Guidance for Higher Education providers on current and future skills needs of enterprise
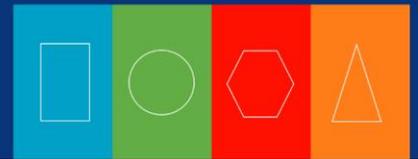
Springboard+ 2015 including ICT Skills Conversion

Expert Group on Future Skills Needs

Guidance for Higher Education providers on Current and Future Skills Needs of Enterprise

Springboard+ 2015 including ICT Skills Conversion

SPRINGBOARD +
www.springboardcourses.ie

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Introduction

The information contained in this document gathers together the most recently available data concerning higher education level skills needs for enterprise appropriate to Springboard+, which incorporates Level 8 ICT skills conversion courses. It provides a synthesis of the data from both recent reports published by the Expert Group on Future Skills Needs (EGFSN) and consultations with industry bodies and the enterprise development agencies. In addition to the skills needs identified in the EGFSN sectoral reports such as _Addressing Future Demand for High-Level ICT Skills_ (Nov 2013), _Future Skills Requirements of the Manufacturing Sector to 2020_ (Apr 2013), _Assessing the Demand for Big Data and Analytics Skills in Ireland 2013-2020_ (May 2014) and _Assessing the Demand for Skills in the Freight Transport, Distribution and Logistics sector in Ireland 2014- 2020 (forthcoming)_ this guidance document also includes the findings from the EGFSN reports published annually, namely the _National Skills Bulletin_[1] (July 2014) and the _Vacancy Overview 2013_ (May 2014). These latter two reports are produced using data gathered by the Skills and Labour Market Research Unit (SLMRU) in SOLAS. Local enterprise needs may also be identified through engagement between education providers and local employers and a Springboard+ course developed to address this local need.

Engagement with Enterprise

Enterprise engagement is of pivotal importance to the progression of Springboard+ participants to employment. Springboard+'s objectives are as follows:

1. To help unemployed **people to return to** sustainable **employment**.

2. To enhance **collaboration between enterprise and higher education** to design and deliver relevant higher education courses that support job creation and expansion in line with the Government's Action Plans for Jobs.

3. To **enhance the skills profile of the labour force** to meet the targets and objectives of the national ICT skills Action Plan (2014); the 2015 Action Plan for Jobs and the National Skills Strategy (2007).

Progression to employment

The **optimal labour market outcomes** for participants via Springboard+ in 2015 will be delivered by:

- Ensuring courses **are relevant to enterprise** skills needs as identified by the EGFSN in conjunction with companies or through providers identifying a local or sectoral need.

- **Ensuring there is appropriate screening of candidates, ideally in conjunction with employers so that:**

    - candidates are of sufficient calibre to manage the demands of the course; <u>or</u>

    - candidates with significant previous experience in the sector could proceed by advanced entry to programmes (recognition of prior learning); <u>or</u>

    - where specific skills gaps can only be addressed by upskilling individuals who have previous substantial work experience in the sector; and

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[1] http://www.skillsireland.ie/media/23072014-National_Skills_Bulletin%20_2014--Publication.pdf
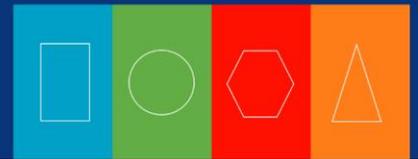
- provision of career guidance to help candidates choose the appropriate course relevant to them and their interests and experience; and

- interest of the learner in the course is paramount.

- Programmes should ideally offer **a structured work placement** focussed on enhancing the **employability** of the graduate particularly with regard to enterprise/generic skills.

- Where less than full awards are proposed, modules should focus on specific skills requirements, **in collaboration with enterprises**/trade associations and aimed at a highly targeted cohort.

- Where possible **aspects of employment readiness should be embedded in the programmes** to facilitate those who have acquired the technical skills for jobs to meet the interviewing and CV preparedness necessary for progression to employment.

In each case the objective is that the jobseeker will benefit through relevant specialisms in addition to their existing qualifications and experience, thereby assisting them in progressing to employment.

Structure of this Guidance Document

There are two groupings of enterprise skills needs, namely:

- Technical or specific skills needed within a given sector;
- Skills needed across all types of enterprises.

The skills needs of enterprise for this call are prioritised as follows:

1   **High-level ICT** Skills – for the ICT Sector and *across all sectors*

2   **Big Data & Analytics** skills – specifically the supporting technology within the ICT sector and big data savvy roles *across all sectors*

3   Skills for **Manufacturing**

    3.1   All manufacturing

    3.2   Engineering

    3.3   Biopharma-Pharmachem

    3.4   Medical Devices

    3.5   Food & Beverages

    3.6   ICT Hardware

4   Skills to **Trade Internationally** - *across all sectors*

5   Skills for **International Financial Services**

6   **Construction** Skills

7   **Entrepreneurship** - *across all sectors*

8   **Creativity, Design & Innovation** - *across all sectors*

9   **Freight Transport, Distribution and Logistics** (FTDL)

10   **Cross Enterprise Skills**
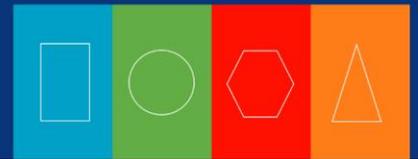
Chapter 1 – deals with the **ICT sector** and its current and future skills needs to 2018 both within the ICT sector itself and across other sectors such as business services, financial services and manufacturing as outlined in the EGFSN reports - _Addressing Future Demand for High-Level ICT Skills (2013)_. There are two calls relevant to the High-Level ICT skills: the NFQ Level 8 Conversion Course which was designed in conjunction with industry and Springboard for NFQ Levels 6 & 7.

Chapter 2 - is about the skills needs for **Big Data & Analytics** which involves the mining, analysis, interpretation and utilisation of Data including Big Data. The EGFSN defined three categories of data analytics skills in its recent report entitled _Assessing the demand for Big Data and analytics Skills, 2013 – 2020_.

Chapter 3 – is about the **Manufacturing sector**, and identifies the skills needs across all manufacturing as well as the skills identified for the 5 sub-sectors researched in the EGFSN report _Future Skills Requirements of the Manufacturing Sector to 2020 (Apr 2013)_, namely: Engineering, Biopharma-Pharmachem, Medical Devices and Food & Beverages and ICT Hardware.

Chapter 4 – deals with the **Skills for Enterprise to Trade Internationally** as identified in the EGFSN report _Key Skills for Enterprise to Trade Internationally (2012)_. They focus principally on Customer Sales/Services Support, International Sales Professionals and International Project Management with Foreign Languages and cultural awareness. Job opportunities across all sectors and the skills needed, including foreign languages, apply equally to manufacturing and services enterprises.

Chapter 5 – deals with the skills needs of the **International Financial Services** sector. The skills needs were originally identified in the EGFSN report _Future Skills and Research Needs of the International Financial Services Industry (2007)_ and current demand was identified from discussions with the enterprise development agencies, trade associations and businesses in the context of the development of the forthcoming Financial Services Strategy.

Chapter 6 – **Construction**, has been included again this year with specific emphasis on Building Information Modelling, now being increasingly stipulated by Government for the delivery of public works projects, IT skills for process improvement in the sector and international knowledge of environmental standards and their impact on ECO construction.

Chapter 7 – deals with the need to develop a culture of **Entrepreneurship** in Ireland and the Government's recently published Strategy for Entrepreneurship _National Policy Statment on Entrepreneurship in Ireland_. Sprinbgboard is an ideal vehicle to both build the capability of and pipeline of entrepreneurs

Chapter 8 – deals with **Creativity, Design & Innovation** which are key drivers of productivity improvement and are needed in all industries and in all occupations. The Irish Government has designated 2015 the Year of Irish Design (ID2015) which presents an opportunity to promote and develop Ireland's capabilities in business-related design across all sectors of the economy. The skills needs for this area are identified in the EGFSN report _Skills in Creativity, Design and Innovation (2009)._

Chapter 9 – deals with **Freight Transport, Distribution and Logistics (FTDL)** sector. The forthcoming EGFSN report _Assessing the Demand for Skills in the Freight Transport, Distribution and Logistics sector in Ireland 2014- 2020_ identifies two areas of FTDL for which a Springboard programme provision at NFQ Level 7 would be suitable, namely: Transport and Distribution Managers – approx. 40 places and Storage and Warehousing Managers – approx. 40 places.

Chapter 10 – **Cross Enterprise Skills** - deals specifically with those skills necessary in any and all enterprises and range from people skills to management skills to entrepreneurial skills.
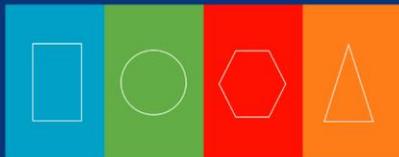
Trends in Employment for professionals & associate professionals, 2008 - 2012

A significant share of the job creation announcements in the media during 2013 were for professional and associate professional positions.

Figure 1.1 below demonstrates clearly that:

1 For vacancies on Irishjobs.ie between 2009 -2013 the largest proportion was for professional and associate professionals which are pertinent for Springboard courses.

2 There has been an increase year on year since 2009 for the number of vacancies for both professionals and associate professionals.

