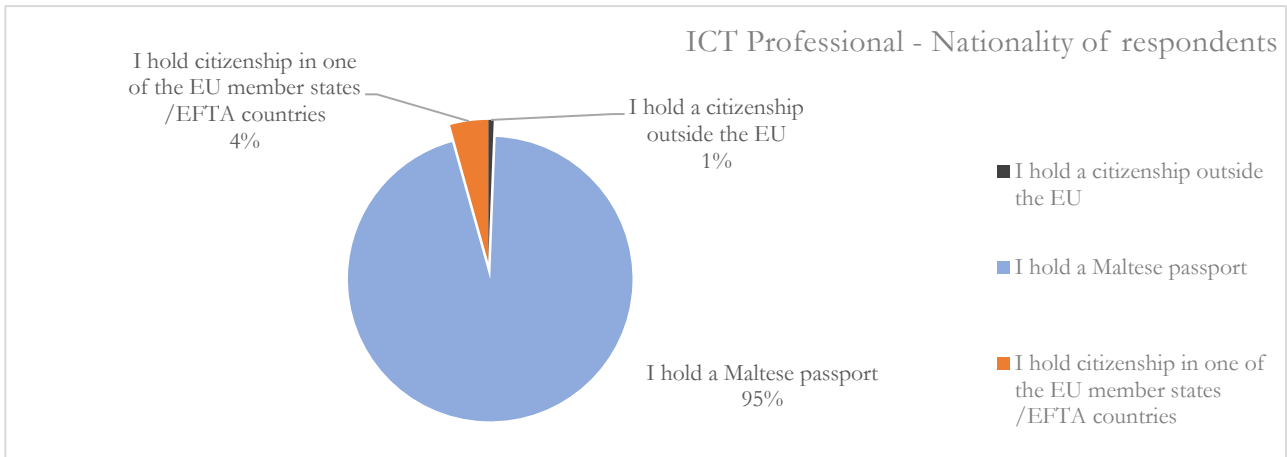
The age group of ICT Professional survey participants is uniformly distributed across various age grouping, providing a good representation of society.



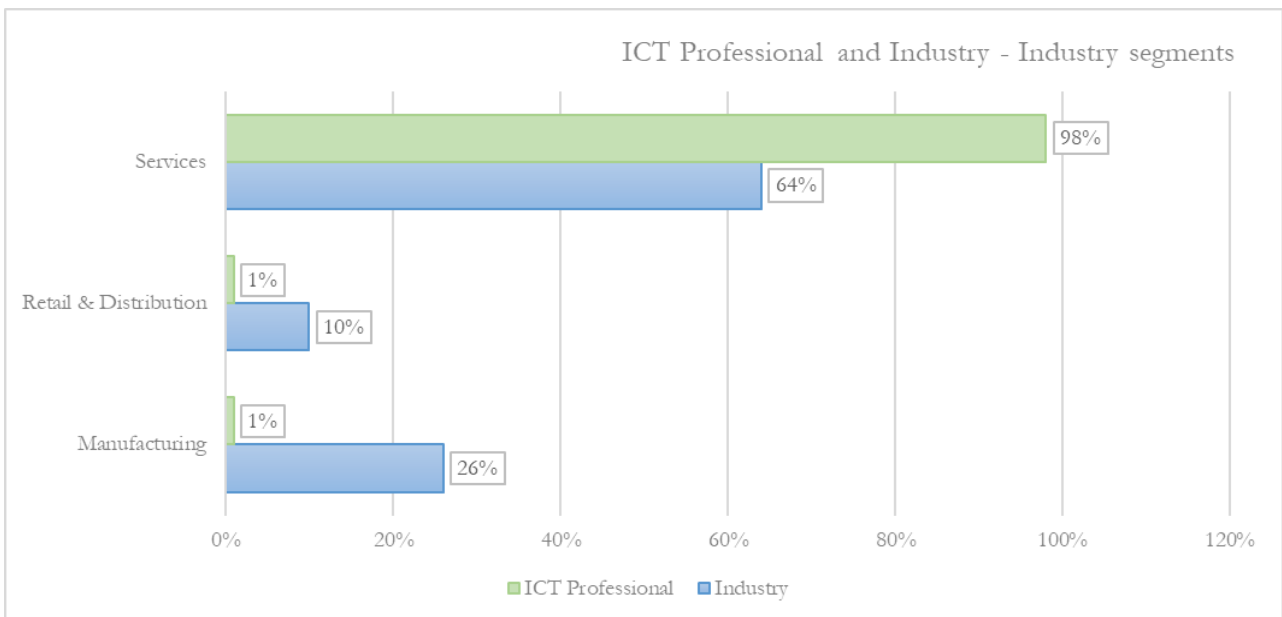
On the other hand, in case of Industry survey participants, the highest age group is that of 51 years and over (28%).



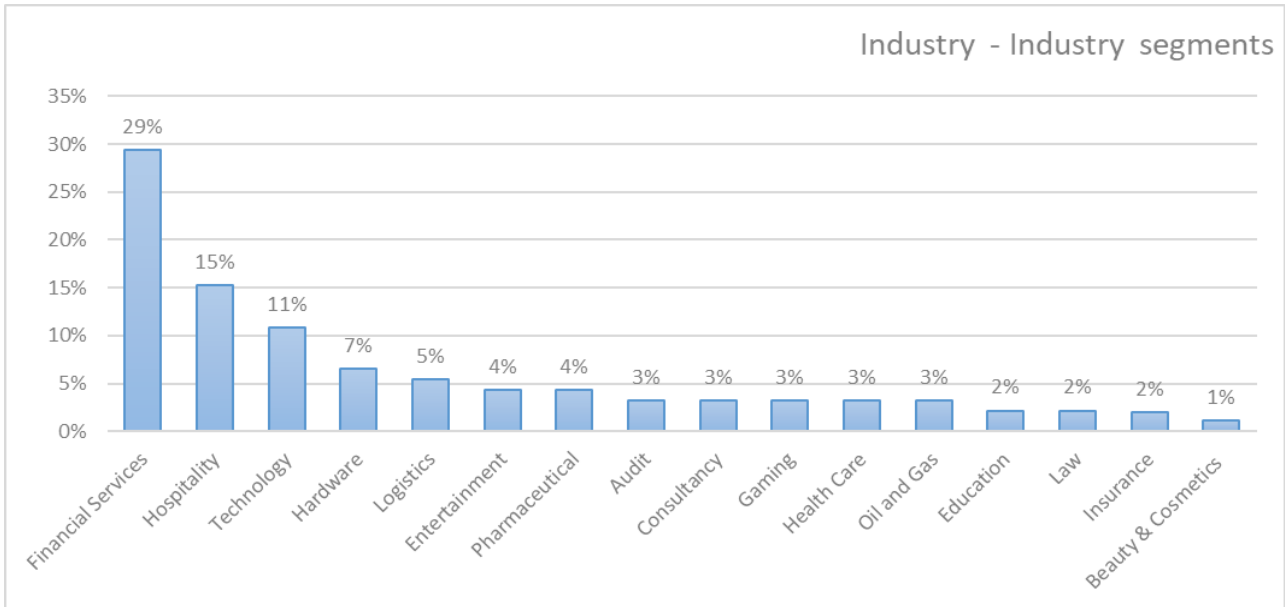
The nationality of those participating in the survey is mostly local employees holding a Maltese passport.



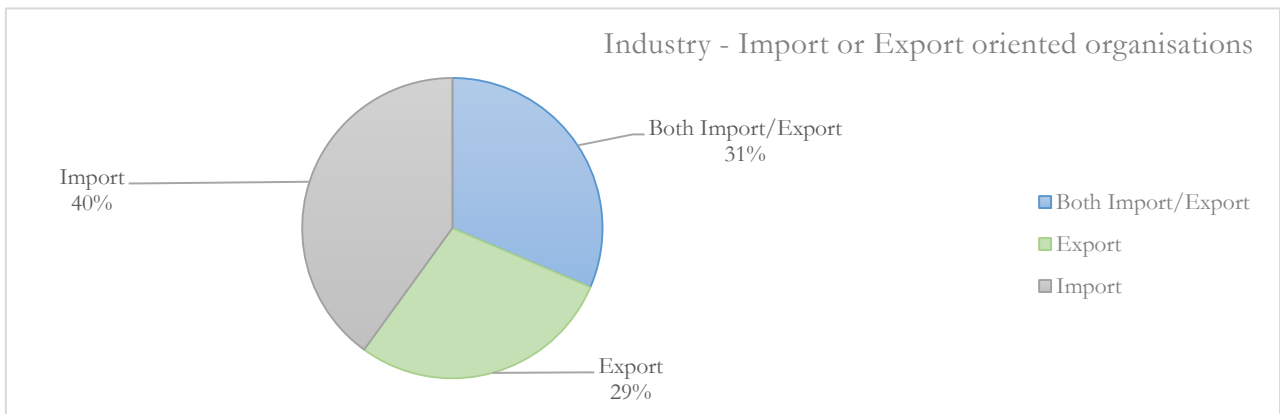
It has been noted that respondents to the ICT Professional survey belong by a larger majority to the services industry with only 2% coming from the manufacturing or retail and distribution. On the other hand, the respondents to the Industry survey belong 64% to services, 26% to manufacturing and 10% to retail and distribution.



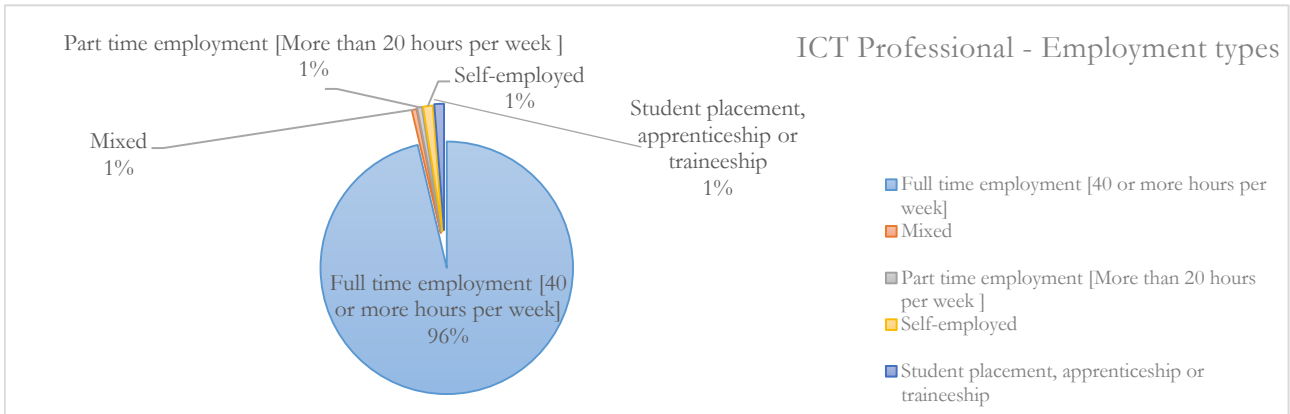
Overall, the Industry survey respondents belong to the financial services sector (29%), hospitality sector (15%) and technology sector (11%).



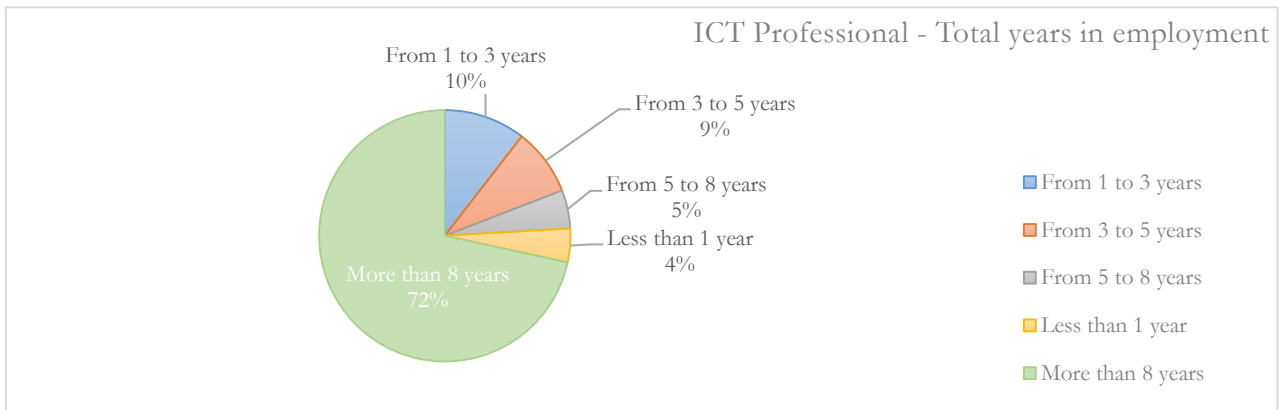
The organisations replying to the survey operate in both the local and the foreign market. Import is stronger amongst the organisations registering a percentage of 40%, followed by 31% that do both Import and Export.



