

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

Springboard+ 2016 including ICT Skills Conversion

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Skills Needs of Enterprise

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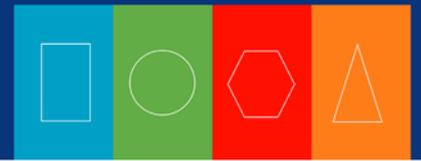
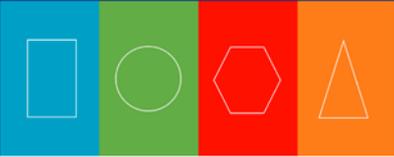
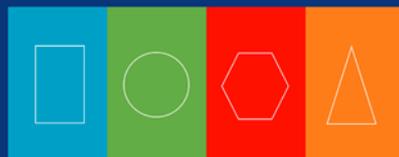


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Introduction

This report has been developed to provide guidance for providers tendering for higher education places for those eligible to participate on Springboard+ courses during this round. It gathers together the most recently available data concerning higher education level skills needs for enterprise appropriate to Springboard+, and the Level 8 ICT skills conversion courses. It draws on data from reports published by the Expert Group on Future Skills Needs (EGFSN)¹ and consultations with industry bodies and the enterprise development agencies (Enterprise Ireland and IDA Ireland).

Engagement with Enterprise

Enterprise engagement is of pivotal importance to the progression of Springboard+ participants to employment. The objectives of Springboard+ are:

- 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 national and regional Action Plans for Jobs, and the Government's new National Skills Strategy 2025 - *Ireland's Future*.

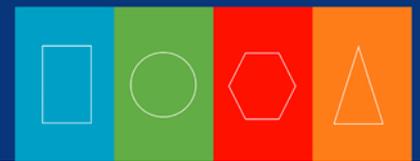
Apart from the work of the EGFSN and the enterprise development agencies, the skills requirements of enterprises are also identified through on-going engagement between education and training providers and employers. The new Regional Skills Fora, which are being established with the support of the Department of Education and Skills, will provide a vehicle for close co-operation at regional level between education and training providers and enterprise. They will also provide a link with the implementation of other Government strategies such as the Regional Action Plans for Jobs and Pathways to Work.

National Skills Strategy

In January 2016, the Government published a new National Skills Strategy - *Ireland's Future* - which sets out the Government's commitment to improving and using skills for sustainable economic growth. It outlines how Ireland can develop a well-skilled, adaptable workforce that contributes to, shares in, and benefits from opportunities of economic expansion.

A critical success factor for the Skills Strategy will be the level of partnership between the education and enterprise sectors. The Strategy is closely aligned with broader Government policies, including Enterprise 2025, Pathways to Work 2016-2020 and the Action Plans for Jobs.

¹ The Expert Group on Future Skills Needs (EGFSN) advises the Irish Government on current and future skills needs of the economy and on other labour market issues that impact on Ireland's enterprise and employment growth



Recent labour market developments and future projections

Economic recovery has seen employment increase by over 135,000 jobs since 2012. Jobs growth has been realised in most economic sectors. The unemployment rate has fallen from 15% to under 9%.

Looking ahead, Enterprise 2025, the Government's new enterprise policy framework and strategy, sets out the potential to have 2.18 million people in employment and an overall unemployment rate of 6% by 2020. On a 2014 baseline, Enterprise 2025 envisages that an additional 266,000 people could be in employment by 2020, based on the premise of export-led growth and the additional indirect jobs stimulated by the activities of exporting enterprises.

The strategy sets out the enterprise sectors in which Ireland has comparative advantage and which contribute the greater proportion toward exports. These sectors include ICT (hardware and software), Health Lifesciences (which includes pharma, biopharma and medical technologies), International Financial Services, Internationally Traded Services, Engineering/Industrial Products and Agri-Food.

All sectors are evolving in response to market demands and enabled by technological developments. New areas of opportunity and untapped potential are highlighted in Enterprise 2025 and the potential for employment growth across four broad sectoral cohorts was assessed, as set out below. Anticipating and addressing the skills needs of these various sectors will be important to enable them to reach their growth potential and Springboard+ can play a part in meeting those skills needs.

Enterprise 2025 Sectoral Ambition

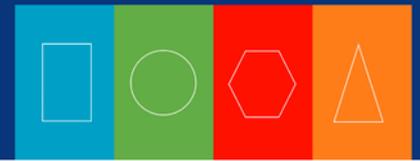
Sectoral cohorts	Total Employment 2014 (base year)	Total Employment 2020
Building on Strengths. ICT, Lifesciences manufacturing, Agri-food, Internationally Traded Services, International Financial Services, Engineering/industrial products	283,100	345,000
Transforming employment-intensive sectors. Tourism, Retail & Wholesale, Construction, Transport & Logistics, Primary Production, other manufacturing	893,800	1,000,000
Realising untapped potential. Creative industries, Green technologies, Environmental services, Marine and Maritime, Education services, Healthcare services	213,300	243,300
Other locally traded services and activities. Legal, Accounting and other professional services. Business and Consultancy services. Personal services.	187,000	208,000

Source: Enterprise 2025, DJEI 2015

Progression to employment

The **optimal labour market outcomes** for participants via Springboard+ in 2016 will be delivered by:

- Ensuring courses are **relevant to enterprise skills needs** as identified by, inter alia, the EGFSN, sectoral and thematic research, and on-going engagement between providers and employers.
- 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 relevant, specific skills gaps can only be addressed by upskilling individuals who have previous substantial work experience in the sector.
- Provision of **career guidance** to help candidates choose the appropriate course relevant to them and their interests and experience, with the interest of the learner in the course paramount.
 - Programmes should ideally offer a **structured work placement** focussed on enhancing the **employability** of the graduate, particularly with regard to enterprise/generic skills. Provision of experiential learning to students can greatly enhance their chances of success in securing employment.
 - 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.

Skills Demand in the Irish Economy

The labour market is constantly evolving, and the specific occupations, skills and qualifications that are required by the economy change over time. Increasingly, there are overlaps in the skills required across different sectors and occupations.

Job descriptions are becoming more fluid, as occupations which may traditionally have been seen to be specialist are requiring a broader mix of skills. Nonetheless, there is a continuing need for

- sector-specific skills,
- cross-sectoral, skills and
- transversal skills (skills that are relevant across the enterprise base).

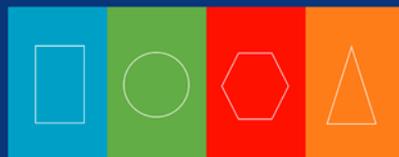
A mix of these skills types will be needed in the economy to contribute to economic growth.

This Guidance groups together these skills types as follows:

Chapters 1 to 4 address cross-sectoral skills which are in demand across different sectors of the economy. These include skills in ICT, Big Data/Data Analytics, Skills for International Trade (including foreign languages, cultural awareness, global sales and marketing) and Engineering Skills.

Chapters 5-12 deal with sector-specific skills for International Financial Services, general Manufacturing, as well as for manufacturing in the Medical Devices, Biopharma-Pharmachem, and the Food & Beverages sectors. These sectoral Chapters also cover skills required for the Construction sector and for the Leisure, Tourism and Hospitality sector.

Chapter 13 addresses Cross-Enterprise, or transversal, skills.



Sector-Specific Skills

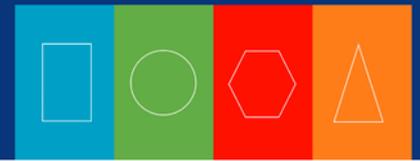
Notwithstanding the increased demand for cross-sectoral and transversal skills in the economy, some sectors will continue to require specific skill-sets. Sectors with such skills needs and the type of skill needed are outlined below. The sectors are those which are important to the Irish economy and have also been the subject of a future skills needs analysis by the EGFSN.

