Future Skills Needs of the Biopharma Industry in Ireland

An Roinn Post, Fiontar agus Nuálaíochta
Department of Jobs, Enterprise and Innovation

Expert Group on
Future Skills Needs

Objective of Study

- To Review the Skills Needs of the Biopharma Industry in Ireland up to 2020, with a specific focus on Biologics manufacturing, a growing sector of the Industry.

- Typology of Companies covered include those that are engaged in one or more of the following activities:
  - Biologics manufacturing – “large molecules”.
  - Pharmaceutical “small molecules”.
  - Biopharma related services.

- The Study is included as an action in the Action Plan for Jobs 2016.

- The most recent related study was carried out in 2010.

Methodology

- Workshops were held in Cork and Dublin on skills demand and supply issues involving companies, Biopharmachem Ireland, education and training providers, IDA Ireland, Enterprise Ireland and Science Foundation Ireland.
- A structured survey was undertaken with company and education/training key informants.
- Review of main global and domestic trends and drivers impacting on skills demand.
- Assessment of Biopharma related skills supply – by NFQ levels and by disciplines.
- Development of two future skills demand and supply scenarios up to 2020.
- Review of actions related to Biopharma skills supply in other countries.
- A "Validation Group" was established to "sense test" findings and recommendations, involving BioPharmaChem Ireland, IDA, EI, SFI, HEA, CIT, NIBRT, and Bristol Myers Squibb.

Biopharma Industry Profile

- Estimated 28,200 people engaged in the Biopharma industry in Ireland in 2015.
- Of this, 6,700 were employed in Biologics Manufacturing.
- Industry has many large–sized companies – 35 companies comprise 85% of employment.
- The Biopharma industry accounts for over €30bn in exports and €6bn in imports.
- Regionally based with concentrations in South-West, Dublin, Mid-East and West Regions.
- High share of Professional/ Associate Professional employment in the industry.
- 68% percent of the workforce are male, 38% are female.
- Significant contribution to secondary employment, especially construction and services.

Differences between Pharmaceutical versus Biologics Drugs

Pharmaceutical Drugs – Chemical based	Biological Drugs – Living organisms based
Less complex production Process	Complex production Process
Product robust - can be taken as a tablet	Fragile product - most are administered by injection rather than via the oral route
Low risk of product degradation	High risk of product degradation
Process is well defined	High process variability
Process losses not very high	Process losses can be high: 30% and upwards
Low risk of contamination	High risk of contamination
Simple analytical techniques used	Complex analytical techniques required

Views from Stakeholder research

- The Biopharma Industry is in a constant state of renewal.
- Roles in demand include Process Engineers, Scientists, Quality Assurance/Validation.
- Soft skills essential - leadership, team-working, communications, problem-solving.
- There is a global shortage of experienced Biopharma talent - especially for Biologics.
- Springboard+ and Skillnets upskilling programmes are valuable supply sources.
- Engagement between academia and companies needs to be strengthened.
- Not all students have work placements – needs to be 6-9 months duration.
- Quality of students said to be variable. Some teaching considered out-of-date.
- Graduate entrant programmes need to be opened/expanded.
- Lack of awareness among students, teachers and parents of careers in the industry.

Strengths and Weaknesses of Industry

Strengths

- Strong Cluster here of Biopharma Companies.
- Industry has a strong representative body (BPCI) and is proactively looking at its skill needs.
- Increasing R&D capacity with a high level of collaborative academic/public research.
- NIBRT is an internationally renowned centre for Biologics research and training.
- Industry making use of Springboard+ and Skillnets upskilling programmes for unemployed.

Weaknesses

- Limited awareness of the success and scale of the Industry and available rewarding career opportunities.
- Engagement between companies and academics has weakened over recent years (although there is recognition of the need to improve).
- Many students do not receive structured work place training.
- Academia require funding resources to provide experiential learning for students.