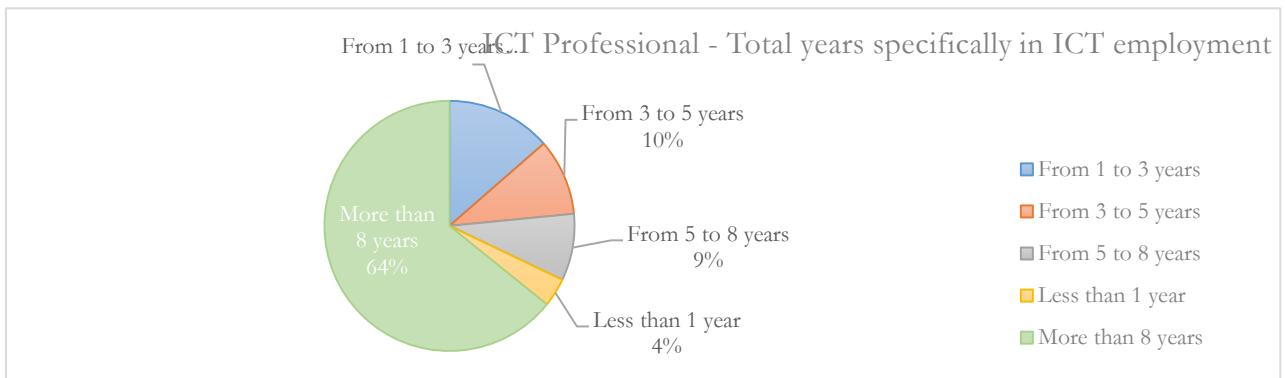
Those responding to the online ICT Professional survey predominantly are in full-time employment.



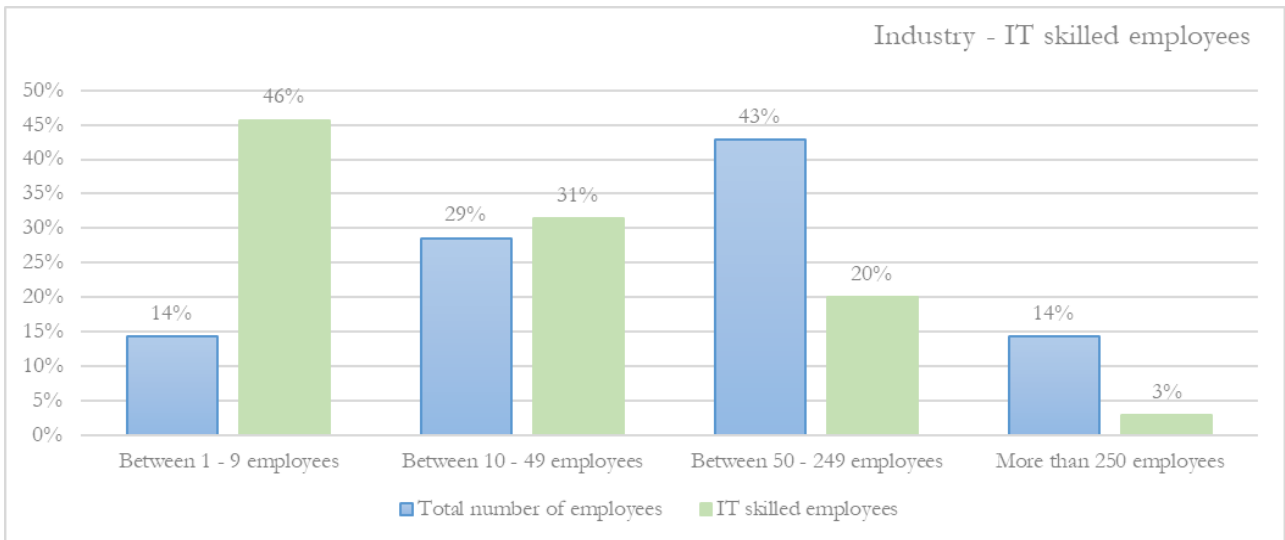
72% of those answering the survey have been in employment for more than 8 years.



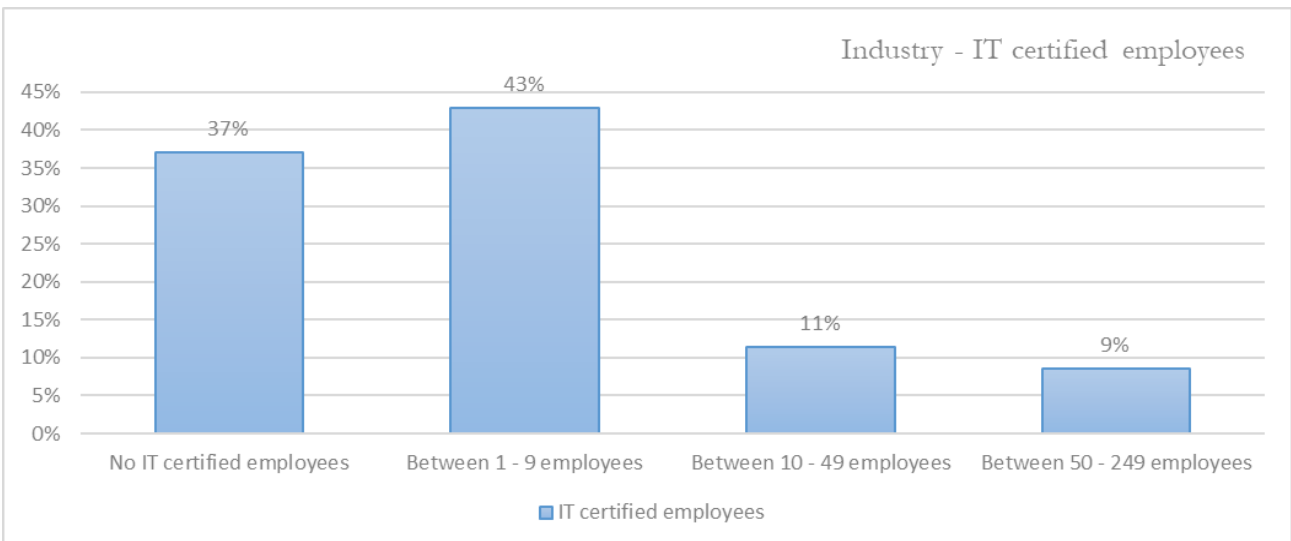
Interesting to note (when comparing the two charts on employment information) that out of the total years in employment a variance of 8% indicates that some of the respondents moved into ICT from a different stream.



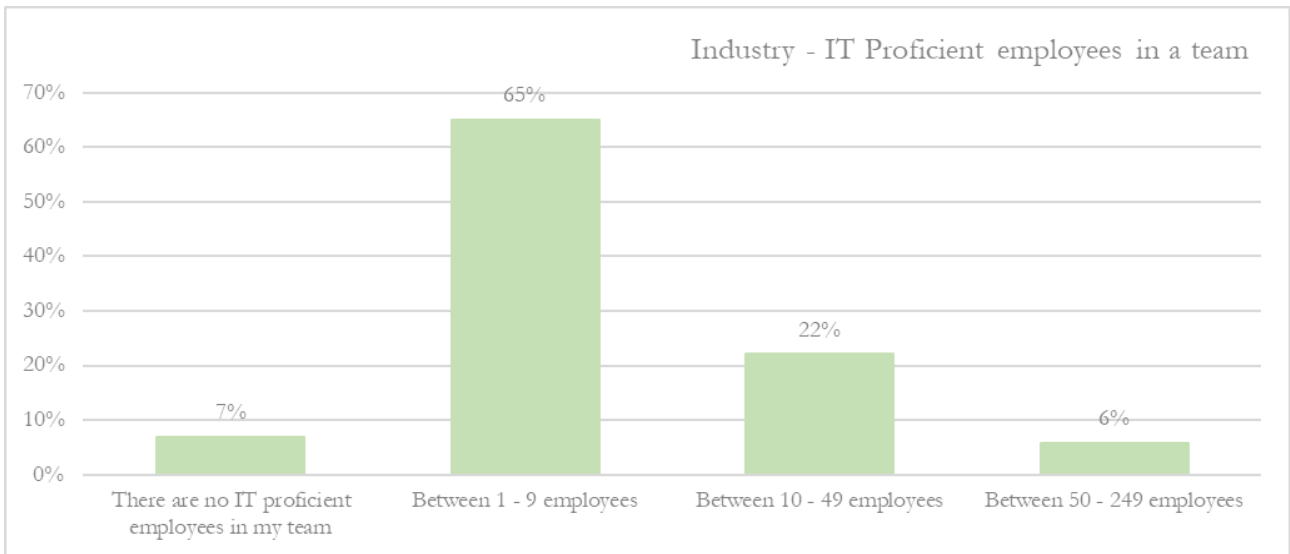
The majority of respondents to the Industry survey employ more than 50 employees, representing 57% of the total replies.



Most employers (43%) have around 1- 9 certified employees within their firm. 37% of the respondents have no IT certified employees.

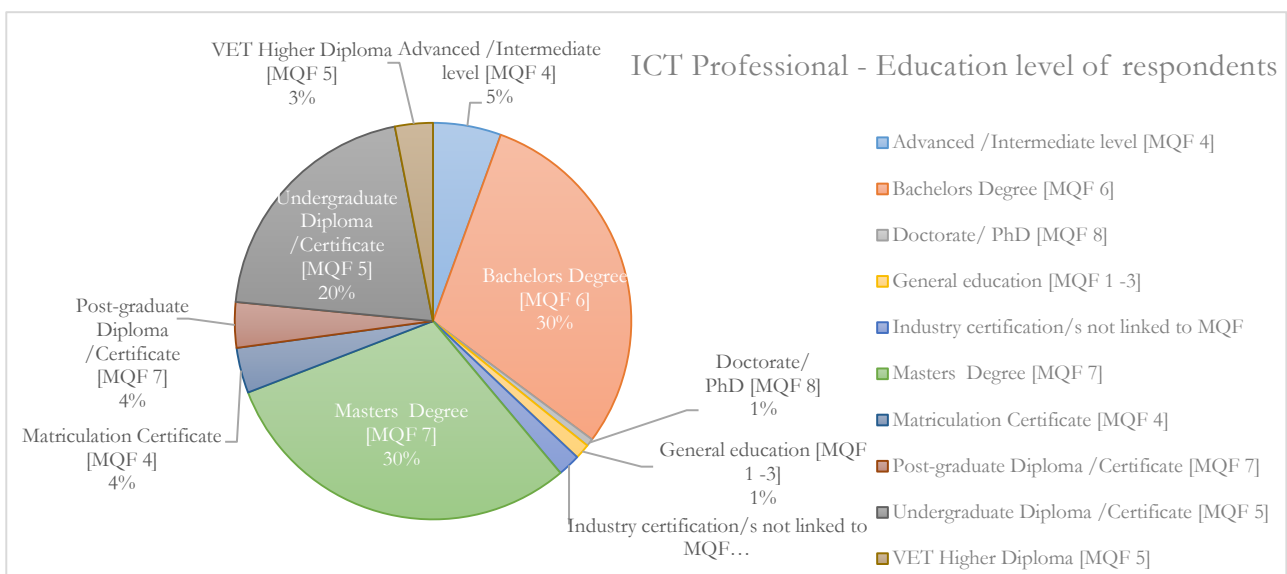


65% of the respondents to Industry survey mentioned that between 1 – 9 employees within their team are IT proficient.

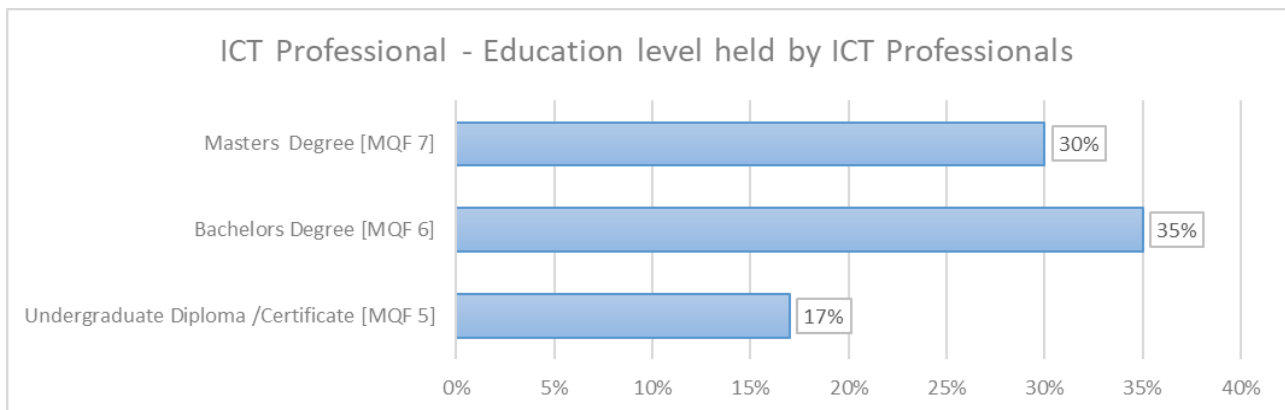


On the other hand, 7% of respondents mentioned that there are no IT proficient employees in their team.