Sector-specific skills requirements

Sector	Skills needs
Financial Services	Risk, compliance, accounting, business intelligence, ICT and data analytics. These skills can be found in engineering, mathematics, data analytics, business and law graduates.
ICT Sector	Core technology skills, e.g. software developers, cloud, security, networking and infrastructure and a combination of the technical skills with business/analytic/foreign language skills as the skills requirements become more complex
Manufacturing	Scientists with experience and engineers (including process engineers, bioprocess scientists, validation engineers, precision engineers, toolmakers, automation engineers), quality professionals, supply chain managers
Medical Devices	Mechanical, automation and validation engineers; polymer technicians, software engineers, quality engineers and regulatory compliance experts
Bio-Pharma	Technicians and senior process scientists, pharma co-vigilance personnel, biotechnologists, biochemists, engineers including precision engineering
Food & Beverages	R&D scientists, food technologists and technicians with new product development skills; international sales/marketing with languages for international trade
Leisure, Tourism & Hospitality	Chefs: commis, demi, pastry and chef de partie.
Freight, Transport & Logistics	Graduate-managers, planners and ICT staff; skilled warehouse staff and HGV drivers
Wholesale & Retail	Accountancy, supply chain management, retail marketing and data mining of retail data, finance and human resource management
Construction	Chartered surveyors; internationalisation and management capability; ICT, Building Information Modelling (BIM) systems, Green Economy skills, orbital welders and high-end electrical and plumbing skills for complex facility constructions (e.g. BioPharma, Food Processing, data centres, etc).

A number of EGFSN reports and Government strategies have quantified the specific skills requirements in a number of sectors, such as those outlined below.

- ICT employment across a range of sector is projected to grow by an estimated 44,500 potential job openings which will arise for high level ICT professionals (NQF Level ≥ 6) across all sectors of the economy between 2013 and 2018, with the majority required to have NQF level ≥ 8 , and a minority having NQF levels 6 & 7. Continuous upskilling through CPD and other certified training is also a feature of this dynamic area.



- **Data Analytics** - 18,000 extra jobs are forecast between 2013-2020.
- **Manufacturing** is expected to grow by 43,000 jobs over the period 2011-2020. This includes Biopharma, which the industry expects to grow in the short term by 5,000 jobs between 2015-2018.
- **Hospitality** - based on the ESRI Medium-Term Review, employment growth between 2015 and 2020 is expected to range from 9,990 to 21,540 with the successful implementation of the Government's new Tourism Strategy to 2020.
- **Freight Transport, Distribution & Logistics** - 10,000 extra jobs are forecast between 2015-2020.
- **Agriculture and Food**. The Teagasc FAPRI (Food and Agricultural Policy Research Institute) assessment of employment impacts of achieving the *Food Harvest 2020* targets estimated growth in agri-food employment of at least an additional 16,500 employees. *Food Wise 2025*, a new national ten year Strategy for the Irish Agri Food Sector, was subsequently published in July 2015 and projects Agri-Food exports to increase to €19 billion and create 23,000 new jobs by 2025.
- The Government's **Construction 2020** strategy forecasts employment growth in the order of 60,000 to 2020.
- The strategy for the **International Financial Services to 2020** forecasts growth of 10,000 jobs in that sector.

The greatest occupational skills demand is for Professionals, Associate Professionals and people with multilingual skills.

Cross-Sectoral Skills

Cross-sectoral skills are also of growing importance. There is increasing convergence between sectors such as ICT, business, and engineering, which were once considered to be unique in their own right. ICT now permeates almost all sectors of the economy, and similarly, strong business skills are relevant across many sectors.

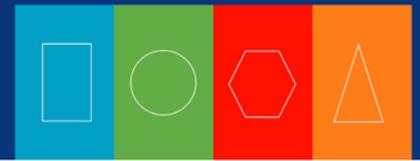
Cross-sectoral skills can be used in a number of similar occupations and sectors, but might also require additional domain-specific training to allow them to be applied in a particular job and/or work environment. The key cross sectoral skills identified by the EGFSN are:

- **ICT Skills**² - core technology skills, e.g. software developers, cloud, security, networking and infrastructure and a combination of these technical skills with business/analytic/foreign language skills as the skills requirements become more complex.
- **Data Analytics**³ - Deep analytical talent, Big Data-savvy roles, Supporting technology.
- **Foreign Language and Cultural Awareness**⁴ - languages in demand are: German, French, Spanish, Italian, Portuguese and the Nordic languages. Industry engagement also advises on the growing need for Mandarin.

² Addressing Future Demand for High-Level ICT Skills, Expert Group on Future Skills Needs, 2013

³ Assessing the Demand for Big Data and Analytics Skills, 2013 - 2020, Expert Group on Future Skills Needs 2014

⁴ Key Skills for Enterprise to Trade Internationally, Expert Group on Future Skills Needs 2013



- **Business Skills - Sales and Marketing**⁵ - required in addition to technical skills, as roles may involve dealing with customers, technical sales and product development
- **Engineering**⁶ - Mechanical, Electrical/Electronic, Industrial/Manufacturing - production, process quality, validation, product design/development

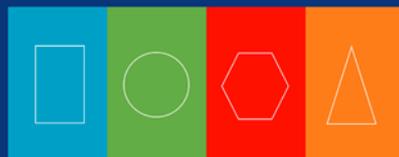
Transversal Skills (cross-enterprise skills)

It is clear from engagement with employers across many sectors that transversal skills are increasingly important for enterprises and also in enabling people to enter into and maintain employment. Transversal skills are relevant to a broad range of occupations and sectors. They are often referred to as generic, core, basic or soft skills and are the cornerstone for an individual's personal and career development. Transversal skills are the building blocks for the development of the "hard", "vocational" or "technical" skills required to succeed in the labour market. The transversal skills which are sought after by enterprises include creativity, innovation and entrepreneurship, critical & analytical thinking, team working, communication and business acumen.

Many of these skills can best be imparted as core modules in courses focused on sectoral or cross-sectoral skills provision (e.g. BioPharma, Construction, Freight Transport, Distribution & Logistics, etc.). These skills are also further developed through the work placements which are integral to most courses and provide an excellent opportunity for workplace learning.

⁵ Future Skills Requirements of the Manufacturing Sector to 2020, Expert Group on Future Skills Needs

⁶ Addressing Future Demand for High-Level ICT Skills, Expert Group on Future Skills Needs 2013



1. High-level ICT Skills (across all sectors)

EGFSN Report: [Addressing Future Demand for High-Level Skills](#) (2013)⁷

ICT skills continue to be in demand across many sectors of the economy. 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 *ICT Action Plan*⁸. The latest Plan aims to meet high level ICT skills needs (Level 8 +) through a mixture of domestic supply and skilled inward migration. The target is that by 2018, 74% of supply will come from the Irish education system. One of the key measures of the Plan is the NFQ Level 8 Higher Diploma ICT Skills Conversion Programme. A separate guidance document is provided on this programme.

This Chapter deals with the cross-sectoral high-level ICT skills needs to 2018. ICT is an example of a cross-sectoral skill need which is relevant both to the ICT sector itself, and across other sectors such as business services, financial services and manufacturing.

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 the new pilot part-time Level 8 Conversion Course which is referred to in the Springboard+ call document; and
- Springboard for NFQ Levels 6, 7, 8 and 9.

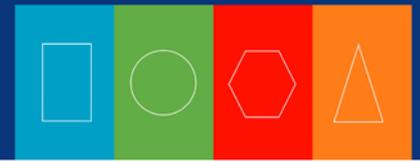
In 2012, the EGFSN estimated there were 68,280 ICT professionals working both within the ICT sector and across other sectors of the economy (e.g. ICT, Financial Services, Business Services, Manufacturing) and that Ireland is likely to face an average increase in demand for high-level ICT skills of around 5% a year out to 2018 with the employment of ICT professionals anticipated to rise to just over 91,000. It was estimated that there would be more than 44,500 potential job openings for ICT professionals over the period 2013 to 2018⁹ arising from expansion and replacement demand. This could increase further if the economy continues to grow strongly. 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.

