The skills needs of the ICT and FinTech Sectors in the North West 2018

Skill Audit undertaken by the North West Regional Skills Forum in Collaboration with FIT

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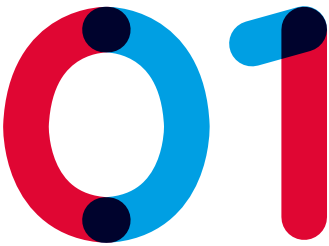
The Information & Communications Technology (ICT) and FinTech sectors are among the fastest expanding industries in Ireland

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Ireland is currently the European headquarters for many of the world's largest tech companies. Many of the jobs in these sectors are in Software Development, Data Science/Analytics and Technical Support. Cloud Computing, Cybersecurity, Blockchain, Artificial Intelligence (AI), Robotic Processing Automation (RPA) and the Internet of Things (IoT) are other areas that are expected to experience strong growth in the next five years. Despite fears of new disruptive technologies/ automation threatening certain roles, the need for skilled employees to use advanced technologies will become more apparent than ever. It should also be emphasised that these disruptive technologies will create a significant number of new jobs and roles in the coming years. Advances in these technologies will mean that skills unique to humans such as creativity, teamwork, empathy and innovative thinking will become increasingly more valued by employers.

ICT now permeates almost all sectors of the economy. Almost 50% of those employed in ICT occupations in Ireland are employed outside of the ICT sector. Many financial services organisations are looking at technology to embrace innovation and provide better customer experience. The converging financial and technology sectors or "FinTech" will continue to provide significant opportunities to Ireland. The FinTech sector is a Government priority, as evident from its strategy for developing Ireland's Financial Services Sector, IFS 2020. Ireland is renowned as a world-leading centre for the FinTech industry and in particular the new disruptive technologies such as Blockchain. Today, Ireland is a gateway for international technology businesses seeking to enter or serve the European Market and is home to many of the world's leading FinTech employers. A combination of factors, such as government support, the existing technology ecosystem,

a large pool of talent, to name but a few, make Ireland an attractive location for FinTech businesses & entrepreneurs who are looking to succeed. The North West region is home to some of the major FinTech organisations operating in Ireland and significant employment opportunities in this sector will exist for graduates and job seekers wishing to gain employment here.

It has been reported that almost 40% of 'difficult to fill' roles across all sectors in Ireland in recent years were in the area of ICT. The ICT sector accounts for the highest share of new employment permits issued each year, illustrating the challenges that employers are facing in filling positions in this sector. At 42%, employed programmers and software developers had over double the national average share of non-Irish nationals (15.4%); the share of non-Irish IT business analysts & systems designers was even higher at 44% (SOLAS, 2017).

— Software developers: mobile (iOS/Android), database (with Oracle/SQL), web, cloud with skills in Java, JavaScript, C++, .Net, PHP, CSS, F#, Python, and Ruby on Rails.

— FinTech: business and financial professionals with skills in specific software packages.

— InfoSec (IT security), IoT (internet of things), cyber security analyst, data/information security, network security.

— Web design (niche areas only): particularly web related applications focusing on enhancing users' online experience (UX) and supporting user interaction (UI) with 3-5 years' experience.

— Engineers: network (Linux, Open Source), database, QA, automated performance testers, DevOps (developing/ testing, process re-engineering and communication skills).

— Systems/solutions architects, database architects (e.g. data centres/data warehousing).

— Business intelligence: BI solutions, big data analysts (e.g. Hadoop, Cassandra, SQL), ERP (enterprise resource planning) with SAP.

— IT managers and business analysts (especially systems migration and IT project management e.g. waterfall and agile).

— IT technicians: troubleshooting, tech support with languages, particularly German and database administrators.

This Skill Needs Analysis is a joint collaboration between the North West Regional Skills Forum and FastTrack in Information Technology (FIT) Ltd. which seeks through close dialogue with industry to better inform skills development programmes and strategies in order to maximise tech related employment opportunities in the North West region over the coming years.

The report commences with a profile of the North West region (Donegal, Sligo and Leitrim) by looking at population demographics, composition of employment as well as ICT activities in the region. There has been significant growth in relation to the number of persons engaged in ICT activities across the three counties in recent years.

CSO data shows private sector ICT jobs in the North West have grown strongly adding almost 850 additional jobs, which is a growth of 72% in the seven years from 2008 to 2015

Private sector ICT jobs amounted to 2% of total private sector employment in 2008 in the North West and this almost doubled to 3.9% in 2015. In addition, there are robust indicators, which show that ICT and FinTech jobs are of growing importance in contributing to the prosperity of the region.

General trends in relation to skills demand from ICT and FinTech employers are presented in a number of disciplines including programming/development methodologies, mobile technology, web development, cloud computing, platform administration, cyber security, networking, big data, enterprise applications, digital skills, contact centre support and project management. Trends in the FinTech sector are also presented. In addition, there are some significant themes arising from the face-to-face exchanges with tech employers from the North West that are explored. Firstly, the availability of critical communications skills, project management, marketing and business acumen for tech companies, in addition to tech skills is vital. Secondly, there is a broad endorsement for the enhancement of access routes into the sector that incorporate further education training (FET) capacity in addition to third level provision, and which embrace the government priority to transfer the benefits of the apprenticeship / traineeship model into the digital age, blending theory with practice and the application of learning. Thirdly a desire to build future capacity across all levels of education to meet an unprecedented appetite, as tech skills permeate across all sectors of the economy and society in general – tech skills that will be used in tech companies, tech enabled organisations and by companies where technology serves as an important operational function.

North West Regional Skills Forum promoting skills for growth

A major objective of the North West Regional Skills Forum is to determine the current and future needs of employers in relation to education, skills and recruitment

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The North West Regional Skills Forum is one of nine Regional Skills Fora, which were established by Government as part of its National Skills Strategy to provide an opportunity for employers and the education & training system to work together to meet the emerging skills needs within the region. The region's Education and Training Boards (Donegal ETB and Mayo, Sligo & Leitrim ETB) and Higher Education Institutions (St. Angela's College, IT Sligo and Letterkenny Institute of Technology) along with employers & employer representative bodies and the Department of Employment Affairs & Social Protection are represented on the North West Regional Skills Forum.

A major objective of the North West Regional Skills Forum is to determine the current and future needs of employers in relation to education, skills and recruitment. This information will further inform local education and training providers when designing new programmes and reviewing existing programmes.

Aware of FIT Ltd.'s previous experiences and competencies when conducting skills needs analysis in tech related sectors, the North West Regional Skills Forum approached FIT

to collaborate in undertaking a North West regional analysis into employers' skills needs within the tech related sectors.

FIT has a specific approach and a unique set of instruments for conducting a 'Skills Needs Analysis' which has been used to diagnose skills shortages and skills deficits in the IT and other sectors nationally. Its audit methodology probes employers' skills needs in sufficient practical detail that training solutions can be designed and implemented within an acceptable time frame. Its expertise is recognised by leading employers in the tech sector and cited in Ireland's National Skills Strategy 2025.

The focus of this regional Skills Audit is primarily to identify the tech skills needs of ICT and FinTech employers residing within the catchment area of the North West Regional Skills Forum. However, the wider needs of the sector nationally and indeed internationally are also considered in the deliberations and recommendations. The overriding objective is to further inform the training and education providers in the region about employer requirements in relation to recruitment, training and education.

Fastrack into Information Technology Ltd. (FIT Ltd.): is a not-for-profit, industry-led body. Its core mission is to promote an inclusive Smart Economy by creating routes to marketable technical skills for people at a disadvantage in Ireland's labour market, including young people without a higher education. It has pioneered its own methods for working with employers to understand their skills requirements. Working in collaboration with QQI, other awarding bodies, SOLAS, ETBI / ETBs and Regional Skills Forums and local development agencies, it designs programmes that enable people to acquire the in-demand skills identified, collaborate with regional / local education and training providers in their delivery and supports those who complete the programmes secure employment.

The North West Region at a Glance

Socio-Economic Profile – A Census 2016 Update

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The North West Regional Skills Forum (NWRSF) serves the counties of Donegal, Sligo and Leitrim. Data from Census 2016 is used here to provide an up-to-date and tailored description of the population within this catchment area.

The NWRSF serves 5.4% of the national population, with Donegal accounting for over 60% of this. Over the decade, 2002-2011, population growth in the region (17%) kept pace with national growth but the economic collapse after 2008 impacted particularly severely on the North West. While population growth at the national level slowed dramatically to 3.8% between 2011 and 2016, it went into reverse in the North West (-0.6%). This was wholly on account of a fall of -1.2% in the population of Donegal. Donegal was the only county to record declines in both its urban and rural populations between 2011 and 2016.

Leitrim recorded virtually no change in either urban or rural (thus, hanging on to its exceptionally large increase of 23% during 2002-2011), while Sligo's urban population grew but its rural population declined.

Table 1: Population Size and Rate of Growth - Donegal, Sligo and Leitrim

Area	2016			Change	
	Population	% State		2011-2016	2002-2011
Donegal	159,192	3.3%		-1.2%	17%
Sligo	65,535	1.4%		0.2%	12%
Leitrim	32,044	0.7%		0.1%	23%
Total-North West	256,771	5.4%		-0.6%	17%
State	4,761,865	100.0%		3.8%	17%

A number of graphs are presented below to provide an overview of employment data for the region

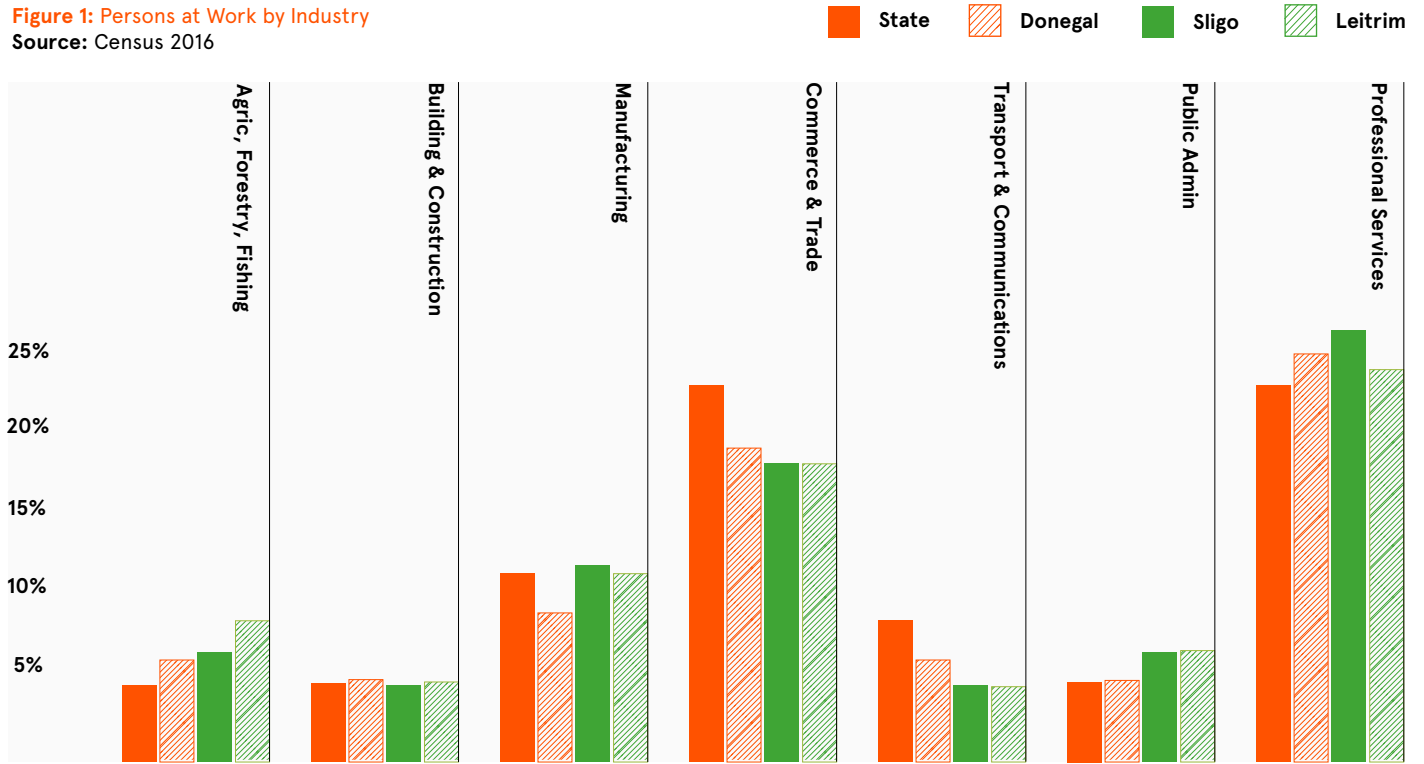**Figure 1:** Persons at Work by Industry
Source: Census 2016

Legend: State | Donegal | Sligo | Leitrim

Categories: Agric, Forestry, Fishing | Building & Construction | Manufacturing | Commerce & Trade | Transport & Communications | Public Admin | Professional Services

Y-axis: 5% 10% 15% 20% 25%

Figure 2: Persons at Work or unemployed by Occupation
Source: Census 2016

Legend: State | Donegal | Sligo | Leitrim

Categories (top to bottom):
Elementary
Process, Plant & Machine Operatives
Sales & Customer Service
Caring, Leisure & Other Services
Skilled Trades
Administrative & Secretarial
Associate Professional & Technical
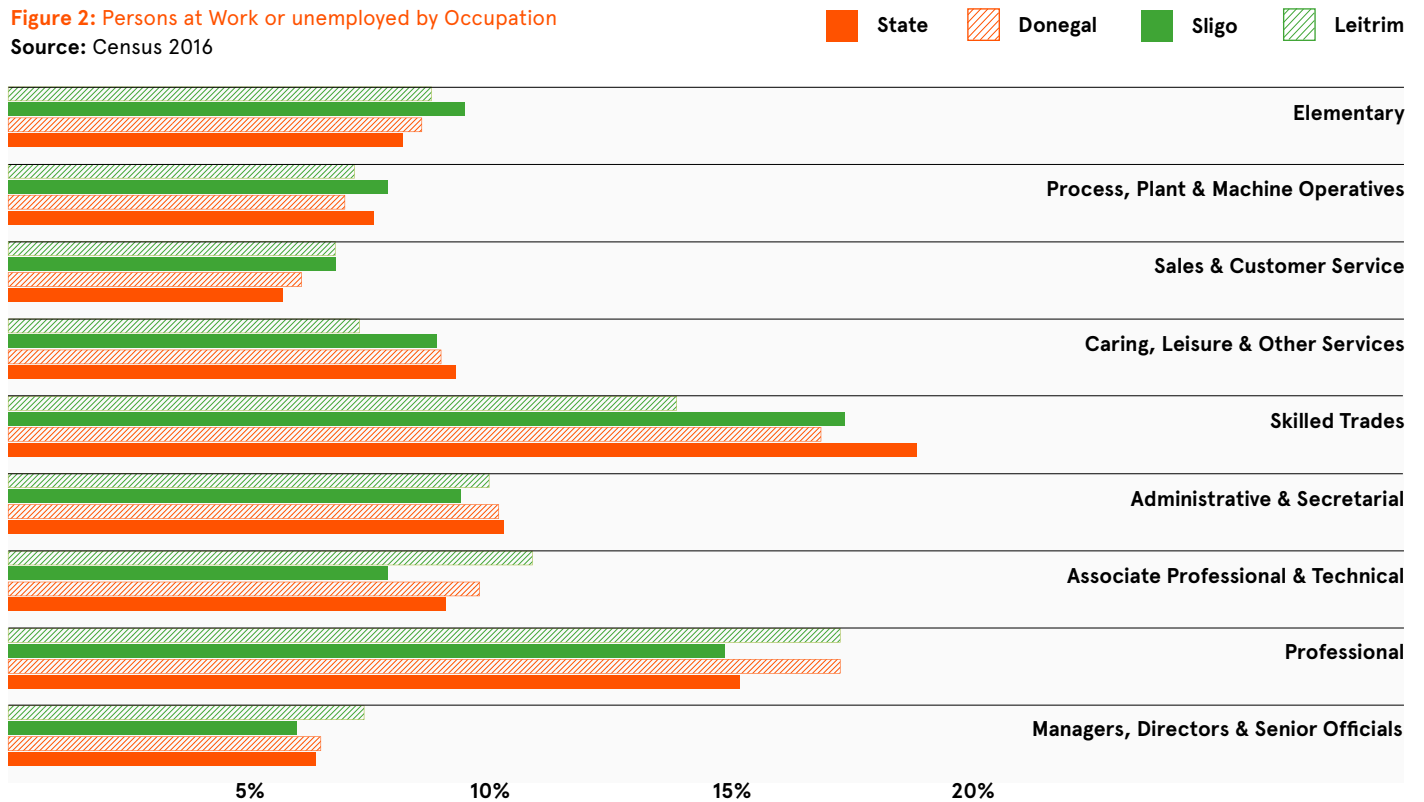Professional
Managers, Directors & Senior Officials