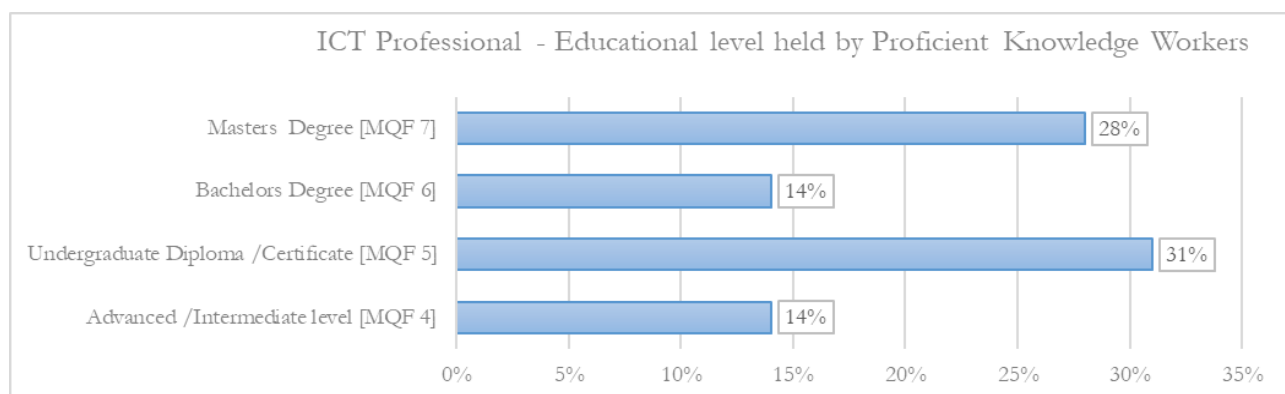
The education level of the respondents to the ICT Professional survey is spread mostly between a Masters degree (30%), a Bachelors Degree (30%) and an Undergraduate Diploma (20%).



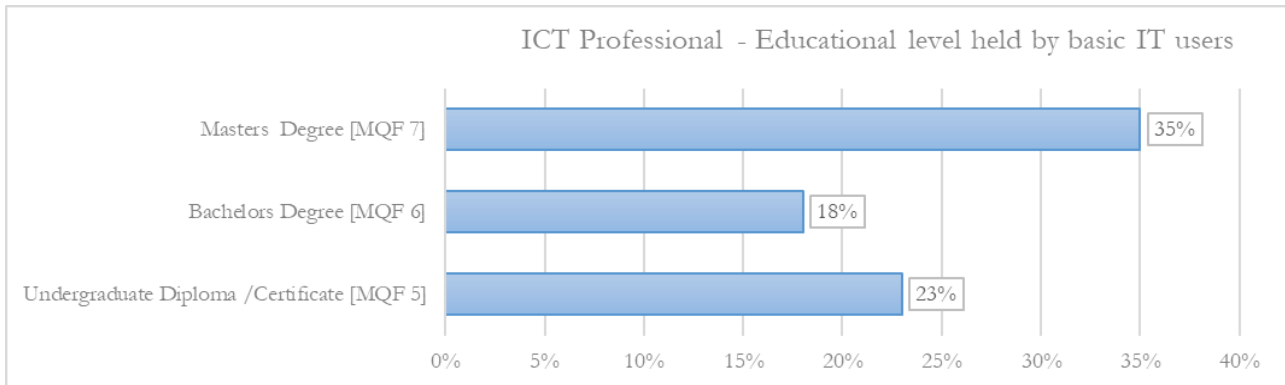
The education levels of the IT professional answering the online survey show a spread between MQF levels 5 to 7. The largest cohort being IT professionals holding a Bachelors degree as their highest qualification.



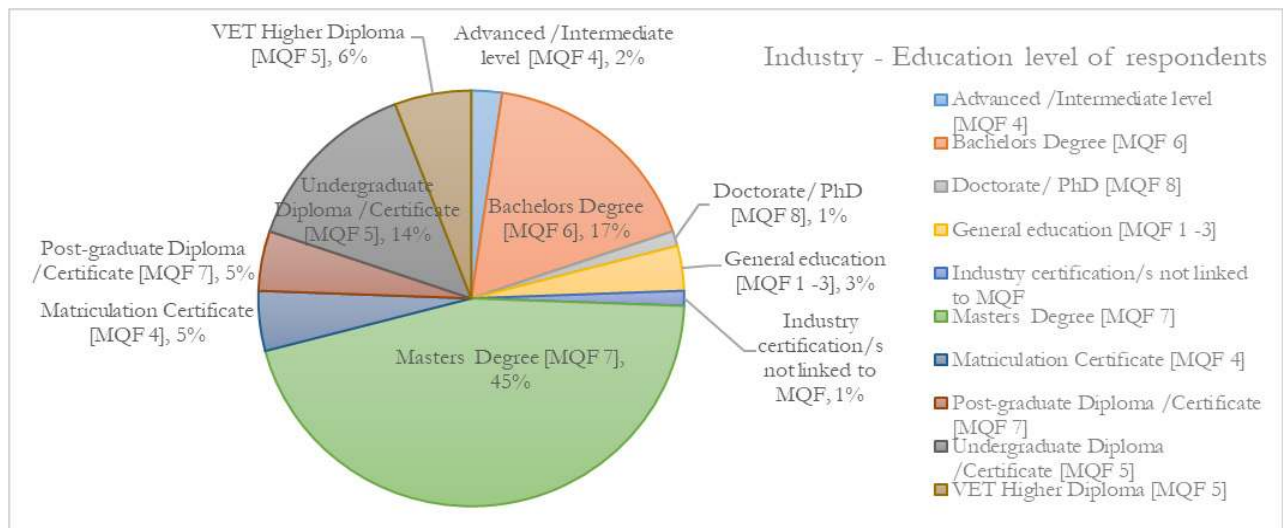
In the case of proficient knowledge workers, the scenario changes with an important segment of undergraduate diploma and certificates being the highest rank. This data implies that with this cohort there exists the prospect for further educational attainment. It is also worth noting that on the other hand, 28% of the respondents hold an MQF level 7.



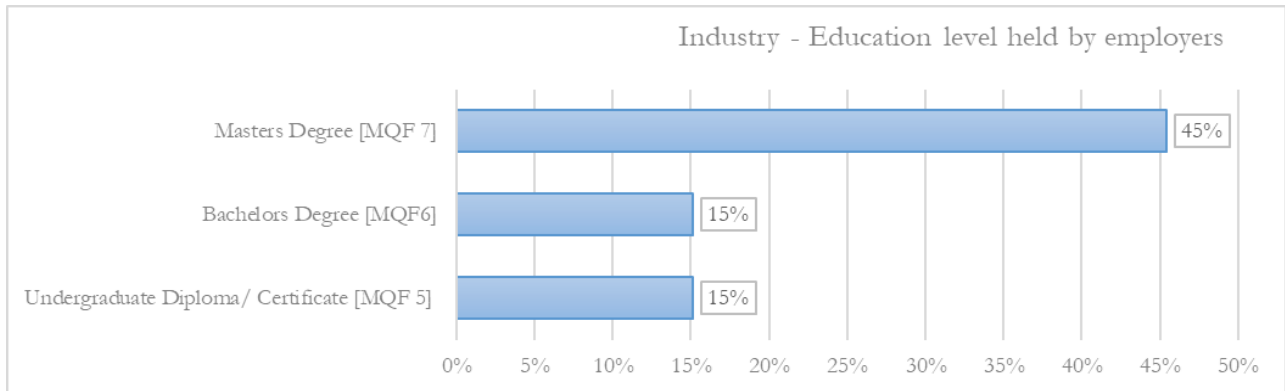
The level of education held by the majority of basic IT users answering the online survey hold an MQF level 7, indicating that the use of ICT for such respondents is possibly secondary from an educational standpoint. Undergraduates in this case also represent an important share at 23%.



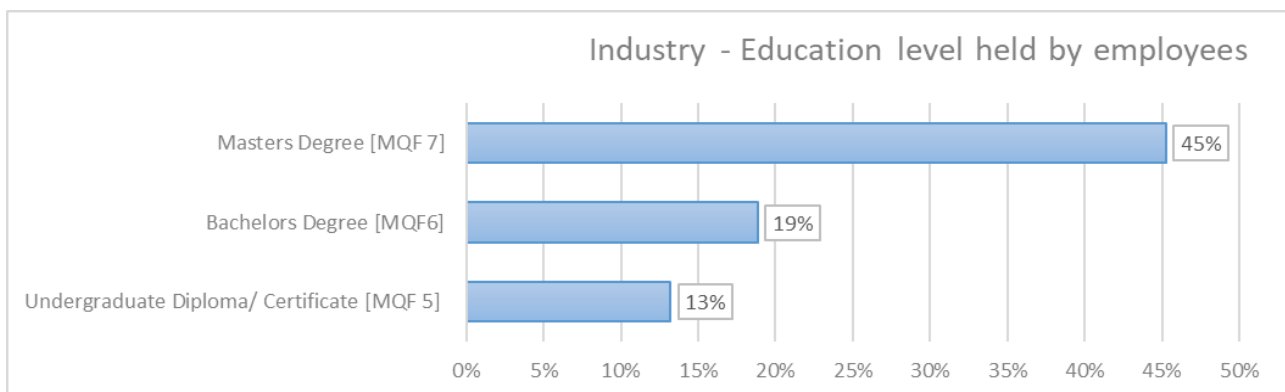
On the other hand, 45% of those responding to the online industry survey have a Masters Degree, 17% have a Bachelors Degree and 14% have an undergraduate diploma.



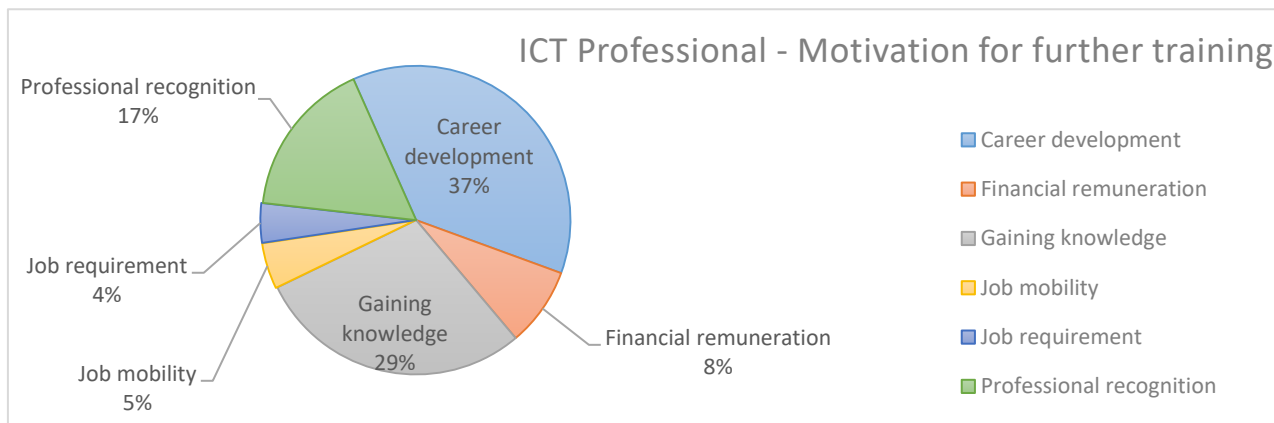
The level of education held by the majority of employers answering the online survey hold an MQF level 7.



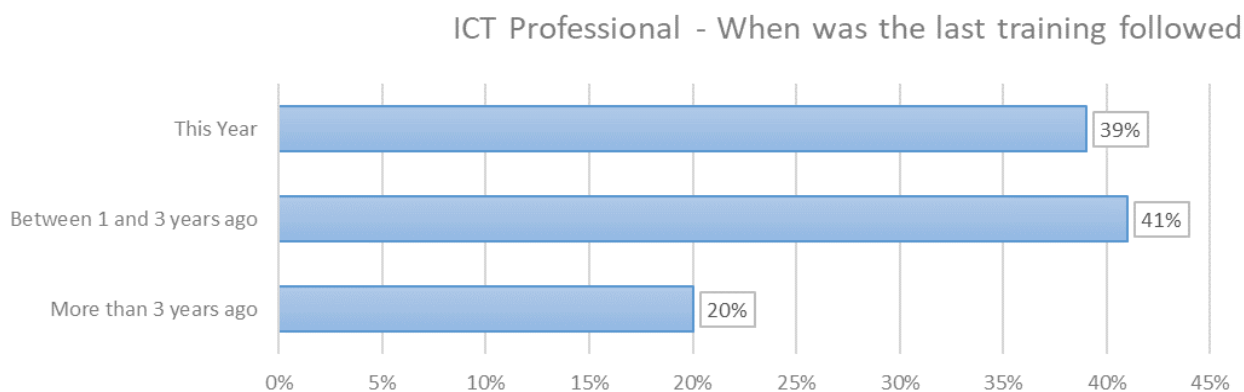
The majority of employees answering the online survey hold a Masters Degree.



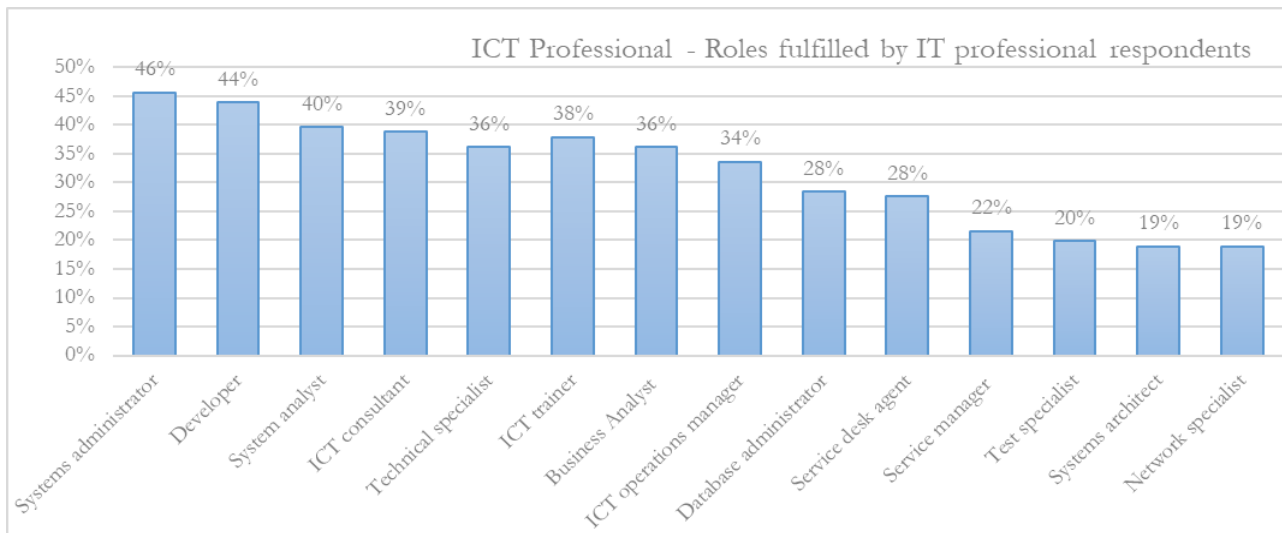
On a different note, 'Career development', 'Gaining knowledge' followed by 'Professional recognition' are the top reported motivators when further training is considered. These three motivations alone add up to 83% of respondents.