⁷ <http://www.skillsireland.ie/publication/egfsnSearch.jsp?ft=/publications/2013/title,11287,en.php>

⁸ <http://www.education.ie/en/Publications/Policy-Reports/ICT-Action-Plan-Meeting-the-high-level-skills-needs-of-enterprise-in-Ireland.pdf>

⁹ These figures do not include job churn job openings arising from the movement of workers between firms in the economy.

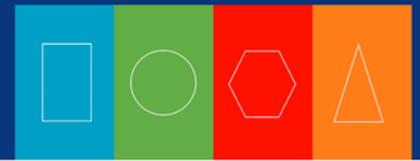


EU Projections of High-Level ICT skills demand highlight a growing demand for e-leadership skills - persons involved in proposing innovative projects using IT. This is in recognition that a significant part of the problem in realising ICT based opportunities appears to be due to deficits in Business departments. Therefore such e-leadership roles may not only include those working in R&D and IT roles, but also those in Business Executive roles.

The output from ICT skills conversion courses referred to above should contribute to the high-level ICT skills needs identified in Table 1.1 below (and the Data Analytics - Supporting Technology Roles outlined in Chapter 2), along with Springboard Level 8 and 9 ICT courses. The majority of high-level ICT skills identified below should predominantly be addressed through the ICT conversion courses, or Springboard Level 8 and 9 ICT courses. There is also a smaller requirement for Springboard Level 6-Certificate & Level 7-Diploma which should be a 60 credit course.

Table 1.1: Current and future high-level ICT skills needs

High-Level ICT Current & Future Skills Needs
<ul style="list-style-type: none"> ▪ Software Programmers for the design and development of applications & systems: Specific skillsets required are: <ul style="list-style-type: none"> □ 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: <ul style="list-style-type: none"> □ 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: <ul style="list-style-type: none"> □ 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).



High-Level ICT Current & Future Skills Needs

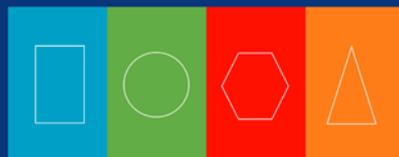
- **Network specialists and engineers:** e.g. Server Message Block (SMB), wireless sensor testing, collaboration functions, process management, search modules and document management platform, router configuration and management, experience with scripting language Java, C, C+ and network configurations.
- **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.
- **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 user support:** Networking and PC maintenance experts with skills in Cisco CCNA and MS (Microsoft) MCITP. There is also a demand for skills, even for 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).

Other cross-sectoral skills are required in conjunction with ICT skills and these are listed in Table 1.2 below.

Table 1.2: ICT skills needs combined with other cross-sectoral skills needs

ICT skills combined with other cross sectoral skills

- **IT Project managers** with technical skills combined with program management, business analytics, or Agile/Scrum/Kanban and Prince II skill sets.
- 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.
- **E-Leadership skills:** Hybrid Business/IT skills - Strategic management of company information and data flows including design and development of "data supply chains". Combination of business analytics skills with industry-specific skills. Strategic management of data protection/privacy issues.



2. Big Data & Analytics Skills

EGFSN Report: [Assessing the demand for Big Data and Analytics Skills, 2013 - 2020](#)¹⁰

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 economy¹¹. Many of the elements of an ecosystem to support Data Analytics and Big Data are already in place in Ireland, so there is a strong base to build on.

In its report “*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 covered under the Chapter on High-level ICT Skills.

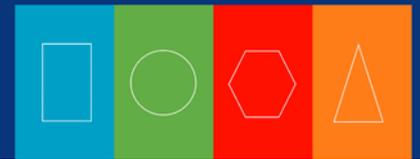
Many of the skilled professionals operating in Data Analytics have qualified under general undergraduate programmes in areas such as mathematics, statistics and IT, and may also have completed further postgraduate specialism training in Data Analytics, including Big Data. The EGFSN report forecasts a 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 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 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 NFO Level 9 and candidates taking such a course will need to have an Honours Degree in one of the aforementioned disciplines and a proven advanced mathematical, statistical and analytical ability which is required by employers for their deep analytical roles. In order to ensure the programmes are aligned to the

¹⁰ <http://www.skillsireland.ie/publication/egfsnSearch.jsp?ft=/publications/2014/title,12194,en.php>

¹¹ Action Plan for Jobs 2013, 2014, 2015 & 2016



skills needs which the EGFSN identified with industry, providers are strongly encouraged to engage with the ICT Division, IDA Ireland.

Table 2.1: Skills for Deep Analytical Talent

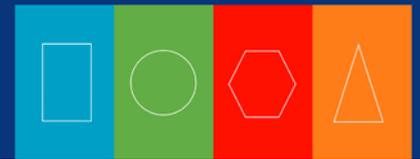
Skills for Deep Analytical Talent roles
<ul style="list-style-type: none"> ▪ Business intelligence (BI) & User Interface Design (UI): <ul style="list-style-type: none"> ▫ Business intelligence, and data mining and analysis through the use of complicated algorithmic problem solving and presentation of this information using quality user interface (UI).

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 2.2) below:

Table 2.2: 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. (see also Chapter 13)

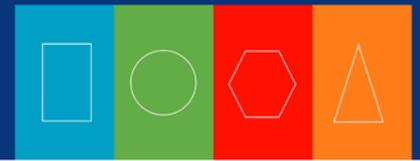


Supporting Technology Roles

For Data Analytics/Big Data Supporting Technology Roles, the *NFQ Level 8 Higher Diploma Conversion* programme (60 credits) 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 2.3: 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. (see also Chapter 13)



3. Skills for International Trade: Foreign Language Skills/Cultural Awareness, Global Sales and Marketing

EGFSN Report: [Key Skills for Enterprise to Trade Internationally](#) (2012)¹²

3.1 Foreign Language Skills and Cultural Awareness

Shortages of multilingual skills have been identified in the EGFSN National Skills Bulletin each year. Ireland needs to build up a multilingual workforce to be able to compete in an increasingly globalised marketplace and to increase export penetration in non-English speaking markets.

There is a consensus that Ireland's continued 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.

While 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. Foreign language skills that are in demand include European languages (German, French, Spanish, Italian, Portuguese and the Nordic languages). Industry also indicates a growing need also for Mandarin. Persons with language proficiency in any of the languages in demand could upskill by undertaking a business or international selling course.

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. Springboard can have a direct impact on international selling courses by providing international selling courses to unemployed persons who already have a proficiency in a foreign language, primarily European languages (French, German, Spanish, Italian, Portuguese and the Nordic languages) and Chinese/Mandarin. Alternatively Springboard can develop language proficiency to a business proficiency level on international selling courses.

The skills required by enterprise to drive trade and export performance, additional to the technical/know-how skills needs of a particular sector, are outlined in Table 3.1.

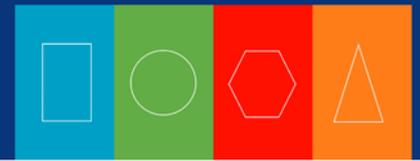
¹² <http://www.skillsireland.ie/publication/egfsnSearch.jsp?ft=/publications/2012/title,9402,en.php>



Table 3.1: Skills for International Trade

Skills for International Trade
<ul style="list-style-type: none"> ▪ Customer Sales/Service Support with Foreign Languages to a <u>business proficiency level</u>* (NFQ Levels 6/7). Specifically German, French, Spanish, Italian, Portuguese, 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).
<ul style="list-style-type: none"> ▪ International Sales Professionals with Foreign languages to a <u>business proficiency level</u>* (NFQ Levels 6/7/8). 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).
<ul style="list-style-type: none"> ▪ Global & International Management Skills with foreign languages.
<ul style="list-style-type: none"> ▪ Business Development Managers with foreign languages.
<ul style="list-style-type: none"> ▪ International Marketing Skills incl. e-commerce & social media skills with foreign languages.
<ul style="list-style-type: none"> ▪ Channel Marketing Skills - Identification/Support and Management with foreign languages.
<ul style="list-style-type: none"> ▪ International Project Management (NFQ Levels 7/8).

