



Irish Medtech
Association
Ibec

medtech rising

1916 - 2016

The story of how Ireland became a success in global medtech



Contents

- 
- 01 Making Ireland a global medtech hub**
Welcome from Irish Medtech Association director, Dr Sinead Keogh
- 04 The future is bright for Irish medtech**
A look to what's ahead for Irish medtech with Irish Medtech Association chair, James Winters
- 06 Over a century in the making**
Mapping the history of the sector – and the country – from 1916 to the present day
- 08 Change over time**
Sharon Higgins, former director of the Irish Medtech Association, looks back on how the sector has grown
- 10 Prime location**
Martin Shanahan, IDA Ireland, talks about how Ireland has become a global medtech hub and identifies some future trends
- 14 From the ground up**
Tom Kelly, Enterprise Ireland, sets-out how Irish indigenous medtech companies are making their mark
- 20 Innovation nation**
State-of-the-art research facilities are driving new innovations and facilitating collaborations, key players tell us how
- 26 Getting connected**
As a location of choice for the medtech, ICT and biopharma sectors, Ireland is uniquely positioned to become a global leader in convergent technologies and IoT
- 32 Vibrant venture capital**
With entrepreneurs driving new innovations and creating new products, getting funding to get to the next level is key
- 33 Regulatory ready**
To provide stability in the market place and promote quality patient care, getting regulations right is essential
- 34 An Ireland that works**
Danny McCoy, Ibec, sets out the Irish business community's ambition for the future
- 38 A magnet for talent**
Mobile talent are looking to Ireland for new opportunities and career development
- 40 Driving the skills agenda**
Medtech growth means more jobs, looking at the Irish model for developing talent
- 46 Global view**
As a small open economy, Irish companies are born global according to key business leaders
- 52 High fliers**
Working in Ireland opens doors internationally, find out how the Irish succeed abroad
- 54 Smooth operators**
Read about Ireland's winning formula for achieving internationally recognised business excellence
- 60 Mapping our world-class medtech sector**
18 of the world's top 25 medtech companies have a base in Ireland and of the 450 business here, 60% are indigenous companies
- 62 About Ibec**

Making Ireland a global medtech hub

The Irish Medtech Association plays a key role in bringing companies together to collaborate in areas of strategic importance.



Ireland's medtech sector has seen a dramatic shift in the past 16 years since IMDA was formed.

And we've recently changed our name to the Irish Medtech Association to reflect this sophisticated evolution: from manufacturing medical devices to laying the foundations to become a global leader in convergent technologies. But this would not have been possible without the sector developing a strong reputation which has helped grow businesses, jobs and the Irish economy.

The European medtech market represents 31% of the world market and is the second largest after the US. So how does a small island off the coast of Great Britain stand out? How do we explain that more than a third of all medtech investments coming to Europe comes to Ireland?

Firstly, we're a global village, as a small open economy, collaboration lies at the heart of how we do businesses. We network and connect, from finding the right supplier, academic partner for research or funding for startups, there is no distance so great that we can't bring people together.

Secondly, we have focus and vision, in our strategy ten years ago, our ambition was to "make Ireland the location

of choice" for medtech and by working together the industry has helped to make Ireland one of the top five global hubs.

Lastly, we're adaptable, Ireland and the medtech sector learnt from the recent economic crisis. And while some sectors suffered, we grew with exports quadrupling in the past ten years to €12.6 billion, representing 10% of Irish exports.

Now, the challenge is to continue to develop the sector's strategic competencies and enable Ireland to compete as a mature, high-value added economy with innovation at its core.

Global economic growth is expected to be 3.1% this year and reach 3.4% in 2017 partly due to the continued recovery of developed markets while Brazil and Russia are lagging behind Asian economies.

But in Ireland, all indicators are now pointing to a strong recovery with steady and continued growth. The Central Statistics Office (CSO) figures showed annual employment growth of 2.9% (56,200) in Q1 bringing total employment to over two million for the first time since 2009 and the regional spread of employment growth is now more even, with manufacturing being one of the largest drivers of this growth.

continued overleaf

Medtech
exports in 2006

€3bn

Medtech
exports in 2016

€12.6bn

“In our strategy ten years ago, our ambition was to ‘make Ireland the location of choice’. Now, Ireland’s medtech sector is recognised as one of the top five emerging global hubs.”