Opportunities

- Cluster here offers economies of scale re supply of services and supply chain activities.
- Proposal could be made for a new Biopharma Apprenticeship and National Career Traineeship.
- Opportunities here to engage in Clinical Trials with recent establishment of Health Innovation Hub.

Threats

- Concern given scale of growth re a sufficient skill supply to support Biologics employment and business growth.
- That as a result of possible tightening skills supply, the cost base of the industry might dis-improve.

Drivers of Change Impacting on skills Demand

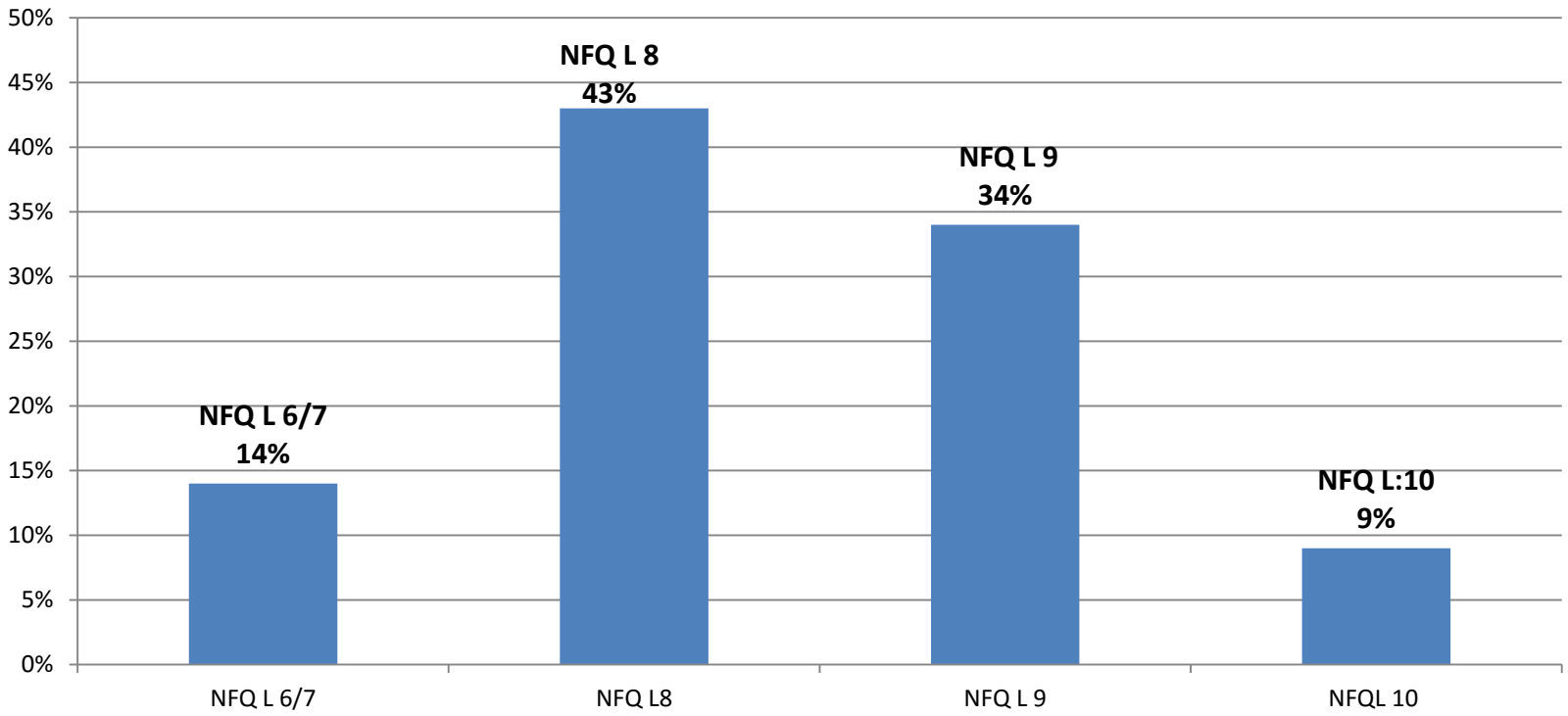
Global

- Competitiveness and Productivity-operational excellence is essential.
- Stringent Quality Compliance and Regulatory Demands - US Food and Drink Administration.
- Use of new technologies including advanced analytics.
- The growth of advanced data capture from patients and production processes.
- Increasing proportion of new medicines are “large molecule” Biologics based.

