



**Irish Medical Devices Association (IMDA)**

# Submission on the National Apprenticeship Model for Ireland

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**Department of Education & Skills**

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## Executive Summary

In this submission, The Irish Medical Devices Association, the IBEC sector that represents the medical technology sector in Ireland, have set out a number of key requirements for the medtech industry, that we would like Government to take into consideration when devising a new National Apprenticeship Programme. The key recommendations are as follows: -

- Re-naming of the National Apprenticeship Programme to a '**National Career-path Programme**';
- Expansion of existing infrastructure to support industry-relevant apprenticeship programmes;
- Broadening of the scope of traditional apprenticeships to include medtech and other growth industries;
- **A dual-level manufacturing apprenticeship:**
  - Level 1 Operator Level apprenticeship fully-state-funded programme; and
  - Level 2 Advanced level apprenticeships with 85 -95% state-financed, with 5 – 15% contributed by students, households, or private enterprise (industry tax incentives or grant aid to be incorporated).
- Multi-sectoral representation on governance of apprenticeship programme;
- 60 - 80%.work-based training should be core to any apprenticeship programme;
- Investment in sophisticated equipment to enable hands-on practical experience towards a progressive high-tech manufacturing base;
- **Creation of a 'Centre of Manufacturing Excellence'** to provide practical application opportunities for medical device development and Industrialisation that can be utilised in apprenticeship programmes, undergraduates programmes, and executive learning programmes.

The IMDA urge Government to consider a flexible approach to any National Apprenticeship model, which allows for the ability to facilitate changing employment and technological conditions - typical in a largely export-driven, open economy such as Ireland.



## Introduction

Ireland has been extremely successful in developing an internationally renowned centre for medical technology, with over **250 companies** currently developing and manufacturing medical technologies - nearly half of which are Irish owned. Fifteen of the top twenty Medtech companies are located in Ireland. The Irish Medtech sector has continued to perform well with **exports of €7.9 billion** recorded in 2012, up 10% on 2011. The Irish Medical Device Sector employs in excess of **25,000 people**, which makes Ireland, per capita, the biggest medical technology employer in the European Union (EU).

The Irish Medical Devices Association (IMDA), a business association within IBEC which represents the medical technology sector, aims to promote and support an environment that encourages the sustainable development and profitable growth of multinational and indigenous medical device and diagnostic companies. 170 companies strong, IMDA achieve this by focusing on four strategic themes including; Ecosystem Development; Industry Foresight; Entrepreneurship and Member Services.

## Unemployment

The overall unemployment rate in the EU-27 reached 10.5 % in 2012. Ireland maintained stability in rates of unemployment of 14.7% between 2011 and 2012.<sup>1,2</sup> In quarter 4 2012, one in five unemployed persons were under 25, while less than 10% were aged over 55.<sup>1</sup> above The percentage of unemployed persons aged 25-54 was 71%. Educational qualifications are still the best insurance against unemployment, which clearly increases the lower the level of education attained. Across 27 EU states, 16.8% of unemployed 25 – 64 year olds have attained at most a lower secondary level education, and 5.6% had obtained a tertiary level education qualification.<sup>2</sup>

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<sup>1</sup> Forfás National Skills Bulletin 2013. Available from:  
<http://www.forfas.ie/publication/search.jsp?ft=/publications/2013/Title,10974,en.php>

<sup>2</sup> Eurostat (2013) European Commission [Internet] Available from  
[http://epp.eurostat.ec.europa.eu/statistics\\_explained/index.php/Unemployment\\_statistics#Unemployment\\_trends](http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Unemployment_statistics#Unemployment_trends)



### Current Skills Requirements in the Medtech Industry

Ireland's export-led economy is heavily dependent on manufacturing and services exports, with the medical technology industry playing a vital role. In order to ensure competitive advantage, Ireland's manufacturing base must remain strong, and continue to be attractive as a place for Foreign Direct Investment (FDI) companies to locate. Aligning our education and training system with labour market needs is critical to the creation of job opportunities. Ireland is well positioned to exploit the advances in manufacturing technology, and to build and maintain a strong base of manufacturing activity, particularly in the growth areas, such as medical devices.