Medtech
employees in 2016

29,000

The global
medtech market is
expected to reach€477.5bn
by 2020

The voice of medtech in Ireland

The Irish Medtech Association plays a central role in bringing companies together and lobbies key stakeholders both at a national and international level on areas of importance such as trade and regulatory affairs.

Ahead of the 2016 general election, the Irish Medtech Association led a strong campaign on its priorities for government, calling for ambitious investment in the healthcare system and further collaboration with the sector to support better patient care. With medtech businesses in every Irish constituency and an international reputation for innovation the sector is well placed to help under pressure health systems deliver better outcomes.

In the past year, we have made strides with Medtech Europe in exploring radical, new approaches for value-based healthcare. The move to value-based healthcare is revolutionising the commercial model used by healthcare systems across the world by shifting the focus to long-term results for patients over short-term costs and ensuring that SMEs can engage in the tendering process.

The elected Dail established a Special Committee on the Future of Healthcare to help set-out a single long-term vision for healthcare and the direction of health policy in Ireland. With guidance from our board we made a detailed submission. Key priorities included making Ireland’s healthcare infrastructure world class by adopting new innovations and technologies as well as promoting a culture of innovation leadership within the Irish healthcare system by rewarding clinical research underpinned by world class facilities.

This year we celebrated the second European MedTech Week, which brings companies and associations across Europe

together to raise awareness about medtech. And we were pleased to be joined by Minister for Health Simon Harris TD at a special event that week on ‘Industry-clinical collaboration for better patient outcomes’, which was run in partnership with the Royal College of Surgeons in Ireland to drive engagement among all members of Ireland’s vibrant medtech ecosystem and explore opportunities for the future.

Building on Ireland’s history

As a nation, we have learnt from our history to be industrious, internationally attractive and competitive; with the Knowledge Development Box and our corporation tax rate standing out. Our pro-business environment is the work of many men and women over the past century.

While Eamon de Valera’s work to end Ireland’s overreliance on its trading relationships with Britain led to protectionist policies, under John Costello Ireland made its first visit to the White House, and while the IDA was founded during his tenure, it is Sean Lemass who is known for his unparalleled efforts to develop international trade relations and support industrial growth.

This year we remember the 100th anniversary of the 1916 Easter Rising and the birth of a nation. Since then a lot has changed. Our past has laid a solid foundation for our future, which is guided by a number of pivotal social and economic changes.

Irish people have been welcomed all over the world and our hundred thousand welcomes, or *céad míle fáilte*, is known the world over. This has helped to make us a rich multicultural society. And since 1916, the population has increased from around 3.1 million in 1911 to nearly 4.8 million now.

The latest census tells us that nearly one in five people here is an immigrant and more than half a million people speak a foreign language fluently. We will build upon this to become an even more open and globally focused nation.

We have included some special milestones throughout this publication in a one of a kind timeline charting just some of what it means to be 'Irish', such as our sporting prowess, our love of the spoken and written word, our thirst for knowledge and to be part of something bigger than ourselves at home or abroad.

The Irish poet WB Yeats wrote, *"Wherever the green is worn, Are changed, changed utterly: A terrible beauty is born."* Modern Ireland will continue to strive for a better for future, and the medtech sector will continue to play its part, as part of local communities and regional clusters. And notably, by saving and improving lives.

Dr Sinead Keogh
Director, Irish
Medtech Association
– an Ibec business
association

Pictured at the launch of The Global Medtech Hub in February 2016 were (L-R): Conor Russell, Boston Scientific; Sinead Keogh, Director, Irish Medtech; and James Winters, DePuy Synthes.

The infant mortality rate was

81.3

in Ireland in 1916

By 2014 it had dropped to

3.7

per 1,000

Life expectancy has risen, a baby boy born in 2011 can expect to live for nearly

25 years more

than a baby born in 1911



The future is bright for Irish medtech



As we celebrate the tenth Irish Medtech CEO Forum and Awards, which we co-host with Enterprise Ireland and IDA Ireland, we want to look back on everything which has helped to make the Irish medtech sector a global success and explore what the future might bring.

This publication is an opportunity to take stock. One piece of the puzzle is the creation of the Irish Medtech Association, which is why I was delighted this year to take up the mantle as chair of the group. Building on the success of previous Irish Medtech Chairs, I wanted to match the sector's ambition and innovativeness.

