

Guidance for Higher Education providers on current and future skills needs of enterprise

Springboard 2014 / ICT Level 8 Conversion Programme

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on Current and Future
Skills Needs of Enterprise**

Springboard 2014 and ICT Conversion Programme 2014



Table of Contents

Table of Contents.....	1
Executive Summary.....	2
1. Introduction.....	4
1.1 Engagement with Enterprise	4
1.2 Progression to employment.....	4
1.3 Structure of this Guidance Document	5
1.4 Trends in Employment for professionals & associate professionals, 2008 - 2012	6
2. ICT Skills.....	8
2.1 High-Level ICT Skills Needs across All Sectors of the Economy	8
2.2 NFOQ Level 8 Higher Diploma ICT Skills Conversion Programme	10
2.3 Springboard -NFOQ Levels 6 & 7 - ICT Courses.....	11
3. Manufacturing	12
3.1 All Manufacturing Skills.....	12
3.2 Engineering	14
3.3 Biopharma-Pharmachem	15
3.4 Medical Devices	16
3.5 Food & Beverages	16
3.6 Consumer Goods.....	18
3.7 ICT Hardware.....	18
4. Skills for Enterprise to Trade Internationally	20
5. Skills for International Financial Services	23
6. Cross Enterprise Skills Needs.....	25
6.1 Data Analytics.....	25
6.2 Entrepreneurial skills	26
6.3 Skills required for creativity, design and innovation.....	26
6.4 Business & Finance Skills.....	27
6.5 Core Management Skills	28
6.6 Generic Skills Portfolio - 'Soft' Skills	29
7. Skills for Construction.....	31
Appendix 1. Links to the Enterprise Development Agency's - IDA Ireland's and Enterprise Ireland's Job Announcements in 2013 - 2014.....	34



Executive Summary

The information contained in this Guidance Document gathers together the most recently available data concerning higher education level skills needs for enterprise suitable for the Springboard/Level 8 ICT Conversion Programme. It is a synthesis of the data from both recent reports published by the Expert Group on Future Skills Needs (EGFSN)/Forfás and consultations with industry bodies and the enterprise development agencies.

A key objective of Springboard is to enhance **collaboration** and engagement **between the enterprise sector and higher education providers in the design and delivery of programmes** to support job creation and expansion in line with the Government's Action Plans For Jobs.

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

- 1 High-Level ICT Skills needs - All Sectors
- 2 Manufacturing
- 3 Skills to Trade Internationally - International Sales and Customer Sales/Service Support with Foreign Languages to a business proficiency level
- 4 International Financial Services
- 5 Entrepreneurship

The report has six chapters each dealing with either a different enterprise sector or a set of skills needs common across all sectors. The Table below is a summary of the key current and future skills needs for a given sector or across all sectors suitable to be addressed through this current call.

Key areas of Focus for the 2014 Higher Education call for ICT Skills
NFQ Level 8 High-Level ICT Skills Conversion Programme - across All sectors
<ul style="list-style-type: none">▪ NFQ Level 8 ICT Conversion programme (minimum of 60 credits, 1 year full time, designed in conjunction with the industry) should contribute to the high-level ICT skills needs identified in Section 2 of this document.
Springboard (Level 6 & 7) ICT Skills - across All sectors
<ul style="list-style-type: none">▪ Springboard Level 6 - 60 Credit -Certificate Level or Level 7 - 60 Credit - Diploma Level programmes and should have an identified enterprise partner or local need and include a work placement component.



Key areas of Focus for Springboard 2014

Manufacturing - Engineering, Biopharma-Pharmachem, Medical Devices, Food & Beverages, Consumer Goods & ICT Hardware

- **Mechanical/Manufacturing engineers** - Process Automation & System Control - managing the interface of IT systems with factory systems and software applications for the management of Validation, Quality Assurance and Automation; Product Development & Design (140 places (approx.), NFQ Level 8).
- **Validation, Quality, Polymer, Supply Chain & Automation engineers** (50 places (approx.), NFQ level 9).
- **Polymers/plastics technicians** (place numbers to be decided with industry).

Skills to Trade Internationally - All Sectors

- **Customer Sales/Service Support WITH Foreign Languages** (750 places (approx.), NFQ Levels 6/7) (Specifically German, French, Spanish, Italian and Dutch).
- **International Sales Professionals - WITH foreign languages** (235 places (approx.), NFQ Levels 6/7/8) (Specifically German, French, Polish and Russian).
- **International Project Management** (40 places (approx.), NFQ Levels 7/8).
- **Foreign Language Proficiency/Cultural Awareness** for management positions (conversational German, French, Dutch, Swedish and Norwegian at Levels B1, B2 & C1 on the CEFR) International Sales.

International Financial Services

- **Process innovation and product development for the funds industry** and accountants with experience for financial services.
- **Regulation and Compliance** for financial services.
- **Financial services Project management** (e.g. PRINCE2 or PMI Certification).

Cross-Enterprise Skills - All Sectors

- **Data analytics - Big-data savvy roles**, (Springboard NFQ Diploma level 7 - 250 places (approx.), 60 credits. Jobseekers such as market research analysts, business and functional managers could upskill through NFQ level 7 programmes of 60 credits to develop an understanding of the value and potential for the exploitation of Data Analytics including Big Data.
- **Entrepreneurship**.

Construction

- **ICT & Building Information Modelling (BIM) Systems**.
- The '**Greening of Construction**' to meet higher environmental standards which are becoming legal requirements in the context of EU climate change targets.
- **Management Capability & Internationalisation**.