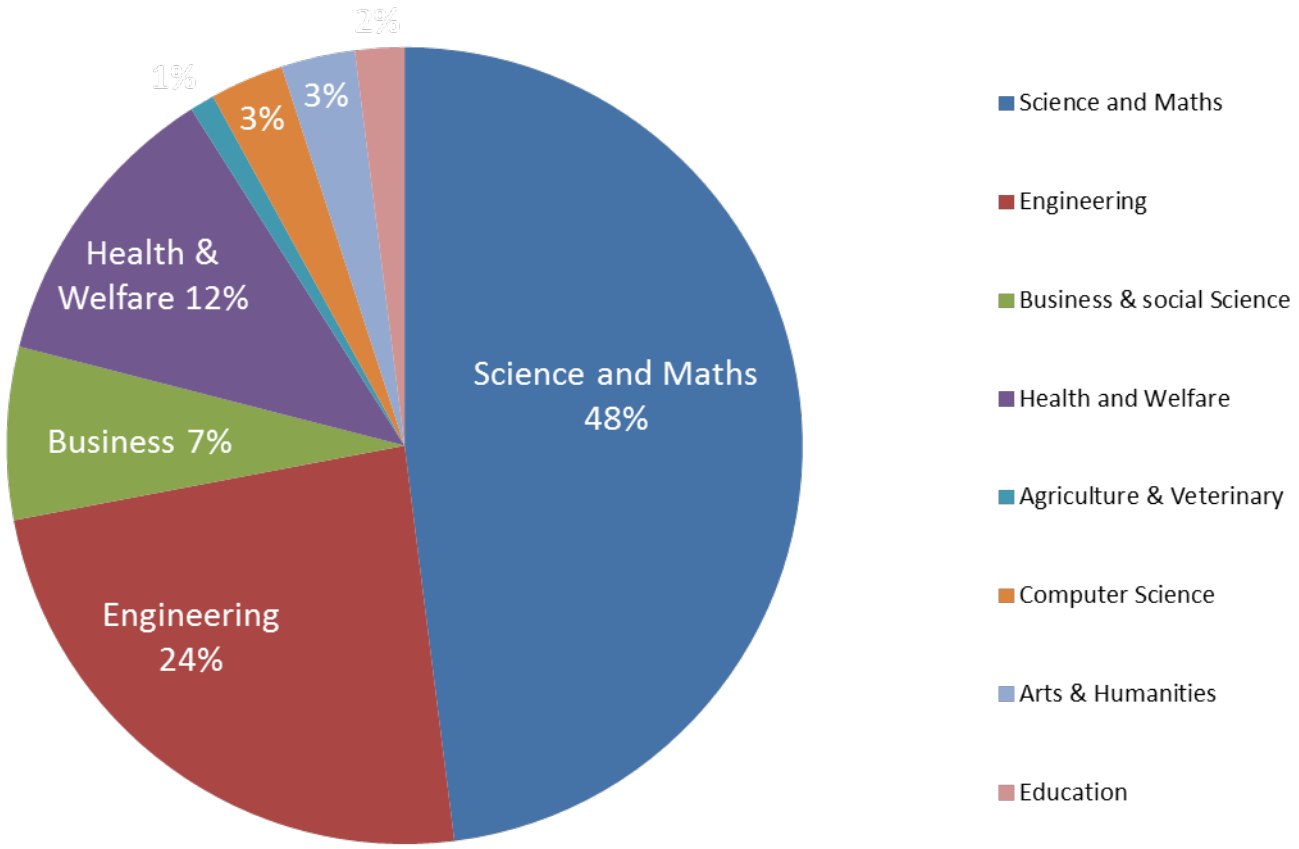
Domestic

- Post-Patent Cliff environment has improved.
- Strong pipeline of Biologics manufacturing Investments of over €4 bn.
- Pharma “small molecules” move towards continuous manufacturing, lower volume, higher value runs.