Figure 1.1: IrishJobs.ie Vacancies by Broad Occupation, 2009-2013
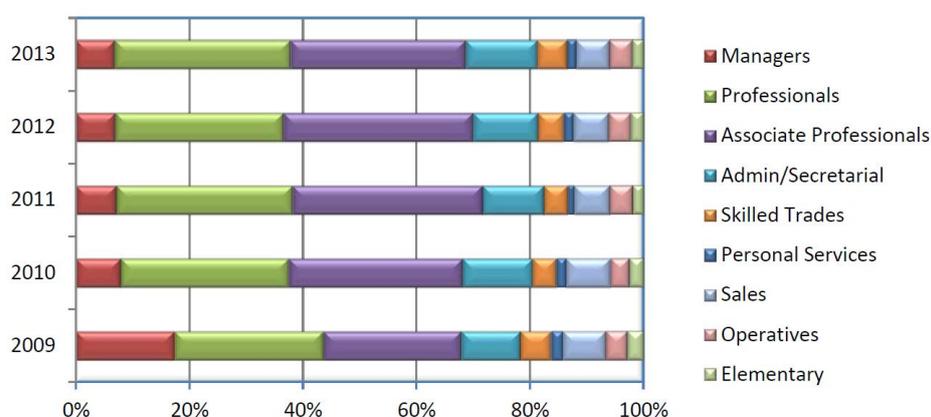

Source: IrishJobs.ie

Job Announcements

Job creation announcements in the media were mostly for ICT professionals and sales related occupations, followed by operative and associate professional positions; expansion demand was also confirmed through job announcements by IDA and EI client companies, most pronounced for the ICT sector, followed by high-tech manufacturing and business.

The demand for professionals was particularly strong for:

- Software engineers and developers;
- Business analysts/enterprise risk analysts;
- Finance, accounting and tax experts (IT, consulting, financial and manufacturing);
- Engineers and scientists (automation & process (chemical) & quality control engineers and biotechnologists in high-tech manufacturing; energy engineers);
- R&D Engineers and scientists (ICT, energy, life sciences and marine science/technology).

A requirement for language skills was also frequently cited, particularly for associate professional positions. German was the most frequently mentioned language required, followed by French, Italian, Spanish and Dutch. Increasingly, **foreign languages** are seen as **an integral part of the skills portfolio** of candidates across a range of occupational groups and sectors.
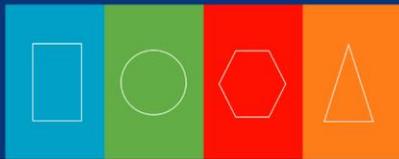
1. High-level ICT Skills – *for the ICT sector and across all sectors*

EGFSN Report:

<u>Addressing Future Demand for High-Level Skills (2013)</u>[2]

The EGFSN study reports that in 2012, there were an estimated 68,280 ICT professionals working both within the ICT sector and across other sectors of the economy, e.g. ICT, Financial Services, Business Services, Manufacturing and that Ireland is likely to face an average increase in demand for high-level ICT skills of around 5% a year out to 2018 with the employment of ICT professionals anticipated to rise to just over 91,000. Overall, in the EGFSN Central Growth Scenario, it is estimated that there will be more than 44,500 potential job openings for ICT professionals over the period 2013 to 2018[3] arising from expansion and replacement demand over the next six years. A key factor for Ireland will be to ensure an adequate supply of ICT talent and skills from the domestic supply pool and global talent, to meet the needs of both foreign-owned and indigenous enterprises. This is against the background of a strong global demand for high-level ICT skills and talent in other countries actively competing for these skills.

The on-going ICT wave of innovation is driving strong demand for new high-level ICT skills and competences, particularly to design, develop and deploy new applications and services. Some of these are core technology skills but others, for example Big Data and social media, require skillsets with a combination of skills, such as technology, statistics and business skillsets for Big Data; or technology and marketing skillsets for Social Media. Consequently, high-level ICT skills requirements will become increasingly complex and will demand more of the education and training systems and from in-company training.

The current and medium-term recruitment difficulties experienced by companies mainly relate to ICT honours degree (computing/electronic engineering NFQ Level 8) and above – both for graduate entry level positions and particularly for ICT professionals with experience. In a direct response to the high-level ICT Skills shortages the Government in 2012, and again in 2014, launched the <u>*ICT Action Plan*</u>[4]. One of the key measures of the Plan is the NFQ Level 8 Higher Diploma ICT Skills Conversion Programme. The Action Plan identified a need for 1,250 places on Springboard/ICT Conversion each year in order to meet the Government's target of 74% of the ICT skills demand from domestic supply by 2018.
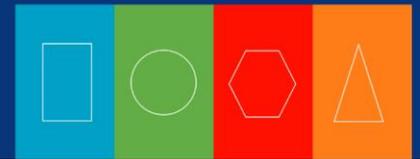
The NFQ Level 8 ICT Conversion programme was designed in conjunction with the industry and is an intensive one year full time course, with a minimum of 60 credits. It is targeted at people who, regardless of employment status, have an honours degree in a cognate discipline, as well as the capacity and underlying aptitude to undergo an intensive programme of study and work-experience to acquire industry-relevant ICT and software development skills at NFQ level 8. The programme is designed around collaboration and engagement between the enterprise sector and higher education providers and includes a mandatory work-placement.

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[2] http://www.skillsireland.ie/publication/egfsnSearch.jsp?ft=/publications/2013/title,11287,en.php
[3] These figures do not include job churn job openings arising from the movement of workers between firms in the economy.
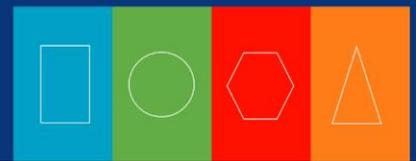[4] http://www.education.ie/en/Publications/Policy-Reports/ICT-Action-Plan-Meeting-the-high-level-skills-needs-of-enterprise-in-Ireland.pdf

The output from ICT skills conversion courses should contribute to the high-level ICT skills needs (and the Data Analytics – Supporting Technology Roles outlined in Section 2) identified in Table 1 below. The majority of high-level ICT skills identified below should predominantly be addressed through the ICT conversion courses. There is also a smaller requirement for Springboard Level 6-Certificate & Level 7-Diploma which should be a 60 credit course.

Table 1: Current and future high-level ICT skills needs:

High-Level ICT Current & Future Skills Needs
Software Programmers for the design and development of applications & systems: Specific skillsets required are: **Programming languages** - Java, JavaScript, C#, C++,.Net; SQL data base; Ruby, Python, Object–Oriented Programming (OOP), Objective-C;   - Java knowledge combined with experience in Spring and Grails Frameworks; PHP knowledge;   **Web Development** - understanding of Web 2.0 development technologies, HTML5, XML, Microsoft ASP.Net (web application framework to build sites, applications and services), Personal Homepage Tools (PHP), Microsoft Sharepoint family of software products, other web page development skills (HTML, CSS, XHTML, Ruby on rails);   **Games developers** with skills (both entry and advanced level) in web based architecture and technologies, Java, and game state management, as well as high level skills in 3D animation;   **Enhancing end user experience** and usability (UX (User Experience), UI (User Interface), Tibco, Messagebroker), which are becoming increasingly important as businesses migrate to online platforms; and   - Knowledge of **operating platforms** – Windows, UNIX / Linux processing environment.   **Computing architects and administrators,** with skills and expertise in: - Big Data analytics infrastructure and technologies (for big data developers: NoSQL, Java, JavaScript, MySQL and Linux combined with TDD, CSS and Agile; for big data architects: Oracle, Java, SQL, Hadoop, SQL Server and Data Modelling ETL);   - customer relationship management applications (Salesforce, Dynamics, Oracle, SAP, Advanced Excel); and   - SQL Server database administration and alternative systems such as Cassandra, Hadoop, MongoDB.   **Cloud computing specialist:**   - cloud infrastructure skills (e.g. Python and open source technologies);   - VMWare and other virtualisation technologies know-how; and   - Expert support engineers (Windows, Linux, Redhat, Debian, Ubuntu).
Network specialists and engineers: e.g. Server Message Block (SMB), wireless sensor testing, collaboration functions, process management, search modules and document management platform, router configuration and management, experience with scripting language Java, C, C+ and network configurations.
Security experts: high level expertise in security, malware, digital forensics, web security, etc. Internet security and network security models and solutions - certified IT systems, architecture, engineering and management (e.g. Cisco information security systems), firewall configurations

| High-Level ICT Current & Future Skills Needs |
| --- |
| administration, authorisation mechanisms. |
| ▪ **Mobile technology applications** developers (e.g. Apple iOS; Android (e.g. Honeycomb, Icecream, Sandwich); Windows Phone; Linux; Unix; open source tools; Software Development Life Cycle); the demand spans a range of levels but is particularly strong for high level skills. |
| ▪ **IT Project managers** with technical skills combined with program management, business analytics, or Agile/Scrum/Kanban and Prince II skill sets. |
| ▪ **IT user support:** Networking and PC maintenance experts with skills in Cisco CCNA and MS (Microsoft) MCITP; there is also a demand for skills, even those with less experience, in Oracle, Comptia Linux+, Comptia A+, wireless networks and IP networking, especially, although not restricted to, the telecommunications and security industries. |
| ▪ **IT Quality Assurance, Testing and Troubleshooting:** performance testers; automation and manual testers (especially in the financial and telecommunications industries). |
| ▪ Personnel with **foreign languages skills** and ICT technical background: To fill positions in IT technical support, accounting, marketing and business development; requirement for fluent oral and written French, German, Spanish, Dutch, Flemish and Swedish. |
| ▪ **Sales and Marketing personnel** with IT Technical Background and relevant industry knowledge: To support business development; Oracle and SAP business applications and services and other software solutions for specific business solutions. |

Job announcements:

The demand for ICT professionals as indicated through the job announcements in the media remained strong, in particular for:

- Software engineers and developers, particularly in cloud computing; many of the roles related to social media, online shopping, online payment services, IT/data security (e.g. forensics, e-discovery and cyber security), data analytics and mobile phone technologies;
- Senior IT specialists, project managers, product managers;
- Software test analysts, performance engineers, quality assurance IT engineers;
- Web developers.