The Global Medtech Hub

With leadership from the board as well as significant engagement from the wider membership, the Irish Medtech Association developed an ambitious strategy for 2020, *"The Global Medtech Hub: How Ireland is innovating for future healthcare and economic growth"*. Irish Medtech Director Sinead Keogh, Boston Scientific and Irish Medtech Association Vice Chair Conor Russell and I launched this strategy in February in the Royal College of Physicians Ireland and then we took it one step further launching it internationally at AdvaMed 2016, in Minneapolis.

Medtech in Ireland is global with 18 of the world's top 25 medtech companies having a base here; reaching out to an international audience to communicate our roadmap for continued success is about more than attracting business, but also growing our capabilities and remit.

While strong regional clusters from Cork and Galway, to Dublin, Limerick and Sligo are the heart of the Irish medtech sector, 2016 saw our international lobbying achieve new heights. After four years of negotiations on the new EU Medical Devices and IVD regulations, a political agreement has been reached, with our association acting as the voice of Irish business in Europe to ensure that they are balanced by contributing to increased patient safety and foster the development of innovative healthcare solutions.

These regulations are a significant step to modernising the legislation and were pleased that Mairead McGuinness MEP joined us at the Irish Medtech Association's sixth Global Access Conference to highlight this important issue which will affect a broad spectrum of business functions. The event was lead by Aine Fox with support from our Regulatory Steering Committee and saw over a dozen speakers fly in to Ireland to discuss the latest trends in medtech regulatory affairs from Canada to China, with over 200 attendees over two days.

This has not been the only change in Europe, with the association playing an active role as a member of Medtech Europe in a number of areas including compliance. At the end of last year, along with other members, we voted to amend its code of ethical business practice to reflect the changing times. There will now be a shift to promote greater transparency, while maintaining our commitment to education with the phasing out of direct sponsorship of physicians at third-party medical conferences. With over 11,000 patent applications granted in Europe in a year in medtech, it is clear that the industry leads the way in terms of innovation. But to achieve this we need to work together, market-led innovation which brings together businesses and healthcare professionals is key.

This issue was highlighted at the Global Medtech Compliance Conference which came to Ireland for the first time this year. Adrienne McDonnell played a pivotal role, working with AdvaMed and Medtech Europe, to make it a triumph with 300 attendees over 3 days coming together to explore best practices in business ethics and compliance.

A global leader in convergent technologies

The global medtech market is expected to grow by 4.1% annually, reaching €477.5 billion by 2020. Within this, key growth areas are in vitro diagnostics, followed by cardiovascular and orthopaedics.

Global trends have highlighted a number of other medtech opportunities, such as collaborating with the ICT and biopharma industries to lead in convergence technologies, in particular in the areas of connected health and drug delivery. With 10 of the top 10 ICT companies and nine of the top 10 biopharma companies with bases in Ireland with the major medtech players, we're uniquely positioned to become a leader both connected health and drug deliveries.

That's why the Irish Medtech Association has

joined forces with Ibec groups ICT Ireland, Irish Software Association and BioPharmaChem Ireland to establish an Internet of Medical Things (IoMT) forum which has already met four times this year and we co-hosted a members' evening with BioPharmaChem Ireland in Cork to bring business leaders together to identify areas where we can work together and probe possible strategy approaches.

Supporting entrepreneurship and developing talent

But you don't have to be a big company to make a big impact, that's why the Irish Medtech Association developed a new kind of business event for startups, Medtech Brew, in conjunction with BioInnovate which brings business leaders to a bar in Galway to share their experience, learn from best practice and ask the hard questions.

With 80% of the 450 medtech businesses being either an SME or startup, helping these companies succeed is essential for the sector. While one of the benefits of Ibec membership is a voice on business issues, with Ibec's Policy Division doing great work to promote entrepreneurship and lobbying on key areas in its Budget 2017 submission, the Irish Medtech Association develops industry specific supports. Medtech Brew which explored, growing a medtech business, the commercial model and access to funding for startups, along with the mentoring programme run with Enterprise Ireland are part of the work by the group to develop policies and conditions where entrepreneurship thrive.

As the sector grows, attracting and developing talent, at every level, has remained a vital part of our success. And while Ireland's talent pool with more third level graduates than the EU average and world-class managerial talent means that many elements are in place to help companies succeed more needs to be done to keep

pace with our growth.

The association made a major submission to the Department of Education and Skills which included promoting medtech careers, a new approach to entrepreneurial education and addressing gender imbalance in STEM, as strategic priorities.