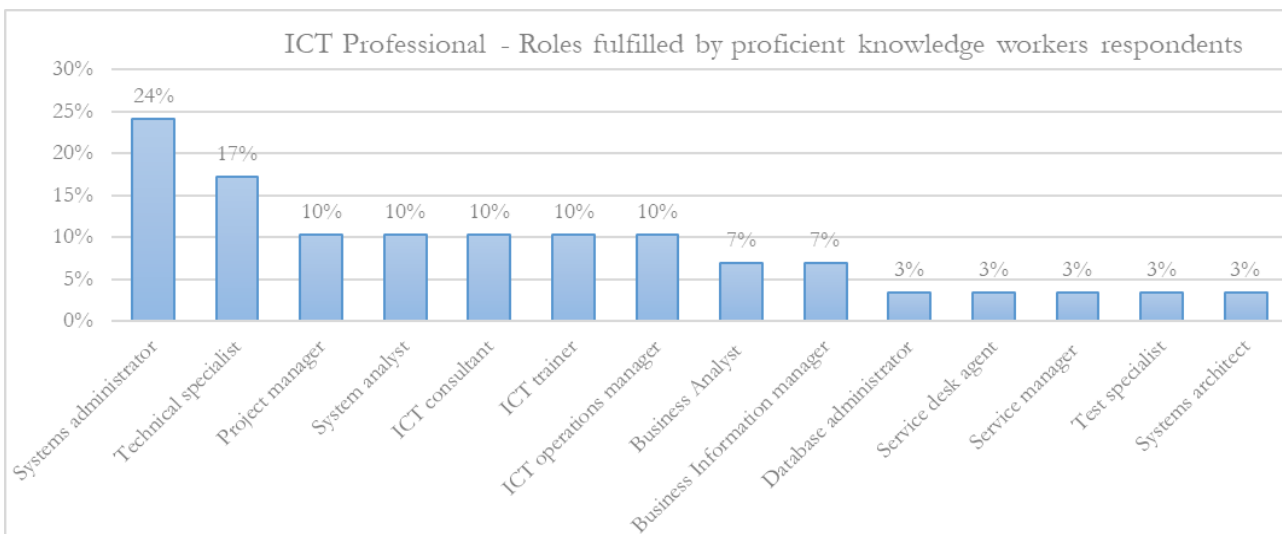
Looking into the last training followed by the respondents to the online questionnaire, it is clear that even though a good number have followed training quite recently, one-fifth of the population has received training more than 3 years ago.



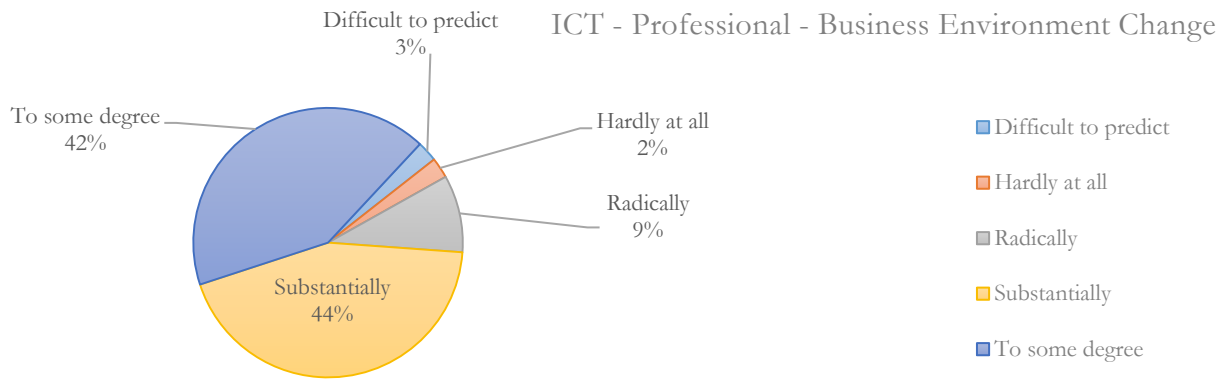
The roles fulfilled by respondents to the survey are spread across a number of job responsibilities. The more frequent roles for the IT Professional were ‘Systems administrator’, ‘Developer’ and ‘System analyst’.



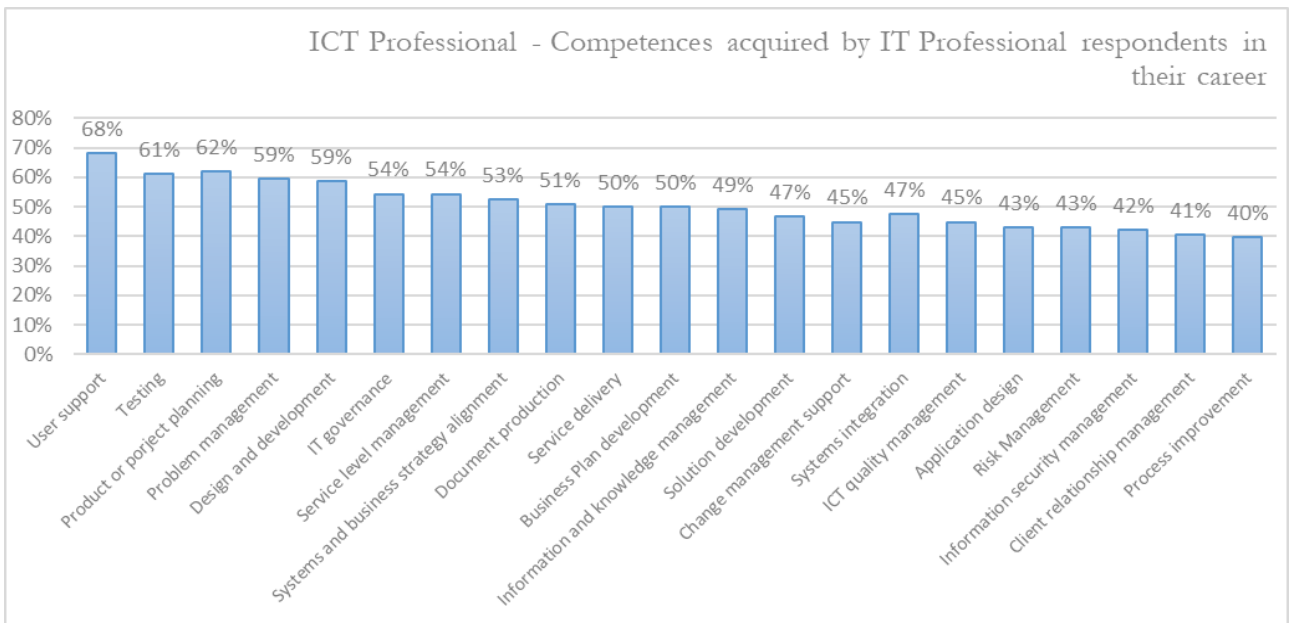
On the other hand, the most frequent roles by the Proficient Knowledge Workers were ‘Systems administrator’ and ‘Technical specialist’.



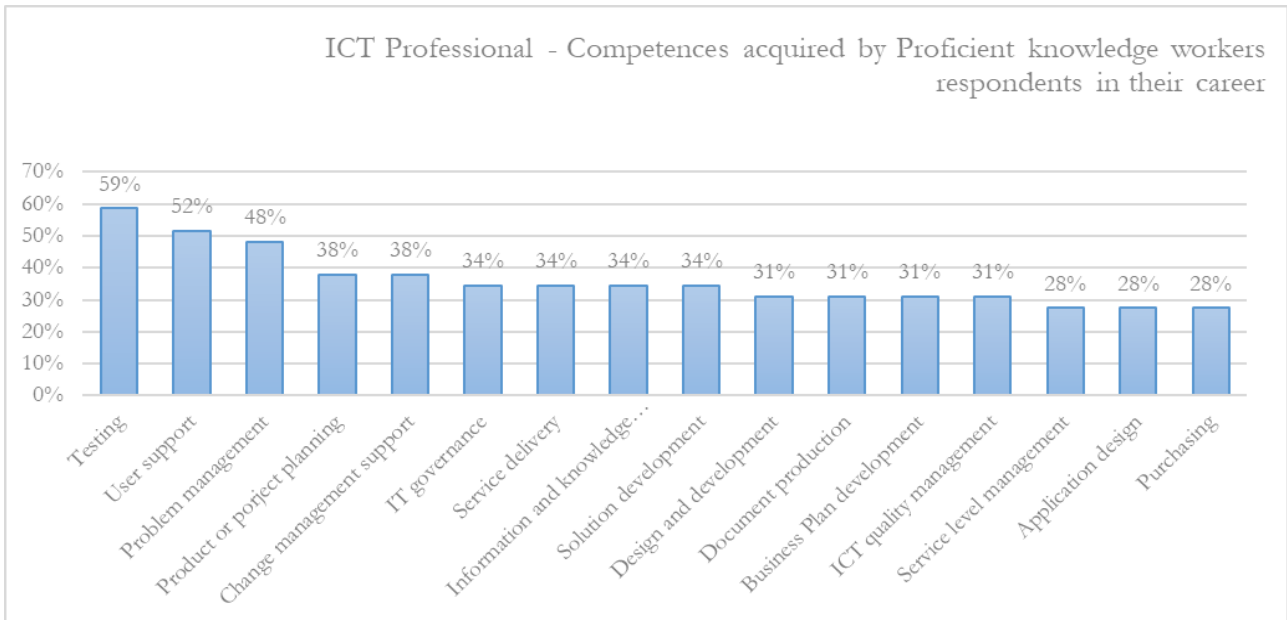
With respect to changes to the work and business environment, the vast majority do expect changes to take place with 95% believing that change will be radical, substantial or to some degree.



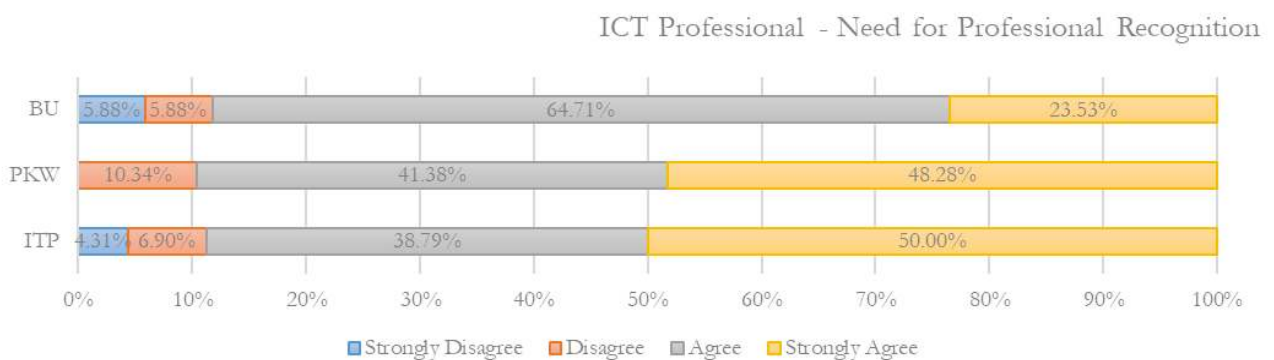
The competences acquired span across a number of ICT domains. 'User support', 'Testing', 'Product or project planning', 'Problem management' and 'Design and development' feature the most amongst IT Professionals.



On the other hand, the most frequent competences by the Proficient knowledge workers were 'Testing', 'User support', and 'Problem management'.



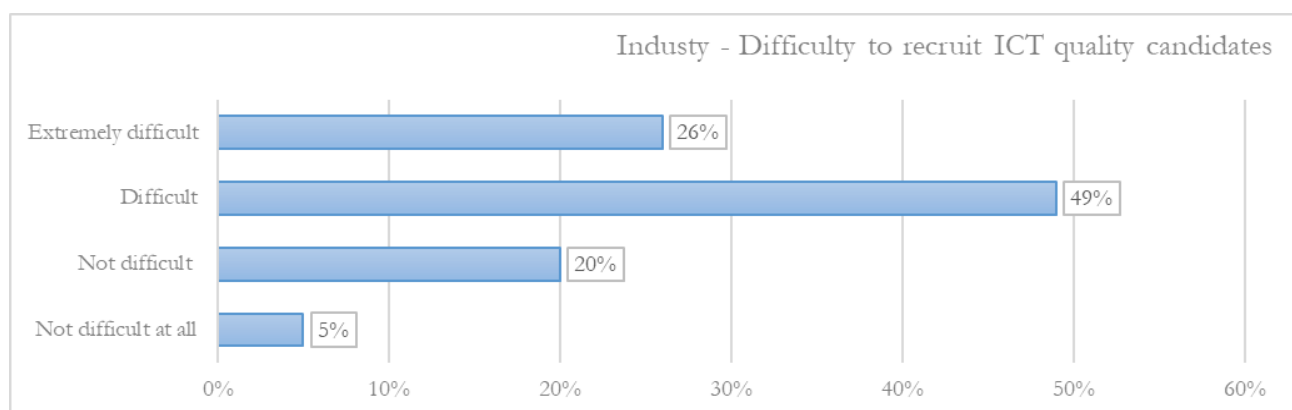
The majority of respondents irrespective of the role or function agree or strongly agree that professional recognition would be an important development in relation to the ICT career development.