The Forfás National Skills Bulletin 2013<sup>1</sup>, highlighted the most recent survey by recruitment agencies on 'difficult-to-fill' vacancies most frequently mentioned in ICT, high level manufacturing (especially biopharma, and medical devices), agri-food and other healthcare sectors, with cross disciplinary skills remaining difficult to source. These needs could be satisfied with a **correctly adapted and nurturing approach by government and industry combined.**

A detailed breakdown of results from an internal survey of IMDA members organisations identified of 32 companies, an additional requirement of 637 vacancies across a number of competencies. Of the 32 companies that responded to the survey, 33% indicated a requirement for Level 7/8 Engineers across a spectrum of Engineering disciplines, including; Design, Quality & Validation, Mechanical (biomedical), Mechanical (production), Polymer, and Mechatronics.

Findings also revealed that a staggering 320 (50%) additional requirements exist for Level 5/6 Production Operatives, with a 10% further requirement for Toolmakers, CNC programmers/Machinists, and Moulding Operatives. These figures signify an immediate need by industry to meet these skills shortages, and a prospect for Government to harness this as an opportunity to address the youth employment by providing meaningful education and skills to grow the medtech industry.



The Forfás Making it in Ireland 2020 Report<sup>3</sup>, sets out a strategic action of driving the manufacturing skills study, and re-energising interest in manufacturing as a career. IMDA believe that promoting manufacturing as a viable career, with significant career progression opportunities is fundamental to the economic stability of Ireland's future. This can be achieved by the creation of a newly named Apprenticeship Programme, which could be a vocational technical training programme and re-branded as a **'National Career-path Programme'**.

There appears to be a clear need for improving the manufacturing ecosystem by nurturing it at grass-roots level. The IMDA believe that this can only be achieved with a more practical and hands-on emphasis offering by the course providers. The development of the entry-level to mid-level ecosystem is a key requirement for generation of employment.

#### **IMDA Propose two levels of manufacturing apprenticeship:**

##### ***Level 1: Operator Level apprenticeship (1 – 2 years)***

An operator level apprenticeship over 1 to 2 years focused on manufacturing operations and aimed at school leavers (Leaving Certificate level) and possibly pre Leaving Certificate level who are seeking a career in manufacturing.

Features of the apprenticeship should include a dual learning approach collaborating with Industry, involving classroom based theory in addition to work placement training and on the job experience.

The option to select from a pallet of modules including options that meet various industry requirements would create a flexible programme that enables companies and individuals alike to tailor their training needs to meet their specific learning and resource objectives.

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<sup>3</sup> Forfás Making it in Ireland: Manufacturing 2020. Available from:  
<http://www.forfas.ie/publications/2013/title,10445,en.php>



### ***Level 2 : Advanced level apprenticeship (3 - 5 years)***

An advanced apprenticeship level leading to a Diploma or Degree in Engineering. This may be a 5 year apprenticeship or an extension of level 1 above. The delivery would again be in collaboration with industry, to ensure industry needs are met and the modular approach recommended so that multiple Industry sectors could benefit from a generic apprenticeship model (e.g. medtech and Food sector could select appropriate sub modules, but share a number of generic ones).

Traditional apprenticeships would also be advantageous depending on demand and could possibly be interlaced with the above options: e.g. tool making, injection moulding, automation/mechatronics & maintenance (mechanical/electrical). Thus the traditional sectors of apprenticeship could be expanded to include a sub-set which imparts knowledge and training on new technologies, materials and skill-sets particularly associated with the medtech Industry.

### **Governance**

The apprenticeship model should be moved to a non-legislative scheme, outside of the statutory framework to allow for a more co-ordinated governance structure and process. A broader multi-sectoral representation should be included in the governance structure – particularly in the growth sectors.