- Strong research collaboration between Biopharma industry and State supported research centres.
- Investment made in NIBRT as a centre of Biologics process research and training.

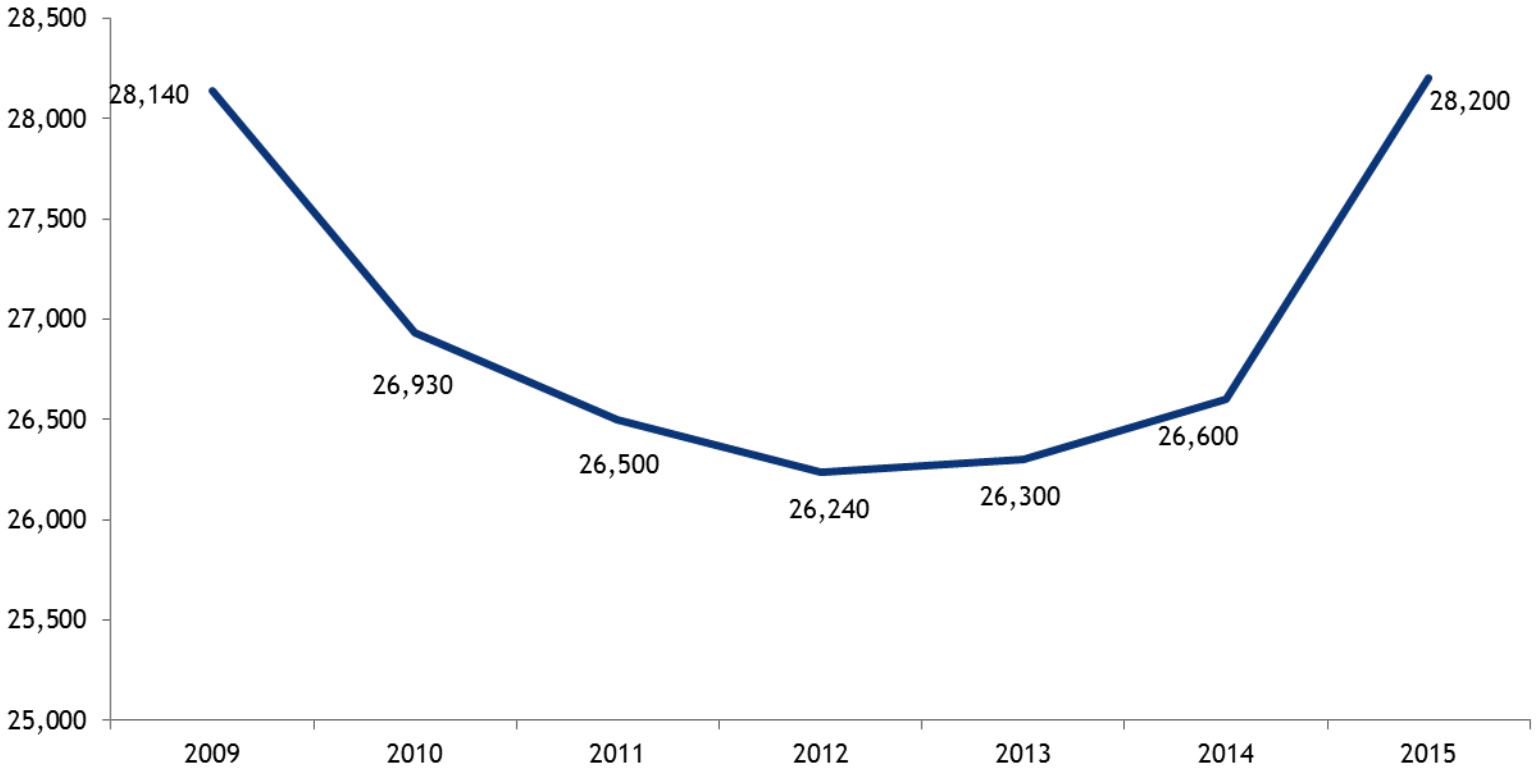
Biopharma Industry Graduate Entrants - Estimated Breakdown by NFQ Levels