A list with hyperlinks for the IDA and Enterprise-Ireland job announcement since Jan 2014 is given in Appendix 1. This is a useful resource for providers to ascertain who might be interested in partnering in an NFQ Level 8 Higher Diploma ICT Skills Conversion Programme.
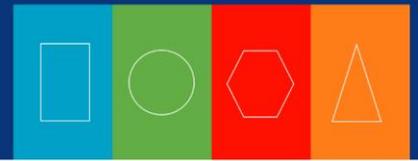
2.   Big Data & Analytics – *across all sectors*

EGFSN Report:

Assessing the demand for Big Data and Analytics Skills, 2013 - 2020[5]

Data analytics involves the mining, analysis, interpretation and utilisation of Data including Big Data (obtaining and utilising large volumes of data in structured and unstructured forms). The Irish Government has set an ambition for Ireland to become a leading country in Europe in Data Analytics and Big Data with the potential to create significant additional employment in the economy[6]. Many of the elements of an ecosystem to support Data Analytics and Big Data are already in place in Ireland so that there is a strong base to build upon. Data analytics, which has the potential to create significant additional employment in the economy, involves the mining, analysis, interpretation and utilisation of Data including Big Data (obtaining and utilising large volumes of data in structured and unstructured forms). Globally, there is a reported shortage of skilled professionals with data analytics skills.

In its recent report entitled "*Assessing the demand for Big Data and analytics Skills, 2013 – 2020*" the EGFSN defined three categories of data analytics skills, namely:

Deep analytical talent – skills requiring a combination of advanced statistical, analytical, machine learning and communication skills.

Big data savvy roles, individuals at all levels of a business or organisation, e.g. market research analysts, business and functional managers, who have an understanding of the value and potential for the exploitation of data analytics including big data and can pose questions for analysis, interpret and challenge the results and take appropriate decisions using data to drive business performance.

Supporting technology - the skills to develop, implement and maintain the hardware and software required to make use of Data Analytics including Big Data. The skills for the Supporting Technology roles are under the high-level ICT Skills.
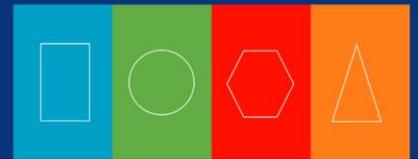
Many of the skilled professionals operating in data analytics have qualified under general undergraduate programmes in areas such as mathematics, statistics and IT, and also may have completed further postgraduate specialism training in data analytics including big data. The EGFSN report, forecasts a continuing strong demand for data analytics and related skills across the economy over the period 2013-2020 and estimates that Ireland has the potential to create between 12,750 and 21,000 job vacancies by 2020, arising through expansion and replacement demand. Companies envisage that they will continue to need to recruit both experienced individuals and new graduates in these areas in the future.

Deep Analytical Talent

Because of the high skilled nature of this work a 4 year undergraduate study in, for example, maths, computer science, business analytics, statistics engineering and physics, and in many cases an additional postgraduate specialism are generally required. Maths, statistics and computer science

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[5] http://www.skillsireland.ie/publication/egfsnSearch.jsp?ft=/publications/2014/title,12194,en.php
[6] Action Plan for Jobs 2013,2014 & 2015

disciplines are the most common anticipated sources of skills for deep analytical roles. In this regard Springboard+ courses for deep analytical roles will need to be at NFQ Level 9 and candidates taking such a course will need to have an honours degree in one of the afore mentioned disciplines and a proven advanced mathematical, statistical and analytical ability which is required by employers for their deep analytical roles. It is anticipated that these Springboard+ courses will be accelerated/full-time courses in order to meet the identified enterprise skills needs for deep analytical talent. In order to ensure the programmes to meet the deep analytic skills needs are aligned to the skills needs the EGFSN identified with industry, providers are strongly encouraged to engage with the ICT division, IDA Ireland.

Big data Savvy Roles

For **Big data Savvy roles** *Springboard+* courses are primarily expected at NFQ Diploma level 7 (60 credits). These courses may be particularly suited to jobseekers who have taken an NFQ level 6+ or equivalent award in disciplines such as business, management studies, finance, marketing and social sciences. The programme content should include the following (Table 2.1) below:

Table 2.1: Skills for Big Data Savvy Roles

NFQ Diploma Level 7 (60 credits) Springboard content for Big Data Savvy skills
▪ Data protection, governance, and IP knowledge.
▪ Enterprise Data management.
▪ Specific user tools, (i.e. dashboards/KPI data/market analysis).
▪ Development of numeracy and analytical skills.
▪ Knowledge of social media.
▪ Business intelligence and Business Strategy.
▪ Ethics, Team-working and Communication Skills.

Supporting Technology Roles

For Data Analytics/Big Data **Supporting Technology Roles** the *NFQ Level 8* Higher Diploma (60 credits) *Conversion* programmes is the more appropriate programme. The NFQ Level 8 Conversion programme is targeted at jobseekers that have an NFQ Level 8 + honours degree in a cognate discipline, as well as the capacity and underlying interest and aptitude to undergo an intensive programme of study and work-experience. The programme content should include the following.

Table 2.1: Skills for Supporting Technology Roles

NFQ Level 8 ICT Conversion course - content for Data Analytics Supporting Technology Roles
▪ Fundamentals of computing software development.
▪ Building, implementing and managing Hadoop environments.
▪ Mapreduce.
▪ Data base management and administration– SQL, MySQL, NoSQL.
▪ Social media technologies.
▪ Design/user experience skills.
▪ Communications, problem solving, Ethics and team-working skills.
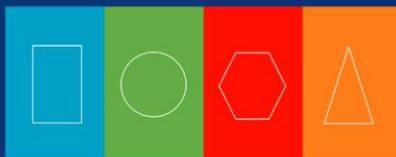
3.   Manufacturing

EGFSN Report: _Future Skills Requirements of the Manufacturing Sector to 2020_ (Apr 2013)[7]

Manufacturing plays a critical role in the Irish economy – as a driver of exports, as an employer, as a source of revenue and as a key driver of growth. In total, there are 12,790 manufacturing enterprises in Ireland. Most of these are small in scale, with 83 per cent employing less than 10 people (micro firms) and 95 per cent employing less than 50 people. In general, the larger firms are foreign owned, with the exception of a small number of firms involved in the food and engineering sectors. Overall, firms assisted by IDA and Enterprise Ireland represent approximately 92 per cent of total manufacturing employment. Looking at employment in manufacturing firms by ownership, historically, it has been split virtually evenly between Irish-owned and Foreign-owned firms.

In its 2013 report _Future Skills Requirements of the Manufacturing Sector to 2020_ the EGFSN under the Competitive Manufacturing Scenario predict employment to rise by 22,000 to 2016 and continues incrementally to increase by 43,000 by 2020. The report identified the skills needs for manufacturing generally and some specific needs for a number of manufacturing subsectors, namely; Engineering, Biopharma-Pharmachem, Medical Devices, Food & Beverages and ICT Hardware.

This chapter summarises current and future skills needs for the manufacturing sector. Section 3.1 deals with skills needs that are common across many different manufacturing subsectors while the subsequent sections summarise the current and future skills needs for the subsectors dealt with in the Manufacturing report.

There is a challenge for manufacturing enterprises in attracting the top graduate talent as many graduates are sought after for other sectors, including services. Replacement demand for the sector is estimated in the region of 4,000 to 5,000 per annum regardless of whether employment expands or not and there are upskilling requirements at both occupational and qualifications level. Manufacturing firms across all sub-sectors reported that professional engineering and science occupations for those with experience, were the most frequently mentioned as being difficult to fill as detailed in the table.

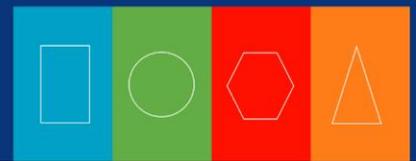## 3.1   All Manufacturing Skills

In its report on Manufacturing the EGFSN identified a demand for approximately 250 **mechanical engineers** with particular emphasis on skills related to automation, development and design until increased enrolments in mainstream engineering programmes result in an increased supply in 2-3 years' time. Approximately 120 of these engineers will graduate from the 2013 & 2014 Springboard programme. A further 130 will be required from the 2015 Programme.

The report also recommended that Springboard provide 200 **places on taught postgraduate** (primarily at NFQ Level 9) courses specifically to address critical shortages across a number of engineering disciplines including **validation, polymer, quality, automation and supply chain engineering**. Approximately 160 of these places were delivered in 2013 and 2014 and a further 40 will be needed in 2015.

The current and future skills needs across ALL Manufacturing is outlined in the following table:

Table 3.1: All Manufacturing Current & Future Skillos Needs

All Manufacturing Current & Future Skills Needs

▪ **Mechanical Engineers** (130 graduates at NFQ Level 8) with:
    ▫ **Process Automation** & **System Control** Skills; and
    ▫ Product innovation skills - **product development & design.**

▪ Engineers (40 graduates at NFQ Level 9) with specialisms in:
    ▫ **Validation;**
    ▫ **Quality;**
    ▫ **Polymer;**
    ▫ **Supply Chain;** and
    ▫ **Automation.**

▪ Knowledge of **data analytics:**
    ▫ Skills that combine scientific expertise with an understanding of the manufacturing processes (data analytic skills for managers & decision makers in Manufacturing); and
    ▫ Skills to analyse and interpret data produced in manufacturing from controllers, shop floor data capture and quality systems.

▪ **Lean manufacturing** skills.
▪ **R&D project management** skills.
▪ Knowledge of **Additive Manufacturing – (3D printing).**
▪ **Technical sales skills** which combine technical product knowledge with commercial ability and people skills to engage with customers, understand their needs, propose solutions and build on the relationship for further sales.
▪ Engineers with **European & other foreign languages**, in particular German, for technical selling, and customer-facing commercial & engineering roles.
▪ **Managing Change** - project management & change management skills including the ability to engage/motivate people to embrace and work with change in the sector.

▪ **Software Engineers:**
    ▫ for writing control software for automation equipment, & for product development;
    ▫ to **manage the interface** of IT systems with factory systems; and
    ▫ **for software applications** for the management of Validation, Quality Assurance and Automation.

Job announcements:

Strong demand for engineering skills, at both professional and to a lesser extent at technician level, is illustrated in recent job announcements in high-tech manufacturing.