X-axis: 5% 10% 15% 20%

Figure 3: Weight of Knowledge-Intensive Services in Private Sector Employment
Source: CSO (2017) Business Demography 2015
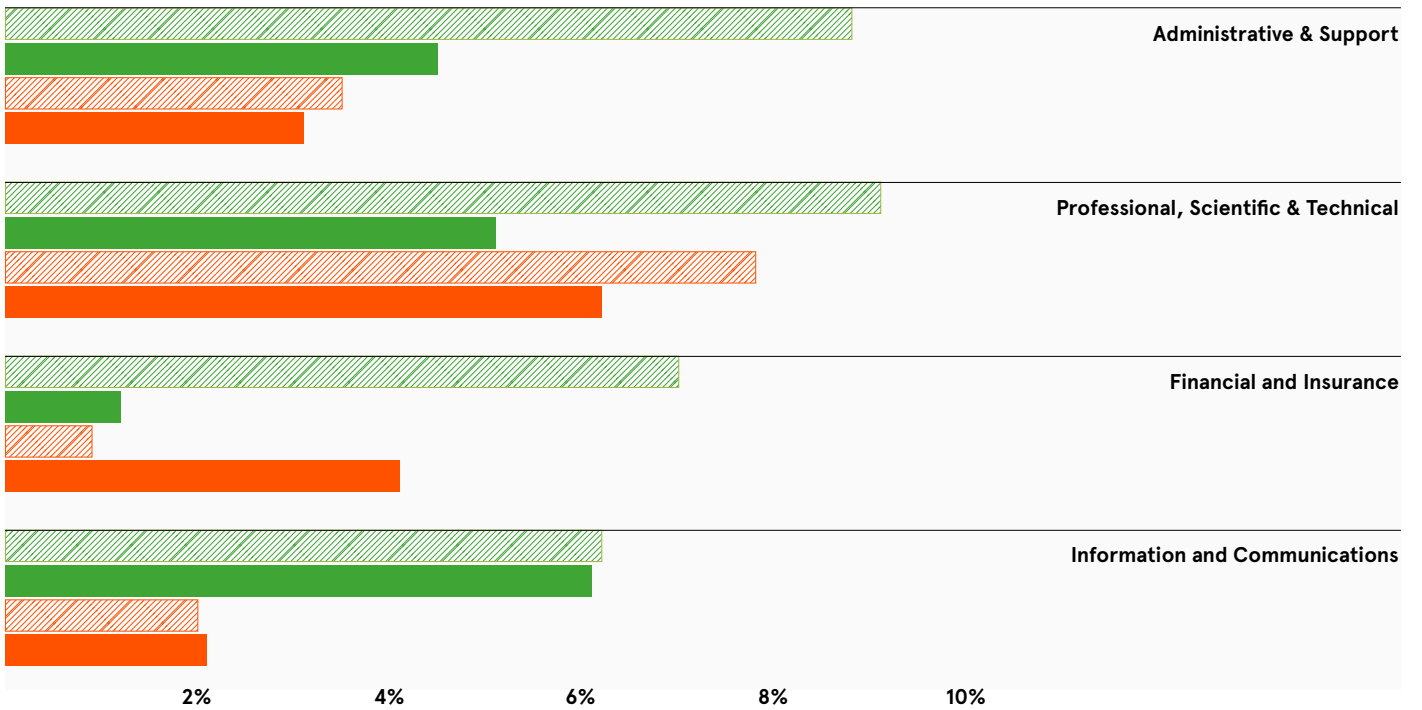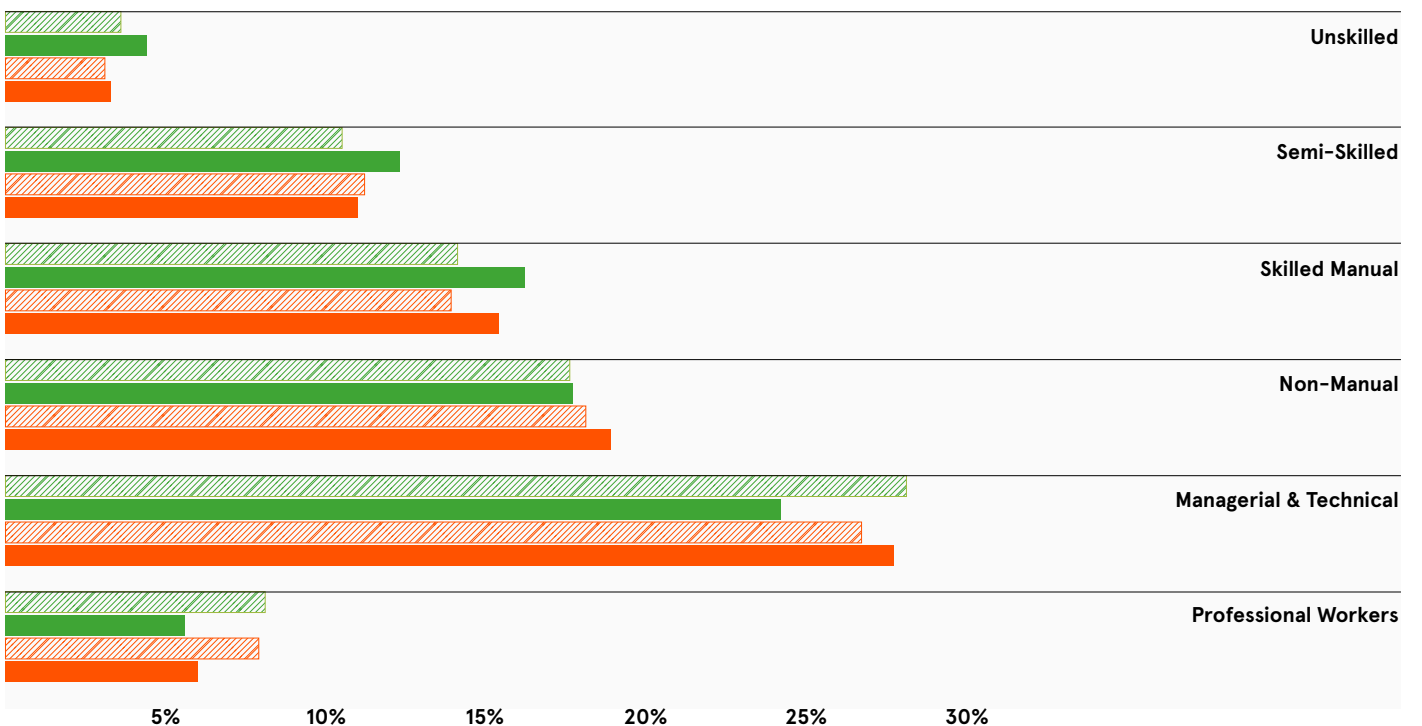
Legend: ■ State ▨ Donegal ■ Sligo ▨ Leitrim

Administrative & Support

Professional, Scientific & Technical

Financial and Insurance

Information and Communications

(x-axis: 2%, 4%, 6%, 8%, 10%)

Figure 4: Socio - Economic Profile
Source: Census 2016

Legend: ■ State ▨ Donegal ■ Sligo ▨ Leitrim

Unskilled

Semi-Skilled

Skilled Manual

Non-Manual

Managerial & Technical

Professional Workers

*(x-axis: 5%, 10%, 15%, 20%, 25%, 30%)*

Dublin has the greatest number of ICT jobs at 60,267 out of a national total of 97,948. However, both Cork at 10.1% and Kildare at 11.4% have a greater density of ICT jobs than Dublin at 9.2%. There is no county in the North West that has a private sector ICT employment level as high as the national average of 7%. However, there are robust indicators, which show that ICT jobs are of growing importance in contributing to the prosperity of the region. Donegal is leading the way in this regard with 1,645 private sector ICT jobs in 2015, which amounts to 5.4% of total private sector employment. This is a strong increase, up from 915 in 2008, according to CSO data. Both Sligo and Leitrim have also seen significant increases from 2008 compared to 2015 (Sligo up from 214 to 241 and Leitrim from 53 to 137). Taken together the number of ICT jobs has increased from 1,182 in 2008 to 2,023 in 2015. Our analysis shows the significant role that private sector ICT employment has played in maintaining and increasing employment levels in the North West region. Based on these recent trends and the findings from our survey FIT forecasts that private sector ICT jobs in the North West will grow from 2,023 in 2015 to over 3,500 in 2020.

Public sector employment in the North West is an important component of overall employment levels and should not be overlooked when assessing its potential for contributing to growth in ICT jobs for the region. Government Departments, the health sector and other public sector employers are experiencing the same pressures of digital transformation as the private sector and will require more ICT practitioners to design, build, deploy and maintain the ICT systems that will be needed in the next five years.

Figure 5: Private Sector employment in ICT 2008 & 2015
Source: CSO (2017), Business Demography 2015

— ICT as a % of all business 2015   ■ 2008   ▨ 2015
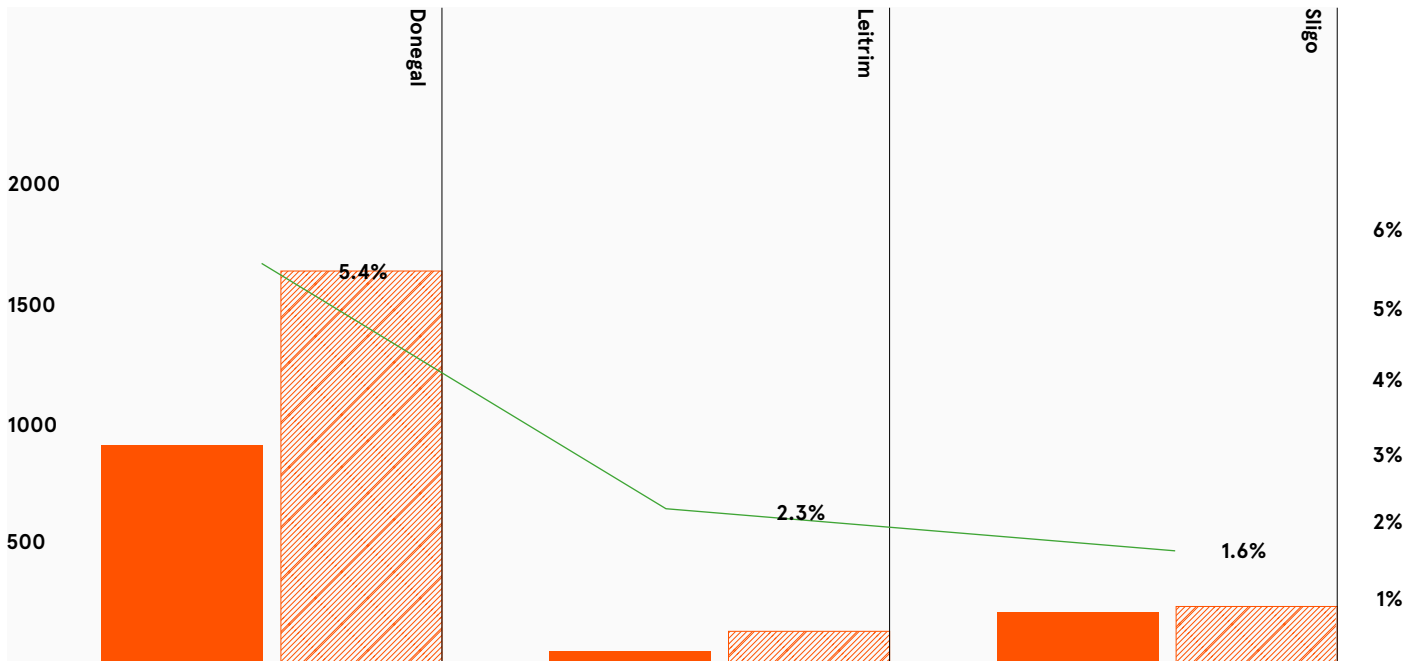
Consulting with tech employers on skills needs

Companies with significant ICT and FinTech related functions in the North West were invited to participate in a skills audit initiated by the North West Regional Skills Forum.

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Twenty-eight companies participated and shared their valuable experience and insights in the interest of enhancing the tech talent pipeline within the region. All interviews were face-to-face, involving a detailed questionnaire and were on average 1.5 hours in duration, for which we would like to thank all participants. Interviews took place during the period July to September 2017. In addition, follow-up interviews with a large sample of employers were carried out between December 2017 and January 2018.

Altogether, 11,274 people are employed across the 28 company locations incorporated within the study, with the median number of employees being 24. The single largest location had almost 1,500 people at work and the smallest 1. Twenty of the companies that took part in the survey had 50 or fewer employees.

Generally, respondents (typically Technical Leads, HR Managers, General Managers or CEOs) were very enthusiastic to participate in the audit interview process indicating their appreciation for this kind of initiative. Their interest in the skills agenda and commitment to the people and region where they were located was strong with many articulating a desire to maximise local employment where possible. However, all indicated that the suitability of skills and, where necessary, experience was the determining factor in the selection process. Most indicated that they would be keen to support local initiatives that progress the skills development agenda.

In addition to highlighting specific tech skills requirements outlined later in this document the participants also shared insights on broader issues impacting business development in the region:

— Respondents were happy with the calibre of candidates coming from existing programmes but felt that

further collaboration between education & training providers and employers regarding curriculum design and delivery would be beneficial to all stakeholders.

— There was concern expressed regarding the volume of qualified candidates leaving the region and in response a desire for government to initiate some interventions that would encourage more individuals to stay and work within the sector locally.

— Companies emphasised the importance of candidates acquiring soft skills alongside technical competencies and stressed the need for education and training programmes to incorporate more prolonged periods of practical work experience to facilitate the application of learning. In this regard, 93% of companies who participated in the skills audit expressed strong support for the introduction of more dual education initiatives such as the proposed new Apprenticeship and Traineeship programmes. The only one provision being that the administration / bureaucracy associated with this be kept to a minimum.

— The key issues cited as impeding business development in the region were broadband infrastructure and infrastructure in general. There was a general view that enhancement of access routes would stimulate economic development and facilitate trade regionally, nationally and internationally.

The following section provides some analysis of the skills requirements and demands of the tech sector in the North West over the next 12–18 months.

Key findings & analysis

The survey responses were analysed to determine the specific skills most in demand for each discipline

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Tech skills most in use

Overall, the level at which ICT skills, across all disciplines, are most exercised and required in the North West are expert level (44%) with competent level accounting for 31% and entry level for 25% (top chart in Figure 6). This differs from the picture for Ireland as a whole (bottom chart in Figure 6) which shows that nationally there are more openings for those with entry & competent level skills at 75% compared to 56% in the North West. However, with a combined figure of 56% (entry level + competent level) there are significant opportunities for job seekers who complete FET tech programmes at NFQ Level 5 and Level 6.