The Irish Medtech Association Skillnet's Pauline O'Flanagan and Michelle Reinecke-Quain also continue to develop practical, industry-led training programmes from training in Lean Leadership to a full Masters in Regulatory Affairs. And their efforts have been bolstered with Jennifer McCormack joining the team. Additionally, Irish Medtech was amongst the 25 successful applicants out of nearly 90 to get the green light to develop new apprenticeships. These manufacturing apprenticeships are being project managed by Denise Carthy with the assistance of Shane Beirne.

This year has seen both a rise in the level of our lobbying activities and in the number of events run by the Irish Medtech Association. What makes this association effective is the relationships between its dedicated team and the members who chair and contribute to its various working groups.

I want to take this opportunity to personally thank all the membership, and key stakeholders across the ecosystem who come together to help us to realise a shared vision for the industry. I have learnt from personal experience as part of the OpEx group, on the board and now as chair the value of participation. And I recommend that members get involved to help shape the future of the medtech sector in Ireland.

Lastly, I hope that you enjoy this publication; it's an example of the larger body of work led by our PR Taskforce to improve the awareness of the sector and highlight the value of medtech.

**James Winters,
Irish Medtech
Association Chair
and VP Manufacturing
and Joint Reconstruction
DePuy Synthes**

1916

1939

April 1916

The Easter Rising is launched by Irish republicans to end British rule in Ireland and establish an independent Irish Republic. Fifteen of its leaders are executed in Kilmainham Gaol.

July

3,500 Irish soldiers serving in the British army die during the Battle of the Somme. More than 200,000 Irish soldiers fight in the 'Great War'.

December

Irish women gain the right to vote, but only if they are over 30 and own property.

The Irish War of Independence is fought until 1921 between the Irish Republican Army (IRA, the army of the Irish Republic) and the British security forces in Ireland.

The Spanish flu pandemic which killed more than 20,000 people in Ireland ends.

The Irish Civil War is waged between Irish republicans and Irish nationalists over the Anglo-Irish Treaty.

February

James Joyce's *Ulysses* is first published.

1928

Sir Alexander Fleming discovers penicillin

1916

1918

1919

1922



The Royal College of Surgeons in Ireland (pictured above) unwittingly becomes involved in the struggle for an Irish Republic when the building is occupied by rebels during the Easter Rising. Right: the interior in the aftermath of the Rising.



Over a century in the making

May 1932

The Confederation of Irish Industry is established.



1937

Bernard Fantus pioneers first blood bank



October

The Wall Street Crash, the greatest stock market crash in the history of the US, takes place. It signals the start of the 10-year Great Depression that affected all Western industrialised countries.

The Anglo-Irish Trade War takes place until 1938 between the Irish Free State and the UK. It results in the imposition of unilateral trade restrictions by both countries, causing severe damage to the Irish economy.

May

The first flight service by Aer Lingus takes off from Baldonnell Military Aerodrome in Dublin to Bristol Airport.

July

The Constitution of Ireland comes into force replacing the Irish Free State with a new state called 'Éire', or, in the English language, 'Ireland'

September

At the outbreak of the Second World War, Ireland declares a state of emergency, passing the Emergency Powers Act.

The Federation of Irish Manufacturers is established.

1929

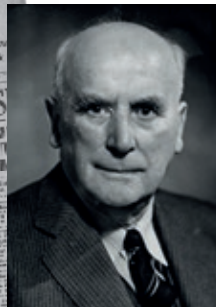
1932

1936

1937

1938

1939



Neurosurgeon Adams McConnell (President of the Royal College of Surgeons in Ireland) performs the first posterior fossa craniotomy in the Richmond Hospital, Dublin.



Success doesn't happen overnight. We may be a small island, but we've made a big impact internationally. Our heritage has helped us forge an identity rich in culture, with great achievements, and political landmarks that put us on the map. As we set our sights on an ambitious future as a global medtech hub, we remember some of the milestones that helped get us here.

Change over time

Director of member services at Ibec Sharon Higgins reflects on how things have evolved since she became director of the Irish Medical Devices Association, now the Irish Medtech Association.

Pictured are (L-R): Pat Forristeral, Stryker Limerick; Sharon Higgins, Ibec; Sean Dorgan and Richard Henderon, IDA Ireland.