A list with hyperlinks for the IDA and Enterprise-Ireland job announcement since Jan 2014 is given in Appendix 1. This is a useful resource for providers to ascertain who might be interested in partnering in a Springboard proposal.
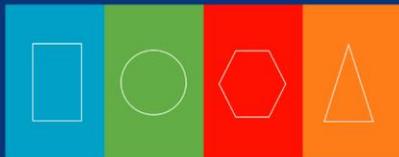
3.2 Engineering

The Irish Engineering sector is highly diverse in terms of size, scale and product. The sector includes companies primarily concerned with metal and plastic processing and machine manufacture encompassing agricultural machinery, materials handling, precision engineering, plastics and tool-making and metal fabrication and processing. The majority of employment is in companies that are primarily indigenous and there are some parts of the engineering sector that have significant growth potential such as: Agricultural Machinery; Materials Handling; and Niche Precision Engineering as key growth areas in the future.

Within the multinational sector, engineering companies include those in the: automotive sector; aerospace industry; mechanical and electrical engineering; fluid components; process equipment; and materials handling. Activities carried out at these operations include High Value Manufacturing, Supply Chain Management, Research and Development and Intellectual Property Management. The key players include Valeo (automotive suppliers) and Siemens (solutions engineering). In addition to the skill demand identified in the All Manufacturing skills needs listed in Section 3.1, Engineering current & future skills in demand were identified in the EGFSN report as follows:

Table 3.2: Engineering Current & Future Skills Needs

| Engineering Current & Future Skills Needs |
|---|
| ▪ Engineers with **materials expertise** for new product design and testing in metals. |
| ▪ **Polymer technology** is a specific skill shortage across a number of different manufacturing areas, including Medical devices, Consumer Goods and plastics/polymers. The skills are needed at both technician and at engineer level. |
| ▪ **Automation skills** in robotics to increase throughput. |
| ▪ **Technical procurement skills**, e.g., engineers with commercial knowledge who work with suppliers and can negotiate supply terms. |
| ▪ **Technical sales skills.** |
| ▪ Engineers with **European & other foreign languages**, in particular German, for technical selling, and customer-facing commercial & engineering roles. |
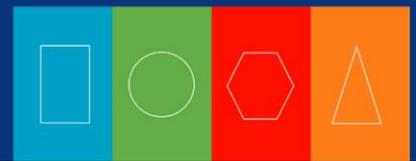
3.3   Biopharma-Pharmachem

The Biopharma-Pharmachem sector encompasses the discovery, development, production and sale of drugs licensed by an appropriate body (e.g. Food & Drug Administration in the US) for use as medications. The sector is subject to stringent laws and regulations regarding the patenting, testing, production and marketing of drugs. In 2011, there were approximately 25,000 people employed in Biopharma-Pharmachem, predominantly in multinational firms. Nine of the top ten Biopharma-Pharmachem companies globally (Pfizer, Merck, GSK, J&J, Novartis, Roche, Amgen, Eli Lilly, BMS) have research, manufacturing and services activities here. In addition, there is a growing indigenous base made up of medium-sized Irish-owned firms.

The sector in Ireland has undergone profound change. In 2003 less than 2% of the pharmaceutical sector workforce was focused on manufacturing of complex, biopharmaceuticals, with the focus on manufacturing of conventional drugs using synthetic chemistry. Today approximately 20% of the Irish sector is focused on biopharmaceutical manufacturing and this continues to grow.

There is a major growth in bio-pharma manufacturing. The pharmaceutical industry is evolving to become the bio-pharmaceutical industry and employment in biotech in Ireland has grown from 400 in 2004 to over 5,000 in 2014. IDA has a number of significant similar biopharma investments in its pipeline and a significant investment in upskilling/cross training will help in ensuring that Ireland can win these investments by avoiding a skills gap in biopharma manufacturing. In particular there is an <u>acute need</u> for technicians and senior process scientists and engineers. The skills needed to serve the biopharmaceutical manufacturing sector are in table 3.3 below:

Table 3.3: Bio-Pharma Manufacturing Current & Future Skills Needs

| Bio-Pharma Manufacturing Current & Future Skills Needs |
|---|
| ▪ Biotechnology skills for bioprocessing with a focus on:
 ◻ **Bioprocess analytical technology & Data Analytics/Data Savvy;**
 ◻ **Regulatory affairs** in biopharmaceutical manufacturing & release testing;
 ◻ **Supply chain management;**
 ◻ **Bioprocess engineering** (including emphasis on single use manufacturing systems). |
| ▪ **Engineers with specialisms in Commissioning** – overseeing the installation of systems, plant and/or equipment. |
| ▪ **Precision Engineering** – toolmaking. |
| ▪ **Product Development and Design.** |
| ▪ **Science Graduates** – with knowledge of the science of:
 ◻ process development for bio-pharma production;
 ◻ analytical biochemistry for QC method development. |
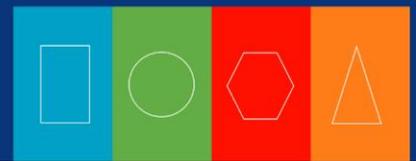
3.4   Medical Devices

The medical devices sector is highly diverse. It covers thousands of products – from simple bandages and spectacles, through implantable devices, equipment for screening, to the most sophisticated diagnostic imaging and minimally invasive surgical equipment. Strong growth prospects for the industry globally are driven by ageing populations, increase in chronic ailments and increasing consumer wealth driving demand in emerging economies. High value opportunities such as remote diagnostics, combination products and eHealthcare services are being driven by advances in science and technology and convergence, particularly with ICT. The sector employs approximately over 24,000 people.

There is a very strong multinational presence in the sector with 20 of the top 30 medical devices companies globally (for example, Abbott, Boston Scientific, Medtronic) with large production facilities in Ireland. There is also a small but growing indigenous base with some notable medium sized Irish owned companies. The medical devices sector also links in strongly with the ICT and engineering base, for example as key partners in delivering healthcare solutions (HP, IBM, Analog, and Intel). In addition to the skill demand identified in the All Manufacturing skills needs listed in Section 3.1, Medical Devices current & future skills in demand were identified in the EGFSN report as follows:

Table 3.4: Medical Devices Current & Future Skills Needs

Medical Devices Current & Future Skills Needs
▪ **Software engineers** for development of ICT enabled medical devices, as the addition of intelligent systems to medical devices has led to a demand for software design skills on product development teams in the convergence of technologies.
▪ **Automation engineering** skills with a particular focus on robotics and machine vision.
▪ **Mechanical engineers** with honours Bachelor degrees.
▪ **Polymer technicians** and engineers at NFQ Levels 7 & 8. For the design of plastic components which account for a substantial part of all medical device production in Ireland, both in subcontractors and in medical device companies.
▪ **Product assurance** skills including software and validation skills for software quality assurance, change approval, risk assessment and failure mode analysis.
▪ **Regulatory Compliance** for the medical device sector -NFQ Level 8/9.
▪ **Quality engineers** in the medical devices industry for quality assurance, interaction with internal corporate quality auditors and regulatory affairs.
▪ The skills to drive **operational excellence** which include skills in managing technology, change, strategy, cost control and leadership.
▪ **Supervisory soft skills**, especially people engagement skills.
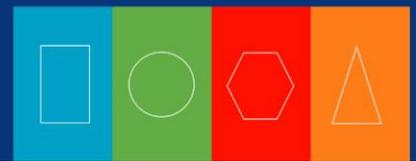
3.5   Food & Beverages

The Food and Beverages sector in Ireland is highly export-oriented with the value of Irish food and drink exports approaching €10 billion for the first time in 2013. This represents an increase of 9% on the previous year and 40% in the last four years with revenues almost €3 billion higher than in 2009. The agri-food industry remains a key component of Ireland's modern economy accounting for some eight per cent (8%) of GDP and a similar proportion of total employment, amounting to almost 160,000 jobs with over 50,000 people directly employed in Food and Beverage processing and an estimated further 85,800 in primary production, agriculture, forestry and fishing.

While the sector is primarily made up of small firms, a number of firms of significant scale have developed over the last decade, through organic growth and mergers/acquisitions. It accounts for a major proportion of exports of Irish-owned enterprises and its products are sold in over 170 markets around the world.

Foreign affiliates of leading multinationals have a strong presence in Ireland, employing just over 10,000 and with Irish economy expenditure of €1.2bn. They include Cadbury, Unilever, Nestle, Northern Foods and Heinz. A number of Irish owned firms are among the world's 50 largest food and beverage multinationals. Indigenous agri-food companies in Ireland include: the co-ops, Cuisine de France, Glanbia, Kerry Foods, Greencore, Kepak, Fyffes, Carbery, Silver Hill, C&C, Gleeson's and Cooley Distillery. The Government Harvest 2020 strategy target is to increase exports of the sector by 42 per cent by 2020, to reach €12bn building on existing markets and expansion into new markets.

There is significant optimism about the Food & Beverages sector as reflected in the Government's Harvest 2020 Strategy. However, companies have recorded difficulties recruiting technical staff and in addition to the skills need identified in the All Manufacturing skills needs listed in Section 3.1, Food & Beverages current & future skills needs were identified in the EGFSN report as follows:

Table 3.5: Food & Beverages Current & Future Skills Needs

Food & Beverages Current & Future Skills Needs
▪ **R&D scientists and food technologists.**
▪ **New Product Development skills.**
▪ **International sales/marketing** & languages for developing business in the UK, Europe & the Far East.
▪ **Laboratory technicians-** niche areas including technicians working with customers to develop products most suitable for markets.
▪ **Production/supervisory management,** process control software engineering & upskilling operatives & supervisory level staff.
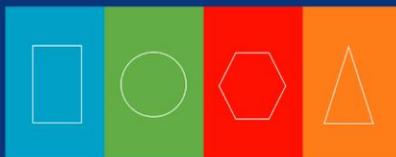
4.   Skills to Trade Internationally – *across all sectors*

EGFSN Report: Key Skills for Enterprise to Trade Internationally (2012)[8]

4.1   Skills for International Trade

There is a consensus that Ireland's economic recovery will necessarily be export-led. Economic forecasts anticipate continuing growth in Ireland's export position. There is potential for foreign affiliates and indigenous companies to further grow existing markets in the UK, US, and the Eurozone and to develop new growth markets including China, Brazil, Russia, India and South Africa (BRICS) and the Middle East. To export successfully Irish companies must offer innovative, competitively priced products and services that meet the needs of international customers.