### **Funding**

IMDA suggest a predominantly company-based apprenticeship programme with the public sector as the main source of finance, i.e. the provision of a fully-state-funded programme for Level 1 Operator Level apprenticeships.

The provision of funding from the state for Level 2 Advanced level apprenticeships should be modelled on that of Spain, Slovakia and Poland, where 85 -95% of financing is from the state, with 5 – 15% contributed by students, households, or private enterprise. In these countries, usually the amount of public funding is set according to the number of students.



A sliding scale or tiered level of funding may apply for Level 2 Advanced level apprenticeships, according to duration and qualifications attained.

IMDA would welcome the incorporation of financial and fiscal incentives to encourage participation of enterprises in apprenticeship schemes, such as:

- a tax credit incentive-scheme (similar to the R&D Tax credits system); or
- a grant to employers as a recruitment subsidy (similar to the Apprenticeship Grant to Employers in the UK).

### **Providers and delivery methods**

This governance process could still be achieved through an expansion of the FÁS traineeship model and/or PLC model, both of which also combine alternating periods of on and off the job training. However, the percentage of work-based training, i.e. on the job training is a critical factor in realising the outputs of any apprenticeship programme. IMDA recommend the percentage ratio of work-based training should be in the region of 60% - 80%. The off the job phases in a modified dual system could be delivered by the VEC's, Institutes of Technology (IOT's), Enterprise Training Board (ETB)'s, or private entities such as Skillnets Ltd, as previously outlined. IMDA recommend the expansion of the range of occupations covered, which necessitate the ever-changing and progressive demands of a successful global Medtech industry.

### **Recruitment**

There should be direct collaboration with industry to ensure adequate inflow of apprentices, to meet industry needs. This in turn will allow for adequate provisions to be put in place to enable accurate economic forecasting by the State. IMDA recognise the need to tackle youth unemployment and proposes a collaborative approach by industry and the state to recruit apprentices. However, it is also worth noting that there is a demand for up-skilling of existing employees within companies. Affording industry with the opportunity to avail of up-skilling apprenticeship programmes for existing employees could go some way to addressing any variation in demand for these programmes. This would ensure optimisation of state



resources on any apprenticeship programme (See appendix 3 Case Study: Lake Region Medical and appendix 4 Case Study: Siemens Healthcare Diagnostics).

### **Range of Occupations**

IMDA believe the range of occupations in an apprenticeship system should be broadened to align with labour market needs. The current range of occupations offered in the existing apprenticeship system, are essentially limited to the construction, engineering, motor, electrical and printing technical occupations.

#### ***Level 1: Operator Level apprenticeship (1 – 2 years)***

##### **Production operatives**

Production operatives are typically educated to Leaving Certificate level or equivalent. Production operatives are likely to require manual dexterity, the ability to conscientiously comply with formal working procedures, sufficient awareness to identify visual problems with components and assemblies, and the flexibility to move between assembling different products. A basic of understanding of Lean Manufacturing techniques would benefit them greatly in identifying & removing all forms of non-value adding activity.

##### **Toolmakers**

Toolmakers are typically educated to Leaving Certificate level or equivalent. Toolmakers require the skills and knowledge to operate machine tools and use CAD/CAM software in the manufacture, maintenance and repair of a variety of tool types and specialist equipment.

##### **Computer Numeric Control (CNC) Programmers / Machinists**

CNC Programmers / Machinists typically educated to Leaving Certificate level or equivalent. CNC Programmers require the skills and techniques to manufacture precision components using Computer Numerical Control technology.