1. Introduction

The information contained in this document gathers together the most recently available data concerning higher education level skills needs for enterprise appropriate to the Springboard/NFO Level 8 calls. It is a synthesis of the data from both recent reports published by the Expert Group on Future Skills Needs (EGFSN)/Forfás and consultations with industry bodies and the enterprise development agencies. In addition to the skills needs identified in the EGFSN/Forfás sectoral reports such as *Addressing Future Demand for High-Level ICT Skills* (Nov 2013) and *Future Skills Requirements of the Manufacturing Sector to 2020* (Apr 2013) and *Assessing the Demand for Big Data and Analytics Skills in Ireland 2013-2020* (forthcoming), this guidance document also includes the findings from the EGFSN reports published annually, namely the *National Skills Bulletin*¹ (July 2013) and the *Vacancy Overview 2013* (forthcoming). These latter two reports are produced using data gathered by the Skills and Labour Market Research Unit (SLMRU) in Solas.

1.1 Engagement with Enterprise

It is worth stating at the outset that enterprise engagement is of pivotal importance to the progression of Springboard participants to employment. Springboard's objectives are as follows:

1. to enhance **collaboration and engagement between the enterprise sector and higher education providers in the design and delivery of programmes** to support job creation and expansion in line with the Government's Action Plans For Jobs;
2. to provide part-time & flexible education opportunities for unemployed people to upskill in areas where sustainable employment opportunities are likely to arise and to improve the prospects for the participant to progress to employment.

1.2 Progression to employment

The **optimal labour market outcomes** for participants under Springboard 2014 will be delivered by:

- Ensuring **programmes are relevant to enterprise skills needs** as identified by the EGFSN/Forfás 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; or
 - candidates with significant previous experience in the sector could proceed by advanced entry to programmes (recognition of prior learning); or
 - where specific skills gaps can only be addressed by upskilling individuals who have previous substantial work experience in the sector; and
 - 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.

¹<http://www.skillsireland.ie/publication/egfsnSearch.jsp?ft=/publications/2013/title,10965,en.php>



- 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 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.

1.3 Structure of this Guidance Document

There are two groupings of enterprise skills needs, namely:

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

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

- 1 High-Level ICT Skills needs - All Sectors;
- 2 Manufacturing;
- 3 Skills to Trade Internationally - International Sales and Customer Sales/Service Support with Foreign Languages to a business proficiency level;
- 4 International Financial Services; and
- 5 Entrepreneurship.

Chapter 2 - 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/Forfás reports - *Addressing Future Demand for High-Level ICT Skills (2013)* and *Addressing High-Level ICT Skills Recruitment Needs - Research Findings (2012)*. 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 3 - is about the **Manufacturing sector**, and identifies the skills needs across all manufacturing as well as the skills identified for the 6 sub-sectors researched in the EGFSN/Forfás report *Future Skills Requirements of the Manufacturing Sector to 2020 (Apr 2013)*, namely: Engineering, Biopharma-Pharmachem, Medical Devices and Food & Beverages, Consumer Goods and ICT Hardware

Chapter 5 - deals with the skills needs of the **International Financial Services** sector as identified in the EGFSN/Forfás report *Future Skills and Research Needs of the International Financial Services Industry (2007)* and focuses on the specific skills that are still in demand based on discussion with the enterprise development agencies and trade associations.



Chapter 6 - deals with the **Skills for Enterprise to Trade Internationally** as identified in the EGFSN/Forfás report *Key Skills for Enterprise to Trade Internationally (2012)*. They focus principally on Customer Sales/Services Support and International Sales Professionals both with Foreign Languages and international project management. Job opportunities across all sectors and the skills needed, including foreign languages, apply equally to manufacturing and services enterprises.

Chapter 7 - **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.

Chapter 8 - **Construction**, has been included this year with specific emphasis on Building Information Modelling now being increasingly stipulated by Governments 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.

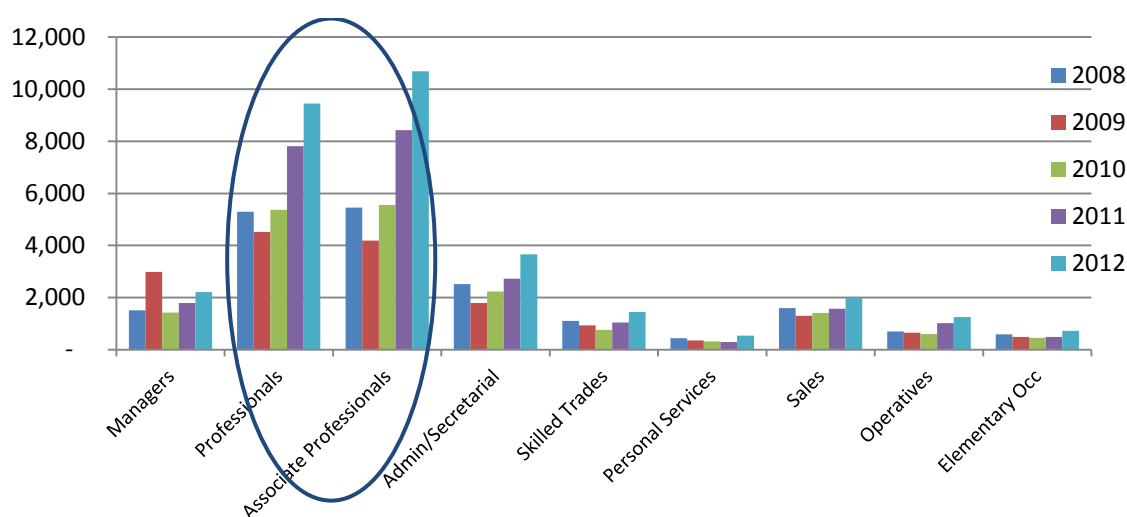
1.4 Trends in Employment for professionals & associate professionals, 2008 - 2012

A significant share of the job creation announcements in the media during 2012 were for professional and associate professional positions.