Foreign language skills and cultural awareness are complementary to other skills such as business, science, engineering and technology. Jobseekers with these combined skills are in increasing demand by employers. European languages will continue to be important, especially in the ICT, Life Sciences, Engineering, Cleantech and Food sectors. The requirement for multilingual skills is increasing each year. The skills and competencies required by enterprise to drive trade and export performance, in addition to the skills needs of the particular sector the enterprise belongs to e.g. manufacturing (Chapter 3) and the relevant Cross-Enterprise skills needs (Chapter 10) are outlined in Table 4 below:
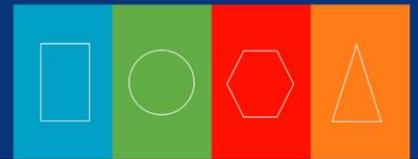
Table 4.1: Skills for International Trade

Skills for International Trade
▪   **Foreign Language Proficiency/Cultural Awareness.**
▪   Global & International Management Skills **with foreign languages.**
▪   Business Development Managers (200 – 500) **with foreign languages.**
▪   Business Sales Executives (250 – 750) - International Sales Skills **with foreign languages.**
▪   International Marketing Skills incl. e-commerce & social media skills **with foreign languages.**
▪   Channel Marketing Skills – Identification/Support and Management **with foreign languages.**
▪   Customer Service/Support Skills (200-500); **with foreign languages.**
▪   Product/Service Design Skills.
▪   Fulfilment – Distribution & Installation Skills.

4.2   Foreign Language Skills and Cultural Awareness

Foreign languages, sales, marketing and soft skills are the main skills identified as needed to drive trading and export market performance in the years ahead. Foreign language skills that are in demand include European languages (German, French, Spanish, Italian, Portuguese, the Nordic languages) and Chinese.

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[8] http://www.skillsireland.ie/publication/egfsnSearch.jsp?ft=/publications/2012/title,9402,en.php

Multi-lingual skills arise as skills shortages in the EGFSN National Skills Bulletin each year. Ireland needs to build-up a multi-lingual workforce to be able to compete in an increasingly globalised marketplace and to increase export penetration in non-English speaking markets. Whilst many positions require a high level of language fluency, conversational level can also be valuable **especially for Irish-owned SMEs selling into non-English speaking markets**.

Provision to boost the supply of foreign language skills should include contextual language learning for specific purposes, such as for managers, engineers and international marketing and sales professionals.

Foreign language skills and cultural awareness are complementary to other skills such as business, science, engineering and technology. Jobseekers with these combined skills are in increasing demand by employers. European languages will continue to be important, especially in the ICT, Life Sciences, Engineering, Cleantech and Food sectors. The requirement for multilingual skills is increasing each year. Persons with language proficiency in any of the languages in demand could upskill by undertaking a business or international selling course.

Springboard can have a direct impact on international selling courses by providing international selling courses to unemployed persons who already had a proficiency in foreign languages, primarily European languages (French, German, Spanish, Italian and the Nordic languages). Alternatively Springboard can develop language proficiency to a business proficiency level on international selling courses. The focus on these two approaches is different. The former, which is likely to be the more efficient option, would be upskilling those already with a language proficiency and the latter, to develop the language proficiency within the duration of the Springboard course.

Job opportunities arising within exporting companies which could be filled through tailored skills conversion programmes, developed in partnership with industry. It is recommended that Springboard should provide courses as follows:

Current & Future Skills Needs for Enterprise to Trade Internationally

- **Customer Sales/Service Support WITH Foreign Languages** to a <u>business proficiency level</u>* (NFQ Levels 6/7) ~ **500 places**. Specifically German, French, Spanish, Italian and Dutch and the Nordic languages (Levels B1, B2 & C1 on the six level Common European Framework of Reference for Languages for grading an individual's language proficiency).

- **International Sales Professionals WITH Foreign languages** to a <u>business proficiency level</u>* (NFQ Levels 6/7/8) – **235 places**. Specifically German, French, Polish and Russian (Levels B1, B2 & C1 on the six level Common European Framework of Reference for Languages for grading an individual's language proficiency).

- **International Project Management** (NFQ Levels 7/8) - **40 places.**

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* <u>All</u> the <u>Customer Sales/Service Support and International Sales Professionals courses</u> need to be provided <u>WITH a Foreign language</u>. It is important to ensure that the language component is of sufficient length and intensity to enable the participant to achieve the requisite business proficiency level. It may be preferable for such courses to be provided jointly by both the "technical/business" department and a language department to ensure the desired outcome.
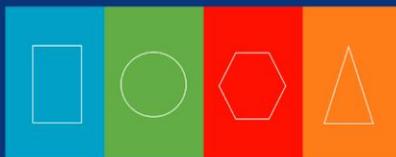
5. Skills for International Financial Services

EGFSN Report: _Future Skills and Research Needs of the International Financial Services Industry_ (December 2007)[9]

Even though the EGFSN report _Future Skills and Research Needs of the International Financial Services Industry_ (December 2007) on Skills requirements in the International Financial services sector dates back as far as 2007, the skills areas identified above still hold true, as confirmed in discussions with IDA Ireland, trade association, businesses in the context of the development of the forthcoming Financial Services Strategy and from the shortages identified in the National Skills Bulletin[10] 2014. The International Financial Services (IFS) industry in Ireland is undergoing a process of evolution. The IFS sector, which is a sub sector of financial services, has grown dramatically in Ireland over the last two decades. Impressive overall sectoral growth at a global level is also replicated in the individual sub-sectors in Ireland, namely the banking and capital markets sub-sector, the investment management sub-sector and the insurance sub-sector both life and non-life insurance. International financial services companies continue to view Ireland as an attractive investment proposition. Skills currently in demand are as follows:

Table 5: Skills for International Financial Services

Skills for International Financial Services
▪ **Process innovation and product development** for the funds industry.
▪ **Accountants** with experience for financial services, in particular **fund accounting;**
▪ **Investment Fund** Management.
▪ **Regulation and Compliance** to include: ▫ depositary, risk and middle office.

▪ **Risk Analysts** with expertise in:
  ▫ Data analysis and Data visualisation,
  ▫ Quantitative modelling;
  ▫ Big data web analytics; and
  ▫ Forecasting, Evaluation and reporting.

▪ **Project management**:
  ▫ Project management procedures and techniques (PRINCE2 (Project Management in Controlled Environments 2) or Project Management Institute (PMI) Certification);
  ▫ Project planning and control;
  ▫ Quality management; and
  ▫ Earned value analysis.

▪ **Hybrid technologists** – business analysis with IT/systems skills.
▪ **High-level ICT Skills** and **Big Data and Analytics**. (ref – Chapters 1 & 2).
▪ **Multi-lingual skills** across many occupations.

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[9] http://www.skillsireland.ie/publication/egfsnSearch.jsp?ft=/publications/2007/title,2515,en.php

[10] http://www.skillsireland.ie/media/23072014-National_Skills_Bulletin%20_2014--Publication.pdf
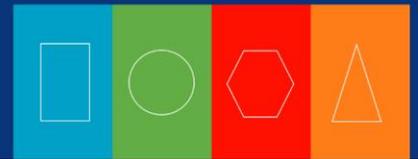
The high-level ICT skills areas in demand as described in chapter 1 and the Big Data & Data analytics skills needs in chapter 2 apply also to the financial services sector, which also has strong ICT and big data and analytics requirements. In this context, measures to address ICT and data analytics shortages, similarly apply to the Financial Services sector, aside from the specific financial skills in demand that are identified in Table 5 above.

In order to ensure the programmes are relevant to the sector and will meet current and future business needs it is strongly advised that engagement take place with relevant industry associations /financial institutions. These include:

- Banking & Payments Federation Ireland (BPFI), (formerly the Irish Banking Federation (IBF)/ Federation of International Banks in Ireland (FIBI)) – www.bpfi.ie
- Financial Services Ireland, (FSI) – www.fsi.ie
- Irish Funds Industry Association, (IFIA) - info@irishfunds.ie
- Dublin International Insurance & Management Association (DIMA). www.dima.ie
- Insurance Ireland – www.insuranceireland.eu

Job announcements:

A list with hyperlinks for the IDA and Enterprise-Ireland job announcement since Jan 2013 is given in Appendix 1. This is a useful resource for providers to ascertain who might be interested in partnering in a Springboard proposal.
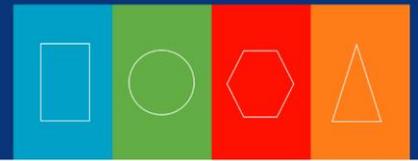
6.   Skills for Construction

Report: <u>Ireland's Construction Sector: Outlook and Strategic Plan to 2015 – Forfás, 2013</u>[11]

The construction sector has a dual role in Ireland's economy - as a sector in its own right and one that provides and maintains the infrastructures and buildings on which every other industry and society depends. In Q3 2013 it employed over 105,400 persons, regionally distributed across a variety of occupations and skill levels, accounting for 5.5% of national employment. Between Q4 2011 and Q4 2012 employment contracted 4.3%, which was significantly lower than in preceding years. Construction by its nature is a cyclical industry, aligned with economic performance generally. Over the short-term recovery in the sector will be slow. However, the trajectory is upwards. Employment levels will grow in line with increased activity although employment figures will not reach the levels recorded at the peak of the boom in 2007 as these were artificially inflated.

The dramatic contraction of the domestic construction industry has changed the construction skills landscape utterly. It is plausible that the sector will encounter skills shortages at a future point in time as a result of the current supply-demand configuration[12]. There are growing concerns that the industry in Ireland is already short on capacity to deliver, and that skills shortages of specific experienced professionals will become a challenge in the context of a return to growth.

In the short term the **occupational distribution** of the construction sector is **expected to shift slightly further towards managers, non-wet trades** (e.g. electricians, fitters, plumbers and welders) and construction operatives, and away from some wet trades (e.g. bricklayers & plasterers) to reflect a greater balance between residential and other construction activities than those observed during the housing bubble.