* All the Customer Sales/Service Support and International Sales Professionals courses need to be provided with a Foreign language. Where the course involves developing the language proficiency of learners, it is important to ensure that the language component is sufficient to ensure that the participants can achieve the requisite business proficiency level.



4. Engineering Skills

Engineering skills are diverse and in demand across a wide range of sectors. The preferred option of industry is for engineering students to undertake a traditional Engineering undergraduate degree (NFQ Level 8) and specialise either in their final year and/or undertake a Level 9 Masters in a specialist area. The traditional branches of Engineering disciplines are:

- Mechanical Engineering
- Electrical/Electronic Engineering
- Industrial/Manufacturing Engineering
- Civil Engineering
- Marine Engineering
- Aeronautical engineering

Engineering skills needed across all Manufacturing sectors are outlined in Chapter 6, and the more sector-specific engineering skills for manufacturing Medical Devices, Biopharma-Pharmachem and Food & Beverages are detailed in Chapters 7, 8 & 9 respectively.

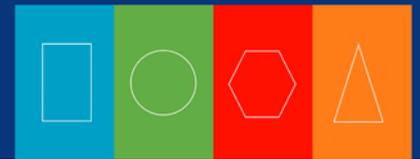
These three sectors are the largest manufacturing sectors in Ireland. However, the Irish “Engineering” sector is also important and highly diverse in terms of size, scale and product. The sector includes companies primarily concerned with metal and plastic processing and machine manufacture, encompassing agricultural machinery, materials handling, precision engineering, plastics and tool-making and metal fabrication and processing. The majority of employment in these particular areas 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.

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 Engineering skills in Table 4.1 apply to the “Engineering” sector as well as to the manufacturing sectors referred to above.

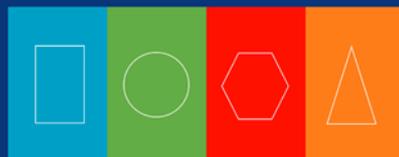
Table 4.1: Engineering Current & Future Skills Needs

Engineering Current & Future Skills Needs
<ul style="list-style-type: none"> ▪ Engineers (NFQ Level 8) with: <ul style="list-style-type: none"> □ Process Automation & System Control Skills; □ Product innovation skills - product development & design.
<ul style="list-style-type: none"> ▪ Engineers with materials expertise for new product design and testing in metals.
<ul style="list-style-type: none"> ▪ Engineers (NFQ Level 9) with a specialism in Polymer technology which 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.



Engineering Current & Future Skills Needs

- Engineers with specialisms in **Commissioning** - overseeing the installation of systems, plant and/or equipment.
- **Automation Engineers (NFQ Level 9)** with specialism in robotics to increase throughput.
- Engineers (NFQ Level 9) with specialisms in:
 - **Validation;**
 - **Quality.**
- **Precision Engineering** -
 - plastics; and
 - toolmaking.
- **Technical Procurement and Supply Chain 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.



5. Skills for the International Financial Services Sector

Report: [IFS 2020 - A strategy for Ireland's International Financial Services sector 2015 - 2020](#)¹³

Report: [A Skills Needs Analysis of the International Financial Services Sector in Ireland, 2015](#)¹⁴

Ireland today has a thriving and growing International Financial Services (IFS) sector, comprising mainly about 430 IDA Ireland and Enterprise Ireland client companies of which half are Irish-owned. These IFS companies directly employ over 35,000 people, with three quarters of this number employed by foreign-owned companies and one quarter by Irish-owned companies.

The past 25 years has seen quite spectacular growth in the IFS sector and Ireland is now well-regarded internationally as a competitive location for IFS. In March 2015, the Government launched *IFS2020*, a new strategy for developing the international financial services sector. The aim of the Strategy is to ensure that existing jobs are protected to ensure the sector can take advantage of new and emerging global opportunities for the remainder of the decade. The Strategy sets a target to grow the numbers in employment in the sector from its current base of 35,000 to 45,000 by the end of 2019.

The IFS sector in Ireland is a broad-based industry, with several sub-sectors including:

- Fund & Asset Management;
- International Banking (including Securitisation);
- Insurance & Reinsurance;
- Aircraft Leasing & Financing
- FinTech (including Payments & Money Transfer)
- Corporate Treasury
- Professional Services (including BPO)

However, the industry today is faced with significant challenges, including growing international competition for IFS investments, and the rapid transformation of financial services business models and products.

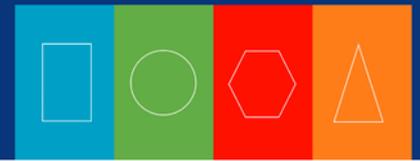
The global trends and challenges shaping the IFS industry, include:

- ICT developments;
- Big Data;
- increased emphasis on risk, compliance and security;
- new business models, products and services; and
- the intensified global competition for talent.

The IFS sector is competing with other sectors for graduates in disciplines such as ICT, engineering, mathematics, data analytics, business and law. This competition for talent has been accentuated in more recent years as the convergence between ICT and IFS has accelerated. However, the sector in Ireland is mobilising to address its skills needs.

¹³ <http://www.finance.gov.ie/sites/default/files/IFS2020.pdf>

¹⁴ <http://www.finuas.ie/documents/IFSSkillsNeedAnalysis.pdf>



The High-Level ICT skills areas in demand as described in Chapter 1 and the Big Data & Data Analytics skills needs outlined in Chapter 2 apply also to the International Financial Services sector. In this context, measures to address ICT and Data Analytics shortages, similarly apply to, and benefit, the International Financial Services sector.

Fund and Asset Management

The Funds and Asset Management sector has been one of the leading IFS sectors in terms of jobs growth in the past five years. Since 2010 approximately 2,000 new jobs have been created, bringing overall employment to over 13,000 in this sector.

Regulation expertise has been identified as the number one skills need, primarily driven by regulations such as AIFMD (Alternative Investment Fund Managers Directive), UCITS (Undertakings for Collective Investment in Transferable Securities Directive) and FATCA (the US Foreign Account Tax Compliance Act). As Irish based Fund and Asset Management companies move up the value chain, they are moving from a traditional role of fund administrator to a governance and oversight role. Job roles are becoming less functionalised, require more end-to-end business process knowledge and teams are moving to a more complex matrix environment compelling management to have an increased focus on managing teams remotely as well as managing external vendors.

Fund Managers are now expected to provide more innovative, diverse and attractive hybrid products, building the requisite valuation expertise as well as preparing more increasingly complex models and implementing the supporting operational procedures.

Fintech

Fintech (Financial Technology) is best described as innovation in financial services enabled by technology. FinTech companies are easing payment processes, reducing fraud, saving users money, promoting financial planning, and ultimately moving a large industry forward.

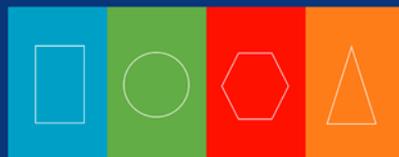
The outlook for growth in Ireland's FinTech sector is very encouraging but the sector is competing with other sectors in the economy for highly-skilled individuals particularly in the ICT area. In a survey conducted by Finuas¹⁵ to establish the IFS skills needs, the FinTech companies identified technology as their number one skill need.

Aviation Financing

With over 30 top aviation leasing companies operating from bases in Dublin and Shannon, Ireland is the world leader in this fast growing financial services sector. The outlook for the sector is positive with over 100 new jobs announced in 2015 in addition to the 650 employees currently employed in the sector. Over the next two decades, \$2.5 trillion additional aircraft leasing demand is expected to materialise globally and Ireland is well placed to attract half of that demand.