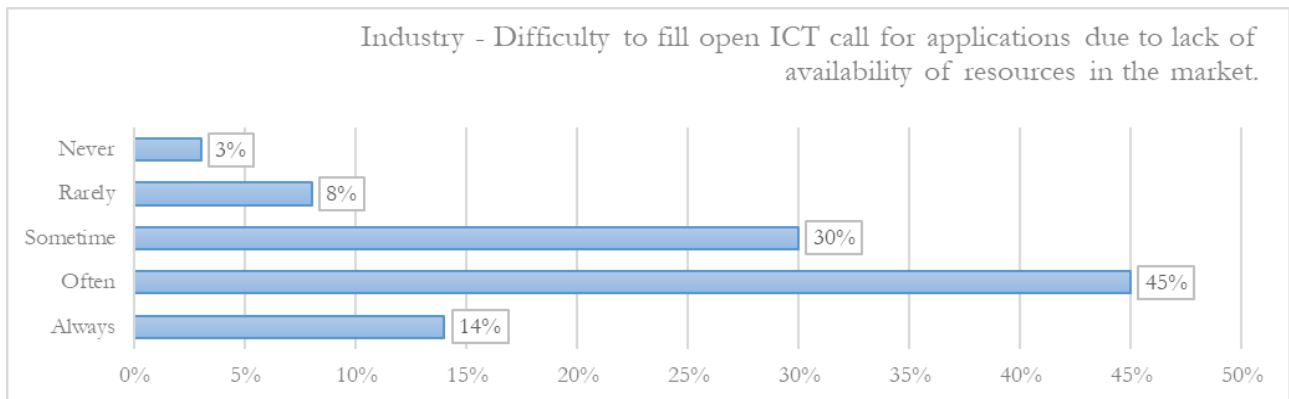
The majority of respondents to Industry survey pointed out that they have attempted to recruit staff having an ICT background over the past 6 months.



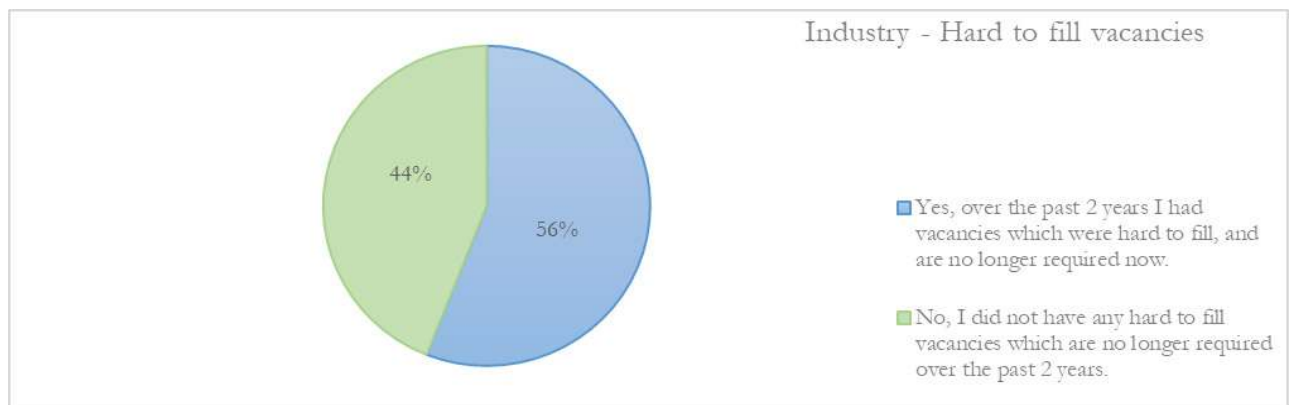
49% of which have said that it is difficult to recruit ICT quality candidates. In addition, 26% of respondents said that it is highly difficult to recruit.



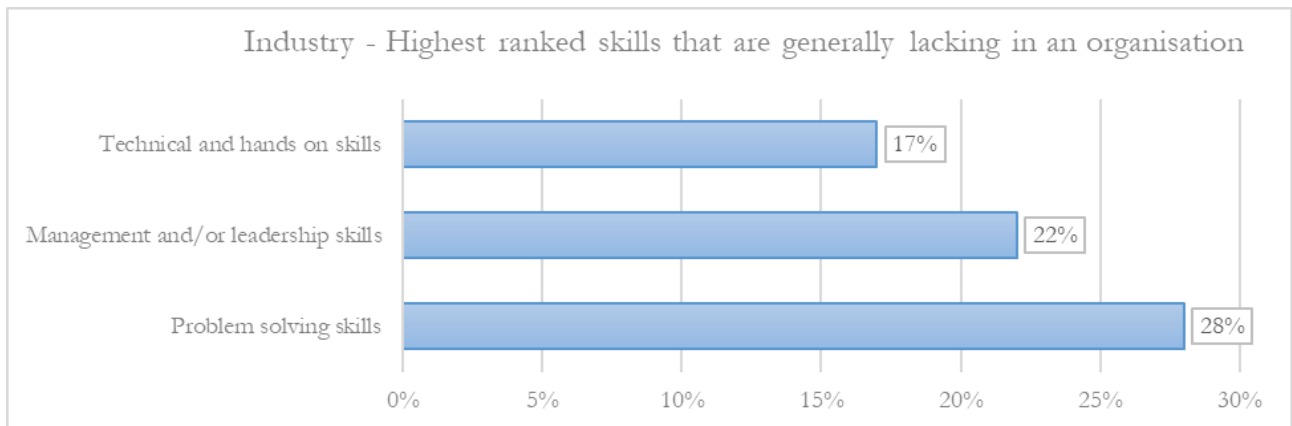
The respondents to the Industry survey said that they find difficulty to fill open ICT call for applications due to lack of availability of resources in the market.



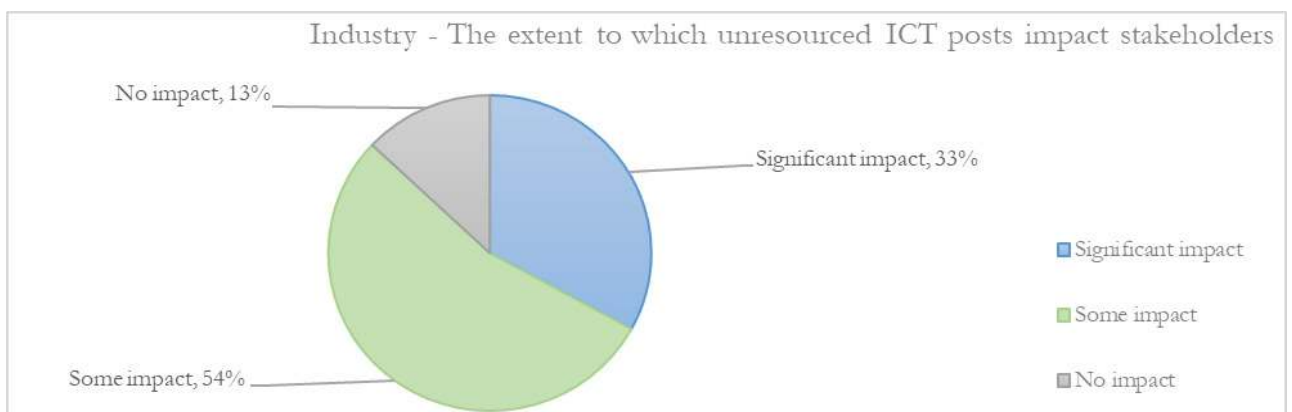
Moreover, 56% replied that over the past 2 years they have had vacancies which were hard to fill, which are no longer required now.



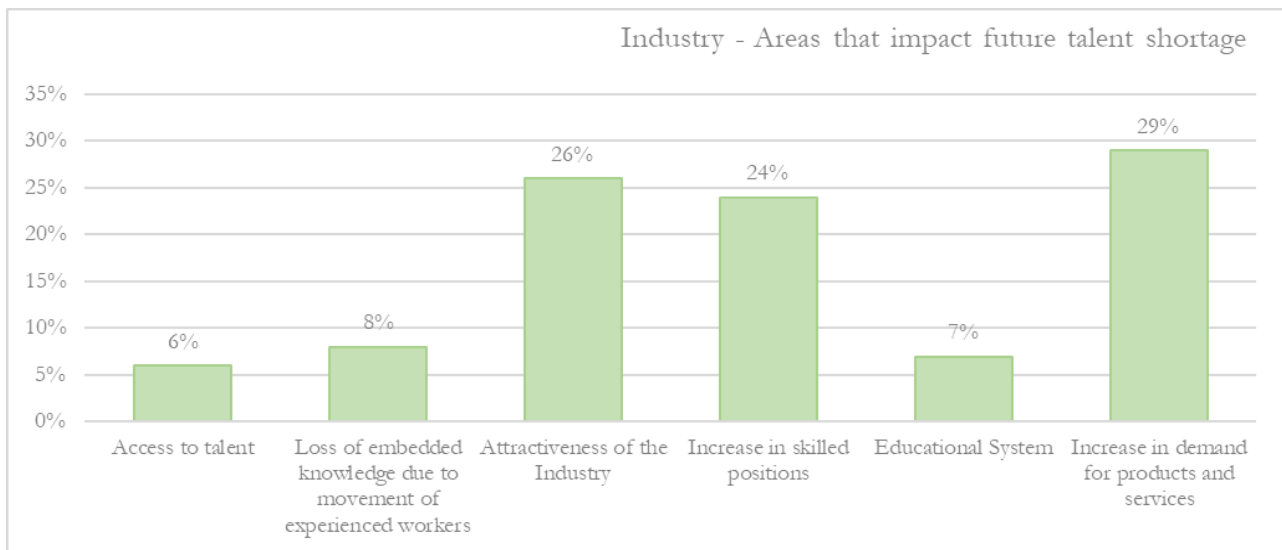
Problem-solving skills (28%), Management and /or leadership skills (22%) and technical and hands-on skills (17%) are the highest ranked skills by employers that are usually lacking in an organisation.



The responses to the Industry survey show that unresourced ICT posts in an organisation do impact other stakeholders.



An increase in demand for products and services (29%), the attractiveness of the industry (26%) and an increase in skilled positions (24%) are the areas that affect future talent shortage the most according to the respondents to Industry survey.



# 09

## Strategy Recommendations Summary

Below is a high-level summary of the initiatives identified as part of the research, workshops and consultations process with key stakeholders.

### Supporting a strong strategic direction

- Developing a 3-year rolling plan
- Establishing an eSkills Strategic Consultation Committee

### Communicating in a digital environment

- Development of a 3-year communications plan

### Economic growth and future technology

- Creation of an online reference technology board

### Funding sustainable initiatives

- Focus on of sustainable and value-adding projects

## IT teaching professionals and guidance

- Bringing industry experts to the classroom
- Initiatives with guidance practitioners

## Quality in curriculum design - digitisation by design

- Support the introduction of ICT changes in curriculum across all educational structures
- Harmonisation of new curriculum across public and private education organisations
- Supporting use of EU-based self-reflection tool - SELFIE

## Continuous professional development & industry collaboration

- Development of CPD toolkit for industry

## Upskilling, specialisation, and retention of existing industry workforce

- Project to establish short-cycle specific training

## A framework for grading and evaluating digital competence

- Development of an evaluation scoreboard

## A Focus on youth with a shift towards participative vs consumer use of technology

- Collaboration with local and EU networks to hold participative projects

## Combatting Digital divide within society

- Foster stronger relationships between public and private organisations

## Opening up to a professional structure in ICT

- Launch a campaign to introduce a framework for ICT professionals

# 10

## Strategy Recommendations

### Supporting a strong strategic direction

Sustaining a strong and focused strategic direction at the national level is key to maintaining high levels of industrial competitiveness. Starting by evaluating the evolving strategy adopted by the European Union down to key initiatives at the national level is a decisive step towards a thriving national ICT ecosystem. A strong and effective strategy is one that establishes effective mechanisms that bring together all relevant industry sectors, the educational system, society, and the citizen together.

Considering the developments happening at EU level, the European Commission, in particular, has been actively promoting various initiatives aimed at increasing training in digital skills for the workforce and for consumers with the specific intent of modernizing education across the EU. Most of the initiatives are aimed at harnessing digital technologies for learning as well as for the recognition and validation of skills sets with the specific objective of analysing and anticipating skills needs across the Union.

European competitiveness as much as the local economy depends highly on a digital economy that sustains innovation, growth, and jobs. Over the past years, the spread of digital technologies has had a massive impact on the labour market including the respective competences and skill sets required by the economy and society.