Figure 6. Levels at which skills are being exercised and required
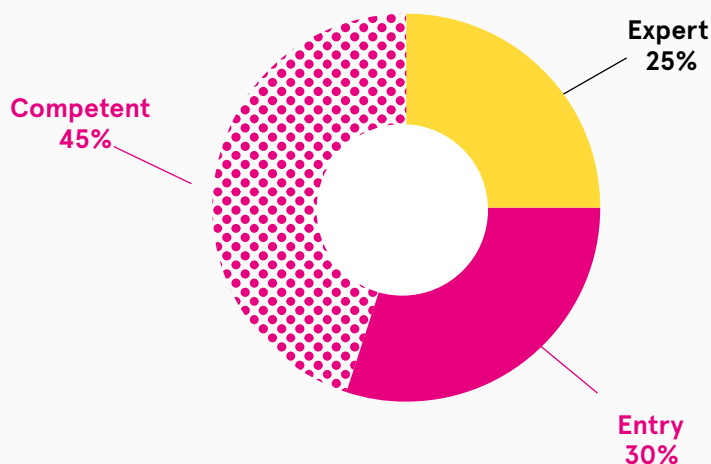
FIT Skills Audit 2017 – North West
Level of skilled required [all disciplines]

Expert 44%
Competent 31%
Entry 25%

FIT Skills Audit 2014 – Ireland
Level of skilled required [all disciplines]

Expert 25%
Competent 45%
Entry 30%

ICT skills needs by discipline

The survey responses were analysed to determine the specific skills most in demand for each discipline. This information is presented in radar charts which present the data in a form easy to assimilate and which gives readers an overview of the intensity of demand reported for each specific skill within a discipline. In each radar diagram:

— The outermost ring represents the highest demand for a specific skill.

— All rings represent significant demand even the inner ones.

— Different coloured symbols illustrate demand for entry, competent and expert levels.

— A table gives the same information in the form of a ranked list with the number 1 position occupied by the most in-demand skill.

Readers of this report are invited to explore the top ranked skills / high demand roles, as set out in the radar diagrams and tables in Annex 1, for any of the disciplines which are of particular interest to them or indeed all of the disciplines if a comprehensive understanding is required. For those who only need an overall understanding of skills needs, the general findings in the following pages and the information in Figure 7 right should prove insightful.

Figure 7 shows a comparison of the levels of skills required by discipline with the leftmost being the discipline with the highest requirement for those with entry and competent levels of skills. We can see that Cloud Computing, Enterprise Applications, Big Data and Cybersecurity roles at entry and competent levels are available for those with the required skill sets. At the other end of the spectrum the current demand in the Project Management, eBusiness and Contact Centre disciplines are for those at expert level.

Figure 7: Level of Skill Required by Discipline
**Source:** Census 2016
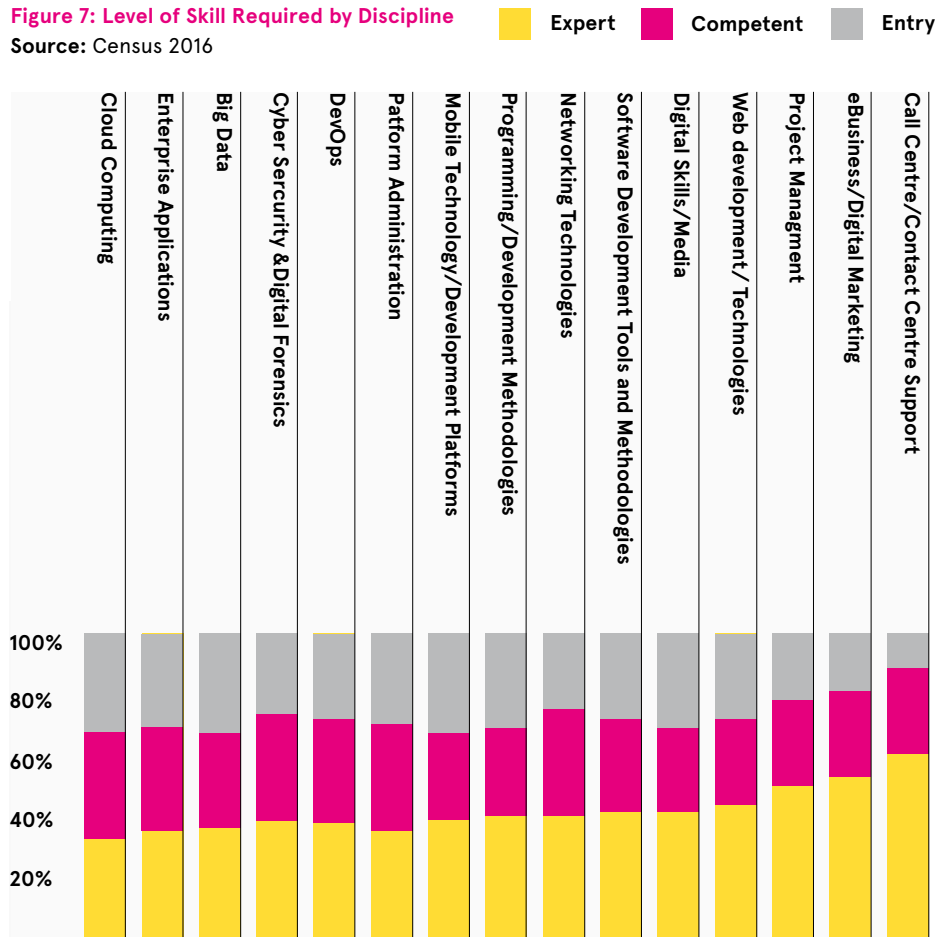
General Trends in relation to ICT/FinTech Demand

In the Programming / Development Methodologies category, SQL is the most in demand technical skill set followed by hard skills in .Net, Java and transversal talent in Problem Solving. Also sought after are skills in JavaScript (JQuery) and Python.

In the Mobile Technology / Development Platform discipline, JavaScript (jQuery), CSS, HTML5 and Java stand out as the key skills requirements across all levels. Competency in programming in Java is a good calling card to have for those seeking Entry-level roles.
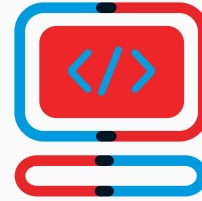
SQL/MySQL, JavaScript and .Net are the most sought after skills in the Web Development / Technologies discipline followed by HTML5 and CSS. A grounding in these skills would prepare learners for entry-level roles.

The most in-demand Software Development Tools and Methodologies are Agile and its variants, Software Testing and SDLC. In addition, entry-level roles require a familiarity with Standard Revision Control (SVN) & Defect Tracking Tools (JIRA).

The dominant set of skills required for Cloud Computing are Microsoft Cloud / Azure / Office 365, Microsoft SQL Server, Amazon Web Services and Web Services SOAP, REST and this applies across all levels.
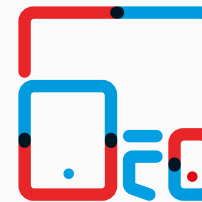
In the Platform Administration category, the most in demand skill set related to Microsoft Cloud / Azure / Office 365, followed by Enabling Office 365 Services and Project Management. Microsoft is the most common platform environment.

The Cyber Security & Digital Forensics discipline calls for a strong grounding in Computer Systems Architecture, Networking & Configuration (WAN / LAN / Wireless) and Network Vulnerability Analysis / Security. Business Continuity Management skills are also commonly in demand.

In the discipline of DevOps the set of skills most needed are the Microsoft related ones of .Net (ASP.NET / VB.Net / C#), Azure and PowerShell. Skills in Amazon Web Services and JavaScript (jQuery) would strengthen the competency set for DevOps roles.
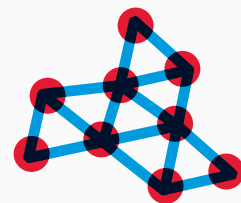
In the Networking Technologies discipline, skills most sought after are MCSE Server Infrastructure 2012 combined with Problem Solving skills. AWS Certified Solutions Architect – Associate and Certified Wireless Networking Professional are also sought after at all levels.

Skills in high demand in the Big Data category are Microsoft Azure and SQL. These two combined with Apache Hadoop and Network Administration skills provide a good foundation for entry and competent level roles.
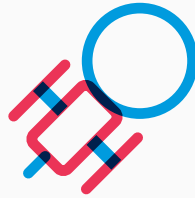
In the Enterprise Applications discipline, a core skillset comprising SQL and Microsoft Access & Excel was a standout requirement. Competency in SharePoint, MySQL, Dynamics CRM and Salesforce were also flagged as common requirements.

The eBusiness / Digital Marketing discipline calls for competency in Google Analytics and SEO. Other Skills in demand are Google Keyword Planner, Facebook Insights and Twitter Analytics complemented by HTML5.
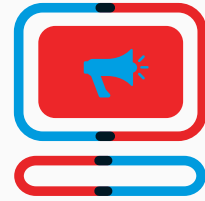
In the Digital Skills / Media discipline a common set of skills required for entry-level roles are HTML5, CSS, Bootstrap and JavaScript (JQuery). Also in demand across all levels are WordPress, Object Orientated Design, Joomla and Photoshop CC.

In the Contact Centre Support discipline, the demand was for competent and expert level roles and skills required included proficiency in relevant Computer Applications and Knowledge of Customer Service Principles & Practices.
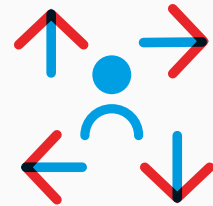
In the Project Management discipline, the most in demand skills are Agile / Scrum / Kanban combined with Experience in People Management and Strategic Planning.

What Does FinTech Cover

As oulined in FinTech Trends to Watch in 2018 by CB Insights

Lending

Peer-to-peer lending & alternative underwriting platforms

Blockchain/ Crypto

Companies leveraging blockchain technologies for financial services
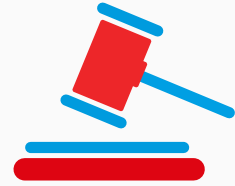
Regtech

Audit, risk, and regulatory compliance software

Personal Finance

Tools to manage bills and track personal and/or credit accounts

Payments/Billing

Payments processing, card developers, & subscription billing software tools

Insurance

Alternative underwriting, claims, distribution, and/or brokerage platforms

Capital Markets

Alternative underwriting, claims, distribution, and/or brokerage platforms

Wealth Management

Investment and wealth management platforms and analytics tools

Money Transfer

International money transfer and tracking software.

Mortgage

Mortgage lending, digitization, and financing platforms

Skills and Knowledge required within the FinTech Sector

In addition to the disciplines and methodologies listed previously, the FinTech sector also requires skills and knowledge in the following programming languages; Java, C++, Go, Python, Solidity, LLL (lisp like language) and Serpent which are associated with programming smart contracts. Core Developers with these skills can expect significant opportunities in the FinTech Blockchain/ Ethereum sector.

However, the bigger shortage is not actually Developers, but Business & Financial Architects & subject matter experts, people who can understand the complexity of the platforms & algorithms emerging from new disruptive technologies such as Blockchain, AI, IoT & RPA (robotic process automation) and apply these to solving real business challenges and creating new Blockchain operating models.

The FinTech sector requires knowledge, skills and competences in the following areas:

✔ Governance & Compliance

✔ Data Analysis & Data Visualization

✔ Quantitative Modeling & Simulation

✔ Cybersecurity & IT Auditing
   Big Data

✔ High level & deep FinTech analysis
   Blockchain Technologies

✔ Financial Markets

✔ Digital Forensics / Digital Auditing

Upskilling Employees in Business and Management related areas

From completing the skills audits and from conducting follow up interviews with employers, it became apparent there exists a significant appetite amongst employers for business and management related upskilling. The following section provides an overview of some of the training areas recommended by employers.

Sales

A significant number of employers mentioned sales as a priority area for training existing employees. The small to medium sized organisations in particular highlighted the importance of upskilling their staff in this area. Respondents claimed that the vast majority of their employees come from an IT background with qualifications in computer related disciplines. Many of these organisations are involved in marketing and selling software or hardware and therefore their staff need a certain level of business acumen. When probed about how this training could best be delivered, respondents suggested workshops delivered over 2-3 days by an experienced sales professional. In addition, a significant component of the training programme would need to focus on selling for the IT sector.

Digital Marketing

Similar to sales, many of the smaller employers who are involved in selling their products / services highlighted the importance of upskilling their staff in digital marketing. Although the majority have a digital marketing presence, few had invested sufficiently in developing staff in this area. Respondents indicated they would be interested in a 2-4 day programme, which focuses on the practical aspects of developing and maintaining a digital marketing campaign.

E-Commerce

Employers involved in selling products or services also identified E-Commerce as an area in which they would like to upskill their existing staff. When probed on the possible content of the programme, respondents highlighted areas such as developing an E-Commerce website, data analytics, security, engaging with PayPal and marketing.

Design Thinking

Design Thinking is one of the most rapidly required emerging disciplines within the FinTech sector. It emphasises every stage of design-led thinking, design concepts and creative solutions associated with implementing new disruptive technologies. The importance of traditional skills and processes is central to design thinking, and while graphic design and digital skills are integral to one another, there is a clear distinction between design thinking and digital skills.

Supervisory Management and Leadership

Another area that many of the respondents referred to when discussing training for their existing staff relates to supervisory management and leadership. Similar to the above, many of the employees responsible for supervision came from a computing background with little exposure to training in supervision or managing people. Many were promoted based on technical expertise and as a result require upskilling in this area.

Knowledge Transfer (KT)

Knowledge Transfer is an essential leadership skill. It is imperative that employers promote learning initiatives in the area of Knowledge Transfer, as it is one of the key requirements for succession planning. Knowledge Transfer is the practical challenge of transferring knowledge from one part of the organisation to another (e.g. the hybrid model of FinTech). Like Knowledge Management, Knowledge Transfer seeks to organise, create, capture and distribute knowledge, thus ensuring its availability for future users. One of the biggest challenge of a multigenerational work environment are the gaps of talent, knowledge, skills, experience and wisdom. It is imperative that companies create and implement a knowledge transfer plan within their organisation.

Soft Skills and competencies

Many of the ICT / FinTech employers who contributed to this survey have highlighted the importance of soft skills amongst job seekers. The following skills and competencies were identified as important:

— Communication skills: Employers seek employees who are proficient at giving and receiving information. Good listening as well as verbal and presentation skills are highly valued.

— Problem Solving: Problem-solving skills provide a good foundation for many of the roles emerging in the ICT and FinTech sectors and employers want to see this in new recruits.

— Persistence and work ethic.

— Ability to work in a team and fit into the culture of the employer organisation.

— Project Management and Time Management: An ability to work under pressure and meet deadlines.

— Ability to learn new skills quickly: The ICT / FinTech sectors are moving at such a pace that employees need an ability to pick up new skills quickly and therefore providers of education and training should incorporate modules or workshops that promote "learning to learn" new skills.

— Emotional Intelligence: Those who can combine technological skills with emotional intelligence will be the most sought after in the coming years and decades. Empathy in particular was highlighted as a key trait highly valued by employers.

Recommendations

The findings of this skills audit underline the value of proceeding resolutely and speedily with reform programmes

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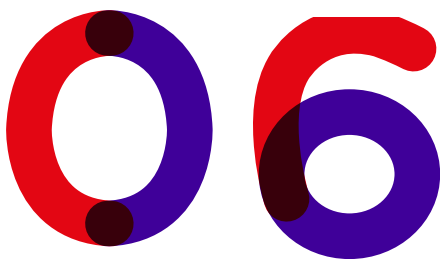
The purpose of this report is to inform local stakeholders wishing to maximise the potential of tech related sectors to contribute to the regional economy, to give some insight on the challenges and opportunities that exist and to provide some thoughts for consideration in charting the way forward. The recommendations listed below are meant to assist such deliberation:

— The NW Regional Skills Forum should proceed with establishing an ICT / FinTech cluster group comprised of regional education and training providers, employers, employer representative bodies and other government departments. The purpose of this group should be to promote working and studying in the ICT/FinTech sectors. The group would also support further collaboration between employers and the education and training providers.

— Tech feeder programmes at NFQ Level 4 should be considered to facilitate wider participation and effective progression in acquiring ICT skills at the competent and expert levels that are in demand across an increasing range of jobs and roles in the North West.