“ Medtech differs from other sectors in Ireland in that it is particularly collaborative. It grew to become the hub it is today because of the ability of strategic thinkers to see beyond their own plant.”

When Sharon Higgins was appointed as director of the Irish Medical Devices Association (IMDA), now the Irish Medtech Association, in 2000 the Irish medtech sector was in a very different place to where it is now.

“The sector was primarily made up of the manufacturing arms of big global companies and was driven by manufacturing and the supply chain. There was very little happening in terms of research and development [R&D] and little ambition to build medtech R&D in Ireland,” she recalls.

In 2000, 13 of the world's top 20 healthcare companies had plants in Ireland and the medical devices sector employed 7.5% of Ireland's manufacturing industry workforce. The medical devices sector was made up of 75 companies in total; now there are 450 companies employing 29,000 people.

The origins of the Irish Medtech Association go back to when Federation of Irish Chemical Industry split into four entities – the Irish Medtech Association, the Irish Pharmaceutical & Chemical Manufacturers Federation (IPCMF), the Irish Pharmaceutical and Healthcare Association (IPHA) and the Irish Medical and Surgical Trade Association.

The Irish Medtech Association operated as an independent for a number of years before joining Ibec in 2000.

“The main driver behind the formation of the Irish Medtech

Association was regulation as there had been a lot of regulatory change in Europe and the industry needed a voice to lobby and inform it,” says Higgins.

“There was also a strong feeling that the industry needed to be represented in a more holistic way as it was a big employer and needed to grow.”

Higgins was recruited as the association's new director from Ibec's sister association IPCMF where she had worked for a number of years. Her work began by meeting the main players in the industry and discussing their business as well as opportunities and barriers to achieving their goals.

“Being a better manufacturer was a common objective in the industry at the time. However, some visionaries were able to see that in order to sustain and grow the sector there needed to be changes. The support system provided by the Irish Medtech Association helped to bring out that ambition,” she says.

In the early years of the Irish Medtech Association a galvanising of effort within the industry took shape. The Irish Medtech Association partnered with IDA Ireland's existing annual networking event for medtech CEOs and the Irish Medtech Association, IDA Ireland and Enterprise Ireland became a triumvirate in terms of identifying visions for the sector.

“The annual CEO meetings were important in terms of bringing people together and highlighting best practice. The

mindset moved from individual company plans to a new vision for the sector as a whole to embrace opportunities,” says Higgins.

“These CEO forums grew from evening events to full-day conferences followed by industry award ceremonies. Most importantly they became part of the calendar of events for industry leaders.”

Since that time Higgins has observed remarkable development within the medtech sector. “As Pete Nicholas, founder of Boston Scientific, said when he came to talk to us, ‘I came here [to Ireland] to make products, but you [Irish people] wouldn't leave it at that’. It was very clear that Irish-based medtech companies and operations wanted to do things differently and better,” she says.

“Irish people showed their ability to work together to design new ways of doing things initially in terms of process development but later through to product development.

“There were really good thought leaders in the industry such as Bernard Collins [former executive in Boston Scientific and board member of several life science companies], Peter Walsh [Vice President of Global Operations, Medtronic] and Liam Downey [country manager, Ireland, at Becton Dickinson].”

Once these leaders started to spread the word about innovation it was as if there was a light bulb moment in the industry and the new vision began to evolve, Higgins continues.

“People started to see the path towards Ireland becoming an innovation hub. It all happened through strong individuals at board level and the people who came together to work in teams to look at how we could build R&D, for example by asking for Government support for R&D tax credits.”

Within another few years academic engagement with the industry had intensified and the vision became as simple as ABC – academia, business and clinical experts working together could achieve much more than they could individually. “It was a massive step in 2006 when we started to develop strategies on the need for clinical trials to be conducted in Ireland, which was unheard of at the time,” says Higgins.

“Medtech differs from other sectors in Ireland in that it is particularly collaborative. It grew to become the hub it is today because of the ability of strategic thinkers to see beyond their own plant and recognise the value in the Irish medtech sector attracting investment and having Government support.

“Some of the things the Irish Medtech Association talked about were seen as crazy but turned out to be prophetic. For example, I remember we held a conference called Meeting of Minds which looked at convergence between sectors, which was unheard of then but it's happening now and medtech continues to lead the charge.”

Prime location

Ireland has attracted the world's top medtech players to establish operations of substance in the country and this FDI multinational base is the fulcrum of its world-class ecosystem.