Developments in the green economy, including transposition of EU Directives geared towards meeting Climate Change 2020 targets are generating **on-going need for up-skilling** across the sector.

The **drive to internationalise has exposed capability issues** amongst an industry and its employees who have to date been oriented towards the local market. Competing internationally demands a high degree of professionalism overall, which extends across business processes, customer relationship management, financial management, project management and regulatory compliance.

The construction sector in a global context has been slow in shifting from traditional modes of working to exploit the **full potential of ICT**. The sector in Ireland reflects this trend and is characterised by low and slow ICT take-up and awareness, especially in terms of utilising ICT for more sophisticated e-business applications and amongst SMEs[13].

In order to restore activity to sustainable levels a number of challenges will need to be addressed. These include:

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[11] http://www.forfas.ie/publication/search.jsp?ft=/publications/2013/Title,10996,en.php
[12] For example a survey of graduate employment trends in construction and property surveying undertaken by the Society of Chartered surveyors Ireland indicated that the number of new graduates emerging from property and construction related courses will soon fall short of demand, Graduate Employment trends in Construction and Property Surveying, SCSI, 2012
[13] Finding a middleware ICT solution for the Irish construction SME sector, Hore, A.V., Redmond, A. & West, R., RICS publication, Sept, 2010
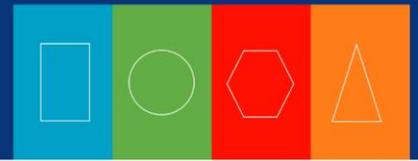
- The continued **low take-up of ICT** within the sector. This is an emerging competitive disadvantage in project delivery due to slow adoption of process improvement (e.g. Lean) and productivity enhancing **Building Information Modelling (BIM) systems**;

- Up-skilling of a broad range of construction trades. This will be required so that the sector can take advantage of **green economy opportunities**, and enable compliance with transposed EU Directives relating to climate change targets etc.; and

- **Management capability** challenges relating to running and managing a business in the face of reduced demand and/or heavy indebtedness. In addition there will be a need for a continued focus on the skills required for internationalisation of the sector.

Building Information Modelling (BIM)

With continued advances in technology (especially IT interoperability), Building Information Modelling (BIM) has become a powerful tool in driving efficiencies and increased productivity in construction and as a result its adoption is growing. The significance of BIM is reflected by the fact that many Government bodies are now stipulating that BIM be deployed in the delivery of key public works projects (e.g. Finland, Denmark, Norway, US, UK[14]). The reality is that the industry is moving towards a situation where BIM is becoming an essential requirement internationally[15]. The implications for Irish construction are clear, unless construction contractors and service providers are able to work in a BIM environment they are likely to find themselves at a serious competitive disadvantage, particularly in overseas markets.

The 'Greening' of Construction

EGFSN report: Future Skills Needs of Enterprise within the Green Economy in Ireland (2010) [16]

The 'greening' of construction is proceeding at a rapid pace. Progressively higher environmental standards are becoming legal requirements in the context of EU climate change targets and associated Directives. Remaining competitive in construction means keeping up with and more often than not, exceeding environmental standards to meet increasing demand for greener construction products and services from the market generally. All of this has a consequential impact on skills within the sector.

In its report the EGSFN undertook an analysis of the future skills needs of enterprise within the green economy, which served to underline the pervasiveness of the green skilling needs, across emerging 'green' sectors as well as for existing activities (including construction). More recently, under the EU *Build-Up Skills Initiative* (BUSI)[17], a coalition of academics and industry representative bodies undertook a comprehensive analysis of skills development requirements in response to the green revolution in construction. The report contends that the move to a building standard of near zero carbon is as fundamental a change in approach as the construction industry has experienced in

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[14] The UK Government will require fully collaborative 3D BIM (with all project and asset information, documentation and data being electronic) as a minimum by 2016, and has established a Client BIM Mobilisation and Implementation Group to drive adoption across government, *Government Construction Strategy*, Cabinet Office, May 2011

[15] Constructing the Business Case: Building Information Modelling, Building Standards Institution, 2010

[16] http://www.skillsireland.ie/publication/egfsnSearch.jsp?ft=/publications/2010/title,7063,en.php

[17] The Build-Up Skills Ireland (BUSI) Project is part of the EU Build-Up Skills Initiative, supported through the Intelligent Energy Europe programme, which aims to support the training and up-skilling of craftspeople involved in the construction sector. The main driver for the initiative is to ensure that there are sufficient numbers of highly skilled construction workers which can assist Ireland, and Europe, to meet the 2020 Energy Targets.
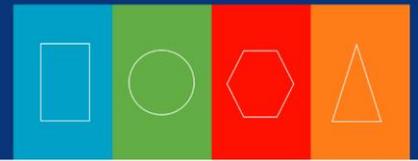
many years. What has been previously considered a niche market for 'green buildings' or 'eco construction' is rapidly moving towards being the norm and all workers involved in the construction process will need to be equipped with the skills and knowledge to deliver to the green requirements of the sector.

Management capability

The relationship between effective management practice and ultimate business performance is irrefutable. Highly proficient leadership, with ambition, vision and a strong management team is fundamental to identifying and anticipating changing market dynamics and to fully understand customer needs[18]. Enterprise Ireland has worked very closely with the sector over the past 2-3 years in particular to augment management capabilities within the Irish construction sector. There is scope for further engagement by the sector in management development programmes and recruitment of experienced management.

Chartered Surveyors

With the upturn in the economy there is an anticipated expansion of the construction sector in addition to pressure from other expanding sectors seeking office space, e.g. ICT and Biopharma-Pharmachem. It is also anticipated there will be an increasing demand for surveying services expanding to international markets with the increased emphasis of internationalisation of the construction sector.

Report: <u>AECOM Ireland Annual Review 2014</u>[19] in particular pages: 14, 20 and 21.

Chartered Surveyors are an integral part of the construction industry and are highly trained and experienced professionals that are typically employed throughout the Construction and Property sectors. The more popular specialities are:

- **Quantity Surveyors:** advise on the costs of developing all types of buildings and infrastructure;
- **Property Surveyors:** provide professional expertise in the valuation, management, estate agency and letting and sale of residential and commercial property.

There are 4,500 members of the Society of Chartered Surveyors Ireland, approximately 1,300 of which are quantity surveyors. The industry is already experiencing a shortage of chartered surveyors working in the field of property. While currently there is no shortage of construction surveyors it is anticipated that there will be a shortage in 1-2 years, although some of this shortage could be addressed by returning emigrants as the occupation has seen high emigration.

In summary the skills necessary to address the challenges and restore construction activity to sustainable levels are outlined in Table 6 below:

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[18] Making it Happen: Growing Enterprise for Ireland, Forfás, 2010
[19] http://www.aecom.com/deployedfiles/Internet/Geographies/Europe/Document%20Library/AECOM%20Annual%20Review%202014.pdf
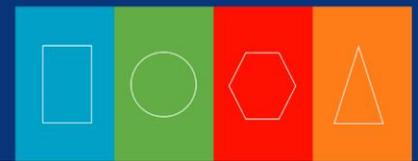
Table 6: Skills for Construction

Skills needs for the Construction Sector
▪ Use **of ICT** within the sector in particular **Building Information Modelling (BIM) systems.**
▪ **Lean Construction** process improvement techniques.
▪ Knowledge of **Building Regulations** and the ability to manage the implementation of: ▫ Building Regulations 1997 – 2014;   ▫ Building Control Amendment Regulations 2014 and the associated requirements to ensure compliance with quality and procedures.
▪ **Advanced welding techniques** – which is particularly relevant to the pharmaceutical and food industry construction projects.
▪ Up-skilling of a broad range of construction trades will be required so that the sector can take advantage of **green economy opportunities**, and enable compliance with transposed EU Directives relating to climate change targets etc.; in particular: ▫ Solar PV (Photo Voltaic) – planning, design and installation.
▪ **Management capability**:   ▫ Planning and prioritising;   • Assertiveness skills/Conflict resolution/decision-making/personnel management.   ▫ Project Management and teamwork;   • Supervisory skills/project lifecycle and managing sub-contractors.   ▫ Communication skills;   • Report writing/bringing on others/dealing with clients and design teams.   ▫ Commercial awareness skills;   • Business acumen/managing people, materials and money.
▪ Skills required for **internationalisation** (see chapter 4 –Skills to Trade internationally).
▪ **Chartered Surveyors,** in particular: ▫ **Quantity Surveyors;** and   ▫ **Property Surveyors**.

Education providers are encouraged to make contact with the Construction Industry Federation www.cif.ie and the Society of Chartered Surveyors www.scsi.ie in order to engage with the industry to develop the courses that will best meet the industry's needs.
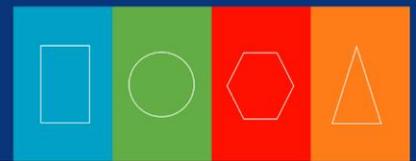
7. Entrepreneurship – *across all sectors*

The Government stated in the 2014 Action Plan for Jobs that its ambition is for Ireland to be among the most entrepreneurial nations in the world and acknowledged as a world-class environment in which to start and grow a business. Entrepreneurship is a fundamental driving force in any economy and with the unemployment challenge that Ireland is currently facing, growing the number of entrepreneurs and start-ups is hugely important for Ireland's economic development. Not only is entrepreneurship a major innovation and change agent for society, it is also the number one producer of jobs in all leading developed economies in the world, with 67% of all new job-creation coming from start-up businesses in the first five years of their existence.

The Global Entrpreneurship Monitor (GEM) results in recent years had shown decling trends in Ireland entrepreneurship potential and entrepreneurial base. However, the 2013 GEM report revealed a significant improvement in attitudes towards entrepreneurship, with 50% of Irish adults considering entrepreneurship to be a good career choice compared to 45% in 2012. Ireland also improved its position from 19th to 17th on the Global Entrenerushir Development Index (GEDI) in the most recent GEDI report.