Figure 1.1 below demonstrates clearly that:

- 1 For vacancies on IrishJobs.ie between 2008 -2012 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, 2008-2012



Source: IrishJobs.ie



Job Announcements

Professionals and associate professionals are employed across all sectors of the economy. Most of the job announcements were in the IT, medical devices, pharmaceutical sectors, and to a lesser extent, green technology. The demand for professionals was particularly strong for

- Software engineers and developers;
- Research & development engineers and scientists (especially medical devices, food processing);
- Regulatory and quality assurance professionals (pharmaceuticals and IT);
- Electrical/electronic engineers (green energy and smart power generation; semiconductors);
- Production/industrial engineers (pharmaceuticals, medical devices, food processing);
- Life scientists, chemical/biochemical scientists and operation research scientists;
- Business analysts/ enterprise risk analysts;
- Finance, accounting and tax experts (IT, consulting, financial and manufacturing);
- Supply chain, programme and change management consultants.

A significant number of job opportunities for associate professionals had **language skills** as a requirement, such as German, the Nordic languages and French for roles in IT technical support, business analysts, risk management, claims and collections. Increasingly, **foreign languages** are seen as an **integral part of the skills portfolio** of candidates across a range of occupational groups and sectors.



2. ICT Skills

EGFSN/Forfás Reports:

[Addressing Future Demand for High-Level Skills \(2013\)](#)²

[Addressing High-Level ICT Skills Recruitment Needs - Research Findings \(2012\)](#)³

2.1 High-Level ICT Skills Needs across All Sectors of the Economy

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. The results from the EGFSN/Forfás study indicate 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 2018⁴ 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 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, 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 launched the *ICT Action Plan*⁵ (the next iteration is forthcoming). One of the key measures of the Plan was the NFQ Level 8 Higher Diploma ICT Skills Conversion Programme (818 places in 2012 and 770 in 2013).

The NFQ Level 8 ICT Conversion programme was designed in conjunction with the industry and is a one year full time course, with a minimum of 60 credits. The output from the ICT Conversion Programme should contribute to the high-level ICT skills needs identified in the following table and is additional to the supply from mainstream degree programmes. An output from Springboard Level 6-Certificate & Level 7-Diploma will also be required.

The current and future ICT skills needs are identified as follows:

² <http://www.skillsireland.ie/publication/egfsnSearch.jsp?ft=/publications/2013/title,11287,en.php>

³ <http://www.skillsireland.ie/publication/egfsnSearch.jsp?ft=/publications/2012/title,9406,en.php>

⁴ These figures do not include job churn job openings arising from the movement of workers between firms in the economy.

⁵ <http://www.education.ie/en/Publications/Policy-Reports/ICT-Action-Plan-Meeting-the-high-level-skills-needs-of-enterprise-in-Ireland.pdf>



High-Level ICT Current & Future Skills Needs

- **Software Engineers** for the **design and development** of applications & systems: Specific skillsets required are:
 - **Programming languages** - Java, JavaScript, C#, C++, C+++, Visual Basic; .Net; SQL data base; Perl, Ruby, Python, Objective-C, Objective - Orientated Programming (OOP);
 - Java knowledge combined with experience in Spring and Grails Frameworks; PHP knowledge;
 - **Web Development** - understanding of Web 2.0 development technologies, 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 (GSM), as well as high level skills in 3D animation;
 - **Enhancing end user experience** and usability (UX, UI, 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.
- **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 administration, authorisation mechanisms.
- **Telecommunications: 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.



High-Level ICT Current & Future Skills Needs

- **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 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 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 IT skills is forecast to be strong as organisations introduce new or migrate existing systems to increasingly sophisticated online and/or cloud platforms. Strong demand is confirmed in recent job announcements from IDA and Enterprise Ireland over the last year, which include:

- cloud computing (e.g. Feed Henry, Aditi Technologies);
- industry specific software applications development (e.g. food manufacturing (Opensky); insurance (Liberty Mutual Insurance), IT security (e.g. FireEye, Zurich IT & Security Services); Big Data (e.g. Quantcast); and
- IT user support (e.g. OnePage, Yahoo).

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 an NQF Level 8 Higher Diploma ICT Skills Conversion Programme.

2.2 NQF Level 8 Higher Diploma ICT Skills Conversion Programme

The NQF level 8 ICT Conversion programme is an intensive full-time programme of study with a minimum of 60 credits. It is targeted at jobseekers that 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 NQF level 8. The programme is designed around collaboration and engagement between the enterprise sector and higher education providers and includes a mandatory work-placement.

The ICT skills outlined in 2.1 should predominantly be addressed through the Conversion Programme in addition to the supporting technology skills for data analytics outlined below.



Data analytics

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. One of the categories of data-analytic professionals identified as suitable for this call is:

- **Supporting technology professionals**, with the skills to develop, implement and maintain the hardware and software required to make use of Data Analytics including Big Data.

In relation to the NFQ Level 8 Conversion call (60 credits), these programmes could be run for Data Analytics/Big Data Supporting Technology roles. The programme should be particularly 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.

Data Analytics - Supporting technology professionals Current & Future Skills Needs
<ul style="list-style-type: none">▪ 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 teamworking skills

2.3 Springboard - NFQ Levels 6 & 7 - ICT Courses

The ICT skills required across all sectors are predominantly at Level 8 and should be delivered through the ICT Conversion Programme but there is also a requirement for Springboard ICT Programmes for major awards at NFQ Levels 6 & 7 for potential job opportunities at that level, but also for providing progression opportunities to full NFQ Level 8 awards in computing/electronic engineering. In addition, programmes should have an identified enterprise partner or local need and include a work placement component.