Biopharma Industry Graduate Entrants - Estimated Breakdown by Main Discipline areas



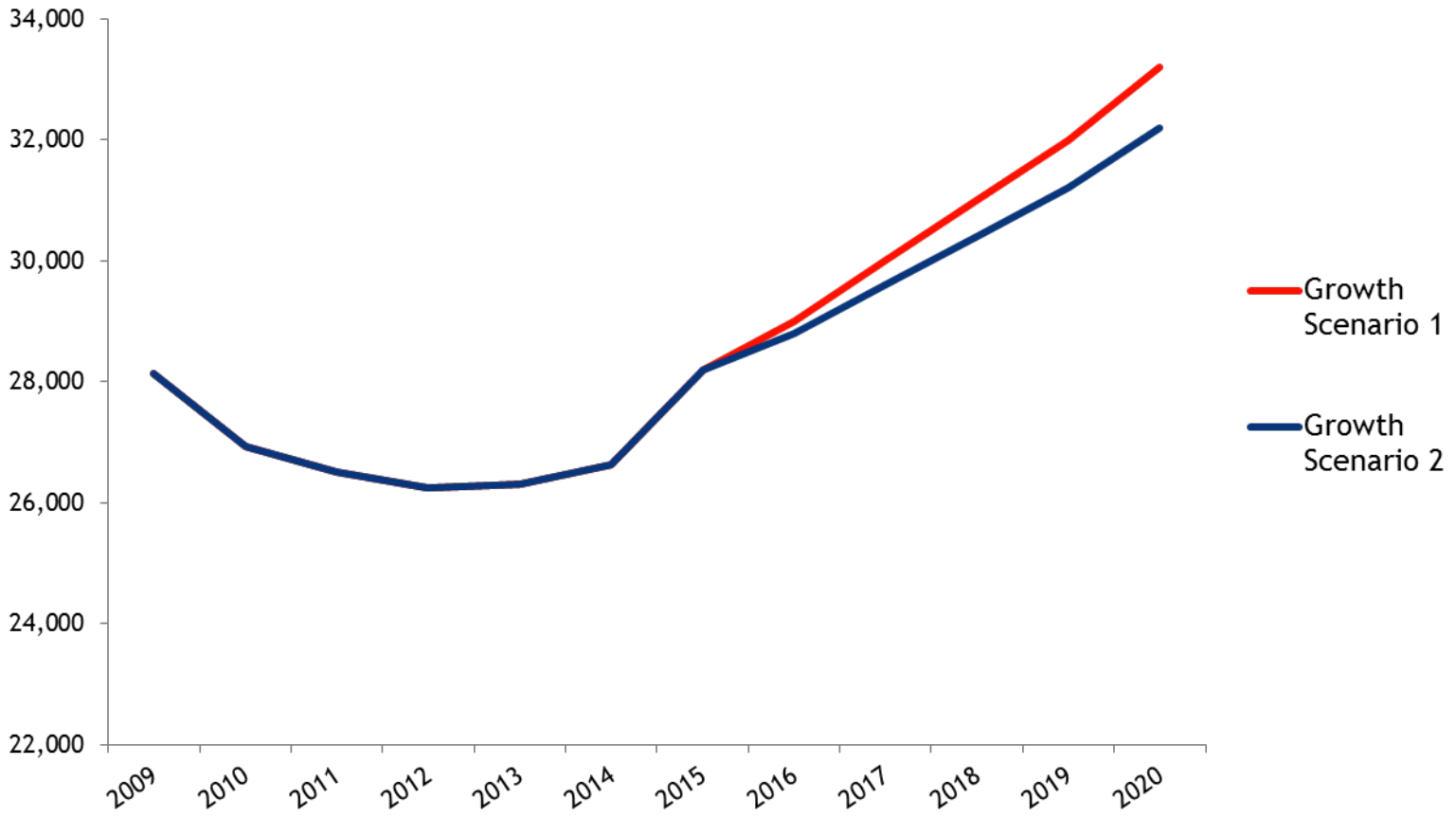
Biopharma Industry Employment Trends



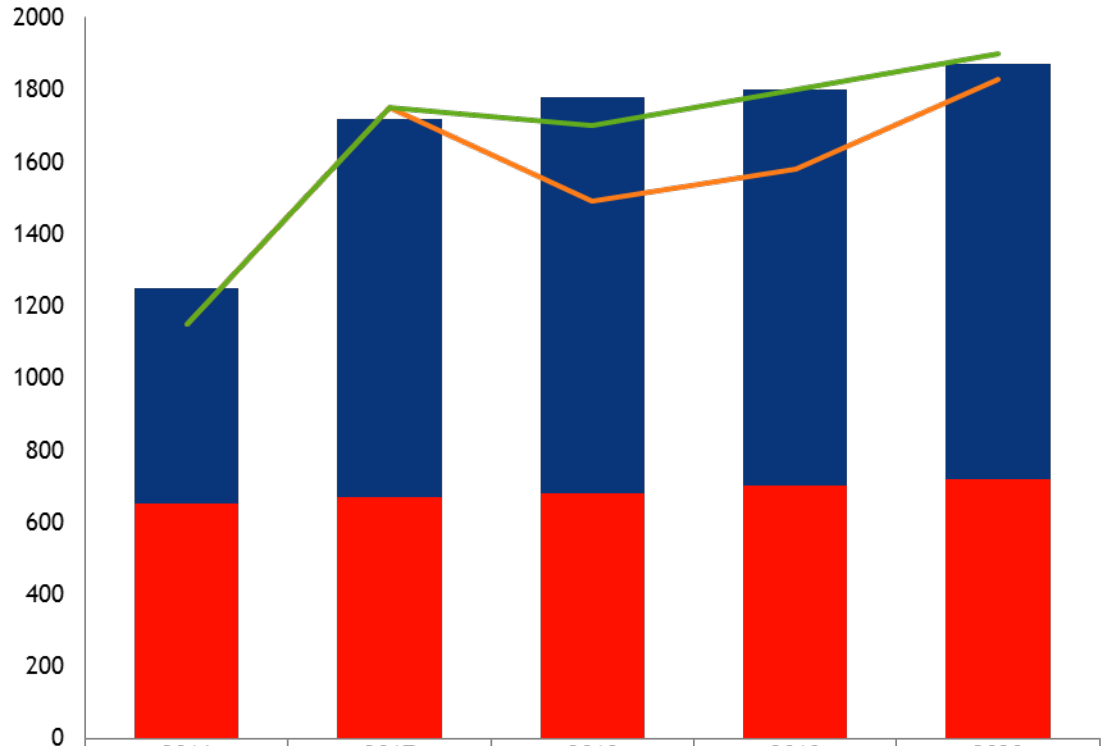
Anticipated Future Skills Demand

- In assessing future skills demand, it is anticipated that Biologics manufacturing employment will grow from 6,700 in 2015 to 11,700 by 2020, whilst Pharmaceutical and related services employment will remain stable at 21,500 (although the nature of the activities and roles within Pharma manufacturing will continue to change).
- Under this Scenario, total employment in the Biopharma industry will reach 33,200 in 2020.
- It is anticipated that some 8,400 potential job openings will arise in the Biopharma industry in the period up to 2020, between expansion and replacement demand.
- It is anticipated that the Biopharma industry will create a diverse range of roles requiring specific scientific, engineering and technical skills across NFQ levels 6-10.
- As well as technical skills, soft skills including communications, team-working, problem solving and environmental health and safety are essential across all of these roles.