— Dual-education initiatives such as the newly proposed Apprenticeships at NFQ Level 5 and above (e.g. the ICT Associate Professional Tech apprenticeship developed by FIT) and the recently revamped Traineeship Programme (NFQ Level 4 to Level 6) should be embraced as an enhancement to existing provision. In addition, the development of rotational programs providing learners with opportunities across different functional areas should also be considered.

— All employers supported the benefit of students undertaking extended placements and rotational programs as part of their study. In addition, employers promoted initiatives like company visits, industry guest speakers and learners collaborating on real life projects proposed by local organisations.

— Providers of training and education should consider including additional business acumen modules or workshops in tech related programmes. Further exposure to areas such as marketing, selling, design thinking and entrepreneurship would be beneficial to employer and learner alike.

— New entrants to the labour market need to be socially and professionally, as well as technically equipped for the transition from school to work. To this end, imparting employability skills, professional development and transferable skills are as important as technical acumen.

— Second level students should have adequate access to career guidance professionals who are 'au fait' with the requirements, and varied demands, of tech related employers. The tech sector experiences rapid change on an on-going basis as innovation is constant. Specific arrangements to support them in this respect should be put in place.

— A key component for successful completion and effective progression from technology programmes is determining prospective candidates' interest, aptitude and aspiration from the outset. Best practice is this regard should be identified and kept under constant review.

— Non-traditional recruitment streams to pursue ICT/FinTech careers should be provided through the provision of upskilling and reskilling opportunities. This would also support greater diversity in the workforce and strengthen social cohesion in the region. Particular initiatives to increase participation of 'women in technology' should be considered with the support of industry. Employers and education/training providers should consider initiatives such as hackathons and demo events to further promote the sector.

— Employers who participated in this survey also promoted the idea that training and education programmes for those in employment would best be delivered online with perhaps occasional workshops to minimise disruption in the workplace.

In conclusion, the findings of this skills audit underline the value of proceeding resolutely and speedily with reform programmes. The report invites the prioritisation of measures that can have the immediate impact in helping employers to create employment for young people and jobseekers residing within the catchment of the North West region. There is still much scope and goodwill towards implementing measures that would lead to an increased supply of talent within the ICT/FinTech sectors. Finally, it is imperative that reports such as this should be reviewed on an annual basis.

The Education and Training Providers

07

Mayo, Sligo and Leitrim ETB

Education and Training Boards (ETBs) are established under and governed according to the Education and Training Boards Act 2013. Each ETB is a statutory body with its own corporate status. Mayo Sligo and Leitrim Education and Training Board (MSLETB), the leading provider of further education and training in Mayo, Sligo and Leitrim is one such ETB which combined the services delivered through the former County Vocational Education Committees and the training services previously delivered by FÁS/SOLAS in those three counties.

MSLETB offers a diverse range of ICT focused and ICT related programmes through our network of Training Centres and Colleges of Further Education and Training. Courses are delivered all year round and lead to accreditation at levels 4–6 on the National Framework of Qualifications and/or certification from a recognised industry accredited body. Courses such as Computer Applications and Office Skills, eBusiness, MySQL, Web Design, Software Development, and IT Support Specialist for example are available on a full time or part time basis.

MSLETB supports employers and enterprise through the development of people who are already in employment by providing new and/or specific ICT training interventions. Employees can access Further Education and Training (FET) Programmes via their employers or they can directly engage with MSLETB by enrolling in one of our FET programmes/Workforce development options. Workforce development training is provided at mutually agreed times. It can be modular, flexible, on a part-time basis during the day or in the evenings or online.

There are charges for these specific interventions. Fees are determined on a case by case basis and are determined by the economic cost to deliver the training, the ability of the employer/employee to pay the fees and the benefits of developing skills for the economy

Summary of our Services

Specific Skills Training (SST) courses are typically around 6 months to complete and are designed to meet the needs of industry across a range of sectors. QQI accreditation is at levels 4–6 on the National Framework of Qualifications (NFQ) and/or industry specific qualifications. Examples of SST courses include, Computer Applications and Office Skills, eBusiness, MySQL, Precision Engineering, Software Development. These programmes typically include work experience/practice modules with paid placements of 3–6 weeks.

Post Leaving Certificate (PLC) provides courses in a combination of general studies, vocational skills and opportunities for work experience so students can enter or re-enter skilled employment in the labour market. Courses generally lead to major awards at NFQ Levels 5 and 6. Typically, courses are one academic year on a full-time basis.

Traineeships provide job-specific training which combines direct training and a significant workplace training element (Work Based Learning, WBL element) with an employer. Trainees in receipt of a training allowance will continue to receive their allowances from MSLETB for the duration of their work experience. **All programmes lead to QQI Major Awards at levels 4 to 6 on the NFQ.** Traineeships take nine - eighteen months to complete (up to 50% of which could be in the work place).

Apprenticeships typically consists of three off-the-job training phases and four on-the-job phases. Apprenticeships Phase 1, 3, 5 and 7 are on the Job phases (placement) of 3–4 years. To undergo the Apprenticeship programme individuals must first be registered by an employer. MSLETB also register Apprentices for the new wave Apprenticeships

Vocational Training Opportunities Scheme (VTOS) provides a range of courses to meet the education and training needs of people who are unemployed. It gives participants opportunities to improve their general level of education, get a certificate, develop their skills and prepare for employment, self-employment and further education and training. Some examples include ICT, Art and Design, Business Administration, Childcare, Digital Media, Sound Production, Institute of Accounting Technicians and Leaving Certificate.

Skills for Work is a programme aimed at providing opportunities to help employees upskill to meet demands of the workplace. Programmes are 35 hours duration and designed in a flexible way to meet the needs of employer and employee. Most programmes are accredited.

Part-time Evening courses of typically 30 hours duration over 10 weeks provide short up-skilling modules for both unemployed and employed persons. Examples of courses include Welding TIG, Interior Design, ECDL, CAD, Door Security, Supervisory Management, and Start Your Own Business. Courses generally lead to accreditation at levels 4-6 on the NFQ or certification from an Industry accrediting body.

ecollege

Delivers courses in business, project management, SQL, Cisco, graphic design, web design, digital marketing, software development and basic computer literacy, online and through distance training courses are also available for people in employment who wish to update their skills. There is a fee for people in employment but subsidised rates are available for employers who wish to enhance the skills of their employees.

For a full "Directory of our Services" and Employer Services see: – msletb.ie

Letterkenny Institute of Technology

There are approximately 6000 people working in IT in the North-West making it one of the biggest employers in the region. This also represents the 6th largest IT cluster in Ireland and the only significant IT cluster outside a major city. Almost all of these IT employers recruit staff on an ongoing basis. To assist employers to continue to develop their existing workforces skill-base and expand by hiring suitably qualified additional employees the Department of Computing at Letterkenny Institute of Technology has, in conjunction with employers, developed a wide range of courses which are available both full-time and part-time. These include:

— MSc in Computing in DevOps

— MSc in Computing in Enterprise Applications Development

— MSc in Computing in Big Data Analytics

— MSc in Computing in Systems and Software Security

— MSc in Computing in Private Cloud Technologies

— Higher Diploma in Computing (Conversion)

— Higher Diploma in IT Project Management

— Higher Diploma in Business Systems Analysis and Design

In addition, a range of smaller Special Purpose Awards (SPA's) are available and others can be created on demand where there are sufficient potential students for the course. For example, we offer a Certificate in DevOps, an SPA in UML Analysis and Design and an SPA in Big Data Architecture to name only a few.

Springboard

Over the years, we have run a wide range of Springboard courses for people seeking upskilling and employment. With the reorientation of Springboard towards courses for upskilling existing employees, we plan to tender for a number of level-8 Degree programmes in 2018. These programmes are targeted at areas where employers have indicated they have an existing upskilling need.

Research

We recognise that employers need to continue to expand their knowledge base and move up the value chain to ensure their operations remain relevant to a changing business environment. We offer bursaries to IT employees who wish to participate in part-time postgraduate research. Research students are working in areas from Blockchain, to Digital Forensics and Data Analytics, Digital Watermarking and Cloud Infrastructure and Security.

FinTech

The Department of Business Studies has had ongoing industry collaboration for more than ten years in the area of financial services and associated technologies. Programmes offered include the newly validated Higher Diploma in Business in Finance and Technology (FinTech), the Certificate in Mainframe Technologies and the Higher Diploma in Arts in Mainframe Business Information Systems & Infrastructure as well as a Higher Diploma in Governance and Compliance in Financial Services.

According to General Motors the mainframe programme in LYIT is currently providing "tailored course solutions in mainframe that are not readily available in any other 3rd level institution". It is testament to the quality and relevance of our mainframe programmes that two graduates were recently awarded 1st and 3rd place in the IBM Master the Mainframe Competition. According to James Flynn, IBM Ireland, "Letterkenny Institute of Technology has an impressive track record in educating mainframe technologies, with 200 students, dating back to 2005, co-operating with a number of companies including IBM. Today's mainframes are growing in popularity and require a new generation of mainframe experts."

Business Related Programmes

The School of Business Studies in LYIT are currently/planning to deliver a number of programmes identified as important by employers who contributed to this report. These programmes include a Masters in Business in Innovation and Leadership, Postgrad Diploma in User Experience Design and Innovation, Postgrad Diploma in Governance, Compliance and Data Protection in Financial Services, Higher Diploma in Finance & Technology (FinTech), Certificate in Mainframe Business technologies, Higher Certificate in Supervisory Management (2 Years Part Time), and range of minor awards in Managing and Mentoring people, Digital Marketing, Sales and Professional Selling, Knowledge Management & Learning.

For further information, please visit our website: www.lyit.ie

lyit

Institiúid Teicneolaíochta
Leitir Ceanainn
Letterkenny Institute
of Technology

Sligo IT

IT Sligo fields a comprehensive offering across key computing areas:

— BSc (Hons) Software Development (Level 8)

— BSc (Hons) Computer Networks & Cloud Infrastructure (Level 8)

— BSc (Ord) Games Development

— BSc (Hons) Computing

This Sept '18 sees the launch of two new programmes:

— BSc (Hons) Smart Technologies (4 yr)
    — Addressing the emergent Internet of Things industry with ties to Industry 4.0

— BA (Hons) App Design and User Experience (UX) (4 yr)
    — Supports design of software applications complete with development skills

Further, this Sept '18 also sees the bringing **online** (in part-time mode) of the BSc (Hons) Software Development and BSc (Hons) Computer Networks and Cloud Infrastructure. This will be of particular interest to companies seeking upskilling of the ICT staff. The institute is also open to development of Special Purpose Awards to attend to industry need.

Similarly, IT Sligo offer the H.Dip. Computing - a conversion Software Development programme to those unemployed or employed, and available part-time, online and funded by Springboard. This offering is likely to be extended in 2018 as Springboard extends to those in employment across a number of new sectors.

The School of Engineering & Design also offers a MSc. in Project Management online and part-time.

Computing at IT Sligo

new Computing Undenominated Higher Certificate **Level 6** **SG102**	**new** Computing Undenominated BSC (Ord) **Level 6** **SG102**	

new **BSc (Hons)** **Computing (Smart Technologies)**	**Level 8** **SG251**
new **BA (Hons)** **App Design and User Experience (UX)**	**Level 8** **SG251**
new **BSc (Hons)** **Software Development**	**Level 8** **SG252**
BSc Software Development	**Level 7** **SG136**
new **BSc (Hons)** **Computer Networks & Cloud Infrastructure**	**Level 8** **SG253**
BScComputer Networks & cloud Infrastucture	**Level 7** **SG137**
BSc Games Devlopment	**Level 7** **SG131**
BSc (Hons) **Computing**	**Level 8** **SG246**

Working in collaboration with the NW Regional Skills Forum, IT Sligo was among the first HEIs in the country to develop an Employer Portal to help industry recruit our graduates, connect with learners for placement in the workplace, becoming guest speakers, suggesting projects for our learners, work based learning and much more. This portal and other information can be accessed on our **website: www.itsligo.ie**

Donegal Education & Training Board (ETB)

Donegal ETB is the largest education and training organisation in the county. It manages 15 out of the 27 post-primary schools in Co Donegal, Gartan Outdoor Education and Training Centre, Donegal Music Education Partnership and has legal responsibilities for youth work. It is also the largest Further Education and Training (FET) provider in the county with almost 12,000 learners completing courses through its service in 2017.

Approach to working with Industry

Donegal ETB's FET Service works closely with local industry (from small and medium enterprises to multinational organisations) to ensure the delivery of high-quality FET programmes which are responsive to the changing needs of the economy. In addition to our industry focus, Donegal ETB also prides itself on its ability to engage with learners on the ground to meet their learning requirements by offering an extensive array of programmes from QQI Levels 1 to 6 on the National Framework of Qualifications, as well as courses with specific industry-recognised certification. This ensures that learners with Donegal ETB are best placed to enter the labour market, upskill or change career direction where sustainable employment opportunities are in existence and continue to grow.

A recent key initiative in engaging with industry is the development of new Career Traineeships. (Industry focused training programmes with significant work placement elements) Donegal ETB has an established Enterprise Engagement Group along with dedicated Liaison Officers who engage with employers at the outset and undertake extensive sector specific skills profiling of industries to establish where the gaps are in terms of skills and qualifications; course content is then developed and agreed by the relevant industry in conjunction with the ETB thus ensuring the programme is fit-for-purpose and up-to-date. Tutors, who are responsible for the delivery of the

day-to-day learning and training, also have the opportunity to engage with industry, thus strengthening relationships and facilitating the further development and adaptation of the programmes following the pilot phase. The importance of "on-the-job training" and longer work placements have long been identified by employers as a key priority and consequently, Donegal ETB Career Traineeships in-company placements now account for a minimum of 30% of the course duration. Work placements for specific skills training courses have also been extended, resulting in an excellent level of in-company placements and an anticipated increase in employment outcomes.

### Donegal ETB and the ICT sector

Donegal ETB's on-going engagement with the ICT sector has resulted in positive relationships with globally recognised companies such as Pramerica, United Health Group, Zeus, Gartan Technologies and Allstate, as well as with smaller companies. Fruitful relationships have also been established with a wide variety of other business sectors in the county, including hospitality, engineering, retail, financial services and healthcare. All of these sectors and businesses are working collaboratively with Donegal ETB to provide essential in-company work placements and employment opportunities to Donegal ETB learners. Industry engagement and feedback has also highlighted the need to change the course content of existing courses. In ICT, staff are currently working closely with relevant companies to develop a new course offering in Cloud Computing, as well as exploring the requirement for an Automated Software Tester programme. Other ICT sector offerings currently include basic computers, ECDL, Digital Imaging using Photoshop, Web Design, Advanced Web Design, Microsoft MTA, E-Commerce, Career Traineeship in Digital Sales & Marketing, Automated Software Tester Traineeship, Software Developer and Multimedia but course offerings are changed and adapted on a regular basis.

Relationships with Employers

Working in collaboration with the NW Regional Skills Forum, Donegal ETB was among the first ETBs in the country to develop an Employer Portal to provide industry with up to date information about the availability of courses and the many different ways in which these courses can be delivered. While many of the programmes are specifically designed to target people who are seeking employment, bespoke training can also be provided for those who are currently in employment. The Employer Portal is user friendly in its design and allows prospective employers to register their interest in offering In-Company placement or guest presentations to learner groups. The Portal also signposts employers to relevant contacts and services within the ETB. In the future Donegal ETB plans to extend this Portal to allow employers to upload job vacancies so that the gap from training and development into employment can be bridged more effectively.

For a full "Directory of our Services" and Employer Services see: www.donegaletb.ie
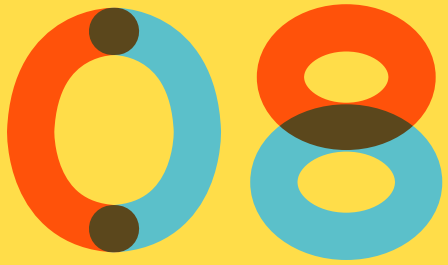
08 Annex 1: Disciplines

1. Discipline 1: Programming / Development Methodologies

In the Programming / Development Methodologies category, SQL is the most in demand technical skill set followed by hard skills in .Net, Java and transversal talent in Problem Solving. Also sought after are skills in JavaScript (JQuery) and Python.