3. Manufacturing

EGFSN/Forfás Report: *Future Skills Requirements of the Manufacturing Sector to 2020* (Apr 2013)⁶

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 Consumer Products and ICT Hardware.

This chapter summarises current and future skills needs for the manufacturing sector. Section 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 110 of these engineers will graduate from the 2013 Springboard programme. A further 140 will be required from the 2014 Programme.

The report also recommended that Springboard provide 200 **places on taught postgraduate** (primarily at NQF Level 9) courses specifically to address critical shortages across a number of engineering disciplines including **validation, polymer, quality, automation and supply chain engineering**. Approximately 150 of these places were delivered in 2013 and a further 50 will be needed in 2014.

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

⁶ <http://www.skillsireland.ie/publication/egfsnSearch.jsp?ft=/publications/2013/title,10363,en.php>



All Manufacturing Current & Future Skills Needs

- **Mechanical Engineers** (140 graduates at NQF Level 8) with:
 - **Process Automation & System Control Skills**; and
 - **Product innovation skills - product development & design**
- **Engineers** (50 graduates at NQF 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**.
- **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 technician level, is illustrated in recent job announcements in medical devices and pharmaceuticals manufacturing (e.g. DePuy Synthes (Ireland) a Johnson & Johnson Company, Regeneron Pharmaceuticals, IMSTec GmbH); food manufacturing (e.g. Glanbia).



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.

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. Employment in the broad engineering sector has decreased substantially since 2007, falling from over 35,000 to 26,000 in 2011. Much of this employment decline is associated with the downturn in the construction sector (for example, reduced demand for machinery and materials). However, 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:

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. It contributes in a major way to Ireland's export base with exports valued at €55 billion⁷ in 2012. 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. This is due to recent, large scale investments in the area of bioprocess-based manufacturing and sterile fill finish of biopharmaceuticals (proteins & vaccines) (e.g. Eli Lilly, J&J, Allergan, Amgen, MSD Carlow, Biomarin, Regeneron, Jazz and Alexion).

IDA has a number of significant similar biopharma investments in its pipeline and a significant investment in upskilling/cross training will help in ensuring the Ireland can win these investments by avoiding a skills gap in biopharma manufacturing. There is an acute need for technicians and senior process scientists and engineers with the following skills to serve the needs in this fast growing biopharmaceutical manufacturing sector.

Bio-Pharma Current & Future Skills Needs

- **Biotechnology skills** for bioprocessing with a focus on:
 - Mammalian cell culture for protein/vaccine production (bench level & industrial bioreactor scale);
 - Protein/Vaccine purification/separation sciences (bench and industrial column scale);
 - Bioprocess engineering (including emphasis on single use manufacturing systems);
 - **Bioprocess analytical technology & Data Analytics;**
 - Aseptic processing (formulation/filling) of proteins/vaccines;
 - Protein/Vaccine Lyophilisation technology & process engineering;
 - Protein/Vaccine Conjugation chemistry, technology and process engineering;
 - Protein/Vaccine formulation technology & process engineering;
 - Packaging technology for proteins/vaccines (including packaging with embedded microelectronics - Autoinjectors);
 - Automation in device filling/packaging processes;
 - Materials/surface science for biopharmaceutical manufacturing (interface of drug product and device);
 - Protein analytical chemistry/biochemistry, glycoanalytics, bioassays; and
 - **regulatory affairs in biopharmaceutical manufacturing & release testing.**
 - supply chain management

⁷€55bn is the total figure for Chemical and related products of which €44.6 bn is for Organic Chemical and Medicinal and pharmaceutical products



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 employed over 24,000 people in 2011 with exports of approximately €7.2 billion in 2010.

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:

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.
- **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:

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.



3.6 Consumer Goods

Employment in the Consumer Goods sector is almost entirely within Irish owned companies, encompassing textiles and apparel, paper print and packaging industries. Many companies in the sector are long-established, family-owned and managed. Employment within the consumer goods sector is in long term decline falling by over 10,000 since 2002 to 12,000 in 2011 reflecting the exposure of the sector to international competition, technological advances and depressed consumer demand domestically. In an increasingly competitive environment there are pressures to adapt business models to become more export focused. Firms that are remaining competitive have invested in marketing, product development, design, logistics and IT. While retaining their traditional manufacturing skills they have become increasingly knowledge intensive, flexible and digitally driven. For example, the Print and Packaging industry in Ireland has undergone significant restructuring to enable it to compete in a most competitive environment. Many companies in the sector experienced significant increases in productivity. The Print and Packaging industry serves the Food, Beverage, Pharmaceutical, Healthcare, Media, Financial, Government and Industrial sectors, with these sectors accounting for over 80 per cent of turnover.

The skills needed in the Consumer Goods sector are predominantly those outlined in the current and future skills needs of All Manufacturing, as set out in Section 3.1, with a focus in particular on:

Consumer Goods Current & Future Skills Needs
▪ Commercial and people related skills.
▪ Supervisory skills, production planning, Material Requirements Planning (MRP), supply chain management, sales and marketing skills and R&D skills, required to differentiate products by adding new product features and to win new businesses.
▪ Design and manufacturing engineers to improve component design for manufacture and to deliver flexible automation solutions and
▪ Polymer technologists