Foreign direct investment (FDI) multinationals form the backbone of Ireland's medtech cluster, with 18 of the top 25 medtech companies in the world now based in the country and annual exports amounting to €12.6bn.

FDI has been accelerating in recent years and Ireland is now the prime location of choice within Europe for medtech investments, accounting for one third of new projects in 2015, according to Financial Times research.

Over the past ten years there has been a 33% rise in jobs in the Irish medtech sector to reach a total of 29,000 people employed. Some 2,000 of these jobs

were added during the past two years on the back of FDI investments amounting to nearly €1bn.

A lot of this success is down to Ireland's general attractiveness for FDI, including its 12.5% corporate tax rate, pro-enterprise environment, highly skilled and flexible workforce and access to the EU market.

While other countries may be competitive in some of these areas, Economist Intelligence Unit research on behalf of Matheson indicates that it is the unique combination of these factors, and not one specific element, which attracts investment to Ireland.

"Ireland's medtech sector has been successful for all the reasons the country

has been successful across many sectors," says Martin Shanahan, CEO of IDA Ireland, Ireland's inward investment promotion agency established in 1949.

"In addition to this, Ireland has an extremely strong proposition in high-value, zero defect manufacturing of highly sophisticated products – a story which has developed over the years.

"The convergence that is happening between information and communications technology, medical devices and pharmaceuticals is also underpinning Ireland's proposition in medtech as the country has specialisms in these areas."

In Shanahan's view, Ireland's medtech cluster is

world-class and competing with others around the world such as Massachusetts and Minnesota. This is as a function of the strong brands and companies based here for many years such as Boston Scientific, Abbott, Baxter International and Johnson & Johnson.

"The presence of these global leaders in itself creates a strong sector, but it is supplemented on the indigenous side by good companies which have grown up through the sub-supply route. The most notable of these is Creganna Medical," he says.

"Ireland is home to a closely knit cluster of 450 medtech companies, supported by industry, academic, clinical and

Shanahan identifies 3D additive manufacturing, connected health and convergence of sectors as key drivers of investments in recent years.

government agencies. This integrated and progressive community has already encouraged an increasing number of companies to expand operations across multiple facilities.”

In the early days of IDA Ireland, inward medtech investments were concentrated on the establishment of basic manufacturing facilities. As operations evolved to a high level of sophistication since then, so too did the type of investments being made by global companies.

Shanahan identifies 3D additive manufacturing, connected health and convergence of sectors as key drivers of investments in recent years and he expects this trend to continue.

“These drivers were behind the investments by Stryker in its innovation centre in Cork as well as the significant investments made by Becton Dickinson, Abbott and Medtronic in recent years,” he notes.

IDA Ireland's role in building the medtech ecosystem has been to support the companies locating in the country through a range of initiatives such as capital grants, R&D grants and employment grants.

It has also worked closely with Science Foundation Ireland and Enterprise Ireland in the development of 15 technology-based research centres including ARCH (connected health) and CeADAR (data analytics) which feed into the sector.

Recent investments

- Fort Wayne Metals Ireland, a world leading supplier of precision wire and components for medical devices, is to expand its production operations in Castlebar, Co Mayo in an €10m investment.
- Fazzi Healthcare Services has established a new Irish based coding and healthcare services company in Limerick, creating 300 jobs over five years.
- ZELTIQ Aesthetics, a medical technology company focused on developing and commercialising products utilising its proprietary controlled-cooling technology, is establishing a European manufacturing facility in Galway, which is expected to create around 60 jobs over the next 18 months.
- Lifesciences technologies company Surmodics is investing more than €7m in facility development and a further €9.5m in two R&D projects at its Co Galway operations



*Martin Shanahan
CEO, IDA Ireland*

1940
1969

NEW IRISH CONSTITUTION
SETS UP 'EIRE' REPUBLIC;
LINK KEPT WITH EMPIRE

1949

Harold Ridley
implants first
intraocular lens



April 1942

The **Federated Union of Employers (FUE)**, the forerunner of the Federation of Irish Employers, is founded in response to the Trade Union Act, 1941.

December 1948

Ireland officially leaves the Commonwealth and becomes a Republic through the Republic of Ireland Act 1948.

April

The Republic of Ireland Act is signed by the President of Ireland abolishing the remaining roles of the British monarch in the government of the Irish state.