**NOTE:** \*CNC programming is a specific craft used for the orthopaedic medical device and precision engineering industries. According to the Forfás Skills Bulletin 2013 *“There is a significant shortage of precision engineering skills in tool making and CNC machining; while the demand for these skills has grown, supply from the education and training system has been affected”*. Recent endeavours by IMDA/Life Sciences Skillnet to address this need, through the provision of a machinists programme posed problematic, mainly due to combined costs of training and capital investment in equipment. There was considerable difficulty with sourcing providers to execute the required programme – while some IOT’s had the ability to provide simulated versions of modules; this was insufficient for industry needs. There is a clear need for ‘hands-on, practical training by understanding and experience’ of equipment; in particular, basic mechanics, PLC’s, electrics, pneumatics, hydraulics, extrusion, CNC programming and highly automated machines.

A revival of the existing FÁS training centres, with strong capital investment by the state may tackle this deficit, alternatively VEC’s, IOT’s or private entities (First Polymer Skillnet, provide FETAC Level 6 modules in extrusion, PLC, etc.) may address the need in a modularised solution or industry-academic partnerships, with state support.

### **Moulding Operatives**

Moulding operatives are typically educated to Leaving Certificate level or equivalent. Moulding operatives are involved in different types of production processes such as injection moulding, blow moulding, extrusion, and thermoforming.

**NOTE:** \*IMDA/Life Sciences Skillnet are currently piloting a FETAC Level 5 (5M2162) (6 minor awards) Manufacturing Operations in Life Sciences Programme. This programme has been developed with industry to address demand for production operatives resulting from internal future skills needs survey results (see appendix 1). The programme runs for 7 months and is 80% work-based and 20% classroom-based. Modules include: Continuous Improvement 5N1915, Good Manufacturing Practice 5N1959, Cleanroom Operations 5N1921, Health, Safety and Environmental Awareness 5N2158, Communications 5N0690,



and Work Practice 5N1433. Please refer to appendix 2 for comprehensive details on module options recommended by IMDA.

### **Mechatronics**

Mechatronics technicians are typically educated to Level 1 apprenticeship as above or direct entry via points system in Leaving Certificate or equivalent. Mechatronics technicians require the skills and techniques to design, build, programme, commission and validate industrial equipment. They are also involved in the maintenance & process improvement of industrial equipment sometimes specializing in vision, robotics & high speed automated assembly. These technicians can also be referred to as Automation technicians.

### **Polymer engineers**

Polymer engineering/technicians require the skills and techniques to set-up and run polymer processing equipment.

### **Mechanical engineers (Production)**

Mechanical engineers are involved in the management of production processes such as process optimization; lean and waste elimination and supplier interface.

### **Mechanical engineers (Biomedical)**

Mechanical engineers (Biomedical) are involved in the management of healthcare automation and automated assembly - manual, semi-automatic and fully automatic assembly solutions.

### **Award**

#### ***Level 1 (1 Year) Qualification:***

Upon completion of Level 1 (1 year), qualification attained will result in a Certificate/Diploma in Performing Manufacturing Operations (Operator level).



### ***Level 1 (2 Year) Qualification:***

Upon completion of Level 1 (2 year) qualification attained will result in a Certificate/Diploma in Performing Manufacturing Operations (Injection moulding involving machines).

**NOTE:** A qualification that is recognised should be awarded upon completion of the programme similar to Qualification 501/0928/5 NVQ Diploma in Performing Manufacturing Operations available in the UK.

### ***Level 2 (3 – 5 Years) Qualification:***

#### ***Advanced level apprenticeship (3 - 4 years) – with specialist level apprenticeship (5 years)***

Upon completion of Level 2 qualification attained will result in a Diploma / Degree in applied Engineering for any of the above listed range of occupations.

The use of the current infrastructure, for instance, VEC's, IOT's will be necessary for the advanced level of apprenticeship, as this requires capital equipment.

### **Establishment of Centre of Manufacturing Excellence**

In line with IMDA's Manufacturing Operational Excellence Taskforce vision, we recommend the Creation of a 'Centre of Manufacturing Excellence' in medical device development & Industrialisation. This is envisaged as a collaborative approach with government, industry and academia to support training in 'real life simulation' environments with specialist equipment. This could provide practical support to an apprenticeship programme. It could also act as a centre of manufacturing excellence by providing practical application opportunities for Job-seekers, apprenticeship programmes, undergraduate and executive Learning Programmes in Manufacturing Excellence for the sector.