3.7 ICT Hardware

ICT hardware encompasses the manufacturing of semiconductors, integrated circuits and computer hardware, peripherals and storage devices (note, it does not including consumer electronics, communications equipment, or industrial electronics). The majority of market share in these sub-markets is occupied by a few key players such as Intel and AMD in semiconductors and IBM, Dell and HP in computer hardware. In particular, the ICT⁸ sector has been impacted by a number of global trends. In 2000 employment peaked at 47,100. The dot.com bust resulted in global employment by these firms being almost halved. The ICT hardware sector continues to contribute a significant proportion toward total manufacturing employment. There were approximately 27,000 people employed in the sector with exports valued at €10.3 billion in 2010. Approximately 3,500 were employed in Irish-owned companies, primarily in wireless and electronic technologies. In addition to

⁸ NACE code : Computer, Electronic and Optical Products



the skills need identified in the All Manufacturing skills needs listed in Section 3.1, ICT Hardware current & future skills needs were identified in the EGFSN report as follows:

ICT Hardware Current & Future Skills Needs

- Skills in **control theory and software, robotics and vision system** applications at both engineer and technician level to support automation.
- Specialised engineering skills including :
 - electronic engineers with **materials and test experience**;
 - **radio frequency engineers**, (e.g. electronic engineers with a Masters in RF), and
 - **specialised engineering skills** - wet etch skills for semiconductor manufacture.
- Data analysts to analyse and interpret large volumes of data. Process experts, such as production engineers who also have data analytic skills.



4. Skills for Enterprise to Trade Internationally

EGFSN/Forfás Report: [Key Skills for Enterprise to Trade Internationally \(2012\)](#)⁹

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.

The skills and competencies required by enterprise to drive trade and export performance are:

- Foreign Language Proficiency/Cultural Awareness;
- International Sales Skills;
- International Marketing Skills;
- Global & International Management Skills;
- Channel Marketing Skills - Identification/Support and Management;
- Fulfilment - Distribution & Installation Skills;
- Customer Service/Support Skills; and
- Product/Service Design Skills.

Export led growth requires a whole of enterprise approach including the need to embrace innovation, enhance productivity, and improve competitiveness. This chapter focuses on the specific skills needed for enterprise to trade internationally and are additional to the skills needs of the particular sector the enterprise belongs to and the relevant Cross-Enterprise skills needs.

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) and Chinese.

In its 2012 study the EGFSN identified 2,200 potential 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:

There is a significant mis-alignment between the domestic supply of foreign language skills and the demand of enterprise for international business. 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.**

⁹ <http://www.skillsireland.ie/publication/egfsnSearch.jsp?ft=/publications/2012/title,9402,en.php>



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.

Current & Future Skills Needs for Enterprise to Trade Internationally	Sectors/subsectors
<ul style="list-style-type: none"> Customer Sales/Service Support WITH Foreign Languages to a <u>business proficiency level</u>* (NFQ Levels 6/7) - 750 places. (Specifically German, French, Spanish, Italian and Dutch (Levels B1, B2 & C1 on the six level Common European Framework of Reference for Languages for grading an individual's language proficiency)). 	All sectors
<ul style="list-style-type: none"> 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)). 	All sectors
<ul style="list-style-type: none"> International Project Management (NFQ Levels 7/8) - 40 places. 	All sectors

* All the Customer Sales/Service Support and International Sales Professionals courses need to be provided WITH a Foreign language. 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.

Key future skills needs by function within the companies are:

- International sales skills with inter-culture competencies, effective communications, networking, knowledge of logistics and competencies such as tenacity and ability to work on own initiative;
- Channel Management needs skills in selection, support of channel partner and managing a network of agents;
- Marketing requires e-commerce and social media skills;
- Customer service need order administration; and
- Management skill requirements include strategy, effective communications.

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. Internships overseas in countries where English is not the first language are highly useful to develop foreign language proficiency and cultural awareness.

Given its focus, Springboard can have a direct impact on international selling courses with developing proficiency in foreign languages, primarily European languages (French, German, Spanish, Italian) to a business proficiency level (Levels B1, B2 & C1 on the six level Common European Framework of Reference for Languages for grading an individual's language proficiency).



5. Skills for International Financial Services

EGFSN/Forfás Report: *Future Skills and Research Needs of the International Financial Services Industry* (December 2007)¹⁰

Even though the EGFSN/Forfás 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 and from the shortages identified in the *National Skills Bulletin*¹¹ 2013. 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:

- Process innovation and product development for the funds industry and accountants with experience for financial services;
- Regulation and Compliance;
- Project management;
- Hybrid technologists - business analysis with IT/systems skills; and
- Data Analytics.

The ICT skills areas in demand described in chapter 2 and the data analytics skills needs identified in the cross-enterprise chapter equally apply to the financial services sector, which also has strong ICT and data 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.

Skill demand	Course topics/ contents
Accountancy with funds experience	Accounting courses with a focus on fund accounting (modular format)
Regulation & Compliance Management	<ul style="list-style-type: none"> ▪ Regulation; and ▪ Compliance.
Project Management	Certificate in Project Management Incorporating modules such as: <ul style="list-style-type: none"> ▪ Project management procedures and techniques (PRINCE2 (Project Management in Controlled Environments 2) or Project Management Institute (PMI) Certification);

¹⁰ <http://www.skillsireland.ie/publication/egfsnSearch.jsp?ft=/publications/2007/title,2515,en.php>

¹¹ <http://www.skillsireland.ie/publication/egfsnSearch.jsp?ft=/publications/2013/title,10965,en.php>



Skill demand	Course topics/ contents
	<ul style="list-style-type: none">▪ Project planning and control;▪ Quality management; and▪ Earned value analysis.

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 Irish Banking Federation (IBF)/ Federation of International Banks in Ireland (FIBI), Financial Services Ireland, (FSI), Irish Funds Industry Association, (IFIA) and Dublin International Insurance & Management Association (DIMA).

Job announcements:

Job creation for financial occupations is confirmed in the media with announcements for financial services roles (e.g. Deutsche Bank).