June

Filming of John Ford's *The Quiet Man*, featuring John Wayne and Maureen O'Hara, begins in Cong, Co Mayo.



December

Ronnie Delany wins an Olympic gold medal in the 1,500 metres at the Melbourne Games.



1942

1946

1948

1949

1951

1956

Abbott establishes a commercial operation in Dublin.

Various groups making up the Federation of Irish Manufacturers included:

- Agricultural Implements Group
- Glove Group
- Handkerchief and Household Linen Group
- Hosiery Group
- Mantle and Gown Group
- Men's Protective Garments Group
- Photo Engraving Group
- Shirts Group
- Women's and Children Light Clothing
- Shroud and Coffin Lining Group
- Irish Pharmaceuticals Association
- Irish Structural Steel and Ironworkers Association
- Irish Waterproof Raincoat and Leather Garment Manufacturers Association
- The Perambulator Manufacturers
- Milk Group



Dr J.P. Beddy,
first chairman
of the IDA



Rosalind Franklin was a chemist and X-ray crystallographer who made vital contributions to the modern understanding of DNA.

The Industrial Development Authority (IDA Ireland) – Ireland's inward investment promotion agency, is established.

1950

John Hopps
invents the
first cardiac
pacemaker



1953

James Watson
and Francis Crick
publish work
on DNA



Johnson & Johnson (Ireland) have been in Ireland since 1935, opening their Tallaght head office (shown) in 1952.

December 1955

Ireland joins the United Nations along with 16 other sovereign states.



The Irish Defence Forces carry out their first peace-keeping mission when 50 officers are assigned to the United Nations observer group in Lebanon along the Armistice Demarcation Line between that country and Israel.

June 1963

President John Fitzgerald Kennedy becomes the first serving American president to visit Ireland.

March

Nelson's Pillar is bombed by an IRA splinter group and later demolished by the army.

September

Education minister Donogh O'Malley announces the introduction of free second-level education

CII organised a delegation of 130 representatives from firms, accompanied by Minister for Industry and Commerce Jack Lynch TD to travel to New York to promote Irish goods in 1963. They were received by President JF Kennedy only weeks before his assassination.

Ireland moves towards free trade, signing the General Agreement on Tariffs and Trade, a worldwide agreement to reduce tariffs.

1957

1958

1959

1960

1963

1966

The Royal College of Surgeons in Ireland is a founder member of the International Federation of Surgical Colleges.



Peter McLean, Billy MacGowan and Anthony Walsh (all Fellows of the Royal College of Surgeons in Ireland) perform the first cadaveric kidney transplant in Jervis Street Hospital.

Anthony Walsh appointed Royal College of Surgeons in Ireland Professor of Surgery.

1959

Taoiseach Sean Lemass introduces tax breaks and grants for foreign firms wishing to set up in Ireland.

Manufacturing output grew 6% annually marking Ireland's industrial take-off between 1958-1963

1964

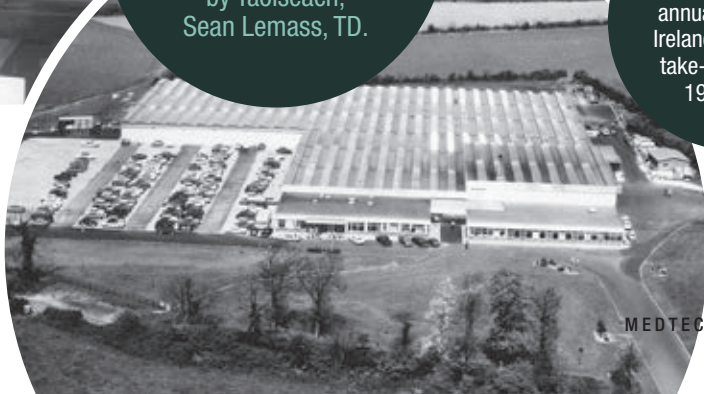
Frank Colton invents first commercially available oral contraceptive

1965

The first portable defibrillator is developed by Dr James Francis 'Frank' Pantridge in partnership with NASA

1966

New Siemens Healthcare factory in Swords is declared open by Taoiseach, Sean Lemass, TD.



From the ground up

Once FDI medtech multinationals had put down roots in Ireland, indigenous Irish companies joined the sector through the sub-supply route. These companies have gone on to become innovators in their own right and a new crop of fledgling companies with novel ideas is emerging on Irish soil.