Technology and digital opportunities are transforming the employment models, leading to the automation of repetitive tasks and to the continuous creation of new and different types of jobs and roles. This whole process has led the need for some type of digital skills for nearly all jobs and functions where ICT complements any of the existing tasks. Careers such as medicine, accountancy, engineering, architecture, etc., depend on and require increasing levels of digital skills.

Over the past two years, the European Commission has embarked on a new Skills Agenda for Europe with the aim of strengthening human capital, employability, and

competitiveness across Europe. This agenda puts forward a number of actions and initiatives that aim to tackle the digital skills deficit in Europe. On 18 April 2016, the European Commission has published a Communication about the Digitisation of the European Industry, which introduced a set of coherent policy measures that form part of the Digital Single Market baseline technologies. The most important part of this communication is devoted to digital skills, specifically in relation to human capital readiness in terms of skills required to address challenges brought about by digital transformation.

The demand for eSkills has been growing at a remarkable pace, possibly swifter than traditional education and training models. It is being anticipated that by the year 2020, the European labour market will grow by more than 670,000 jobs in ICT. On top, market projection indicates that the European labour market would be able to absorb additional 756,000 practitioners. New initiatives stemming at EU level have stimulated innovation in Europe leading to a strengthened the ICT ecosystem, mainly reinforced by European researchers, companies, and entrepreneurs.

In line with its strategic objectives, the European Union invests in emerging technology projects and longer-term research. This provides Malta with an important opportunity to grow its economy further. Malta's Gross Domestic Product in 2017 amounted to €11.1 billion. During the same year, Malta's economy in real terms grew at the rate of 6.6%, contrasting very positively with the EU 28 average of 2.4%. In 2017, Malta was the third fastest growing economy in the European Union.

Evolving digital services are continuously shaping up the way organisations are transforming themselves to ensure highest efficiency and relevance. Through this strategy, the eSkills Malta Foundation is revisiting its approach to make sure its state of readiness by 2020 is high to enable it to provide the best service to society.

## Recommendation

The eSkills Malta Foundation plays an essential strategic role in its mission to support stakeholders on policy matters regarding skills related to ICT. The way the digital economy has been shaping over the past years calls for an effective ICT skills strategy that that keeps up with the agile changes taking place in the economy and within society. To this end, it is being recommended that a three-year rolling strategy framework is considered. As a way to further enhance the governance model, a rolling

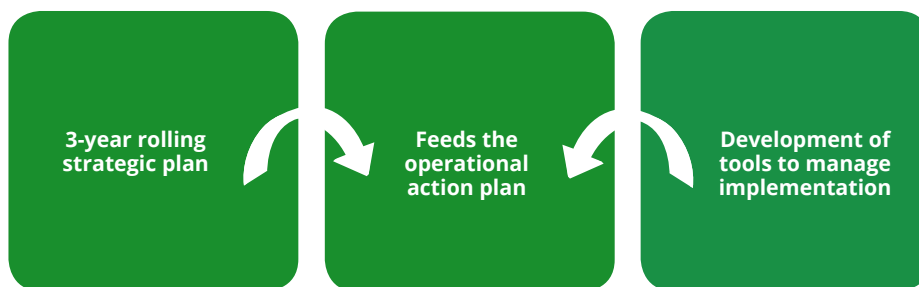
3-year strategy is being recommended to be more sensitive to the changing needs to digital skills within the market. The rolling strategy builds on a detailed strategic set of objectives for the immediate year, a clear profile but less detailed second year, followed by an indicative high-level outline for the third year. Once the first year is over the same process is followed for 'year 2'. A three-year rolling plan is presented in the diagram to follow.



In conjunction with the rolling strategy, a framework to strengthen the governance model is being recommended. It is being proposed that an eSkills strategic consultation committee comprised of policymakers, industry representatives, education institutions, academia, and representatives from society is established. This committee needs to host the widest representation possible. Such a broad committee shall enable a wide consultation that contributes to four main aspects:

- i) broader and more timely strategic consultation across all pertinent parties;
- ii) the committee would serve as a digital skills reference forum essential to synchronise the efforts of all committee members represented;
- iii) increase the ownership of the strategic priorities adopted and serve as a key reference point to strengthen the complementarity of initiatives planned by stakeholders;
- iv) on an annual basis review the implementation initiatives taking place in the previous year, whilst supporting the 3-year rolling plan.

On average, within the upcoming three to five years, more than a third of the desired core skill sets of most occupations will be comprised of skills that are not yet considered crucial to the jobs today. The setting up an eSkills strategic consultation committee designed to meet on an annual basis and will help support a more coherent planning process taking place at any organisation assuming responsibility for upgrading digital skills of its members.



## Communicating in a digital environment

Technology is driving major changes in people's professional and personal lives across Europe and the world affecting every individual within society. A digital society that is now an integral part of how most people interact, work, learn and access knowledge and information. New and emerging technologies are having a transformative effect on how people communicate and how they consume information.

As digital technologies become ubiquitous, there is an emergent expectation from society for easier access, better quality, a more flexible approach, and greater online communication opportunities. The development of ICT has led to a continuous increase in communication channels giving rise to multiple ways of how information is relayed and consumed.

As technology continues to disrupt more aspects of life at an ever-increasing rate, digital competences become ever more important. Communication in an environment that is increasingly more digitally active is more challenging to organise and coordinate. Also, the various communication platforms are today crowded with the extensive number of consumers, creators, communicators, and influencers on social media. It is expected that the number of social media platforms and various ways of interaction will keep on increasing in the next 3 years, particularly with the enablement of 5G networks and the introduction of gig economy. It is predicted that such digital

environments will bring about what is termed as the Industrial Revolution 4.0. In the context of such changes at our doorstep, defining the distinct profile of the target audience to establish the right client-eSkills-journey plays a key role in ensuring that the information shared by the Foundation is effective in today's digital environment.

## Recommendation

It is recommended that the eSkills Malta Foundation develops a communications plan that is regularly reviewed to accompany all the planned initiatives that the Foundation plans to undertake, sponsor or collaborate in.

The communication plan is an essential tool that ensures that the key strategic objectives and activities within the action plan are being effectively imparted to the right audience at the right time. This plan assumes added importance in the context of a more digitally active and heterogeneous environment.

The aim of this communications plan is to ensure effective engagement of all intended message recipients. A professional communications approach is crucial when reaching out to specific cohorts such as middle-school students at the time of choosing the core subjects to pursue, the higher education students choosing their future career or the employee wanting or needing to upgrade respective skill sets. Effective communication is significant when shifting mindsets with an aim of attracting more students to STEM subjects or enticing employees to engage further into ICT careers or specialized areas of technology within their specific area of interest.

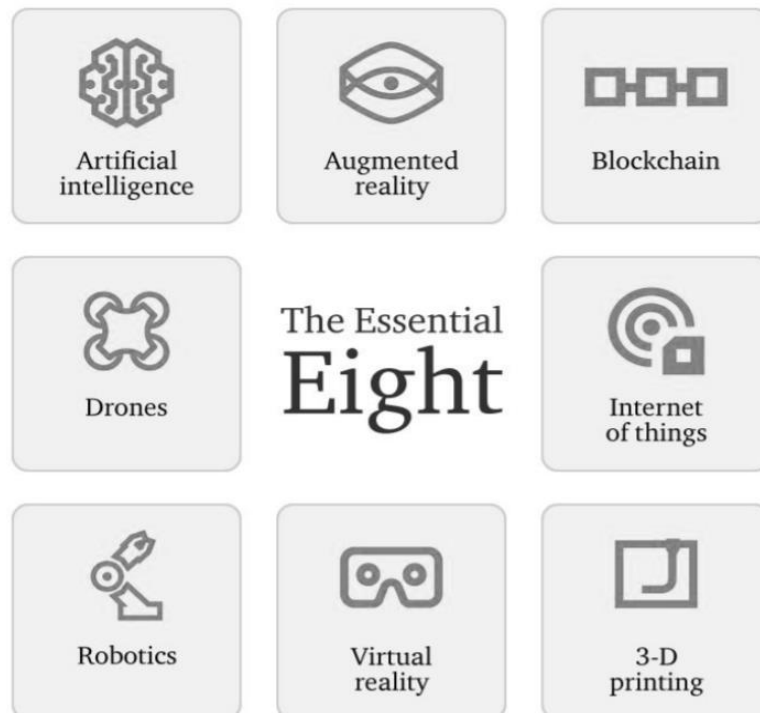
## Economic growth and future technology

Technology advancement has become a daily event. Economic growth and future technologies go hand in hand when looking at opportunities created by continuous developments. Future technologies do provide an indispensable opportunity to bring new economic growth ideas to fruition. With the continuous flow of emerging technologies each of which tagged as 'the next big thing' it has become a challenge for some individuals, organisations and whole industries to keep up with developments.

Making the right strategic choices with respect to emerging technologies is imperative to ensure that aspects related to resources availability and utilisation are capitalized on. Such strategic choices are an important determining factor when considering elements of economic sustainability and viability. Whereas it is desirable to develop expertise in the widest array of technology options available, lack of focus due to

widely spread resource specialisation can result in diminishing returns within the context of an open digital economy.

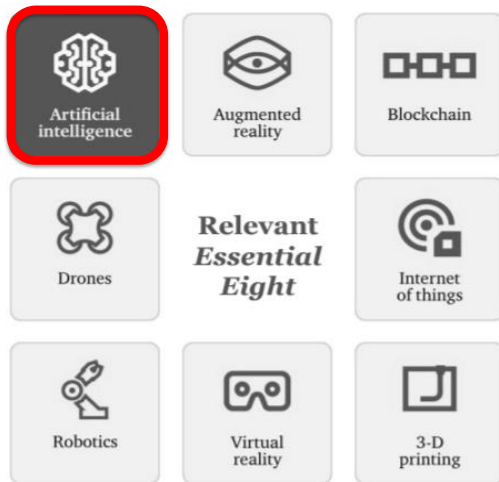
The following are the leading technologies that are shaping up the digital markets at the moment:



Artificial Intelligence (AI), Blockchain, Robotic Process Automation (RPA), Internet of Things (IoT), Drones, 3D printing, and Virtual Reality (VR) and Augmented Reality (AR). Developing the human capital in sufficient numbers to master the right set of competences is essential for Malta to secure a market edge in the context of a more open digital environment. Offering the right opportunities to access further knowledge and training assumes added importance because of the significant investment required to establish oneself as a leader in the context of the globalised digital market. Making the right sustainable choices is key to developing revenue and profit generating activities that justify a return on skills investment.

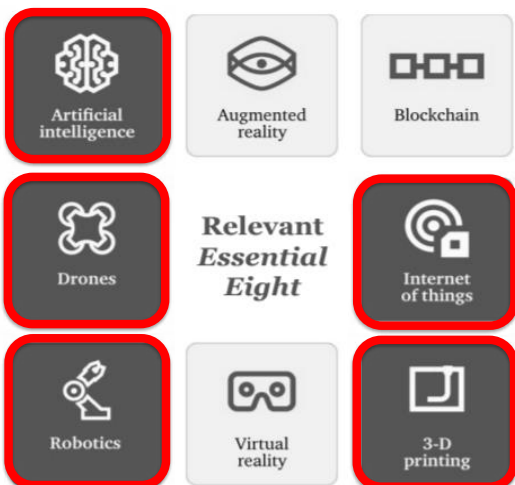
When investigating the trends around emerging technologies, it becomes evident that investing in just one technology is no longer enough to stay ahead of the curve. These key emerging technologies are coming together to create the next wave of innovation.

Below is the list of emerging technologies that shall further persist in digitally disrupting business and industry.



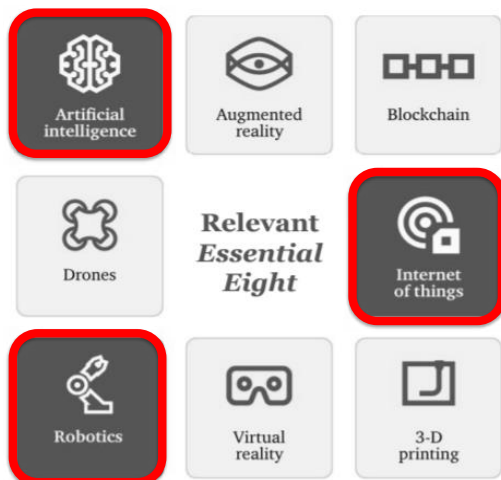
### Intelligent Automation

Adding a layer of intelligence to business process automation to optimise what work is best suited for people and which is best done by machines.



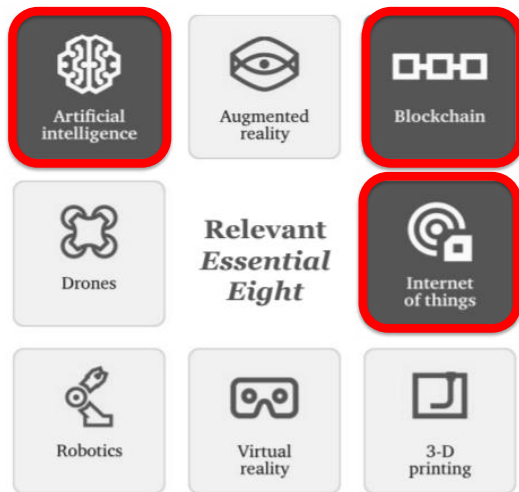
### Embodied AI

A physical IoT-enabled device embedded with AI capabilities, which can perform complex tasks locally.