The skills sets required for aviation financing are considered niche and highly specialised. Industry knowledge is the primary skill, followed by regulatory knowledge. The key challenge is recruiting

¹⁵ Through Skillnets, the Government is supporting the IFS-specific Finuas programme, which has a demonstrated strong track record of engaging with and responding to the sectors skills and training needs. Finuas Skillnets have 400 member companies, and since 2009 have delivered over 1,000 training courses were delivered to 7,900 employed people.



staff with the combined commercial and technical skills in parallel with extensive industry knowledge.

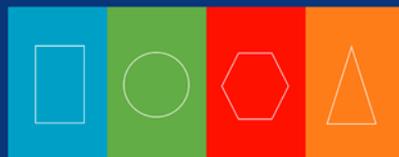
Across the range of IFS sub-sectors the skills currently in demand are outlined below:

Table 5.1: Skills for International Financial Services

Skills for International Financial Services
<ul style="list-style-type: none"> ▪ Regulation and Compliance to include: <ul style="list-style-type: none"> ▫ Data Protection; ▫ Financial Crime Prevention; ▫ Depositary, risk and middle office.
<ul style="list-style-type: none"> ▪ Risk Analysts with expertise in: <ul style="list-style-type: none"> ▫ Data analysis and Data visualisation, ▫ Quantitative modelling; ▫ Big data web analytics; and ▫ Forecasting, evaluation and reporting.
<ul style="list-style-type: none"> ▪ High-level ICT Skills and Big Data and Analytics. (see Chapter 1 High-Level ICT Skills, and Chapter 2 - Big Data and Analytics Skills).
<ul style="list-style-type: none"> ▪ Hybrid technologists - business analysis with <u>IT/systems skills</u>. (see Chapter 1 - High Level ICT Skills).
<ul style="list-style-type: none"> ▪ Project and Change management: <ul style="list-style-type: none"> ▫ 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.
<ul style="list-style-type: none"> ▪ Leadership and People Management (see Chapter 13 - Cross-enterprise Skills)
<ul style="list-style-type: none"> ▪ Process innovation and product development for the various IFS sub-sectors;

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



6. Skills for the Manufacturing Sector

EGFSN Report: *Future Skills Requirements of the Manufacturing Sector to 2020* (2013)¹⁶

Ireland's manufacturing base is a key pillar of Ireland's economy. The sector continues to deliver strong growth and job creation, and is a key driver of innovation. Manufacturing is also changing dramatically, driven by changing consumer demands, the rapid pace of advances in technologies, environmental concerns, intensified globalisation and competition. New materials (e.g. ceramics, polymers, graphene) and associated new processing methods have the potential to revolutionise existing industries and create new ones.

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

This Chapter summarises skills demand common across many different manufacturing subsectors while Chapters 7-9 summarise the skills needs specific to Medical Devices, Biopharma-Pharmachem and Food & Beverages.

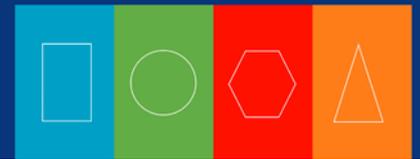
There is a challenge for some manufacturing enterprises in attracting talented graduates, as many graduates are sought after for other sectors, including services. Replacement demand for the sector is estimated in the region of 4,000 to 5,000 per annum regardless of whether employment expands or not, 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.

6.1 All Manufacturing Skills

In its report on Manufacturing the EGFSN identified a demand for **mechanical engineers** with particular emphasis on skills related to automation, development and design.

The report also recommended that Springboard provide **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**.

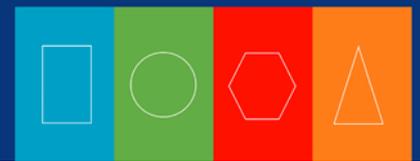
¹⁶ <http://www.skillsireland.ie/publication/egfsnSearch.jsp?ft=/publications/2013/title,10363,en.php>



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

Table 6.1: All Manufacturing Current & Future Skills Needs

All Manufacturing Current & Future Skills Needs
<ul style="list-style-type: none"> ▪ Mechanical Engineers with: <ul style="list-style-type: none"> □ Process Automation & System Control Skills; and □ Product innovation skills - product development & design.
<ul style="list-style-type: none"> ▪ Engineers with specialisms in: <ul style="list-style-type: none"> □ Validation; □ Quality; □ Polymer; □ Supply Chain; and □ Automation.
<ul style="list-style-type: none"> ▪ Lean manufacturing skills.
<ul style="list-style-type: none"> ▪ Knowledge of Additive Manufacturing - (3D printing).
<ul style="list-style-type: none"> ▪ R&D project management skills.
<ul style="list-style-type: none"> ▪ Knowledge of data analytics: (see Chapter 2 - Big Data & Analytics Skills) <ul style="list-style-type: none"> □ 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.
<ul style="list-style-type: none"> ▪ 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.
<ul style="list-style-type: none"> ▪ Engineers with European & other foreign languages, in particular German, for technical selling, and customer-facing commercial & engineering roles. (see also Chapter 3 - Skills for International Trade)
<ul style="list-style-type: none"> ▪ Managing Change - project management & change management skills including the ability to engage/motivate people to embrace and work with change in the sector. (see also Chapter 13 - Cross-enterprise Skills)



7. Skills for the Medical Device Sector

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 24,000 people.

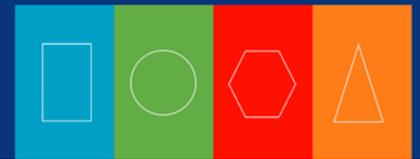
There is a very strong multinational presence in the sector with 20 of the top 30 medical devices companies globally (for example, Abbott, Boston Scientific, Medtronic) with large production facilities in Ireland. There is also a small but growing indigenous base with some notable medium sized Irish 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).

Given the critical role that many medical devices play in maintaining health and well-being and the highly regulated nature of the industry, there is a strong industry aspiration towards zero defect manufacturing embedded in the drive towards operational excellence. Hence science and engineering capability and technology (advanced metrology, automation, additive manufacturing) that can continuously improve quality metrics while increasing productivity is highly valued and sought after in the industry.

In addition to the skills demand for all Manufacturing needs listed in Chapter 6, current and future skills in demand the Medical Devices area which were identified by the EGFSN and in engagement with enterprise are as follows:

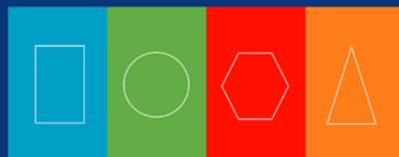
Table 7.1: Medical Devices Current & Future Skills Needs

Medical Devices Current & Future Skills Needs
<ul style="list-style-type: none"> ▪ 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.
<ul style="list-style-type: none"> ▪ Precision engineers, tool makers and metrology experts
<ul style="list-style-type: none"> ▪ Regulatory Compliance for the medical device sector - NFQ Level 8/9.
<ul style="list-style-type: none"> ▪ Quality engineers in the medical devices industry for quality assurance, interaction with internal corporate quality auditors and regulatory affairs.
<ul style="list-style-type: none"> ▪ Mechanical engineers with honours Bachelor degrees. (see also Chapter 4 - Engineering Skills)
<ul style="list-style-type: none"> ▪ Automation engineering skills with a particular focus on robotics and machine vision. (see also Chapter 4 - Engineering Skills)



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 (see also Chapter 1 - High Level ICT Skills)
- **Metallurgy, advanced material and surface science expertise**, in particular advanced alloys, composites and surface coatings/modifications.
- Expertise in **additive manufacturing, polymer, metal and novel materials**.
- **Product assurance** skills including software and validation skills for software quality assurance, change approval, risk assessment and failure mode analysis. (see also Chapter 1 - High Level ICT Skills)
- The skills to drive **operational excellence** and maintain the highest quality standards in manufacturing, including skills in managing technology, change, strategy, cost control and leadership.
- **Supervisory soft skills**, especially people engagement skills. (see also Chapter 13 - Cross-enterprise Skills)



8. Skills for the Biopharma-Pharmachem Sector

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 2014, 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. The industry has moved from a majority of small molecule manufacturing to more complex Biopharma manufacturing. 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 segment continues to grow, with associated skills needs.