As part of this centre for manufacturing excellence, the Medtech industry request that the appropriate investment in equipment is made by the state, as with the Pharma Industry in the creation of the National Institute for Bioprocessing Research and Training (NIBRT)<sup>4</sup>.

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<sup>4</sup> National Institute for Bioprocessing and Training. Available from; <http://www.nibrt.ie/>



Similar centres of excellence in manufacturing exist internationally (e.g. AMTEC National Centre of Excellence, <sup>5</sup>USA; CEME Centre of Engineering and Manufacturing Excellence<sup>6</sup>, UK; ECO15 - Advanced Manufacturing Centre of Excellence in Indiana<sup>7</sup>, USA; and The Fraunhofer Automobile Production Centre of Excellence<sup>8</sup>, Germany).

### Key recommendations

- Re-naming of the National Apprenticeship Programme to a '**National Career-path Programme**';
- Expansion of existing infrastructure to support industry-relevant apprenticeship programmes;
- Broadening of the scope of traditional apprenticeships to include medtech and other growth industries;
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- Multi-sectoral representation on governance of apprenticeship programme;
- 60 - 80% work-based training should be core to any apprenticeship programme;
- Investment in sophisticated equipment to enable hands-on practical experience towards a progressive high-tech manufacturing base;

<sup>5</sup> AMTEC National Centre of Excellence, USA (Toyota involvement)  
<https://www.google.ie/url?sa=t&rct=j&q=&esrc=s&frm=1&source=web&cd=6&cad=rja&ved=0CEcQFjAF&url=https%3A%2F%2Fatecentral.net%2Fg20946&ei=sKklUqOtOlrDtAbwwIDYBw&usg=AFQjCNH-SWRhsh90vrXH60yBuD5q8BIBew>

<sup>6</sup> CEME Centre of Engineering and Manufacturing Excellence, UK : <http://www.ceme.co.uk/>

<sup>7</sup> ECO15 - Advanced Manufacturing Centre of Excellence in Indiana, USA :  
<http://www.google.ie/url?sa=t&rct=j&q=&esrc=s&frm=1&source=web&cd=4&cad=rja&ved=0CDsQFjAD&url=http%3A%2F%2Fwww.eco15.org%2Fadvanced-manufacturing-center.php&ei=l6clUrK1NMXTtAa2u4GwAQ&usg=AFQjCNEfto5OwdjwZrCPjFa93s2y7iXD-A>

<sup>8</sup> The Fraunhofer Automobile Production Centre of Excellence, Germany :  
<http://www.iwu.fraunhofer.de/en/flagship-projects/automobile-production-center-of-excellence.html>



- **Creation of a ‘Centre of Manufacturing Excellence’** to provide practical application opportunities for medical device development & Industrialisation that can be utilised in apprenticeship programmes, undergraduates Programmes, and executive Learning programmes.

## Conclusion

The IMDA urge Government to consider a flexible approach to any National Apprenticeship model, which allows for the ability to facilitate changing employment and technological conditions - typical in a largely export-driven, open economy such as Ireland.