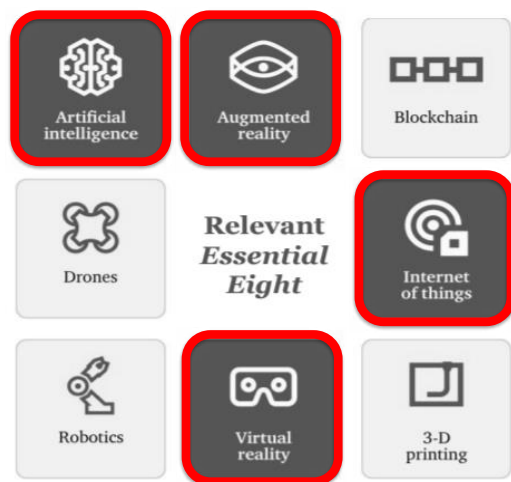
### Conversational Interfaces

Enables humans and computers to interact using natural language



## Automating Trust

Creating automated and authenticated processes that remove the need for central authorities and provide transparency for all participants.



## Extended Reality

The umbrella term encompassing augmented reality, virtual reality, and mixed reality, and representing the continuum between simple, digital overlays, and fully immersive digital experiences

Although a comparatively new player within Malta's economy, the ICT sector has grown to represent an important segment of the Maltese economy. Currently, the industry is composed of more than 300 companies, employing around 7,500 individuals. The success registered to date and the evolving initiatives over the past years suggests favourable prospects for investment by other organisations within this sector.

## Recommendation

The strategic direction in this regard needs to bring together the industry growth needs in terms of applied emerging technologies from micro to large enterprise. Research and development plays an essential role in this regard with ideas and initiatives stemming from industry, academia, and startups.

In line with the effort to develop a rolling strategy over a 3-year term, the key recommendation on emerging technology proposed is for the eSkills Malta Foundation to establish a reference emerging technology board as an online tool. The tool can serve as a reference point in terms of local application and adoption of emerging technology trends sought by industry. The tool is to provide a minimum of 3-year visibility with a clear indication of the blended emerging technologies and the appropriate sets of skills and competences that a respective workforce should aim for. Establishing this mechanism as a reference point can support all local stakeholders in charting out relevant individual strategies in terms technology advancement opportunities as well as the skilled workforce in connection with such strategies.

In view that blended technologies may exist in a multitude of industry sectors, such a reference technology board could support the prioritisation of competences and skill set that are most relevant to the market.



In view of the pervasive nature of the digital market, the main focus in the coming years is that to ensure that the students, trainees, workforce and society are prepared to take on the challenges brought about by the next industrial digital revolution by acquiring the relevant competences and skill set.

In view of the finite human resource availability in Malta and the needs to address the envisaged capacity shortage as a result of this digital transformation, it is being recommended that the eSkills Malta Foundation supports national initiatives to attract foreign talent to Malta. In this regard, it is advised that local international campaigns and initiatives are appropriately announced across the Foundation's established network where pertinent.

## Funding sustainable initiatives

The European ICT sector at present represents approximately 5% of the block's economy. It generates around 25% of total business expenditure on research and development. Investments in ICT account for around 50% of all European productivity growth. ICT is a horizontal enterprise that underpins innovation and competitiveness across both private and public sectors. Technology is the key enabler of scientific progress across all fields and industries. At EU level, different funding mechanisms exist to support the uptake of innovation bringing ideas to life.

Malta should prioritise its support towards sustainable efforts across the whole value chain from basic research to innovative ideas that can deliver new business opportunities. The Foundation's coordination role is essential in this aspect to bring together project activities in the areas of ICT educational offering and digital skills campaigns traversing the key pillars including education, citizens, workforce as well as ICT professionals.

The Foundation is well positioned to initiate and synchronise efforts or joint project activities that can result in added-value initiatives that contribute to sustainable growth. Emerging technologies shall strengthen all multidisciplinary elements transforming drastically the business model we are accustomed to and the educational foundations to a significant degree. The Foundation's coordination role in relation to digital skills acquisition is not limited to local level but also in relation to knowledge transfer and sharing of best practices with the EU Member States. Effective collaboration with technology leaders enables an easier adoption of advanced technologies and innovative business models offered by a collaborative economy.

Looking closer at the aspects of sustainability that need to be kept under check, one finds the state of digital readiness of the various industry sectors, particularly between high-tech and more traditional areas. Another characteristic that points towards a sustainable balance is to ensure equilibrium between large companies and SMEs where research and development potential may vary considerably.

A sustainable ICT ecosystem depends on the right competences, skills and skills proficiency to harness innovation and bring new products to the market faster. In view that the local industry is largely composed of SMEs, supporting the aspect of sustainability shall require initiatives that support the matching of companies on one side and highly-skilled digital experts or digital enablers on the other side.

## Recommendation

The role of the eSkills Malta Foundation in collaborating with 3rd party stakeholders is to prioritise and support sustainable initiatives. Supported activities need to clearly highlight efforts that present a sustainable way forward. This implies that a horizontal thematic leading to adding competences and skill sets to specific cohorts within society needs to be well-defined.

The Foundation needs to identify the best projects at EU or Member State level as well as local initiatives that provide a sustainable way of bettering society through digital. This recommendation assumes more importance when considering the envisaged increase in digital complexity.

## IT teaching professionals and guidance

Developments in the digital environment have led to an increasing availability of knowledge and research content implying that those who wish to thrive and survive in their profession need to do what they can to keep up-to-date with the latest developments. Several changes are taking place at the level of society with increasing pressure on many industries including the education industry.

Professional ICT development within the education system needs to continue to be the catalyst in prepping up students for an ICT-integrated society. ICT development in education, therefore, needs to be effective and the people who provide it need also to be well-skilled in the integration of ICT in curriculums. Local developments in the local educational system and curricula shall introduce important transformations in the next two years.

The role of education and teaching professionals is fundamental to bring about change. There is a clear need to increase awareness about information and communication technologies being an interesting and exciting career. In different ways and forms, it is necessary that information about labour market trends and the pervasiveness of ICT is clearly established in the mind of teaching and guidance professionals. ICT has become an indispensable component for all professions and professionals.

At EU level, ICT practices for guidance and career development providing a structured and detailed characterisation of well-established frameworks and effective practices are available. Such information supports the transfer and adaptation of practices across national contexts.

## Recommendation

The strategic effort in this area is to entice increased interest by students and trainees in taking up STEM subjects through higher quality and increased exposure of the technical subject delivery. The effort as part of this strategic recommendation is to provide each student with a richer educational experience that uncovers the interesting and engaging side of industries.

In addition to important developments at curriculum level, it is being recommended to set up an EU funded project initiative to bring industry experts directly into classrooms to complement the effort done by teaching professionals. The project would support an enriched practitioner experience through field expert coaching incentive to promote the engaging roles of ICT application within the industry. Such effort should contribute to an increased interest and engagement by students and trainees as each individual could share a more clear understanding of the application of ICT within the business world.

In addition, it is being recommended that in the next two years further collaboration with the association of guidance practitioners be pursued. As a result, of change in curricula and teaching methodologies, it is expected that a number of students may require professional guidance support when exploring possible educational paths. In this respect, it is highly commendable that the foundation continues and expands its close collaboration with the guidance practitioners' association with a view of setting up a project that targets upskilling and prepping up the guidance cohort. Such an initiative could also be financed under apposite EU funding mechanisms.

In addition, it is being recommended that the Foundation considers a number of targeted initiatives to encourage further ICT career related take up with the objective of increasing female participation whilst at the same time safeguarding female retention. An increasing digital market provides new grounds for increased work flexibility that could yield a more suitable opportunity for females prioritising family-life balance to rigid work commitments. Initiatives related to guided career choices in this field can be accomplished through the support of guidance professionals.

## Quality in curriculum design – digitisation by design

Education plays a vital role in developing the knowledge, skills, attitudes, and values that enable people to contribute to and benefit from an inclusive and sustainable future. Learning to form clear and purposeful goals, work with others with different perspectives, find untapped opportunities and identify multiple solutions to big problems will increase in importance in the coming years. The education system needs to ensure that it is effectively equipping young people for the world of work of tomorrow.

The curriculum design process is at the heart of the education system as it sets out what is to be learned in a managed effort. The curriculum guides the day-to-day experiences of the student within the classroom and forms the basis for teacher training programmes, the content of materials used. Materials determine how learning is assessed through assessment systems, how standards are developed and how performance is monitored through school inspection and supervision systems. The curriculum is a major determinant of what graduates from the education system bring to the world of work. An education system's capacity to effectively contribute to national social and economic development is therefore shaped by the curriculum, the right skills, competencies, knowledge, and attitudes developed to drive national progress.

Malta is embarking on a major reform to include digital ways of learning across training. The content of the curriculum should be appropriately sequenced and progressive taking into account the various stages of development, with particular attention to the cognitive and emotional growth. The reform undertaken should be sufficiently flexible to enable individualized learning, supported by a good quality curriculum that needs to be well balanced. The new digital context provides space for co-creating conceptual learning frameworks bringing together all stakeholders.

In the Digital Education Action plan, the European Commission aims to support schools with the use of digital technologies for teaching and learning by offering to any school in Europe the possibility of using SELFIE, which is a new initiative offering a free online self-reflection tool on the use of digital technologies.

This initiative also aims to launch a mentoring scheme to scale up ICT-based innovative

practice between schools at different stages of technology integration. This self-reflection tool helps educational institutions from primary to vocational setups to assess through a series of questions to teachers, students, and school leaders, where they stand with the use of digital technologies for teaching and learning. The aim of this EU based model is to build an inclusive and sustainable network where teachers and schools can support each other and exchange experience on the use of digital technologies for teaching and learning.

## Recommendation

It is being recommended that the Foundation supports the use of SELFIE, the self-reflection online tool by local schools to help measure the adoption of digital technologies in 6 key areas of digital education, including leadership, infrastructure and equipment, professional development, teaching and learning practices, assessment practices and also the student's digital competence.

Whilst technology continues to develop unchecked, its applicability and relevance to mainstream education continue to be polarised from the basic mistrust of technology in the classroom to misunderstandings on digital pedagogy. This situation has held back the full potential of the digitalisation of education particularly in a discipline concerned with the development of human potential.

The local educational system needs to influence such trends where it needs to lead rather than react to technological change. On a practical level, this means that the curriculum design needs to focus more on translating technological risks into individual competences to enable more desirable future scenarios.

At local, but also at the EU level, ICT is not always portrayed as an interesting career path and this is reflected in the number of students who are willing to study ICT. Furthermore, there is a bad perception which is also clearly visible through the research conducted that ICT is most interesting for men.

The Foundation needs to complement the efforts done by the educational system to implement a change in curriculum moving towards digital. A key area of intervention in this regard is the support to private and independent training schools to create increased harmonisation in the move towards digital education across the nation.

## Continuous professional development and industry collaboration

Effective CPD is the process of tracking and documenting the skills, knowledge, and experience that you gain both formally and informally as you work, beyond any initial training. The CPD is a record of what you experience, learn and then apply. The term is most commonly used to mean a portfolio documenting your development as a professional. Some organisations use it to mean a training or development plan, but fundamentally CPD is the process of recording and reflecting on learning and development.

CPD is important because it ensures that one continues to be competent in his or her profession or area of major expertise. The process is an ongoing one and continues throughout a professional's career. The CPD approach can be applied to professional streams and careers whereby a learning progression may be established as a result of a training needs assessment.

## Recommendation

It is being recommended that the Foundation pursues a study in relation to the mapping of continuous professional development and lifelong learning for ICT professionals within the local context. Such project which could also be supported through EU funding could be of important assistance to different industries with the development of CPD paths. Over the past years, the eSkills Malta Foundation has undertaken an ICT Skills Audit in an attempt to establish the gaps and the needs of the industry in the context of digital needs. Developing industry sensitive CPD paths is an effective and valuable development in supporting skills gaps identification for key industry streams.

This project could be of great support to a number of industries in view of the major retraining required due to faced paced digital market. The concept of developing a CPD digital toolkit could prove to be essential to some organisations given that on average, by 2020, more than a third of the desired core skill sets of most occupations will be comprised of skills that are not yet considered as crucial to the job today.

The key to surviving this new industrial revolution is leading it. Taking a commanding role requires two key elements of an agile business. The first is complete awareness of disruptive technologies and secondly is being able to develop talent that can make the most of it.

## Upskilling, specialisation, and retention of existing industry workforce.

Improving the ICT skills whilst ensuring the development and retention of the generic and specialist ICT workforce requires the collaboration of a number of stakeholders from tertiary education providers, employees, and employers. Upskilling and skills set specialisation is required to flexibly respond to changing circumstances around us.

Individuals require the adaptive capacity to adjust to changes in the organisation of work, including the growing proportion of contract work in selected areas of ICT, and to ensure ongoing skills development in a climate of skills obsolescence. The educational system and tertiary education providers must ensure that graduates are equipped for a world of work that is constantly changing, including the development of complementary soft skills alongside technical competencies. Employers must adapt by adopting innovative approaches to the organisation of work and job roles to maximise both skills utilisation and the competences of a diverse employee cohort.

Industry requirements continue to evolve for advanced technical skills. New emerging technologies combining a number of relatively new technologies such as Blockchain, Big Data analytics, Artificial Intelligence, and Machine Learning demand the IT industry to be agile and adaptive quicker than ever before. Hence, one way to ensure that happens is if time and financial resources are invested in reskilling and upskilling the workforce. The industry needs skilled professionals who can bring unique qualities and add greater value to the overall business model. This highlights the aspect of continuous training and upskilling of the workforce in relation to digital competences. Cross-functional training is a highly impactful element of reskilling as it makes professionals more employable, along with providing them with complementary skills to enhance their overall expertise. Upskilling and reskilling employees generally leads to increased productivity and overall cost-effectiveness.