Employment in Biopharma in Ireland has grown from 400 in 2004 to 6,000 in 2015. The majority of people employed in the sector remain engaged on manufacturing and process development. IDA has a number of significant Biopharma investments in its pipeline and it is estimated that an additional 5,000 jobs will be created in this sub-sector by 2018. FDI projects in this sphere typically involve capital investment that supports jobs in the construction phase.

Investment in skilling/upskilling for the Biopharma sector will help in ensuring that Ireland can win new investments by avoiding a skills gap in Biopharma manufacturing. In particular there is a strong demand for technicians and senior process scientists and engineers. Work-place learning or simulated learning would be particularly beneficial in this sector. The need to develop transversal skills, such as people skills, communications skills and team working, has also been identified as important by the sector, and should be integrated into courses.

The skills needed to serve the Biopharmaceutical manufacturing sector are in Table 8.1 below:

Table 8.1: Bio-Pharma Manufacturing Current & Future Skills Needs

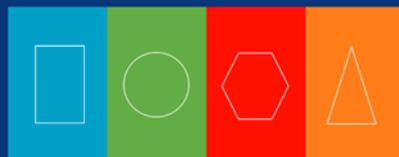
Bio-Pharma Manufacturing Current & Future Skills Needs

- **Bioprocess engineering** -including emphasis on:
 - single use manufacturing systems,
 - sterile producing and aseptic techniques,
 - buffer and media preparation,
 - clean utilities,
 - upstream and downstream processing,
 - process intensification
 - continuous processing
 - downstream process optimisation
 - bioanalytics



Bio-Pharma Manufacturing Current & Future Skills Needs

- process validation,
 - cleaning validation,
 - quality assurance.
-
- **Regulatory affairs** in biopharmaceutical manufacturing & release testing;
-
- **Bioprocess analytical technology & Data Analytics Skills /Data Savvy;**
-
- **Science Graduates** - with knowledge of:
 - Molecular biology,
 - process development for bio-pharma production,
 - analytical biochemistry,
 - QC method development and quality assurance.
-
- **Small Molecule manufacturing:**
 - Continuous manufacturing (drug substance and drug product)
 - Biocatalysis/green chemistry
 - Solid state pharmaceuticals
 - Advanced formulation
-
- **Product Development and Design.**
-
- **Supply chain management for bio-processing.**
-
- **Engineers with specialisms in Commissioning** - overseeing the installation of systems, plant and/or equipment. (see Chapter 4 - Engineering Skills)
-
-All underpinned by transversal skills such as team working, communications skills, etc.



9. Skills for the Food & Beverages Sector

The Food and Beverages sector is enjoying a period of strong performance. Bord Bia estimates total food and drink exports of €10.8 billion in 2015, representing an increase of 51% (€3.6 billion) in value since 2009. Dairy (30%) and meat (34%) accounted for the majority of exports, but prepared foods (17%), beverages (12%) and seafood (5%) were also important. Half of the exports were by indigenous Irish companies.

The industry remains a key component of Ireland's modern economy, accounting for 7.2% of Gross Value Added and providing employment for 163,000 people. Irish Food and Beverage products are sold in over 170 markets around the world.

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

Foreign affiliates of leading multinationals have a strong presence in Ireland, but 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.

In 2015, the Government launched *Food Wise 2025*, a ten year plan for the Agri-food sector (including Beverages). It builds on the previous *Food Harvest 2020* strategy and identifies ambitious and challenging growth projections for the industry over the next ten years including:

- An 85% increase in exports to €19 billion;
- A 65% increase in primary production value to €10 billion;
- A 70% increase in the sector's value addition to the economy, to over €13 billion; and
- The creation of 23,000 additional jobs all along the supply chain from producer level to high end value-added product development.

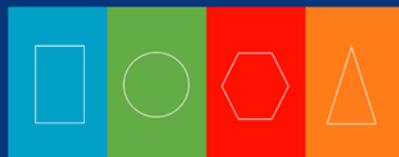
Food Wise 2025 acknowledges that the Agri-food sector will only achieve its full growth potential if it can address its skills needs within the industry. The sector can also increasingly be viewed as a platform and a partner in the development of other sectors of the economy such as Pharma, Tourism, Bio-economy, Biotechnology, IT including Big Data, and precision technologies.

While there is significant optimism about the potential of the Food & Beverages sector, companies have recorded difficulties recruiting technical staff. In addition to the skills need identified in the All Manufacturing skills needs listed in Chapter 6, current and future skills needs for the Food & Beverages sector which were identified by the EGFSN are shown on Table 9.1.



Table 9.1 Food & Beverages Current & Future Skills Needs

Food & Beverages Current & Future Skills Needs
<ul style="list-style-type: none"> ▪ R&D scientists, food technologists and process engineers <ul style="list-style-type: none"> □ Innovation - process innovation and product innovation.
<p>Process engineers with expertise in:</p> <ul style="list-style-type: none"> □ Process optimisation/intensification including continuous processing □ Advanced chromatography/separation science □ Enzymology/biocatalysis □ Colloidal and powder flow, advanced mixing and sparging □ Process analytical technology □ Biochemical analytical methods
<ul style="list-style-type: none"> ▪ New Product Development skills.
<ul style="list-style-type: none"> ▪ Laboratory technicians- niche areas including technicians working with customers to develop products most suitable for markets.
<ul style="list-style-type: none"> ▪ Process control software engineering (see also Chapter 1 - High Level ICT Skills)
<ul style="list-style-type: none"> ▪ International sales/marketing & languages for developing business in the UK, Europe & the Far East. (see also Chapter 3 -Skills for International Trade)
<ul style="list-style-type: none"> ▪ Cost Accountants
<ul style="list-style-type: none"> ▪ Production/supervisory management (see also Chapter 13 - Cross-enterprise Skills) ▪ Upskilling operatives & supervisory level staff



10. Skills for the Construction Sector

Report: [Ireland's Construction Sector: Outlook and Strategic Plan to 2015](#) (Forfás, 2013)¹⁷

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 2015, the sector employed over 127,400 persons, regionally distributed across a variety of occupations and skills level. Year-on-year, employment in the sector increased by 15,000, representing 26% of the net increase in employment nationally, albeit from a low base following the recession. In 2016, the sector is expected to grow from an €11bn industry to a €15bn industry. Construction by its nature is a cyclical industry, aligned with economic performance generally. Employment levels will grow in line with increased activity although employment figures will not reach the peak levels of 2007.

The dramatic contraction of the domestic construction industry has changed the construction skills landscape. As the economy recovers, the sector is beginning to encounter skills shortages. There are growing concerns that the industry in Ireland is already short on capacity to deliver, and that skills shortages of 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 Quantity Surveyors (particularly Mechanical & Electrical), wet trades (bricklayers, plasterers and decorators) and semi-skilled operatives** (e.g. steel fixers, concrete workers, dry liners etc.).

Developments in the green economy, including EU Climate Change targets are generating **on-going need for up-skilling** across the sector.

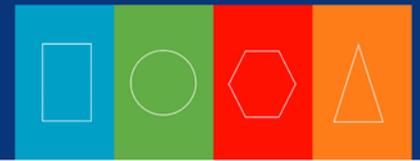
Over €4bn in capital investment has been announced in biotech in the last three years, with more expansions and greenfield investments in pipeline. These projects are extremely complex and need some particularly **high end construction skills** over extended construction times, in particular in areas such as power supply, air handling systems, steam generation and handling, plumbing, waste and orbital welding. Some of the big dairy processing plants being developed following the end of dairy quotas have similar requirements. Investments in Green Energy based data centres also require some specialised skills. Further large scale investments in the semiconductor space could also result in significant requirement for specialised construction skills.