Programming / Development Methodologies
[Outer rings are highest demand]
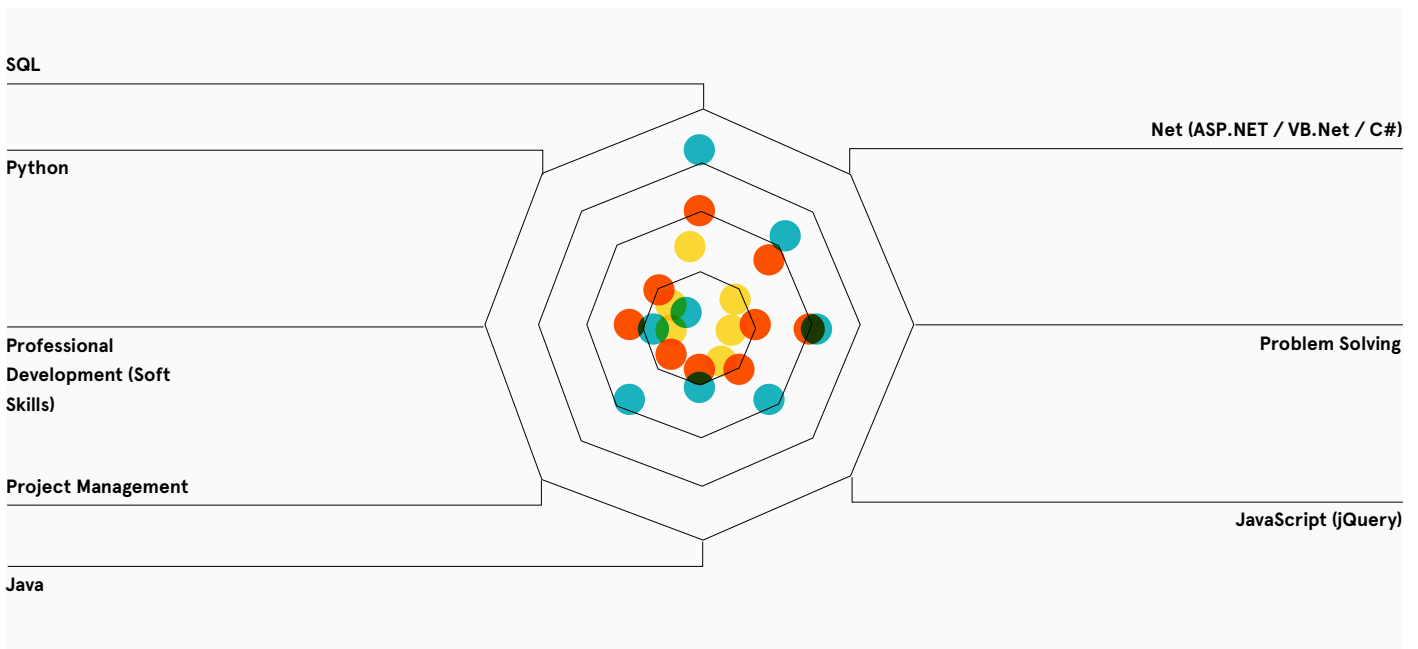
● Competent ● Expert ● Entry

SQL

Python

Net (ASP.NET / VB.Net / C#)

Professional Development (Soft Skills)

Problem Solving

Project Management

JavaScript (jQuery)

Java

Highest Demand Ranked by Most Needed

Rank	Entry Level	Competent Level	Expert Level
1	SQL	SQL	SQL
2	Java	.Net (ASP.NET / VB.Net / C#)	Net (ASP.NET / VB.Net / C#)
3	Problem Solving	Professional Development (Soft Skills)	Problem Solving
4	.Net (ASP.NET / VB.Net / C#)	Python	JavaScript (jQuery)
5	JavaScript (jQuery)	JavaScript (jQuery)	Project Management
6	Project Management	Problem Solving	Java
7	Professional Development (Soft Skills)	Java	Professional Development (Soft Skills)
8	Python	Project Management	Python

2.Discipline 2: Mobile Technology / Development Platform

In the Mobile Technology / Development Platform discipline, JavaScript (jQuery), CSS, HTML5 and Java stand out as the key skills requirements across all levels. Competency in programming in Java is a good calling card to have for those seeking Entry-level roles.

Mobile technology / development platform
[Outer rings are highest demand]

● Competent ● Expert ● Entry

JavaScript (jQuery)

iOS/Swift

Java

Objective C

CSS

.Net (ASP.NET / VB.Net / C#)

HTML5

UX Design (HEART)

Highest Demand Ranked by Most Needed

Rank	Entry Level	Competent Level	Expert Level
1	Java	CSS	JavaScript (jQuery)
2	UX Design (HEART)	HTML5	HTML5
3	JavaScript (jQuery)	Objective C	CSS
4	CSS	iOS/Swift	Java
5	HTML5	.Net (ASP.NET / VB.Net / C#)	.Net (ASP.NET / VB.Net / C#)
6	.Net (ASP.NET / VB.Net / C#)	Java	UX Design (HEART)
7	Objective C	UX Design (HEART)	Objective C
8	iOS/Swift	JavaScript (jQuery)	iOS/Swift

3.Discipline 3: Web Development /Technologies

SQL/MySQL, JavaScript and .Net are the most sought after skills in the Web Development / Technologies discipline followed by HTML5 and CSS. A grounding in these skills would prepare learners for entry-level roles.

Web Development / Technologies
[Outer rings are highest demand]

● Competent ● Expert ● Entry
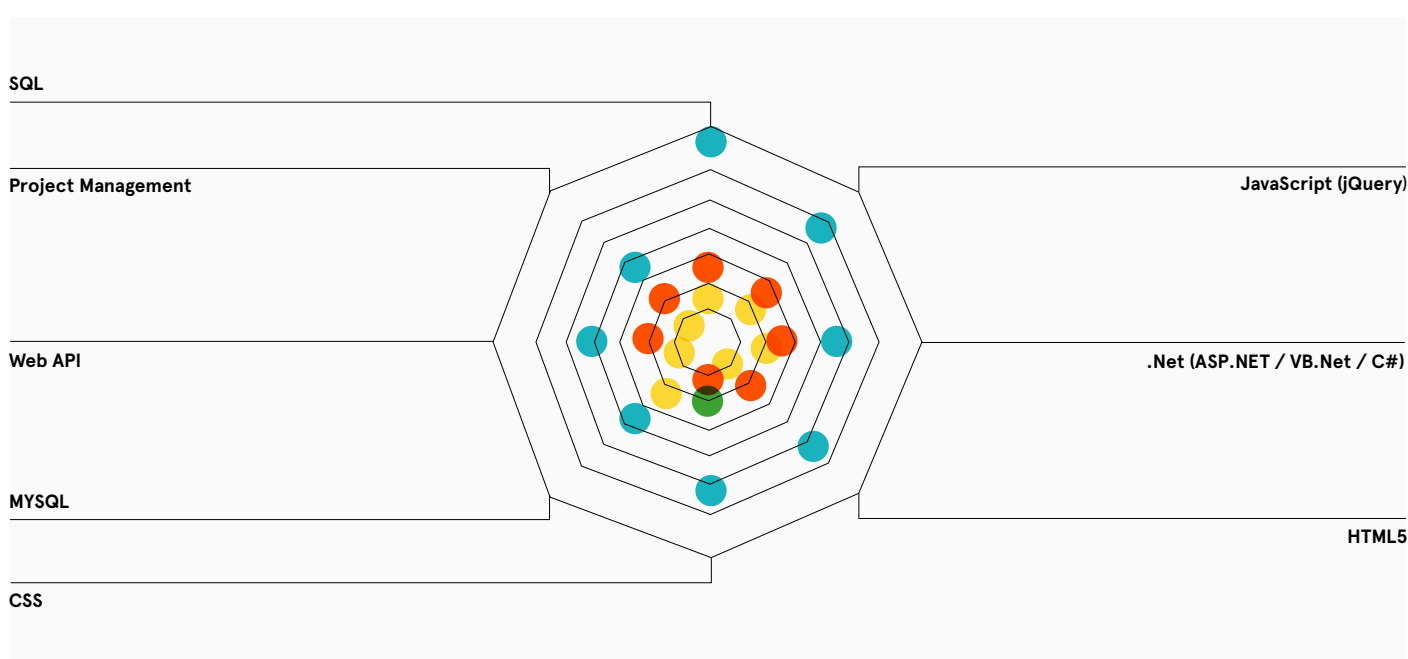
Highest Demand Ranked by Most Needed

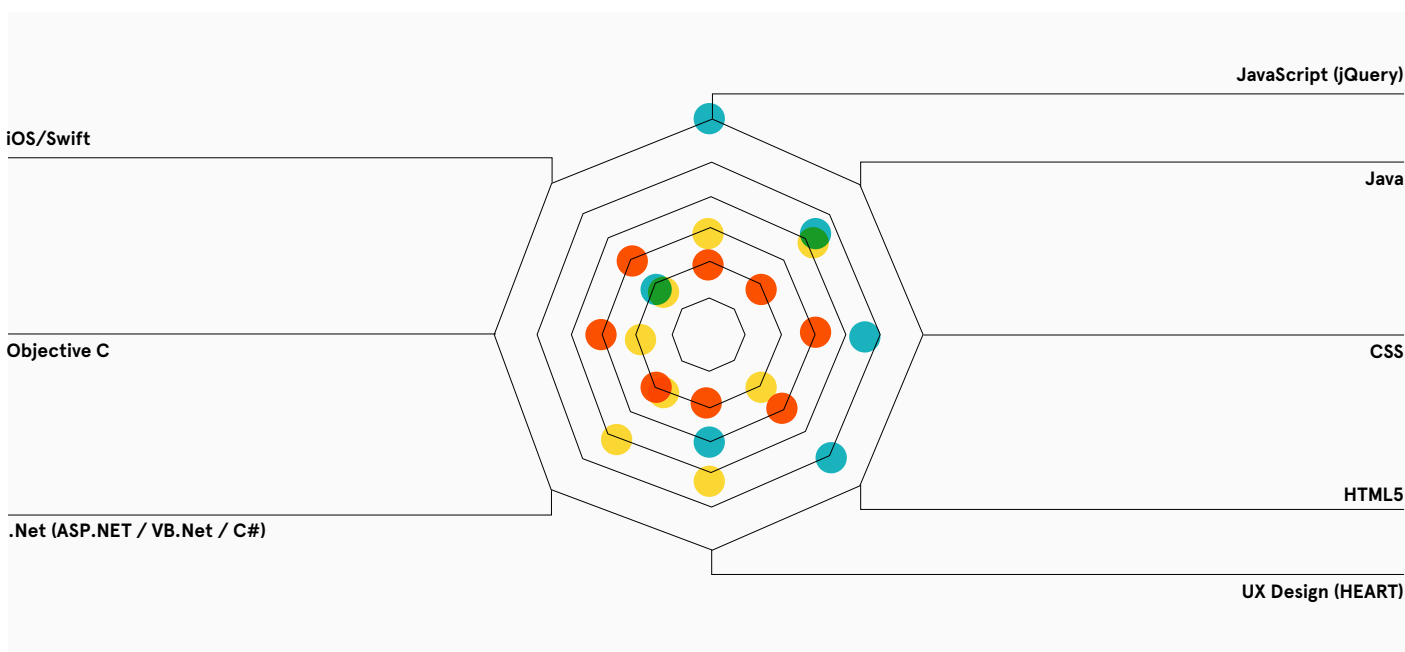| Rank	Entry Level	Competent Level	Expert Level
1	JavaScript (jQuery)	SQL	SQL
2	MySQL	JavaScript (jQuery)	JavaScript (jQuery)
3	.Net (ASP.NET / VB.Net / C#)	.Net (ASP.NET / VB.Net / C#)	CSS
4	SQL	HTML5	HTML5
5	CSS	CSS	.Net (ASP.NET / VB.Net / C#)
6	HTML5	Project Management	Web API
7	Web API	Web API	MySQL
8	Project Management	MySQL	Project Management

4. Discipline 4: Software Development Tools and Methodologies

The most in-demand Software Development Tools and Methodologies are Agile and its variants, Software Testing and SDLC. In addition to those entry level roles require a familiarity with Standard Revision Control (SVN) & Defect Tracking Tools (JIRA).

Software Development Tools and Methodologies
[Outer rings are highest demand]
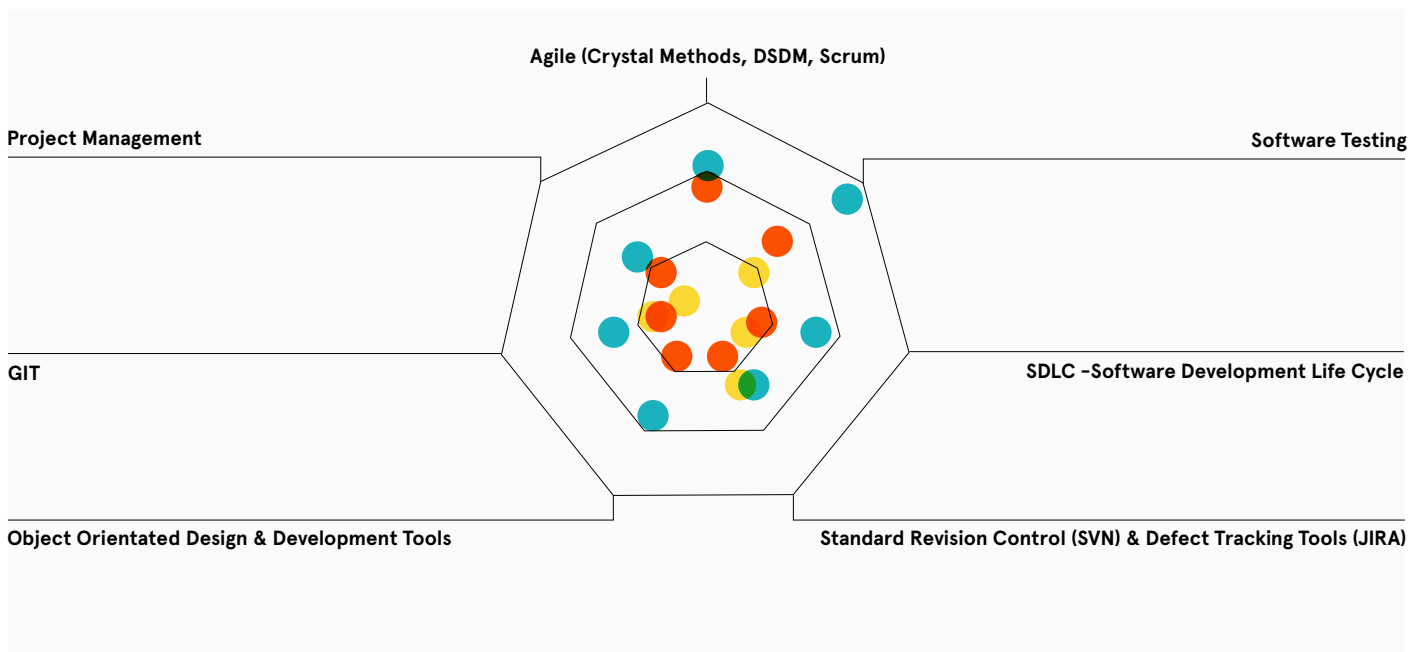
● Competent   ● Expert   ● Entry

Agile (Crystal Methods, DSDM, Scrum)

Project Management

Software Testing

GIT

SDLC –Software Development Life Cycle

Object Orientated Design & Development Tools

Standard Revision Control (SVN) & Defect Tracking Tools (JIRA)

Highest Demand Ranked by Most Needed

Rank	Entry Level	Competent Level	Expert Level
1	Agile (Crystal Methods, DSDM, Scrum)	Agile (Crystal Methods, DSDM, Scrum)	Software Testing
2	Standard Revision Control (SVN) & Defect Tracking Tools (JIRA)	Software Testing	Agile (Crystal Methods, DSDM, Scrum)
3	Software Testing	SDLC –Software Development Life Cycle	SDLC –Software Development Life Cycle
4	SDLC –Software Development Life Cycle	Standard Revision Control (SVN) & Defect Tracking Tools (JIRA)	Object Orientated Design & Development Tools
5	Object Orientated Design & Development Tools	Object Orientated Design & Development Tools	Git
6	Git	Project Management	Standard Revision Control (SVN) & Defect Tracking Tools (JIRA)
7	Project Management	Git	Project Management

5.Discipline 5: Cloud Computing

The dominant set of skills required for Cloud Computing are Microsoft Cloud / Azure / Office 365, Microsoft SQL Server, Amazon Web Services and Web Services SOAP, REST and this applies across all levels.