Regular training keeps employees engaged and helps boost employee retention rates. In today's age, organisations can deal with the massive digital disruption and grow further only as long as they are prepared to invest in their employees and in helping them acquire the skills and expertise they need to succeed in their revised job roles.

Retention of employees, particularly those engaged in professional ICT roles have proved to be relatively difficult for a number of organisations. Retention of staff complement issues of both local and foreign resources is estimated that the

opportunity cost to the local industry amounts to circa 7 million Euro per annum. Premature change in job, lack of adaptation or acceptance of foreign complement and issues relating to long lead times in recruitment are the key issues related to such financial losses. The current pace of change and rapid emergence of new technologies is making it increasingly difficult for companies to find staff with specialised skills.

Every organisation has to adopt new technologies and practices to remain competitive and achieve growth. The demand for e-skills keeps growing at a tremendous pace. In 2020 the European labour market is projected to grow by more than 670,000 new ICT jobs, but it could absorb another 756,000 ICT practitioners if only sufficient supply were in sight.

Being a small island, with a relatively small population, Malta has limited human resources. It is also limited in the number of high-skilled professionals that it produces for sectors such as ICT. This reflects the number of tertiary level graduates which is relatively low when compared to the EU average. Companies in Malta identify lack of skilled workforce as a limiting factor to expand their operations.

## Recommendation

The ICT sector is growing very rapidly and each year the demand for additional workforce is increasing. At the same time, the supply of ICT graduates has not increased over the past years. For this reason, local companies need to struggle harder than other competitors based elsewhere. Several studies have shown that our education needs to provide more essential skills and cutting-edge training that is required by the industry. For this reason, it is being recommended that the Foundation supports the initiatives across industries to support the identification of resource shortage which in turn could be addressed through the provision of more specific training.

The Foundation should seek to collaborate with the social partners within the industry to catalogue the skills and competence gaps. The rapid changes in technologies adopted by the enterprise are adding up the pressure to retrain the workforce. A project to catalogue skill gaps between industry and educational institutions can lead to the supply of short-cycle specific training to enable an employee or trainee to address the needs linked to specific job requirements.

## Adequate structure to grade and evaluate

Evaluation plays a principal role in the teaching-to-competence acquisition process. Grading and evaluation are necessary for the system to understand if the intended objectives are being adequately met and if not, by which margins is one deviating from the intended target. Evaluation is a continuous process and a regular exercise. Such structure helps in forming the right value judgement, the true educational status and the objectives set by the ICT ecosystem.

An adequate methodology for measurement, contributes to the correct formulation of realistic objectives, designing of learning experiences and assessment of learner performance. Proper measurement also provides accountability towards society and the education system.

## Recommendation

As part of managing the effectiveness of the initiatives proposed as part of this strategy, it is being recommended that a system to grade and evaluate outcomes is established. The evaluation system can be linked to the digital KPIs established and agreed upon by the eSkills strategic consultation committee.

This evaluation system would be one of the important tools that would give visibility across all fields of training activity within all levels of the education system as well as feedback from the industry. Such a tool can provide information leading to objective assessment.

The design of the tool can take the shape of an online evaluation mechanism that is shared with all stakeholders. Making use of data analytics and visualisation dashboards, this recommendation could be interconnected with the initiative on emerging technologies as part of the reference emerging technology board.

## A focus on youth with a shift towards participative vs consumer use of technology

Information and communication technologies (ICT) affect people's everyday lives in many ways, whether at the workplace, an educational establishment, at home or on the move. Mobile phones, tablets, netbooks, laptops, and computers are just some of the devices that are frequently used on a daily basis by a large proportion of the population of the European Union, particularly by young people.

The use of ICTs is widespread among children from a very young age as they access technology at home and at school; indeed, it has become commonplace to see young children playing on mobile phones and tablets even before they are able to read and write. By the time young people in the EU leave compulsory education most of them have regularly made use of computers and the internet for a variety of activities. The new curricula are intended not only to develop wider ICT skills and competences but also support the teaching of traditional subjects such as mathematics or foreign languages to use ICT.

Youth are considered early adopters of ICT based technologies, and are an essential driving growth and innovation in the sector. With millions of jobs requiring advanced digital skills and competences in the coming year, many countries are projecting a shortfall of skilled workers to fulfil these jobs. While young people are often considered to be 'digital natives', the reality is that the majority do not possess participative and job-relevant digital skills. In particular, jobs requiring coding and other advanced ICT skills risk going unfilled.

Young persons may be highly proficient in a particular digital area, have access to technology and be an avid social media user. However, as with any digital user, this does not guarantee they have the skills or confidence to actively engage productively as part of the future workforce or critically assess the information they are consuming or access necessary online services. In addition, many young people are connected only via mobile devices, without regular access to a notebook or similar device which can further impact how and which digital spaces some youth can utilise.

In the case of Malta where a high number of early school leavers are registered every year (22.6%) when compared to the EU average (12.8%). Even if it is slowly declining,

Malta's rate of early school leaving is much higher than the Europe 2020 average target of 10%. The Europe 2020 strategy set a specific objective of improving education levels by increasing the share of young people having successfully completed tertiary, or equivalent, education to at least 40% by 2020.

Despite relatively low overall and youth unemployment rates, the skills issue is set to become increasingly challenging in the next few years. Low basic skills achievement, a modest rate of tertiary education attainment and a vocational training system in need of modernisation are key indicators of action areas that require attention in view of emerging technologies and future market needs.

## Recommendation

The recommendation in the field of youth is to draw on initiatives that gradually shifts consumer to a more participative one within youths. Addressing this particular area entails an important medium-to-long term collaborative effort with youth organisations as a shift in mindset often happens through reinforcement rather than one-off events.

Addressing this recommendation entails establishing an eventful calendar of events through which ongoing partnership and collaboration are necessary. The Foundation could also make use of its European network to bring in ideas and share various experiences. To complement such initiatives and activities the Foundation could also be supported by the Youth pillar under the Erasmus+ programme. This programme supports various initiatives from the transfer of knowledge to youth mobility programmes.

A proficient workforce depends on the effective involvement of the youth cohort. The key to successfully engage youth revolves around the creation of thought-provoking and interesting events that are affordable and accessible.

## Combatting Digital divide within society

Digital technologies play an important role in the everyday life of most Europeans. Digital services do offer the citizen a number of services affecting the average quality of life. The internet allows people, businesses and governments to transform the ways they communicate and engage with one another.

Yet some parts of the population are still excluded from using new technologies. The digital divide is defined as the gap between individuals, households, businesses and geographic areas at different socio-economic levels with regard both to their opportunities to access information and communication technologies and to their use of the internet for a wide variety of activities.

There are two aspects to the Digital Divide, the first gap considers mainly the division between those who have access to ICT such as computers and the internet and those who do not have access. The second gap refers to different types and levels of internet use, motivation, and skills: looking at what uses and benefits people enjoy, once they have access to the internet. This also includes looking at the type of content and services accessed online such as eGovernment.

Closing this digital divide ensures that everyone is in a position to access and use the digital services that improve their quality of lives, develop their career, improve their wellbeing, and allow them to connect with others. Narrowing the digital divide brings with it improved economic equality, social mobility, democracy, and economic growth. Emerging technologies are enabling more and more services to shift online, including public services as well as private business transactions.

As established by the DESI index, Malta ranks 12th out of the 28 EU Member States with a rating that is above the EU average. Malta is a European leader in the supply of government services for its citizens. It ranks first on the re-use of information across administrations to make life easier for citizens as well as on the sophistication of services, where it has registered a maximum score.

## Recommendation

The recommendation in the area of the digital divide is to sustain awareness campaigns targeted at supporting minority groups and promote the concept of continuous learning. In view of the rapid evolution of technology, where a number of services may cease to exist in today's current shape and form, it is critical to encourage further training offered that's close to the citizen, particularly at local councils level.

Every individual within society should have the opportunity to make use of digital services so they can reap the various benefits that such services provide. The Foundation needs to keep a close watch over the four main barriers that will affect individuals digitally in the next few years.

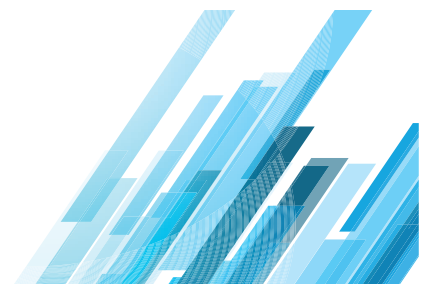
**Access to online services**

**Basic skill set**

**Confidence in using services**

**Motivation to use services**

The Foundation plays an important coordination role contributing to the decrease of fragmentation of similar initiatives to maximize the benefits from initiatives undertaken by various stakeholders. The Foundations can foster stronger collaboration between the public and private organisations to tackle the social divide gaps. Specific cohorts are expected to face increasing difficulties due to lack of digital capabilities within the context of an increasingly digital economy. To avoid a widening digital divide it is essential that such gaps are identified and addressed.



## Opening up to a professional structure in ICT

For the last years, activities relating to the EU e-skills strategy have been focusing on indicators relating to the balance of demand and supply of IT professionals. However, an important initiative focusing on a European framework for IT professionalism is being outlined. Europe is highly dependent on sufficient skills to further boost the digital economy.

In line with forecast figures, it is clear that demand will outstrip the supply of IT skills that can help organisations design, build, implement and manage new digital technologies. The scope for a European framework for IT professionalism contributes to closing this gap as well as to further maturing the IT profession across Europe.

It is expected that this framework will benefit mostly the IT professionals in a direct way. The key deliverable of this framework is that it offers standards and tools that support elements of continuous development of IT knowledge, skills and competences.

The framework has the main objective to serve as a guide to orient and support IT professionals throughout their professional life cycle, from the early school years to career development and progress. The framework builds on various use cases to determine the value-add of the framework, from people preparing to enter the profession, to people that actually started an ICT career, to others that would like to further develop their career or some that will change their career both within ICT career or from outside this profession.

Evidently, there are important values for IT professionals that this framework can effectively contribute to. The framework will contribute to the international recognition of IT skills, competences and knowledge, which enhances both credibility as well as opportunities for professionals.

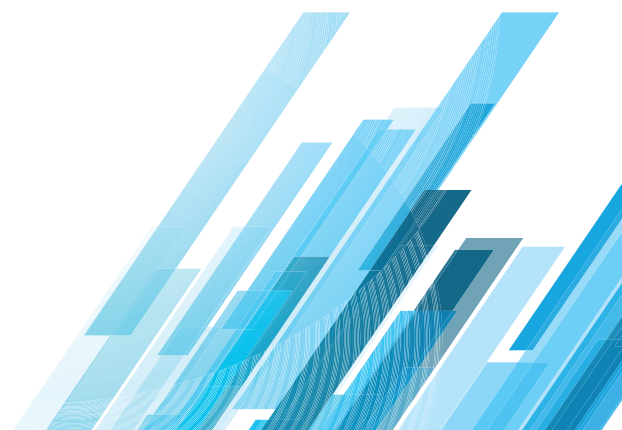
The framework shall also contribute to improved clarity over IT education and career paths as well as related competences. It offers the opportunity to professionals to shape a path in various stages of a career, either through advancing to a next proficiency level within an area of expertise or by switching to another closely related area of expertise.

A European framework for IT professionalism shall also support an improved image and general perception of ICT jobs and IT professionals. Suitable standards of competences, knowledge, and behaviour, as defined by professional bodies, will lead to higher levels of professionalism, and consequently to improved perception of the profession in general. In addition, the framework looks into the digital user skills, competences and knowledge areas used in jobs that are not core-IT but do involve a significant core IT element.

Finally, this framework strengthens the pride IT professionals take in their jobs. Through this framework, professionals can further organise themselves, either in generic associations or in specialist associations around a specific area of expertise. This can potentially trigger further interest and possibly attract them to an ICT career.

## Recommendation

It is being recommended that the Foundation opens up to the adoption of a framework for IT professionals, by developing a campaign to create awareness of such framework laying the foundation for further future consideration. The surveys carried out as part of this strategy identify a clear positive outlook by respondents that such a framework would be beneficial for their ICT career. Within the local context, the benefits highlighted by the European framework for IT professionals can support the industries with the sourcing and recruitment process.



# 11

## Concluding remarks

This strategy document sets out how the eSkills Malta Foundation will build further on the successful outcomes that Malta has achieved on the technology front over the past years. The strategy aims to strengthen the governance standpoint as well as the strategic design capability of the Foundation in the upcoming years. The recommendations put forward in this report address different business objectives from regular timely strategic review to mechanisms that enable the measurement and evaluation of the objectives set.

The eSkills Malta Foundation is committed to implement the strategic recommendations presented in this strategic report. In this respect, the Foundation embraces an ongoing commitment to progress that goes beyond the immediate market requirements. To this end, the Foundation aims to consolidate and sustain its continued engagement with IT experts, educational organisations, industry and civil society with an aim to foster closer collaboration between all parties. Collaboration with all stakeholders is pivotal in the development of sustainable long-term strategy.

The governance model, recommendations and initiatives presented in this document are aimed at strengthening the growth of the local workforce in terms of skills and capability within the context of a continuously growing digital economy. The Foundation commits to focus its efforts on supporting the various sectors in embracing digital skills projects and initiatives with the main objective of strengthening the local digital economy whilst reducing the digital divide across society.

# 12

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