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. Cross Enterprise Skills Needs

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

- data analytics skills;
- entrepreneurial competencies;
- skills for creativity, innovation and design;
- management skills; and
- generic skills such communications and team working.

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

6.1 Data Analytics

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 under the Action Plan For Jobs, with the potential to create significant additional employment in the economy. 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.

Globally, there is a reported shortage of skilled professionals with data analytics skills, which can fall into the following categories:

- **Deep analytical talent** - roles requiring a combination of advanced statistical, analytical, machine learning and communication skills.¹²
- **Big data savvy roles**, such as 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 professionals**, with the skills to develop, implement and maintain the hardware and software required to make use of Data Analytics including Big Data.

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. A forthcoming report by the EGFSN/Forfás, *Assessing the Demand for Big Data and Analytics Skills in Ireland 2013-2020*, forecasts a continuing strong demand for data analytics and related skills across the economy over the period 2013-2020. Companies envisage that they will continue to need to recruit both experienced individuals and new graduates in these areas in the future.

¹² Because of the high skilled nature of this work requiring 4 year undergraduate study in, FOR EXAMPLE, maths, science and computing disciplines, and in many cases an additional postgraduate specialism, these roles are not considered deliverable in an upskilling programme like Springboard or the NQF Level 8 ICT Conversion Programme.



In terms of the Springboard call programmes could be run at NFQ Diploma level 7 (60 credits) for Big data savvy roles. The programme would be particularly suitable for jobseekers that have taken an NFQ level 6 + award in disciplines such as business, management studies, finance, marketing and social sciences. The programme content should include the following:

- Data Protection, Governance and IP Knowledge;
- Enterprise Data Management;
- Specific user tools (i.e. dashboards, KPI /market analysis);
- Development of numeracy and analytics skills;
- Knowledge of social media;
- Business intelligence and Business strategy; and
- Ethics, Team working and Communication skills.

In relation to the NFQ Level 8 Conversion call programmes could be run at NFQ Higher Diploma Level 8 (60 credits) for Data Analytics / Big Data supporting technology roles. The programme should be particularly 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.

- 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; and
- Communications, problem solving, Ethics and teamworking skills.

6.2 Entrepreneurial skills

Entrepreneurial activity can be improved with an increased emphasis on creativity and design turning inventions into innovations. Cultivating an entrepreneurial mind-set, by developing entrepreneurial skills, behaviours and attitudes and equipping learners with the key entrepreneurial competences for entrepreneurial careers or new start-ups is more necessary now in the internationally competitive economic environment.

6.3 Skills required for creativity, design and innovation

EGFSN/Forfás report: [Skills in Creativity, Design and Innovation \(2009\)](#)¹³

Skills required for creativity, design and innovation are needed in all industries and in all occupations. While there is some variation between occupations and across industries, some universal points emerge:

¹³ <http://www.skillsireland.ie/publication/egfsnSearch.jsp?ft=/publications/2009/title,4897,en.php>



- Depth of skill and knowledge is important to creativity and innovation;
- Designing and building products and services to meet customer requirements is key. This 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;
- Creativity relies heavily on finding new ways to combine existing ideas. In skills terms, this means that the capability to work well with people whose deep skills lie in other areas is critical;
- All other capabilities have to be underpinned by strong generic skills in areas including communication skills, team-working and problem solving; and
- Creativity and innovation are influenced heavily by the culture of the organisation, and how innovation is managed and led.

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.

6.4 Business & Finance Skills

Business

The shortages arising for business skills are typically confined to niche and specialist roles. These include:

- Purchasing managers, especially in relation to global supply chains;
- 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, and digital marketing expertise;
- Sales accounts executives (in some cases combined with language skills); and
- Business analysts and statisticians, including big data analysts with proficiency in IT skills (e.g. Oracle, SQL) as well as data mining, data modelling, mathematics/statistics, as well as industry specific knowledge (e.g. for Biopharma-Pharmachem sector).

Finance

The shortages arising for finance skills are typically confined to niche and specialist roles. These include:

- Finance professionals; including:
 - accountants and auditors with skills in tax, compliance, solvency, and financial management, as well as specific industry experience, including banking and manufacturing;
 - risk analysts;
 - regulatory professionals; and
 - actuaries.
- Finance and investment analysts (niche areas, financial securities);
- Fraud analysts;



- Credit control associate professionals;
- **Multilingual** financial accounting technicians; and
- Clerical administrators in credit control and global supply chain with **multilingual skills**.

Job opportunities for business and financial occupations is confirmed by agency announcements and in the media with announcements for financial services roles (e.g. Capita) and posts in niche business areas such as digital marketing (e.g. Hubspot) and technical sales in high tech manufacturing (e.g. Novartis).

6.5 Core Management Skills

The EGFSN report *SME Management Development in Ireland*¹⁴ (2006 - but the findings remain relevant today) highlighted deficits across a range of management capabilities relative to competitors in other countries including general management, HR, marketing and finance skills, strategic management skills, product management skills, and functional management skills (sales, training, marketing, supply chain management), IT and R&D. Skills that combine scientific expertise with these generic skills are necessary for interaction with customers, suppliers, regulatory and funding bodies. The *Management Development Council*¹⁵ identified the following competencies, including strategic competencies, (i.e. the strategic capacity and relationship with the company's external environment) as core characteristics of 'good managers':

General Management Current & Future Skills Needs

- **Business vision:**
 - Strategic business planning & development;
 - Identifying & harnessing business opportunities;
 - Planning and Managing Market intelligence; and
 - **Internationalisation Export sales planning.**
- **Functional Management:**
 - Resource and Change management;
 - Project management & Contract management & Supply Chain management;
 - Sales, Marketing & operations management; and
 - **Global partnership management.**
- **Customer orientation** - responding promptly to customers' suggestions and needs.