In January 2014 the Entrepreneurship Forum, established by the Government, launched its report "*Entrepreneurship in Ireland – strengthening the start-up community*"[20] which fed into the Governments's "*National Policy Statment on Entrepreneurship in Ireland*"[21] and launched in October 2014. It is the first time an Irish Goverment has published a comprehensive national Strategy for Entrepreneurship and is an ambitious plan to to increase the numbers of quality startyups in Ireland over the next five years.

The objectives of the Entrepreneurship strategy are essentially centred around three distinct aims two of which are directly pertinent to Springboard, namely:

1. Building the pipeline – increase the numbers of entrepreneurs, who will actively engage in creating high quality business start-ups and jobs across the country; and

2. Building the entrepreneurial capability – develop entrepreneurial skills among the general population and nurture entrepreneurial thinking and talent.

Sprinbgboard provides an ideal vehicle for entrepreneurs, Local Enterprise Offices (LEOs) and education providers to work together to develop programmes which will simultaneously encourage the unemployed to become entrepreneurs and to provide them with the knowledge and skills necessary to start up a business.

The skills required of an entrepreneur are outlined in Table 7 below:

Table 7: Entrepreneurship Skills

Entrepreneurship Skills
Interpersonal Skills: e.g. Leadership & Motivation, Negotiation & Management.
Creative & Innovation Skills: e.g. creative thinking, problem solving and recognising opportunities.
Practical Skills: e.g. planning & organising, business knowledge, sources of finance, networking.

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[20] www.djei.ie/enterprise/smes/EntrepreneurshipForumReport2014.pdf
[21] http://www.djei.ie/enterprise/smes/PolicyStatementEntrepreneurshipinIreland.pdf
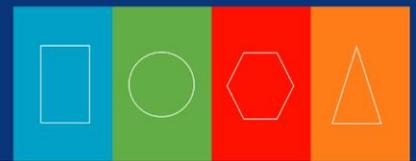
8.   Creativity, design and innovation – *across all sectors*

EGFSN report: <u>Skills in Creativity, Design and Innovation (2009)</u>[22]

Creativity, design and innovation are key drivers of productivity improvement and are needed in all industries and in all occupations. With regard to the EGFSN report the terms were understood as follows:

- **Creativity** is imagination applied for the purpose of creating economic value and is generally about finding new ways to combine existing ideas to do something new.

- **Design** is the process of moving from an initial creative idea to developing a new or changed product, service or process that can be brought to market or implemented internally within a business.

- **Innovation** is change that created economic value, generally through creating a new or improved product or service; improving a way a business operates internally or how it relates to the business system of which it forms a part to bring greater value to its customers.

Internationally there is an increasing policy focus on leveraging design as a driver of innovation and arising from the Global Irish Economic Forum in 2013 the Irish Government designated 2015 the Year of Irish Design (ID2015). This presents an opportunity to promote and develop Ireland's capabilities in business-related design across all sectors of the economy and to improve capacity for quality design across the enterprise sector. In particular design is critical to success in new and emerging sectors like medical devices, ICT, gaming, mobile communications and media.

Given the talent and reputation for creativity in Ireland the Irish design sector has the potential to act as a key driver in the Irish economic recovery and innovative growth through the 21st century. Creative qualifications are highly sought-after by the best global companies because creative graduates are able to think independently and critically; work well as part of a team; multi-task; and generate new ideas through debate and discussion. By integrating design-led thinking into Ireland's drive towards innovation, it can ensure growth and prosperity in the decades to come.

Innovation is essential to the sustained prosperity of the Irish economy, but discussions on how to foster an innovative mindset in education has to date focused on Science, Technology, Engineering and Maths – the STEM subjects. Design thinking is by its very nature innovative: it involves examining how things work and how they can be improved, a process that continually generates new ideas and combinations. Investment in design education will ensure that this creative mindset can contribute to driving innovation across disciplines and throughout the Irish economy. Critical to this is integrating design thinking into all third level education to encourage creativity and interdisciplinary collaboration and to increase collaboration between education and industry

Creativity is probably difficult to pin down in skills terms but it is surrounded by identifiable and definable skills that are necessary for creativity to flourish. While there is some variation between occupations and across industries, some common skills are required to enhance creativity, design and innovation. These are outlined in Table 8:

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[22] http://www.skillsireland.ie/publication/egfsnSearch.jsp?ft=/publications/2009/title,4897,en.php
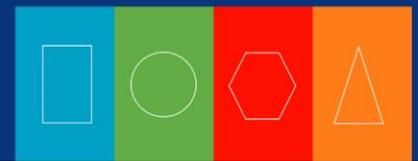
Table 8: Skills for creativity, design and innovation

Creativity, design and innovation
▪ **depth of expertise** and knowledge.
▪ the ability to meet customer requirements – which means **listening to the customer**, being aware of country specific regulations and specifications, and ensuring that the R&D/product development process receives real time feedback on required improvements/adaptations.
▪ the capacity to **work well with people** with from **across other disciplines** and expertise;

▪ strong **generic skills** including:
   ▫ problem solving, information processing and critical thinking;
   ▫ communication skills;
   ▫ team-working.

▪ Innovation management.

There is a close relationship between entrepreneurship, and creativity and innovation. Entrepreneurial activity can be improved with an increased emphasis on creativity and design turning inventions into innovations for markets and customers.
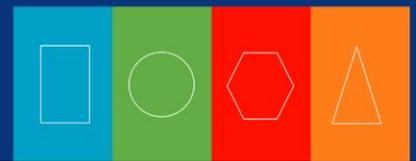
9.   Freight Transport, Distribution and Logistics

There are two areas of Freight Transport, Distribution and Logistics (FTDL) for which a Springboard programme provision at NFQ Level 7 would be suitable. These are for:

Transport and Distribution Managers – approx. 40 places;

Storage and Warehousing Managers – approx. 40 places.

This training would suit those unemployed persons who had previously worked in a managerial/supervisory role within the FTDL sector. It would be important to secure the collaboration of enterprises in the development of the programmes and for the provision of work experience in either a warehousing operation or freight transport depot.

9.1   Transport and Distribution Managers

The content of the training for transport and distribution managers should cover both domestic and international freight-by the various modes – road, air, sea and rail.

An important topic is the application of new technology for the optimisation of route planning and use of track and trace technology.

The development of soft skills including relationship management, people skills, and communication skills should be integrated into the course – especially important given the role's responsibility for the management of staff and engagement with customers. An outline of the required skills for this role is given in the following table.

Table 9.1: Skills needs for Transport and Distribution Managers

| Skills needs for Transport and Distribution Managers |
|---|
| ▪ Effective at organising, directing and co-ordinating the activities and resources necessary for the safe, efficient and economic movement of passengers and freight by road, rail, sea and air transport. |
| ▪ Plans the optimum utilisation of staff and operating equipment, and co-ordinates maintenance activities to ensure least possible disruption to services. |
| ▪ Competent at examining traffic reports, load patterns, traffic receipts and other data, taking appropriate action where necessary. |
| ▪ Managing the movement, handling and storage of freight in transit, and reviewing space utilisation, staffing and distribution expenditure to determine future distribution policies. |
| ▪ Ensures that all team members comply with statutory regulations. |
| ▪ Supervises day-to-day activities in the transport operation. |
| ▪ Good customer relationship skills with the ability to resolve any complaints and problems quickly and effectively. |
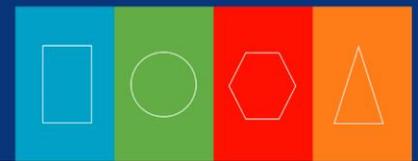
9.2   Storage and Warehousing Managers

The content of the training for Storage and Warehousing managers should cover the requirement of cold storage warehousing for high value food stuffs and pharmaceutical products and the specific security screening and aviation related requirements of aviation warehousing.

An important topic is the application of new technology for stock and order control and the scheduling of the inward and outward movement of goods.

The development of soft skills including relationship management, people skills, and communication skills should be integrated into the course – especially important given the role's responsibility for the management of staff and engagement with customers. An outline of the required skills for this role is given in the following table.

Table 9.2: Skills needs for Storage and Warehousing Managers

Skills needs for Storage and Warehousing Managers
▪ Ability to plan, organise, direct and co-ordinate the activities and resources necessary for the safe and efficient receipt, storage and warehousing of goods and for the maintenance of stocks at an optimal level.
▪ Works effectively with other departments to determine the materials and other items required for current and future production schedules and sales commitments.
▪ Ability to review, develop and implement stock control, handling and distribution policies to maximise use of space, money, labour and other resources.
▪ Competent to develop and manage budgets and preparing reports on expenditure.
▪ Decides on storage conditions for particular items, allocates warehouse space and arranges for regular stock inspections to detect deterioration or damage.
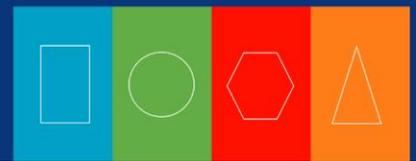
10. Cross Enterprise Skills Needs

A number of areas of skills demand have emerged in EGFSN reports that are apparent across all sectors. These include:

- High-level ICT Skills;
- Data Analytics/Data Savvy skills;
- Skills for International Trade;
- Entrepreneurial skills;
- Skills for creativity, innovation and design.

These Cross-Enterprise skills in some cases can be dealt with as part of the relevant sectoral programmes, e.g. ICT and Data Analytics skills, so that they can be practically applied and developed. Skills that combine scientific/technical expertise with **generic skills** are necessary for interaction with customers, suppliers, regulatory and funding bodies.

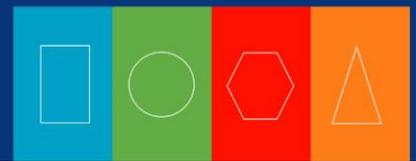## 10.1   Other Skills needs across ALL Enterprise Sectors

Almost all sectors of industry are becoming more knowledge-intensive. This involves a change in the types of skills required, with a rise in the importance of generic skills, including the ability of individuals to work more autonomously, be self-managing, work as part of flexible teams, adapt to change, solve problems, think creatively and engage with innovation as a continuous process.