Cloud Computing
[Outer rings are highest demand]
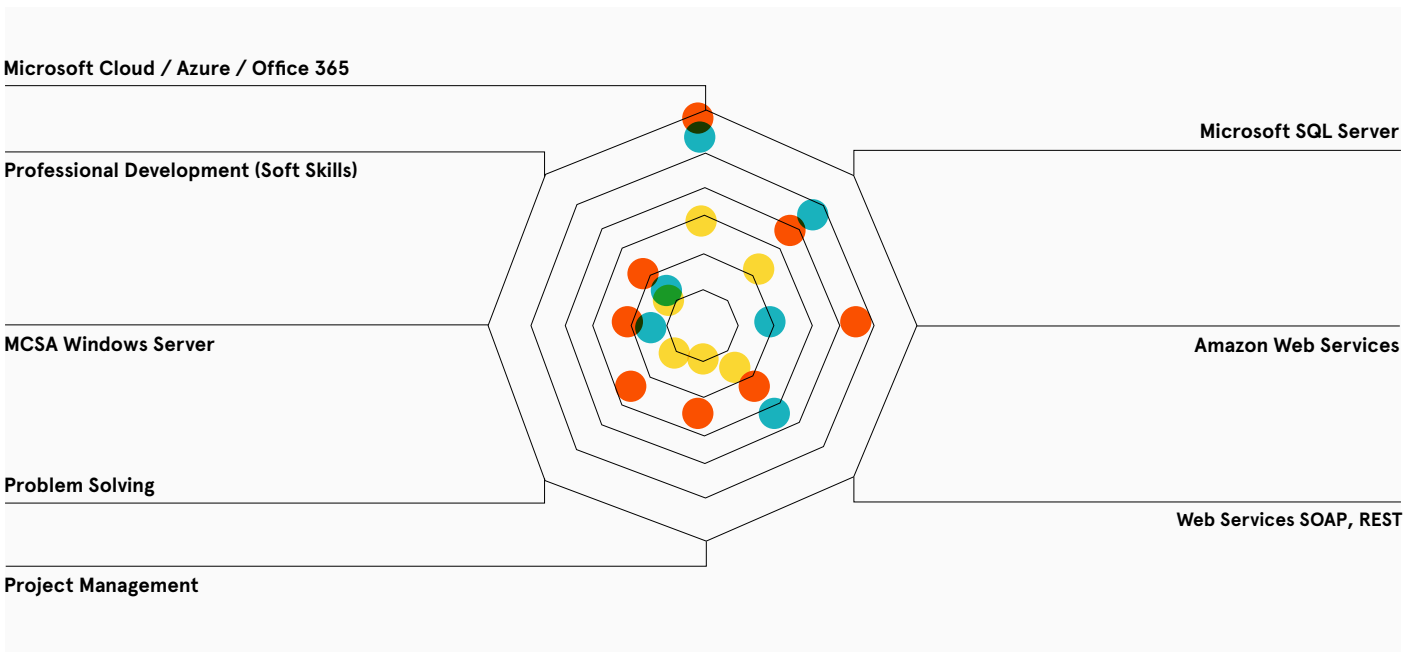
● Competent ● Expert ● Entry

Microsoft Cloud / Azure / Office 365

Microsoft SQL Server

Professional Development (Soft Skills)

MCSA Windows Server

Amazon Web Services

Problem Solving

Web Services SOAP, REST

Project Management

Highest Demand Ranked by Most Needed

Rank	Entry Level	Competent Level	Expert Level
1	Microsoft Cloud / Azure / Office 365	Microsoft Cloud / Azure / Office 365	Microsoft Cloud / Azure / Office 365
2	Microsoft SQL Server	Amazon Web Services	Microsoft SQL Server
3	Amazon Web Services	Microsoft SQL Server	Web Services SOAP, REST
4	MCSA Windows Server	Web Services SOAP, REST	Project Management
5	Web Services SOAP, REST	Project Management	Problem Solving
6	Professional Development (Soft Skills)	Problem Solving	Amazon Web Services
7	Problem Solving	MCSA Windows Server	MCSA Windows Server
8	Project Management	Professional Development (Soft Skills)	Professional Development (Soft Skills)

6. Discipline 6: Platform Administration

In the Platform Administration category, the most in demand skill set related to Microsoft Cloud / Azure / Office 365, followed by Enabling Office 365 Services and Project Management. Microsoft is the most common platform environment.

Platform Administration
[Outer Rings Are Highest Demand]
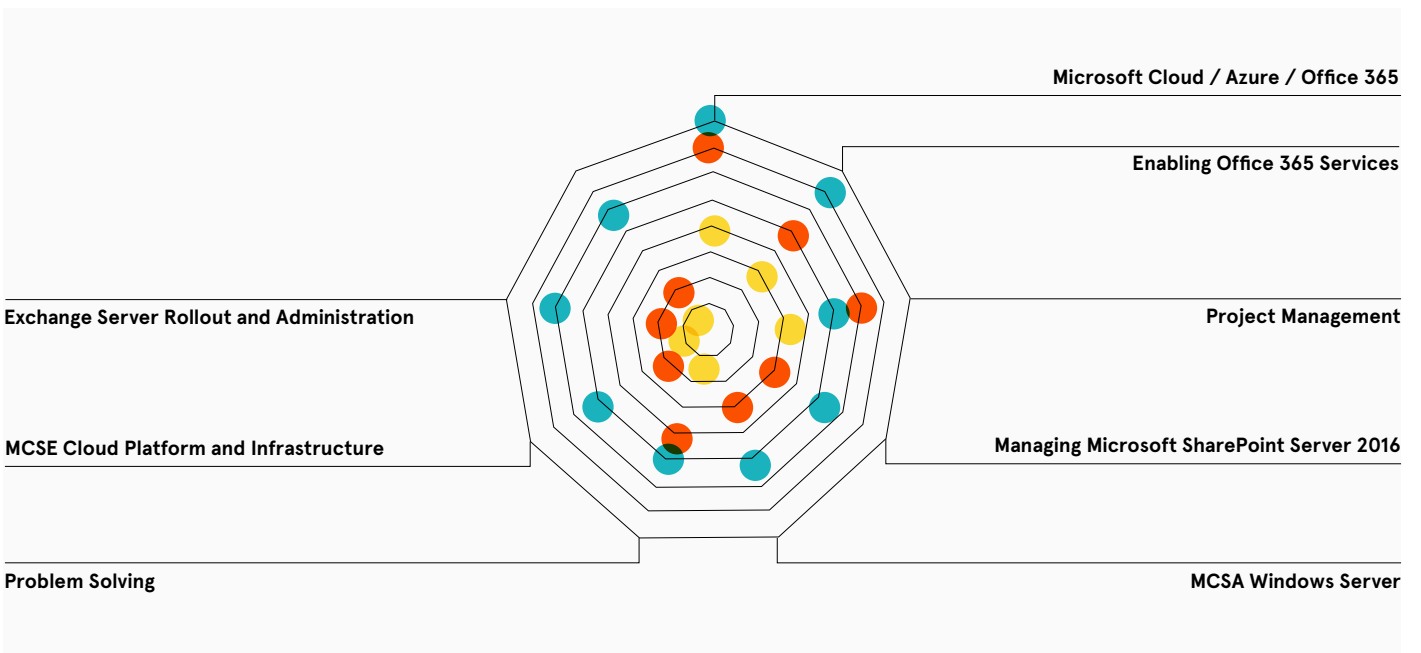
● Competent   ● Expert   ● Entry

- Microsoft Cloud / Azure / Office 365
- Enabling Office 365 Services
- Project Management
- Managing Microsoft SharePoint Server 2016
- MCSA Windows Server
- Problem Solving
- MCSE Cloud Platform and Infrastructure
- Exchange Server Rollout and Administration

Highest Demand Ranked by Most Needed

Rank	Entry Level	Competent Level	Expert Level
1	Microsoft Cloud / Azure / Office 365	Microsoft Cloud / Azure / Office 365	Microsoft Cloud / Azure / Office 365
2	Managing Microsoft SharePoint Server 2016	Project Management	Enabling Office 365 Services
3	Project Management	Enabling Office 365 Services	Exchange Server Rollout and Administration
4	Enabling Office 365 Services	Problem Solving	Project Management
5	MCSA Windows Server	MCSA Windows Server	Managing Microsoft SharePoint Server 2016
6	Problem Solving	Managing Microsoft SharePoint Server 2016	MCSA Windows Server
7	MCSE Cloud Platform and Infrastructure	MCSE Cloud Platform and Infrastructure	MCSE Cloud Platform and Infrastructure
8	Exchange Server Rollout and Administration	Exchange Server Rollout and Administration	Problem Solving

7. Discipline 7: Cyber Security & Digital Forensics

The Cyber Security & Digital Forensics discipline calls for a strong grounding in Computer Systems Architecture, Networking & Configuration (WAN / LAN / Wireless) and Network Vulnerability Analysis / Security. Business Continuity Management skills are also commonly called for.

Cyber Security & Digital Forensics
[Outer rings are highest demand]

● Competent ● Expert ● Entry

Computer Systems Architecture

Vulnerability Assessment / Penetration Testing

Networking & Configuration (WAN / LAN / Wireless)

Cryptographic Storage

Network Vulnerability Analysis / Security

Malware Investigation & Analysis

Business Continuity Management

Routers and Routing / Secure Transfer Topology
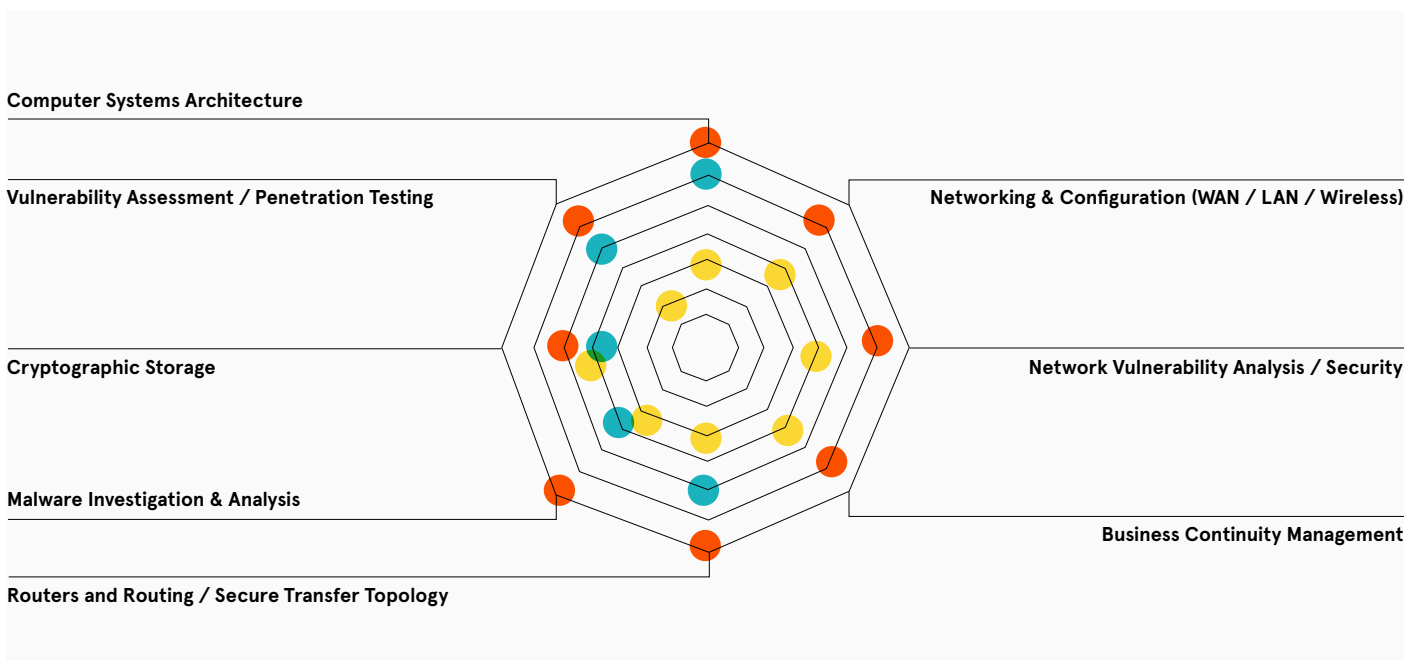
Highest Demand Ranked by Most Needed

Rank	Entry Level	Competent Level	Expert Level
1	Cryptographic Storage	Computer Systems Architecture	Computer Systems Architecture
2	Networking & Configuration (WAN / LAN / Wireless)	Routers and Routing / Secure Transfer Topology	Networking & Configuration (WAN / LAN / Wireless)
3	Network Vulnerability Analysis / Security	Malware Investigation & Analysis Network	Network Vulnerability Analysis / Security
4	Business Continuity Management	Network Vulnerability Analysis / Security	Business Continuity Management
5	Computer Systems Architecture	Networking & Configuration (WAN / LAN / Wireless)	Routers and Routing / Secure Transfer Topology
6	Malware Investigation & Analysis	Business Continuity Management	Vulnerability Assessment / Penetration Testing
7	Routers and Routing / Secure Transfer Topology	Vulnerability Assessment / Penetration Testing	Cryptographic Storage
8	Vulnerability Assessment / Penetration Testing	Cryptographic Storage	Malware Investigation & Analysis

8. Discipline 8: Devops

In the discipline of DevOps the set of skills most needed are the Microsoft related ones of .Net (ASP.NET / VB.Net / C#), Azure and PowerShell. Skills in Amazon Web Services and JavaScript (jQuery) would strengthen the competency set for DevOps roles.