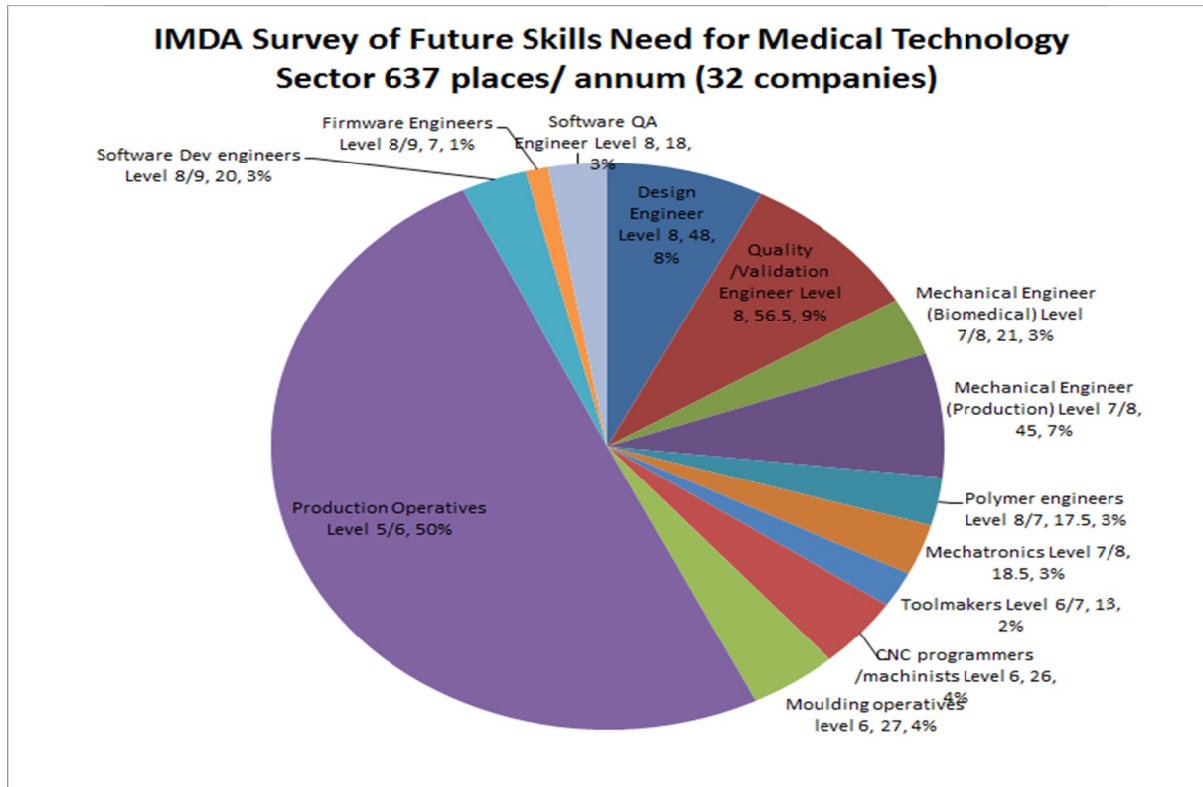
## Appendix 1 : IMDA Survey

In December 2012, the IMDA conducted a member survey on future skills needs for Medical Technology. 32 companies responded. The following are a summary of the results: -

<b>32 Companies 637 vacancies</b>	<b>IMDA Survey</b>	<b>%</b>
	Additional requirements p.a.	
Design Engineer Level 8	48	8%
Quality /Validation Engineer Level 8	56.5	9%
Mechanical Engineer (Biomedical) Level 7/8	21	3%
Mechanical Engineer (Production) Level 7/8	45	7%
Polymer engineers Level 8/7	17.5	3%
Mechatronics Level 7/8	18.5	3%
Toolmakers Level 6/7	13	2%
CNC programmers /machinists Level 6	26	4%
Moulding operatives level 6	27	4%
Production Operatives Level 5/6	320	50%
Software Dev. engineers Level 8/9	20	3%
Firmware Engineers Level 8/9	7	1%
Software QA Engineer Level 8	18	3%
<b>Total</b>	<b>637.5</b>	