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.

¹⁷ <http://www.forfas.ie/publication/search.jsp?ft=/publications/2013/Title,10996,en.php>

¹⁸ Finding a middleware ICT solution for the Irish construction SME sector, Hore, A.V., Redmond, A. & West, R., RICS publication, Sept, 2010



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

- 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 overseas 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.

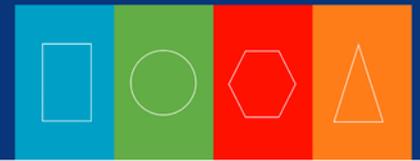
In its report, the EGFSN undertook an analysis of the future skills needs of enterprise within the Green Economy, which served to underline the pervasiveness of the green skilling needs across emerging 'green' sectors as well as for existing activities (including construction). More recently, under the EU *Build-Up Skills Initiative (BUSI)*²², a coalition of academics and industry representative

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.



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 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 successful 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.

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. There is an increasing demand for Quantity Surveyors, particularly in the mechanical and electrical sectors to meet the demand of growing FDI investment in high tech industry.

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 10.1 below:

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

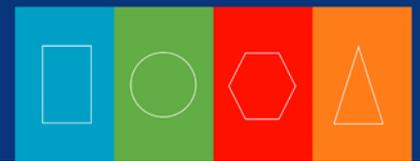
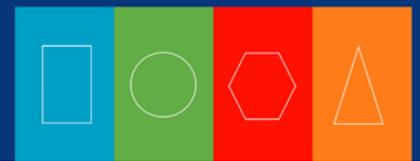


Table 10.1: Skills for Construction

Skills needs for the Construction Sector
<ul style="list-style-type: none"> ▪ Chartered Surveyors, in particular: <ul style="list-style-type: none"> ▫ Quantity Surveyors (particularly Mechanical & Electrical); and ▫ Property Surveyors.
<ul style="list-style-type: none"> ▪ Use of ICT within the sector in particular Building Information Modelling (BIM) systems.
<ul style="list-style-type: none"> ▪ Lean Construction process improvement techniques.
<ul style="list-style-type: none"> ▪ Knowledge of Building Regulations and the ability to manage the implementation of: <ul style="list-style-type: none"> ▫ Building Regulations 1997 - 2014; ▫ Building Control Amendment Regulations 2014 and the associated requirements to ensure compliance with quality and procedures.
<ul style="list-style-type: none"> ▪ Advanced welding techniques - which is particularly relevant to the pharmaceutical and food industry construction projects.
<ul style="list-style-type: none"> ▪ 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: <ul style="list-style-type: none"> ▫ Solar PV (Photo Voltaic) - planning, design and installation. ▫ Energy Management systems
<ul style="list-style-type: none"> ▪ High-end construction skills for major capital investment projects, in particular in areas such as power supply, air handling systems, steam generation and handling, plumbing, waste and orbital welding.
<ul style="list-style-type: none"> ▪ Business acumen and Commercial awareness skills.
<ul style="list-style-type: none"> ▪ Skills required for internationalisation (see also Chapter 3 - Skills for International Trade)
<ul style="list-style-type: none"> ▪ Management capability: (see also Chapter 13 - Cross-enterprise Skills) <ul style="list-style-type: none"> ▫ 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.

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.



11. Skills for the Freight Transport, Distribution and Logistics Sector

EGFSN Report: [Assessing the Demand for Skills in the Freight Transport, Distribution and Logistics sector in Ireland 2015- 2020](#) (2015)

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 and/or HGV drivers who wish to progress into a managerial role. 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.

11.1 Transport and Distribution Managers

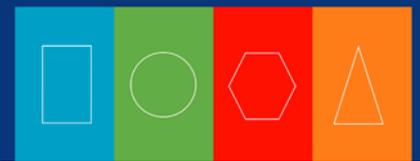
The content of the training for transport and distribution managers should cover both domestic and international freight-by the various modes - road, air, sea and rail.

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 11.1: 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. Ensure logistical security across multi-modal supply chains.
▪ 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 and documentation requirements.
▪ Supervises day-to-day activities in the transport operation.



Skills needs for Transport and Distribution Managers

- Good customer relationship skills with the ability to resolve any complaints and problems quickly and effectively. (see Chapter 13 - Transversal Skills)

11.2 Storage and Warehousing Managers

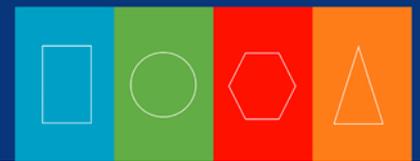
The content of the training for Storage and Warehousing managers should cover the requirement of cold storage warehousing for high value food stuffs and pharmaceutical products and the specific security screening and aviation related requirements of aviation warehousing.

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 transversal 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 11.2: Skills needs for Storage and Warehousing Managers

Skills needs for Storage and Warehousing Managers
<ul style="list-style-type: none"> ▪ 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.
<ul style="list-style-type: none"> ▪ Works effectively with other departments to determine the materials and other items required for current and future production schedules and sales commitments.
<ul style="list-style-type: none"> ▪ Ability to review, develop and implement stock control, handling and distribution policies to maximise use of space, money, labour and other resources.
<ul style="list-style-type: none"> ▪ Competent to develop and manage budgets and preparing reports on expenditure.
<ul style="list-style-type: none"> ▪ Decides on storage conditions for particular items, allocates warehouse space and arranges for regular stock inspections to detect deterioration or damage.
<ul style="list-style-type: none"> ▪ Transversal Skills: (see Chapter 13) <ul style="list-style-type: none"> □ People skills □ Relationship management □ Communication skills



12. Skills for the Leisure, Tourism & Hospitality Sector

The Hospitality sector is one of the most important services sector in the Irish economy. It directly employs 158,000 persons within 16,000 enterprises. It also makes a valuable contribution to regional and local economies. A continuing growth in the Hospitality sector is leading to increased demand for employees of varying skill levels.

There is one area of the Hospitality sector for which a Springboard programme at **Minor award NQF Level 6** would be suitable and that is for a six-month programme in **Culinary Skills with (30 ECTS credits)**.

The programme should be designed to integrate theory and practice and provide a relevant professional qualification for those who wish to follow an entry level career opportunity in Culinary Arts. The theory and practical elements should be delivered in both a college and industry environment.

The programme would enable students to develop their career in culinary arts, entry level commis chef, kitchen management, food product development and food safety for growing opportunities available within restaurants, cafes, hotels, industrial and contract catering, licensed trade and food preparation. There should be an entrepreneurship element within the programme to support those who wish to start up their own business.

As with any Springboard Programme the programme should be developed with the support of industry who would provide the work experience opportunities and industry expert guest speakers within the programme. The delivery of the programme should be supported by mentoring within the workplace to ensure that the student is gaining relevant and valuable experience and applying the skills learnt in college to working in a hospitality establishment.

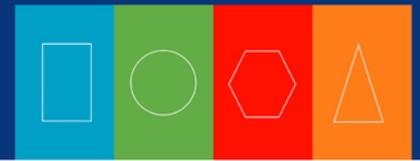
The programme should preferably be designed to enable those complete it to progress onto Year 2 of the Higher Certificate (Level 6) in culinary arts. Applicants for the programme should hold a National Framework award at Level 5 or level 6 and have an interest and aptitude for the work.

Table 12.1: Skills needs for Leisure, Tourism and Hospitality

Minor Award Certificate in Culinary Skills - Level 6 (250 persons)

The content of the programme should include:

- culinary skills,
- contemporary cuisine,
- pastry skills,
- restaurant service,
- food standards and hygiene,
- calorie counts,
- nutrition,
- allergen requirements,
- modern drink serving skills
- customer service,
- start-your-own- business, and
- the use of social media & IT tools.



13. Cross-enterprise (transversal) Skills

Almost all sectors of industry are becoming more knowledge-intensive. However, in tandem there has been a rise in the importance of so called “generic” or transversal skills, which are transferrable across companies and across sectors. These skills include, for example, 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.