Anticipated Biopharma Employment Trends 2020



Scenario 1: Addressing Skills Demand – 2020



	2016	2017	2018	2019	2020
Scenario 1 Expansion Demand Job Openings	600	1,050	1,100	1,100	1,150
Scenario 1 Replacement Demand Job Openings	650	670	680	700	720
(A) Grad Inflow 18% CAGR 2016-2020, plus 2016 Springboard+	1,150	1,750	1,490	1,580	1,830
Inflow from (A) plus additional Jobseeker Upskilling Provision	1,150	1,750	1,700	1,800	1,900

Biopharma Roles and Skills by NFQ Levels

Roles	Skills	Typical NFQ Levels
Manufacturing Engineers and Operators	Good Manufacturing Practice, aseptic and sterile manufacturing, upstream processing, downstream processing, validation.	Engineers: NFQ L 8/9 Operators: NFQ L 7 and NFQ L 6 with craft experience
Manufacturing & Technology Scientists	good manufacturing practice, sterile manufacturing, upstream and downstream processing, molecular biology, bioanalytics.	NFQL 7/8
Bioprocess Engineers and Technicians	good manufacturing practice, aseptic and sterile manufacturing, facility management, clean utilities, automation, equipment maintenance, health and safety, lean six sigma.	Bioprocess Engineers NFQ L8/9 Technicians NFQ L 7+
Quality Assurance & Quality Control staff	good lab practice, biochemistry, protein chemistry, microbiology, quality control and validation, batch release, regulatory filings.	NFQ L 8/9
Research & Development	clinical trial skills, Health Informatics, new product innovation, production technologies and applications.	NFQ 8/9/10
Supply Chain Management	good manufacturing practice, production planning, procurement, stock management, distribution.	NFQ L 7+
Marketing/HR /Finance	domain knowledge of the Biopharma industry.	NFQ Level 7+

Main Findings

- It is anticipated that some 8,400 potential job openings will arise in the Biopharma industry in the period up to 2020, between expansion and replacement demand.
- It is concluded that the quantity of skills required should be available, through a mix of increased graduate intake, upskilling of those seeking employment, continuous professional development of those at work, and where necessary continuing to draw upon available international talent.
- A main challenge for industry working in collaboration with education and training providers will be to attract a greater number of available graduates with the right balance of skills from the fields of science, engineering, technology and business studies.
- There is also a need to ensure the improved alignment and ongoing relevance of Biopharma related education and training programmes, particularly for Biologics manufacturing.
- A greater number of workplace training places for students needs to be made available by industry.
- The scale of Graduate Entry Development Programmes needs to be increased.
- Springboard + and Skillnets upskilling programmes for unemployed persons are valuable inputs to the required skills supply (935 Biopharma related Springboard+ training places approved for 2016).

Recommendations to address Biopharma Skills Demand 2020

Recommendations made in the report are made within the following six main headings. The Lead Body for driving the delivery of each recommendation is identified, along with other partners who need to be involved in ensuring their implementation.

1. Raising Awareness of Careers within the Biopharma Industry
2. Ensuring alignment of skills provision with the needs of the industry
3. Improving the work-readiness of Graduates
4. Attracting, developing and retaining talent
5. Investing in the Continuing Professional Development of the Workforce
6. Maximising available programmes to consolidate skills supply

Full Report at : http://www.skillsireland.ie/