DevOps
[Outer Rings Are Highest Demand]

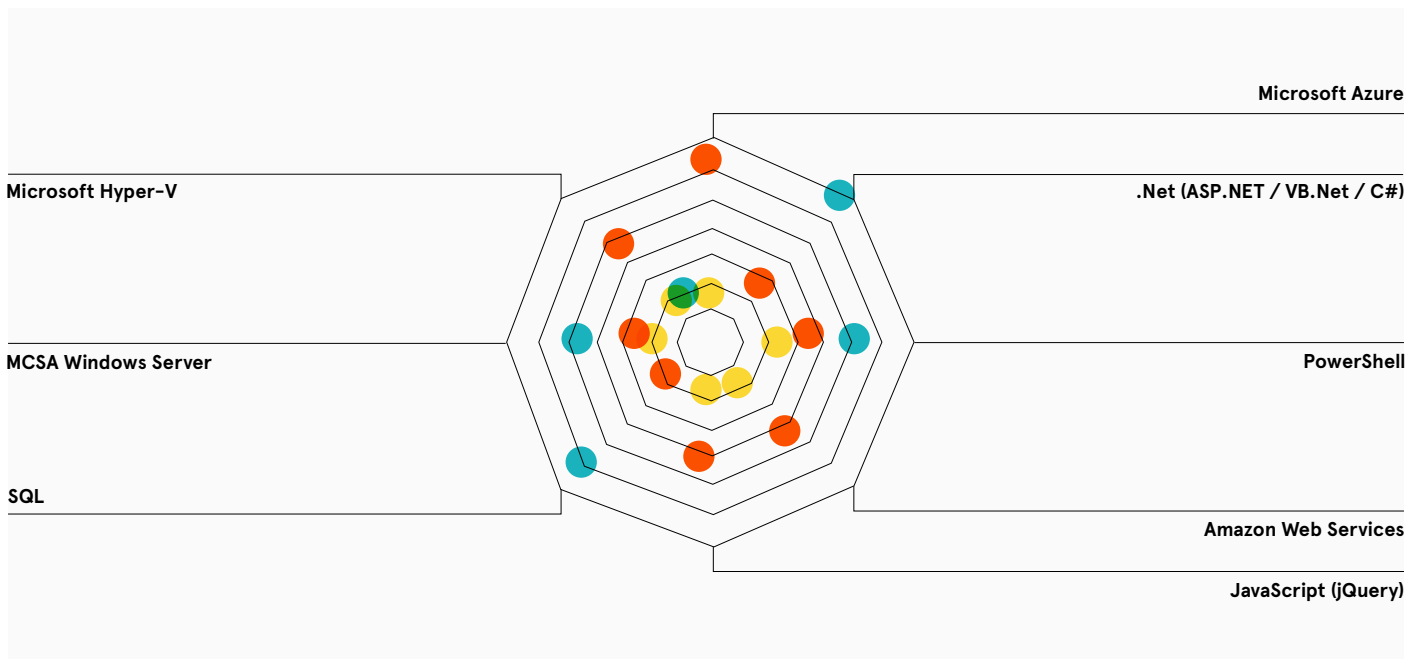● Competent   ● Expert   ● Entry

Highest Demand Ranked by Most Needed

Rank	Entry Level	Competent Level	Expert Level
1	.Net (ASP.NET / VB.Net / C#)	Microsoft Azure	.Net (ASP.NET / VB.Net / C#)
2	PowerShell	Microsoft Hyper–V #)	Microsoft Azure
3	Microsoft Azure	Amazon Web Services	SQL
4	Amazon Web Services	JavaScript (jQuery)	PowerShell
5	JavaScript (jQuery)	PowerShell	Amazon Web Services
6	SQL	.Net (ASP.NET / VB.Net / C	JavaScript (jQuery)
7	MCSA Windows Server	MCSA Windows Server	MCSA Windows Server
8	Microsoft Hyper–V	SQL	Microsoft Hyper–V

9.Discipline 9: Networking Technologies

In the Networking Technologies discipline, skills most sought after are MCSE Server Infrastructure 2012 combined with Problem Solving skills. AWS Certified Solutions Architect – Associate and Certified Wireless Networking Professional are also sought after at all levels.

Networking Technologies
[Outer rings are highest demand]

● Competent ● Expert ● Entry

MCSE Server Infrastructure 2012

VMWare Certified Associate – Network Virtuaization

Cisco Certified Network Professional – CCNP

Professional Development (Soft Skills)

Certified Wireless Networking Professional

Problem Solving

Wireless Networking

AWS Certified Solutions
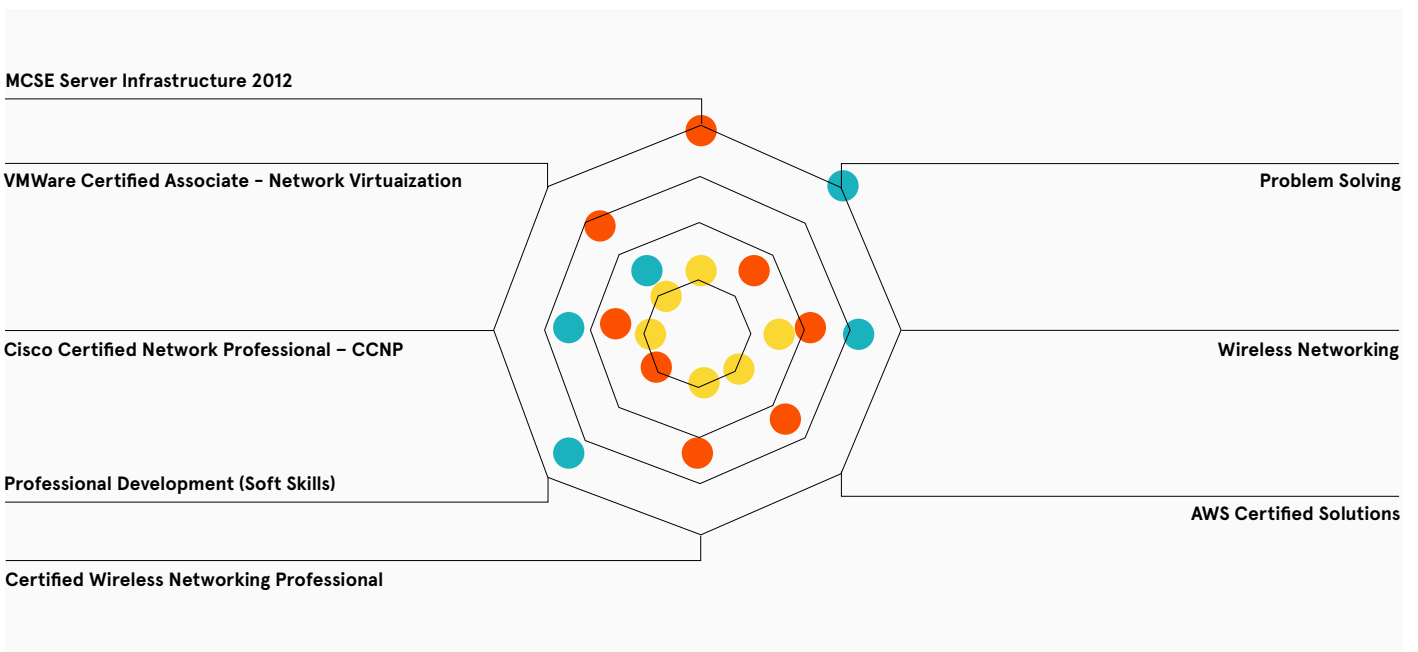
Highest Demand Ranked by Most Needed

Rank	Entry Level	Competent Level	Expert Level
1	Problem Solving	MCSE Server Infrastructure 2012	Problem Solving
2	Wireless Networking	VMWare Certified Associate	MCSE Server Infrastructure 2012
3	MCSE Server Infrastructure 2012	Certified Wireless Networking Professional	Professional Development (Soft Skills)
4	AWS Certified Solutions Architect – Associate	AWS Certified Solutions Architect – Associate	Wireless Networking
5	Certified Wireless Networking Professional	Wireless Networking	Certified Wireless Networking Professional
6	Professional Development (Soft Skills)	Cisco Certified Network Professional – CCNP	AWS Certified Solutions Architect – Associate
7	Cisco Certified Network Professional – CCNP	Problem Solving	Cisco Certified Network Professional – CCNP
8	VMWare Certified Associate	Professional Development (Soft Skills)	VMWare Certified Associate

10. Discipline 10: Big Data / Data Science / Data Mining

Skills in high demand in the Big Data category are Microsoft Azure and SQL. These two combined with Apache Hadoop and Network Administration skills provide a good foundation for entry and competent level roles.

Big Data / Data Science / Data Mining
[Outer rings are highest demand]

● Competent ● Expert ● Entry
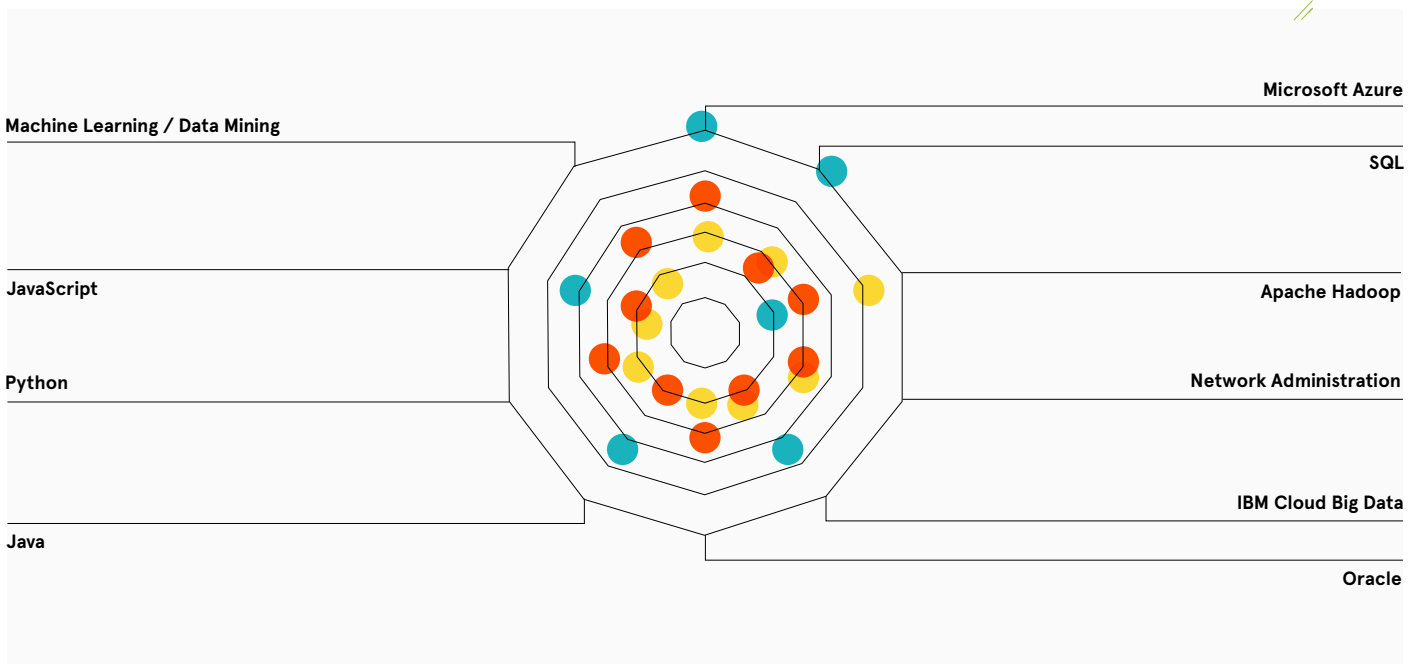
Highest Demand Ranked by Most Needed

Rank	Entry Level	Competent Level	Expert Level
1	Apache Hadoop	Microsoft Azure	Microsoft Azure
2	Microsoft Azure	SQL	SQL
3	SQL	Apache Hadoop	JavaScript
4	Network Administration	Network Administration	IBM Cloud Big Data
5	JavaScript	Oracle	Java
6	Oracle	Python	Oracle
7	IBM Cloud Big Data	Machine Learning / Data Mining	Network Administration
8	Python	Java	Python
9	Machine Learning / Data Mining	JavaScript	Machine Learning / Data Mining
10	Java	IBM Cloud Big Data	Apache Hadoop

11. Discipline 11: Enterprise Applications

In the Enterprise Applications discipline, a core skillset comprising SQL and Microsoft Access & Excel was a standout requirement. Competency in SharePoint, MySQL, Dynamics CRM and Salesforce were also flagged as common requirements.

Enterprise Applications
[Outer rings are highest demand]
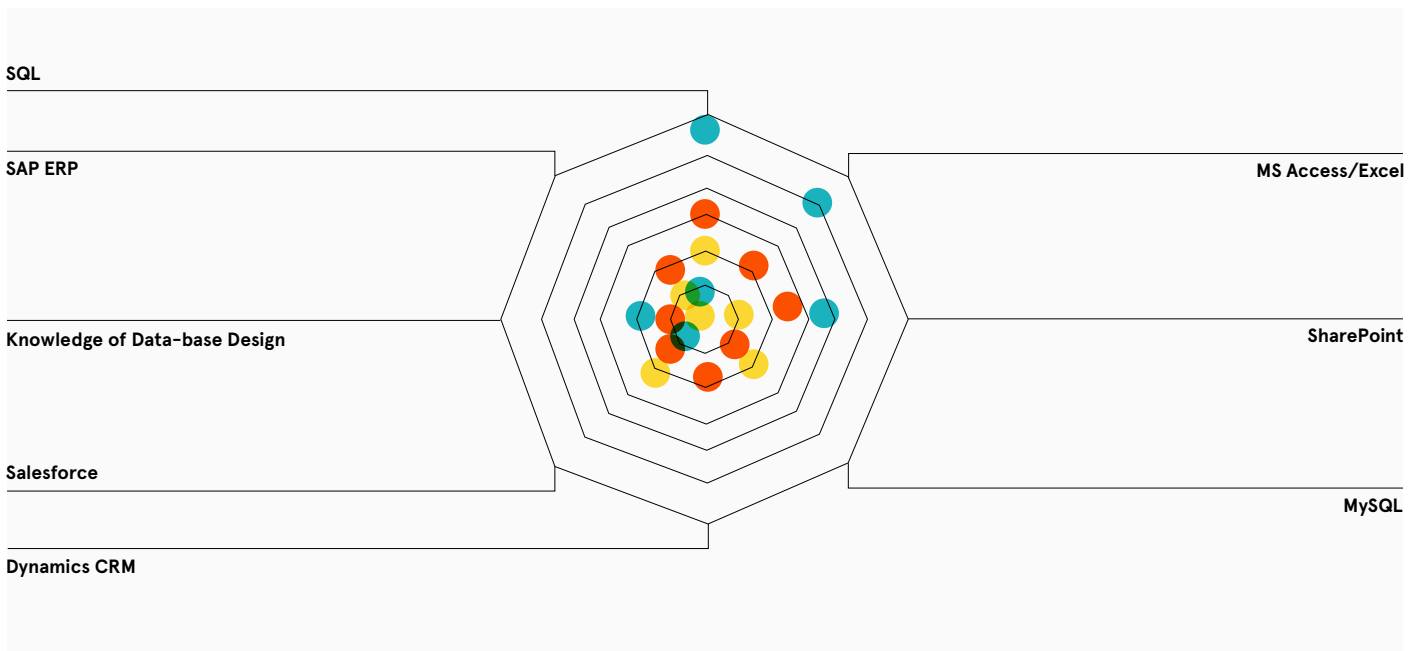
● Competent ● Expert ● Entry

Highest Demand Ranked by Most Needed

Rank	Entry Level	Competent Level	Expert Level
1	SQL	SQL	SQL
2	MS Access/Excel	SharePoint	MS Access/Excel
3	Salesforce	MS Access/Excel	SharePoint
4	MySQL	Dynamics CRM	MySQL
5	Dynamics CRM	MySQL	Knowledge of Data-base Design
6	SharePoint	Salesforce	Dynamics CRM
7	SAP ERP	SAP ERP	Salesforce
8	Knowledge of Data-base Design	Knowledge of Data-base Design	SAP ERP

12. Discipline 12: eBusiness / Digital Marketing

The eBusiness / Digital Marketing discipline calls for competency in Google Analytics and SEO. Also in demand are Google Keyword Planner, Facebook Insights and Twitter Analytics complemented by HTML5.

eBusiness / Digital Marketing
[Outer rings are highest demand]