In the modern work environment, transversal skills are seen as increasingly important by employers across a range of occupations and sectors. They are often referred to as *generic*, *core*, *basic* or *soft skills*. They encompass a wide-ranging and body of knowledge and skills that are not always easy to define or categorize. The transversal skills in demand, as identified through engagement with industry, include (are not limited to):

- **Entrepreneurship**²⁴ - Interpersonal Skills; Creative & Innovation Skills; Practical Skills.
- **Creativity, Design and Innovation**²⁵ - the process of moving from generation to successful exploitation of new ideas.
- **Critical / Analytical Thinking Skills** - problem solving,
- **People Skills** - relationship building; team work; emotional intelligence; negotiation and communication.
- **Management Skills**^{26,27} - general, HR, marketing, financial; strategic and supply chain management for SMEs and internationally trading companies.

This Chapter deals specifically with those transversal skills which can be required in any sector and all enterprises, and range from people skills to management skills, to analytical and conceptual thinking skills.

In providing for transversal skills development in Springboard+ courses, the objective is not necessarily to address these skills separately, but to embed and acknowledge their importance within programmes so that they can be practically applied and developed.

13.1 Entrepreneurship, Creativity, Design & Innovation

DJEI Report: [National Policy Statement on Entrepreneurship in Ireland](#) (2014)²⁸

EGFSN Report: [Skills in Creativity, Design and Innovation](#) (2009)²⁹

There is a close relationship between Entrepreneurship, Creativity, Design and innovation. Entrepreneurial activity can be improved with an increased emphasis on creativity and design, turning inventions into innovations for markets and customers.

Entrepreneurship, Creativity, Design & Innovation are key drivers of productivity improvement and are needed in all industries and in all occupations. Being entrepreneurial is not just about starting

²⁴ [“National Policy Statement on Entrepreneurship in Ireland”, October 2014](#)

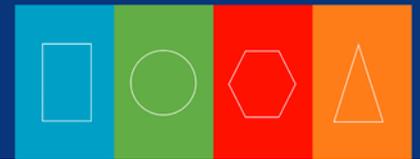
²⁵ [Skills in Creativity, Design and Innovation](#)

²⁶ <http://www.managementworks.ie/about>

²⁷ [Enterprise 2025, Ireland’s National Enterprise Policy, 2015 - 2025](#)

²⁸ <https://www.djei.ie/en/Publications/Publication-files/Policy-Statement-Entrepreneurship-in-Ireland.pdf>

²⁹ <http://www.skillsireland.ie/media/egfsn-091104-cdi.pdf>



and running a business. It is about the willingness and ability of individuals to turn ideas into action. Entrepreneurial skills, along with creativity, design and innovation, can be used by employees to provide innovative inputs within organisations. Springboard is an ideal vehicle to both build the capability and pipeline of entrepreneurs and entrepreneurial thinking.

Entrepreneurship is a fundamental driving force in any economy and 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, but two-thirds of all new job-creation comes from start-up businesses in the first five years of their existence.

The Government's "*National Policy Statement on Entrepreneurship in Ireland*"³⁰, launched in October 2014, is an ambitious plan to increase the numbers of quality of start-ups in Ireland over the next five years. The National Skills Strategy 2025 also places a strong emphasis on developing entrepreneurship, creativity and innovation skills.

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

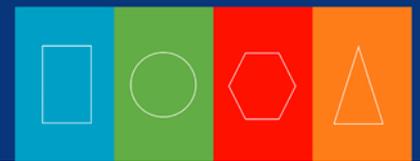
- 1 Building the pipeline - increase the numbers of entrepreneurs, who will actively engage in creating high quality business start-ups and jobs across the country; and
- 2 Building the entrepreneurial capability - develop entrepreneurial skills among the general population and nurture entrepreneurial thinking and talent.

Springboard 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 13.1 below:

Table 13.1: Entrepreneurship Skills

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

³⁰ <http://www.djei.ie/enterprise/smes/PolicyStatementEntrepreneurshipinIreland.pdf>



13.2 Creativity, Design & Innovation

Creativity, design and innovation are key drivers of productivity improvement and are needed in all industries and in all occupations. In this context:

- **Creativity** is imagination applied for the purpose of creating economic value and is generally about finding new ways to apply 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 creates economic value, generally through creating a new or improved product or service, improving the way a business operates internally, or how it relates to the business system to which it belongs to bring greater value to its customers.

Internationally there is an increasing policy focus on leveraging design as a driver of innovation. The Irish Government designated 2015 the Year of Irish Design (ID2015). This presented 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.

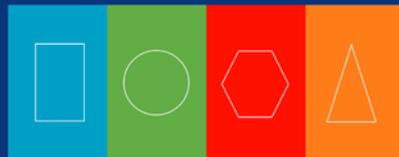
Given the talent and reputation for creativity in Ireland, the Irish design sector has the potential to act as a driver in Irish economic recovery and innovative growth. Creative qualifications are highly sought-after by the best global companies because creative people are generally able to think independently 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.

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.

Some common skills are required to enhance creativity, design and innovation are outlined in Table 13.2.

Table 13.2: 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: <ul style="list-style-type: none"> ▫ problem solving, information processing and critical thinking; ▫ communication skills;



Creativity, design and innovation

- team-working.
- Innovation management.

13.3 People Skills, Conceptual/Analytical Thinking Skills and Management Skills

While specific knowledge and technical skills are imparted through education and training, transversal skills, such as the ability to work as part of a team, provide good customer service, critically analyse situations and make sound decisions based on the information available, are qualities which are increasingly being sought by employers.

Improved management capability in companies of all sizes will improve productivity, innovation and make the best use of skills available to companies. Training and executive education are key tools for companies to grow and develop their existing in-house teams. The development of managers and their ability in turn to develop their staff is critical in supporting Irish enterprises to export and grow to scale.

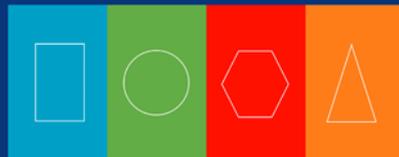
The Report of the Management Development Council (MDC)³¹ published in 2010, cited research carried out by McKinsey Consultants which found that the level of general management skills in Irish businesses was relatively poor, particularly in specific functional skills such as human resources, marketing and finance, and in forward planning and strategic management. Highly proficient leadership, with ambition, vision and strong management teams, is fundamental if a firm is to identify and anticipate changing market dynamics and to fully understand its customer base.

Management capability is being developed through programmes organised by Enterprise Ireland, Skillnets, and many others. However, in the context of further developing the transversal skillset, there is scope for building some of the skills set out on Table 13.3 below into Springboard courses.

Table 13.3: People, Management and Critical Thinking Skills

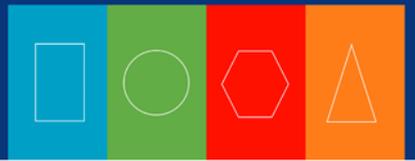
People, Management and Critical Thinking Skills
<ul style="list-style-type: none"> ▪ People-related skills: <ul style="list-style-type: none"> ▫ Communication; ▫ Interpersonal; ▫ Team-working; ▫ Customer-service; and ▫ Effective networking.
<ul style="list-style-type: none"> ▪ Conceptual / analytical thinking skills: <ul style="list-style-type: none"> ▫ Collecting and organising information; ▫ Problem-solving; ▫ Planning and organising; and ▫ Learning-to-learn skills.

³¹ <https://www.djei.ie/en/Publications/Publication-files/Forf%C3%A1s/Management-Development-in-Ireland.pdf>



People, Management and Critical Thinking Skills

- Management skills:
 - Strategic Business Planning & Development;
 - Resource & Change management;
 - Project & Contract management;
 - Sales, Marketing & Operations management; and
 - Global partnership management.



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