The EGFSN has identified the key and most widely shared elements that should be included in a generic skills portfolio as:

- Management Skills;
- People-related skills — communication, interpersonal, team-working, customer-service skills;
- Conceptual/thinking skills — collecting and organising information, problem-solving, planning and organising, learning-to-learn skills, innovation and creative skills.
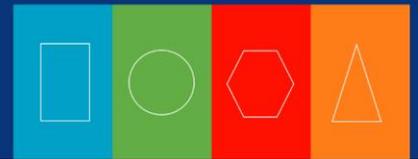
In addition to the cross-enterprise skills dealt with in earlier chapters, there are a number of other business skills, some of which are confined to niche and specialist roles, and others are generic 'soft' skills, but all are important across all sectors.

The objective is not to address these skills separately but to embed them within programmes so that they can be practically applied and developed.

Table 10: Other Skills for ALL Enterprise Sectors

Other Skills needs across ALL sectors

▪ **Management skills** (not covered elsewhere in this document) e.g.:
   ▫ Strategic Business Planning & Development;
   ▫ Resource & Change management;
   ▫ Project & Contract management;
   ▫ Sales, Marketing & Operations management; and
   ▫ Global partnership management.

▪ **Logistics & Supply Chain Management;**   ▫ Purchasing managers, especially in relation to global supply chains.
▪ Generic skills such **communications, team working** and **effective networking**
▪ **Business sales executives,** mostly in technical products sales, B2B sales in IT, and the medical/pharmaceutical sectors.
▪ **Product and marketing managers** and executives, including some shortages of these skills combined with language skills, especially German.
▪ **Digital marketing.**

Appendix 1. Links to the Enterprise Development Agency's – IDA Ireland's and Enterprise Ireland's Job Announcements in 2014 - 2015

IDA Ireland Job Announcements for 2014 – 2015
2015: Jan

- The Viagogo Group announces plans to double workforce in Ireland at opening of new Operations Centre in Limerick

- AMAX Celebrates Grand Opening of Ireland Manufacturing Facility

- Zimmer expands Irish Manufacturing presence

- ABEC Inc. to establish European HQ and Manufacturing Centre in Fermoy, Co. Cork, creating up to 100 new jobs

- Guidewire Software Announces Expansion at its Dublin Software Centre

2014: Jan - Dec

- Aspen Pharma creates 42 new jobs at its Citywest European Operations Centre

- Tyco to Open Business Services Centre in Cork – Potential for 500 Jobs

- IBM Announces 40 jobs in a multilingual Software Services Operations Centre in Ireland using cloud to optimise client engagements

- Global Reviews to create 30 jobs in Cork

- Taoiseach announces 150 new jobs for HedgeServ in Cork

- Alexion Pharma acquire site in Athlone - 40 new jobs

- New Relic create 50 jobs with the establishment of its EMEA HQ in Dublin

- SEKO MedTec Solutions create 30 jobs with the establishment of a European Control Centre

- NeoMed, Inc. create 22 jobs with the establishment of an EMEA HQ

- CapSpire create 20 jobs with the establishment of an international office which will allow the firm to better serve its existing European clients

- Starting Dot creates 10 jobs with the establishment of a Finance and Operations Centre

- VCE create 150 R&D positions at its International HQ

- One Big Switch create 50 jobs in its European HQ

- Kemp Technologies create 50 jobs in its EMEA HQ

- Alexion Pharmaceuticals Unveils Plans for its Future Expansion in Ireland and the Hiring of Approximately 200 New Employees

- Airbnb create 100 jobs with the expansion of its operation

- Survey Monkey creates 50 jobs with the opening its office for a wide range of roles including account and customer support
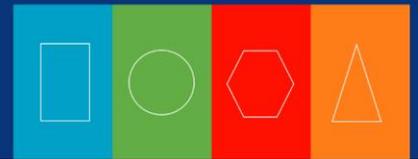
- Enercon creates 22 jobs through the establishment of European Sales Office
- Ethicon create 270 jobs through its investment in its manufacturing facility
- BioMarin create 50 jobs with the expansion of their operations
- Becton Dickinson celebrate 50 years in Drogheda with 20 new jobs and a €16M investment
- Oxford International create 57 jobs in the expansion of its operation in Cork
- Indos create 10 jobs in the expansion of operations in Wexford
- Ericsson create 120 highly skilled roles ranging from software developers to programme managers and consultants
- SAP 60 New R&D Roles and 200 New Technology Support roles in their operation Citywest
- DMS Offshore investment Services creates 50 jobs in fund governance and risk management at its European operations centre in Dublin
- HP creates 100 jobs with the investment in OpenStack Cloud Services at R&D operation in Galway
- Yelp creates 100 jobs with the opening of a new EHQ
- Workday create 200 jobs with the expansion of its workforce over the next 3 years
- Smartbear creates 100 jobs with the establishment of EHQs
- Paypal creates 400 jobs with the expansion of its operations centre in Dundalk
- Innovative Interfaces creates 25 jobs with the expansion of its EMEA HQ in Dublin
- AdRoll creates 100 jobs with the expansion of its European operations
- Viagogo Group creates 100 jobs with the establishment of operations centre
- AlienVault creates 40 highly skilled jobs with the establishment of a sales and technical support centre
- Internal Results creates 20 jobs with the establishment of a Customer Support Centre
- Itron Inc creates 40 jobs with the establishment of a Global Services Centre
- Sidetrade creates 90 jobs with the establishment of Shared Services Centre
- AIG creates 20 jobs with the establishment of a EMEA Treasury Centre
- Optel Vision create 140 jobs with the establishment of an EMEA Manufacturing and Operations centre
- Solarwinds create 100 jobs with the expansion of their operations in Cork
- Filtertek creates 35 jobs with the expansion of their operations in Limerick
- Citrix creates 50 jobs with the expansion of their operations in Dublin
- Dell creates 50 jobs in the establishment of a new Commerce Services R&D Centre in Dublin
- Castlerea colour merchandising company Color Communications to add 20 jobs
- Groupon creates 200 jobs with the establishment of an Engineering and Marketing Centre
- Teleflex creates 100 jobs with the expansion of their operations in Athlone
- Open Text creates 105 jobs with the expansion of their Global Support Centre in Cork
- Clearstream creates 200 jobs with the expansion of their facility in Enniscorthy
- N3 Results creates 100 jobs with the expansion of its Dublin office
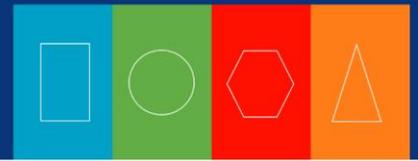
- Sprout Social creates 85 jobs by establishing a 2nd Dublin office to serve EMEA

- Simplivity creates 70 jobs with the establishment of a service and support centre for EMEA

- Udemy creates 50 jobs with its newly established EMEA operation centre in Digital Hub

- Boomerang Pharma creates 25 jobs with the establishment of a Dublin office to support increased demand for services in Europe

- SNP Communications creates 25 jobs with the expansion of its Dublin office

- Perseus Telecom created 25 jobs with the establishment of a proprietary Network Operations Centre

- Hedge Guard create 20 jobs with the establishment of an International HQ and Development centre

- Amazon create 300 jobs with the expansion of their operations in Dublin

- Valeo Vision create 140 jobs with the expansion of their operations in Galway

- Avaya create 75 jobs with the expansion of R&D facility in Galway

- Bristol Myers Squibb create 350 – 400 jobs with the construction of a new state-of-the-art, large-scale biologics manufacturing facility in Dublin.

- Nightowl Discovery create 25 jobs with the establishment of eDiscovery Centre of Excellence in Dublin

- Phenix Jewellery to establish an International Operations Centre in Galway creating 30 jobs

- Storyful To Expand with R&D Centre Creating 30 Jobs

- Investment by Information Technology Shared Services, a Division of Johnson & Johnson Services, Inc. Creates 100 new jobs in Limerick

- Calypso created 150 jobs with the establishment of a management services centre in Dublin

- Allianz create 100 jobs with the expansion of their operations in Dublin

- Nypro Healthcare wins Company of the Year at Irish Medical Technology Industry Excellence Awards

- Nelipak Healthcare Packaging announces expansion for Galway operation

## Enterprise-Ireland Job Announcements for 2013 – 2014

2015: Jan

- Enterprise Ireland's End of Year Statement 2014

2014: Jan – Dec

- Enterprise Ireland's End of Year Statement 2013

- Taoiseach-announces-50-new-jobs-at-Westbourne-IT-Global-Services

- 1850 new jobs to be created over next three years by 122 High Potential Start Up companies supported by Dept of Jobs through Enterprise Ireland – Minister Bruton

- Taoiseach-announces-19-high-tech-jobs-in-Mayo-company-CloudStrong

- Minister-Bruton-announces-40-new-jobs-as-Irelands-Diona-opens-Global-HQ-in-Dublin
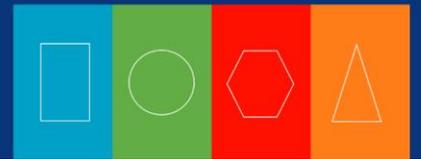
- Taoiseach-and-Minister-Bruton-Announce-350-New-Jobs-at-Voxpro
- Irish company VistaMed announces €7m investment and 125 new jobs in Carrick-on-Shannon and Roosky
- CarTrawler-To-Create-400-New-Jobs
- Irish-company-Ribworld-announces-100-new-jobs-as-part-of-major-investment-programme
- Irish-Company-FINEOS-announces-50-new-jobs-over-the-next-18-months
- Ammeon-announces-the-creation-of-30-high-value-jobs-in-Dublin
- CandD-Foods-open-state-of-the-art-facility-at-Edgeworthstown
- Danone Nutricia Early Life Nutrition concludes a €180m expansion programme with the opening of a €26m production line in Wexford
- TTM Healthcare Group, announces a major expansion of its Irish and international operations, creating 100 new jobs as part of a €5 million investment in its business.
- DPS Engineering celebrates 40 years of success with jobs announcement