● Competent   ● Expert   ● Entry

- Google Analytics
- SEO
- Google Keyword Planner
- Facebook Insights
- Twitter Analytics
- HTML5
- Social Media Marketing / Planning
- Social Media Monitoring / Blogging
- Adobe Photoshop
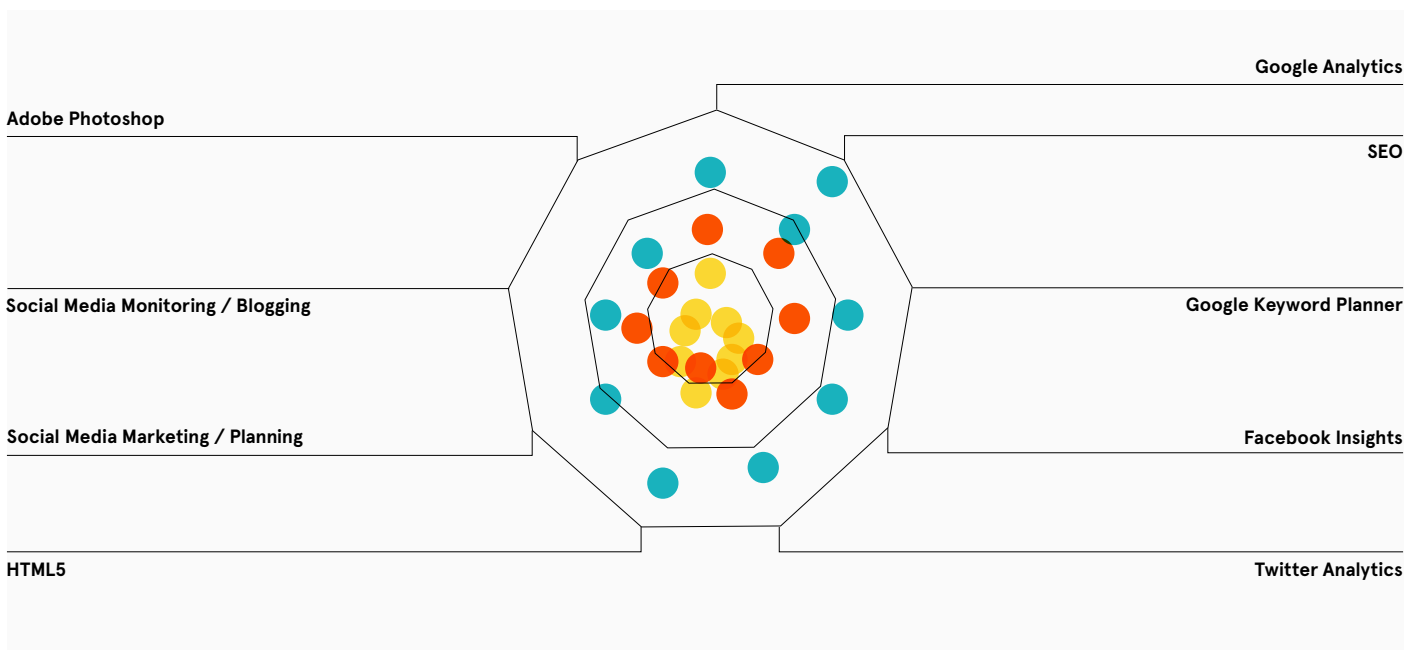
Highest Demand Ranked by Most Needed

Rank	Entry Level	Competent Level	Expert Level
1	Google Analytics	Google Analytics	Google Analytics
2	HTML5	SEO	HTML5
3	Google Keyword Planner	Google Keyword Planner	SEO
4	Facebook Insights	Social Media Monitoring / Blogging	Facebook Insights
5	Twitter Analytics	Adobe Photoshop	Twitter Analytics
6	Adobe Photoshop	Facebook Insights	Google Keyword Planner
7	Social Media Marketing / Planning	Social Media Marketing / Planning	Social Media Marketing / Planning
8	Social Media Monitoring / Blogging	Twitter Analytics	Social Media Monitoring / Blogging
9	SEO	HTML5	Adobe Photoshop

13. Discipline 13: Digital Skills/Media

In the Digital Skills / Media discipline a common set of skills required for entry level roles are HTML5, CSS, Bootstrap and JavaScript (JQuery). Also in demand across all levels are WordPress, Object Orientated Design, Joomla and Photoshop CC.

Digital Skills/Digital Media
[Outer rings are highest demand]

● Competent   ● Expert   ● Entry

HTML 5
Photoshop CC
CSS
Joomla
Bootstrap
Object Orientated Design
JavaScript (JQuery)
Wordpress
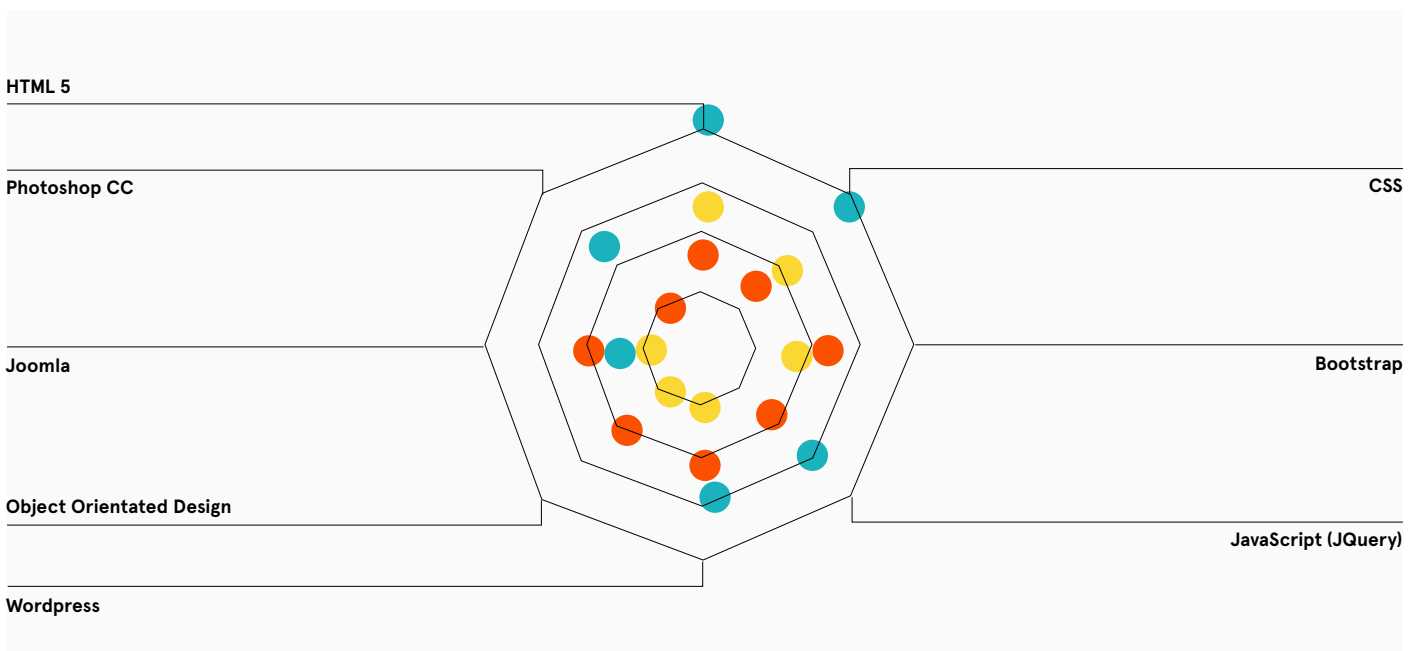
Highest Demand Ranked by Most Needed

Rank	Entry Level	Competent Level	Expert Level
1	HTML5	Bootstrap	HTML5
2	CSS	WordPress	CSS
3	Bootstrap	Object Orientated Design	JavaScript (JQuery)
4	JavaScript (JQuery)	Joomla	WordPress
5	WordPress	CSS	Photoshop CC
6	Object Orientated Design	HTML5	Object Orientated Design
7	Joomla	JavaScript (jQuery)	Bootstrap
8	Photoshop CC	Photoshop CC	Joomla

14. Discipline 14: Contact Centre Support

In the Call Centre / Contact Centre Support discipline, the demand was for competent and expert level roles and skills required included Proficiency in relevant Computer Applications and Knowledge of Customer Service Principles & Practices.

Contact Centre Support
[Outer rings are highest demand]
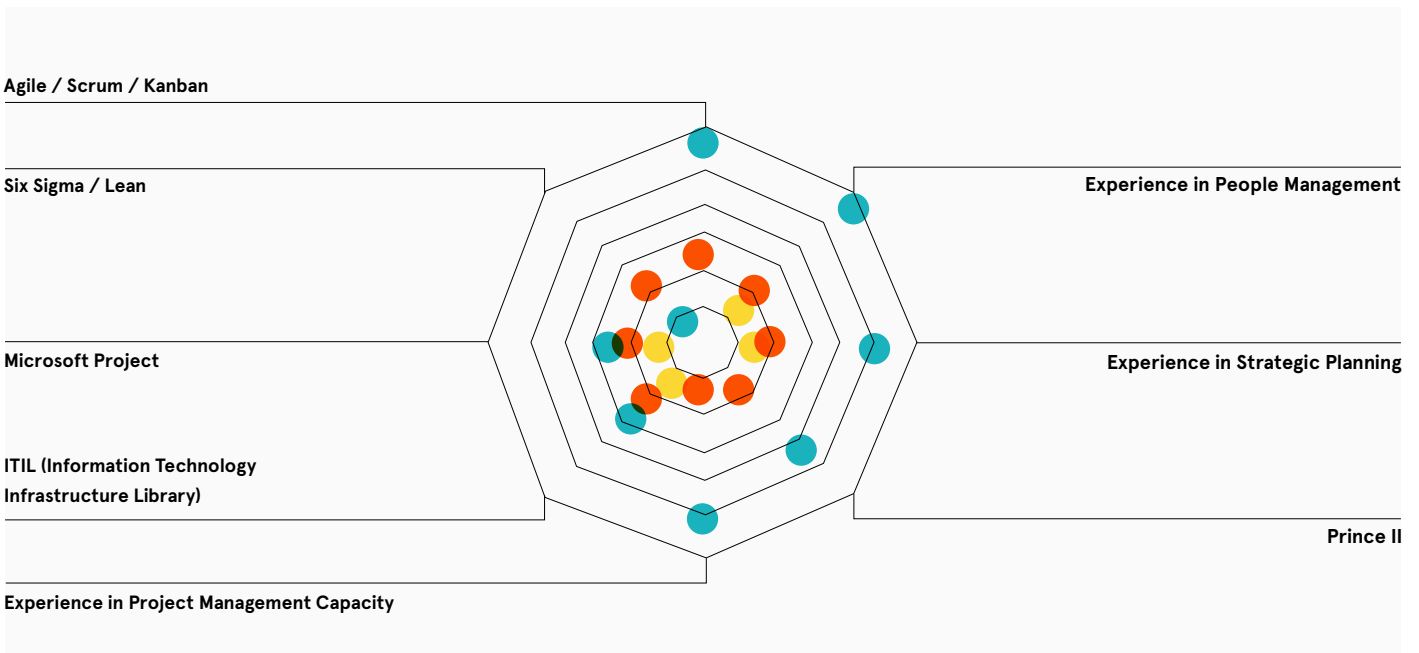
● Competent ● Expert ● Entry

Proficient in relevant Computer Applications

Knowledge of Customer Service Principles & Practices

Customer Service Experience

Knowledge of Administration & Clerical Processes

Good Data Entry/Keyboard Skills

Appreciation of E-Commerce / Cloud Technologies

Knowledge of Call Centre Telephony & Technology

Relevant Product Knowledge
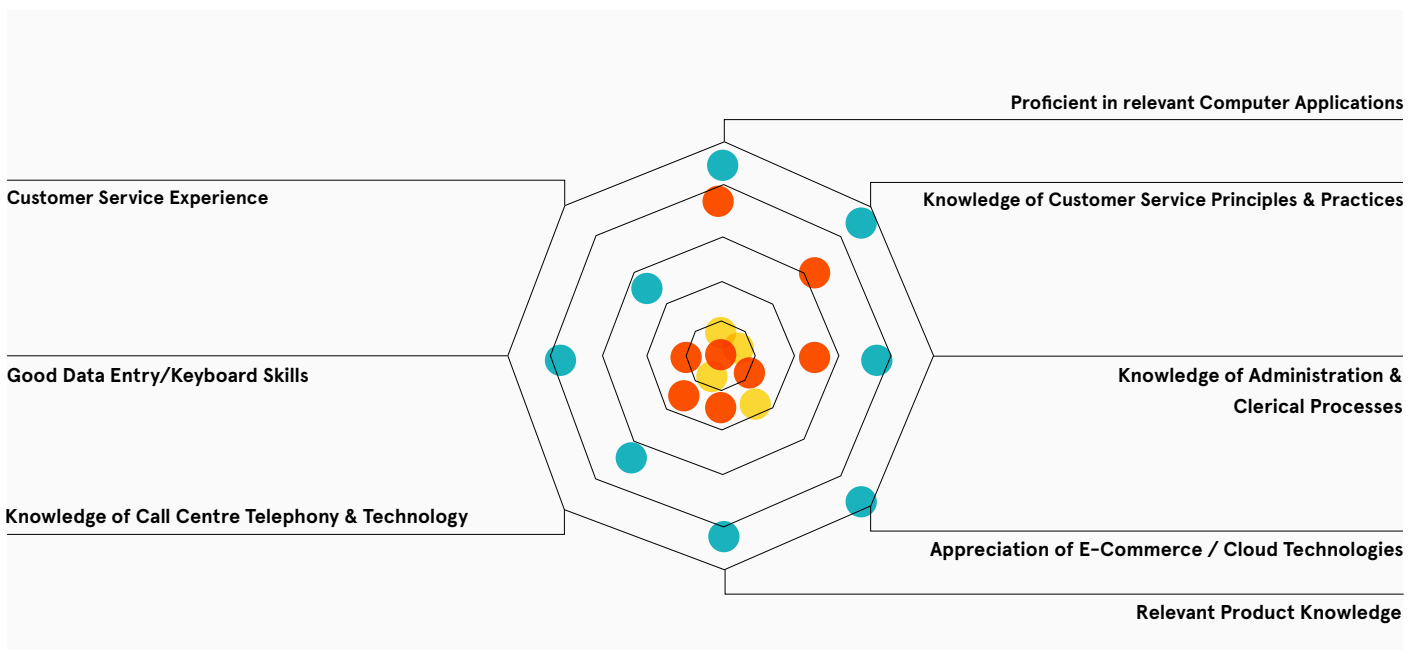
Highest Demand Ranked by Most Needed

Rank	Entry Level	Competent Level	Expert Level
1	Appreciation of E-Commerce / Cloud Technologies	Proficient in relevant Computer Applications	Proficient in relevant Computer Applications
2	Proficient in relevant Computer Applications	Knowledge of Customer Service Principles & Practices	Knowledge of Customer Service Principles & Practices
3	Knowledge of Customer Service Principles & Practices	Knowledge of Admin & Clerical Processes	Appreciation of E-Commerce / Cloud Technologies
4	Relevant Product Knowledge	Relevant Product Knowledge	Relevant Product Knowledge
5	Knowledge of Call Centre Telephony & Technology	Knowledge of Call Centre Telephony & Technology	Knowledge of Admin & Clerical Processes
6	Professional Development (Soft Skills)	Good Data Entry/Keyboard Skills	Good Data Entry/Keyboard Skills
7	Project Management	Appreciation of E-Commerce / Cloud Technologies	Knowledge of Call Centre Telephony & Technology
8	Customer Facing	Customer Service Experience	Customer Service Experience

15. Project Management

In the Project Management discipline, the most in demand skills are Agile / Scrum / Kanban combined with Experience in People Management and Strategic Planning.

Project Management
[Outer rings are highest demand]

● Competent ● Expert ● Entry

- Agile / Scrum / Kanban
- Six Sigma / Lean
- Microsoft Project
- ITIL (Information Technology Infrastructure Library)
- Experience in Project Management Capacity
- Experience in People Management
- Experience in Strategic Planning
- Prince II

Highest Demand Ranked by Most Needed

Rank	Entry Level	Competent Level	Expert Level
1	Agile / Scrum / Kanban	Agile / Scrum / Kanban	Agile / Scrum / Kanban
2	Experience in People Management	Experience in People Management	Experience in People Management
3	Experience in Strategic Planning	Six Sigma / Lean	Experience in Strategic Planning
4	Prince II	Microsoft Project	Experience in Project Management Capacity
5	ITIL	ITIL	Prince II
6	Microsoft Project	Prince II	ITIL
7	Six Sigma / Lean	Experience in Strategic Planning	Microsoft Project
8	Experience in Project Management Capacity	Experience in Project Management Capacity	Six Sigma / Lean

Contact:
North West Regional Skills Manager
Oran Doherty

Email: orandoherty@regionalskills.ie
Tel: +35374 9186707
Mobile: +353 87 1493206

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