¹⁴ <http://www.skillsireland.ie/publication/egfsnSearch.jsp?ft=/publications/2006/title,2969,en.php>

¹⁵ *Management Development in Ireland* The Report of the Management Development Council, February 2010 - <http://www.forfas.ie/publication/search.jsp?ft=/publications/2010/Title,5713,en.php>



General Management Current & Future Skills Needs

- **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.
- **Effective networking** - developing and maintaining a broad network of relationships with key individuals within the company and in the industry.
- **Negotiation** - securing the support and agreement of key individuals and groups that can influence the particular area of responsibility.
- **Delegation** - ensuring that the members of the team have the decision making capacity and resources they need to meet their objectives.
- **Coaching** - helping collaborators to discover areas for improvement and to develop their skills and professional capabilities.
- **Teamwork** - fostering an atmosphere of collaboration, communication and trust among the members of the team, and stimulate them towards the achievement of common goals.
- **Entrepreneurship** - creativity, design & innovation.
- **Horizon Scanning.**
- **Business modules embedded in STEM programmes** focussed on:
 - Legal, Tax and Finance Skills; Intellectual Property Management;
 - Technical compliance expertise with leadership and influencing skills;
 - Communication skills; Problem Solving; Project Management; and
 - Lean Technologies and Six Sigma.
- **Foreign Language & Cultural Awareness Skills**

Skills gaps in green above relate to enterprises trading internationally.

6.6 Generic Skills Portfolio - 'Soft' Skills

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.

What was seen as the 'specialist' skill of IT just 10-15 years ago is now regarded as a 'basic' skill, essential for a greater proportion of jobs and occupations, although the level and complexity of actual skill utilised will vary substantially across and even within occupations.



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

- 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.

These skills are required by enterprises in addition to core specialisms and expertise and should be embedded in programmes.



7. Skills for Construction

Report: Ireland's Construction Sector: Outlook and Strategic Plan to 2015 - Forfás, 2013¹⁶

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 quarter 3-2013 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 to 2015, 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 configuration¹⁷. 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 SMEs¹⁸.

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

¹⁶ <http://www.forfas.ie/publication/search.jsp?ft=/publications/2013/Title,10996,en.php>

¹⁷ 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

¹⁸ 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, UK¹⁹). The reality is that the industry is moving towards a situation where BIM is becoming an essential requirement internationally²⁰. 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)²¹

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 EGFSN 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)²², 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

¹⁹ 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

²⁰ Constructing the Business Case: Building Information Modelling, Building Standards Institution, 2010

²¹ <http://www.skillsireland.ie/publication/egfsnSearch.jsp?ft=/publications/2010/title,7063,en.php>

²² 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 needs²³. 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: [AECOM Ireland Annual Review 2014](#)²⁴ 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.

²³ Making it Happen: Growing Enterprise for Ireland, Forfás, 2010

²⁴ <http://www.aecom.com/deployedfiles/Internet/Geographies/Europe/Document%20Library/AECOM%20Annual%20Review%202014.pdf>



Appendix 1. Links to the Enterprise Development Agency's - IDA Ireland's and Enterprise Ireland's Job Announcements in 2013 - 2014

IDA Ireland Job Announcements for 2013 - 2014

2014: Jan

- [Taoiseach announces 150 new jobs for HedgeServ in Cork](#)
- [IBM Announces Software Services Operations Centre in Ireland using cloud to optimise client engagements](#)
- [Global Reviews to create 30 jobs in Cork](#)
- [Tyco to Open Business Services Centre in Cork - Potential for 500 Jobs](#)
- [Aspen Pharma creates 42 new jobs at its Citywest European Operations Centre](#)

2013: Jan - Dec

- [Minister Bruton and IDA Ireland welcomes Liberty Mutual Insurance Group creation of 150 new Technology jobs](#)
- [Regeneron Plans to Establish a World-Class Biopharmaceutical Production Facility in Limerick](#)
- [Axway Expands R&D Centre of Excellence in Ireland](#)
- [IDA announces investment in Operations Technology Development Centre at DePuy Synthes Companies, Ireland](#)
- [Aon Grows its Presence in Ireland through the creation of 30 new roles at its Centre for Innovation and Analytics](#)
- [Microsoft's Cloud Services Growth Drives Second Expansion of its Dublin Datacentre](#)
- [Leading Digital Cinema Company to establish a Software Development Operation in Cork - creating 20 jobs](#)
- [Total Recruitment of 95 people underway in Microsoft Ireland](#)
- [Aditi Technologies to establish European Service and Business Development Centre in Dublin creating 40 jobs](#)
- [Synowledge establishes its International Headquarters in Dublin with the creation of 35 new high quality jobs](#)
- [Minister Bruton and IDA Ireland welcome announcement of 700 new jobs at Deutsche Bank](#)
- [Indeed Expands Dublin Operations to Meet the Needs of the International Job Seeker](#)
- [Acorn announce plans to create 100 new jobs in Dublin](#)
- [Gilt to Establish Platform Innovation Centre in Dublin](#)
- [An Taoiseach Enda Kenny TD, announces over 330 new jobs in nine IDA Ireland client companies](#)
- [Kobo Opens European Software Development Centre In Dublin](#)
- [Mandiant CEO Hosts Event Celebrating Official Dublin Office Opening](#)
- [TripAdvisor Announcement](#)