## Appendix 1 contd....

### IMDA Future Skills Needs Survey Results 2012





## Appendix 2 : Proposed Modules under Apprenticeship Models

### **IMDA recommend a suite of apprenticeship Level 1 modules options to include:**

Quality and Good Manufacturing Practice (GMP), Continuous Improvement, Health and Safety and Environmental Awareness, Work Practice Expectations, Communications, Team working, Personal Effectiveness, Cleanroom Operations, Packaging and Labelling, Process Science Skills, Chemical Processing, Sterile Production, Materials Management, Controlling Manufacturing Operations, Inspection and Analysis, Producing Shaped products, Producing assembled products, Producing joined products, Producing formed products, Producing moulded products, Producing packaged products, Computer Aided Design (CAD), Computer Aided Engineering (CAE), Computer Aided Manufacturing (CAM), Computer controlled equipment (PLCs), Automation, Combined manufacturing operations, and Computer Numeric Control (CNC), Basic Lean Manufacturing techniques.

Industry-specific technologies: Hydraulics, Pneumatics, Electro-technology, Mechatronics, and Maintenance Organisation.

### **IMDA recommend a suite of apprenticeship Level 1 modules options to include:**

Level 2 modules may include some of the above modules, but at a more advanced level of that of Level 1, and in addition: -

Diagnostics Monitoring, Diagnostics Testing, Leadership and Management, Project Management, Advanced Design Engineering Customer and Technical Support, Applied Mathematics, Applied Science, Trouble-shooting e.g. A3, Advanced Lean techniques, Communications and Computer Skills, Connected-health and Convergence technologies.

Industry-specific technologies: Extrusion, Material Science and Applied Chemistry.



### Appendix 3 : Company Case Studies

#### **Case Study: Lake Region Medical, New Ross, Co. Wexford: John Harris, VP Operations (Vignette that LRM provided for Forfás Future Skills Needs Study)**

Lake Region Medical, New Ross, have developed a system to select production operators who have the potential and drive to become maintenance fitters and put them through an apprenticeship program. Lake Region views the main benefits from this initiative as: Internal candidates (because they have worked for a number of years in production) bring a culture of flexibility & accountability to their new position. They also bring a thorough understanding of Lake Region Medical equipment, systems & processes.

Once the apprentice is fully qualified it creates an opportunity to train and promote an experienced fitter to an engineering role as vacancies arise, therefore creating a pipeline of talent right from operations up through engineering and potentially to management one day.

Turnover within the maintenance department has effectively ceased since 2007, which is remarkable considering the number of blue chip medical device companies operating within the catchment area.

Lake Region decided on this approach in response to the early Celtic Tiger days when tradesmen became highly sought after. The option of recruiting newly qualified Technicians straight from college was also trialled? for a period but proved to be unsatisfactory as unfortunately most lacked the mechanical aptitude necessary to carry out the work effectively. The role of all the maintenance employees has evolved in line with Lake Region Medical's goal to achieve operational excellence. All maintenance personnel have been trained in Scientific Problem Solving and spend 25% of their time either driving or supporting continuous improvement project.



## **Pilot Job-seekers Operators Traineeship Programme supported by IMDA/Life Sciences Skillnet**

Siemens Healthcare Diagnostics are working with the Life Sciences Skillnet on their job seeker Operator Programme (100% funding under JSSP) as a potential feed to the Siemens Traineeship programme. The IMDA/Life Sciences Skillnet programme incorporates 5 weeks training on FETAC level 5, 6 minor modules and a six months internship. Siemens Healthcare Diagnostics will review the current IMDA/Life Sciences Skillnet Operator programme, so that they can develop their internal training modules and ensure no overlap.

The intention is to encourage applicants interested in the Siemens Healthcare Diagnostics Traineeship to apply to IMDA/Life Sciences Skillnets. It is expected internal employees will generate word of mouth (WOM) communications, leading to interest externally and recruitment, once the minimum requirements are met - leaving cert, etc. Upon application, candidates will be selected via interview and dexterity testing.

Candidates will then be put forward for interview with Siemens and other companies for the Traineeship while on job-bridge.

The IMDA/Life Sciences Skillnet Operator Programme forms an integral part of the 2 year Siemens Traineeship programme.