- [Qualtrics Expands into Europe with Plans to Create 150 New Jobs](#)
- [Official Opening of Dell Bank in Ireland](#)
- [@IDAireland welcomes Twitter expansion in Dublin](#)
- [Stream Global Services Hiring 50 Permanent Positions in North Dublin](#)
- [National Pen creates 200 permanent jobs in Dundalk](#)
- [Virtu Financial LLC expands its European HQ in Dublin, with 30 highly skilled jobs](#)
- [SQS to create 75 new jobs](#)
- [Online retailer to create over 45 new jobs in Sligo](#)
- [IDA Ireland announces 50 new jobs in BioPharma Company Alexion](#)
- [Salesforce.com to Add 100 New Jobs in Dublin](#)
- [Symantec to Establish Customer Management Centre in Ireland](#)
- [90 New Jobs announced by four fast-growing IDA client companies](#)
- [Adara establish EMEA HQ in Dublin creating 30 new jobs](#)
- [eMaint announces the establishment of its EMEA Headquarters in Dublin with the creation of 25 new jobs](#)
- [Primeur, a leading European software and services provider, expands its international office in Dublin with the creation of 20 jobs](#)
- [AOL Ireland announces new software engineering jobs](#)
- [EMC to Add 200 Jobs in Cork as Part of Major Expansion Plan](#)
- [Citrix announces 50 new jobs in Ireland](#)
- [Groupon announces 20 new jobs in Dublin](#)
- [UPC creates further jobs in Mid-West Region](#)
- [Prometric Reaches 100 High-Skill Jobs in Dundalk](#)
- [10gen CEO visits Dublin to open new EMEA headquarters](#)
- [Mafic to create 70 jobs in Kells under succeed-in-Ireland - Minister Bruton](#)
- [Squarespace Announces Plans to Establish EMEA Headquarters in Dublin with the Creation of 100 New Jobs](#)
- [IDA Ireland announces the creation of 95 new jobs in Limerick and Dublin](#)
- [US Global Software Company ACI announce a significant expansion in its Irish Development Centre in Limerick](#)
- [Marin Software Incorporated is to establish its International Headquarters in Dublin with plans to create 35 new jobs over three years](#)
- [Nypro is to establish a Medical Device Manufacturing facility in Waterford creating over 200 new jobs](#)
- [Taoiseach Enda Kenny TD announces that Zurich is to establish two IT Hubs in Dublin with the creation of 112 new high quality jobs](#)
- [Yahoo! Announces Expansion Plans in Dublin Company to add more than 200 jobs at its Dublin Operations Centre](#)



- Taoiseach announces that McAfee is to establish a Global R&D Centre of Excellence in Cork with the creation of up to 60 new jobs
- FireEye to establish its EMEA Technical Support Centre in Cork
- Minister Bruton announces that Worldwide TechServices is to establish a European Operations Centre in Limerick with the creation of 62 new jobs.
- Guidewire Software announces creation of 75 new roles at Dublin Software Centre
- Minister Bruton announces that Quantcast is to establish its EMEA Operations Centre in Dublin with the creation of 100 new jobs
- Facebook creates more than 100 new roles in fresh investment in Dublin
- eBay Inc. Announces Creation of 450 New Jobs in Dundalk
- Minister Bruton announces the creation of 167 new jobs for Cork and Dublin in 6 fast-growing companies
- Whitehouse Analytical Labs, an Analytical Testing Facility, Chooses Ireland for First Round of International Expansion
- PE Lynch, a producer of algorithmic trading software for banks and brokers, is to establish its European Headquarters in Dublin with the creation of 20 new jobs
- Loop1 Systems Inc. a Premier Partner of SolarWinds Inc., to create 17 new jobs in Cork with the establishment of a Sales, Customer Support and Technical Centre
- IMSTec to establish a Service support, Research and Development Competency Centre in Kinsale, Co. Cork with the creation of 35 new high-quality jobs.
- OmniPay creates 30 new jobs in Dublin

Enterprise-Ireland Job Announcements for 2013 - 2014

2014: Jan

- Taoiseach announces 50 new jobs at Westbourne IT Global Services
- Enterprise Ireland's End of Year Statement 2013

2013: Jan - Dec

- 1,600 New Jobs to be created in High Potential Start-ups backed by Enterprise Ireland in 2012 - Minister Perry
- €575k investment to create 12 jobs at Galway company OnePageCRM
- Storm Technology to create over 20 new jobs - Minister Bruton
- Irish IT Company opensky announces 30 New Jobs over the next 18 months - Minister Bruton
- 1600 jobs and 450 construction jobs to be created by Glanbia Ingredients Ireland in Government-supported investment
- Waterford-based, FeedHenry Drives Growth with \$9M in funding led by Intel Capital
- Minister Bruton announces 34 new jobs in Galway company Advant Medical
- Cubic Telecom Secures \$5.2 Million from Enterprise Ireland, Qualcomm Incorporated, ACT Venture Capital, TPS Investments



- Minister Bruton announces creation of more than 114 new jobs by three Irish companies
- 15 new jobs and the retention of 70 jobs as Gaines Europe Limited opens new production facility in Arklow
- Minister Bruton announces 25 new jobs at Carlow company Burnside Eurocyl
- 130 new jobs as three Irish food companies invest almost €9 million in major development programmes
- Taoiseach Enda Kenny announces 75 new jobs in Irish tech firm I.T. Alliance Group
- Walsh Whiskey Distillery Unveils €25m Expansion Programme to Build Share of Global Irish Whiskey Market
- Byrne Looby Partners announce creation of 50 jobs in Ireland and internationally

Expert Group on Future Skills Needs
c/o Forfás
Wilton Park House
Wilton Place
Dublin 2
Ireland

Tel: + 353 1 607 3000
Fax: + 353 1 607 3030
Email: egfsn@forfas.ie
Website: www.skillsireland.ie