*Tom Kelly, Life Science
Divisional Manager,
Enterprise Ireland*

Since 1998 Irish Government organisation Enterprise Ireland (EI) has been responsible for the development and growth of Irish enterprises in world markets.

A crucial element to the strategy in relation to indigenous medtech companies has been to create and support the development of a strong supplier base to multinationals, explains Life Science Divisional Manager at EI Tom Kelly.

"The medtech landscape in Ireland is dominated by the presence of top multinationals. Ireland has attracted seriously big players which have put down deep roots including Abbott, Medtronic, Cook Medical and Boston Scientific.

"We now have quite a number of excellent Irish sub-supply companies feeding into multinationals. Several of these have gone from being suppliers into Irish-based plants to being exporters in their own right.

"To a large extent, they were precision engineering companies which became increasingly more concentrated on the medtech sector. They developed significant capability and became highly skilled in meeting demanding customer and regulatory requirements."

Companies such as Bellurgan in Co Louth fall into the category Kelly describes.

"An important feature of these companies is how they have invested in modern equipment and lean operational practices. More recently, they have invested in their own capability to develop products - instead of simply winning a contract to make components for a customer they have developed the capability to work with the customer to develop a part they subsequently supplied," he notes.

EI has supported such companies to work with the university research system on innovation partnerships to build that capability further.

Novel collaboration

Introduced in 2011, BioInnovate is a national medical technology innovation training programme that provides a neutral territory in which academia, clinicians and industry can collaborate to develop novel medical technologies.

A partnership between multiple universities (NUI Galway, University of Limerick and University College Cork), BioInnovate is the only programme in the world directly affiliated to Biodesign in Stanford University in the US.

It engages with hospitals all over the country and is supported by EI, the Irish Medical Devices Association and numerous industry sponsors.

BioInnovate's role is to train people to change their mindset from being technology driven to taking a needs-led approach to innovation, according to programme manager Paul Anglim.

Over a ten-month period multidisciplinary clinical, business and engineering teams work together through a process that involves spending time in hospitals observing surgical procedures and healthcare professionals in a clinical setting with a focus on identifying unmet clinical needs. The team members collaborate to validate these needs, investigate the market opportunity, and then come up with solutions to unmet needs they have validated.

"One of the beauties of BioInnovate is that it brings people with different expertise together to collaborate and learn how to speak each other's language. The team is dealing with a relatively blank canvas in terms of solving unmet needs," says Anglim.

"We support participants who go on to create their own companies as much as possible. BioInnovate is fostering people with the right mindset who will bring this needs-led methodology with them back into the industry. It is helping to encourage R&D in Irish companies as well as promoting research in multinationals."

After just five years, BioInnovate now has 12 fellows, 55 alumni and has resulted in 14 technologies in development.

One example of a spin-out company is Embo Medical, which has created a one-shot embolisation device. Several technologies are in the process of spinning out, notes Anglim.



Paul Anglim, BioInnovate
Programme Manager

“ In the future these fledgling enterprises will scale up in a similar way to companies EI has supported in sectors such as agri equipment.”

It has also provided research and development (R&D) grants to companies, which are expanding their internal R&D capacity. A recent example is VistaMed, which provides catheter and extrusion products to the global medical device industry and is creating 200 new jobs at its new R&D facility in Carrick-on-Shannon, Co Leitrim.

Otherwise, in terms of funding support, EI's various programmes such as its recently introduced Capital Investment Initiative have assisted established medtech companies to acquire top-of-the-range equipment and adopt lean manufacturing principles.

When it comes to indigenous companies making their own end-products, Kelly says Aerogen is top of the list. Founded in Galway in 1997 by John Power, Aerogen designs and manufactures innovative aerosol drug delivery systems for the respiratory care market (see *interview with John Power*).

"Aerogen is a fabulous exemplar of what can be achieved when a platform technology geared towards the healthcare market is developed in Ireland. There is an opportunity for more companies like Aerogen to evolve and export around the world," he says.

Kelly is referring to the trickle of fledgling companies emerging from the higher education system and through initiatives such as BioInnovate, which is supported by Enterprise Ireland (see *BioInnovate panel*).

"In the future these fledgling enterprises will scale up in a similar way to companies EI has supported in sectors such as agri equipment. There are a number of excellent agri equipment companies now turning over tens of millions of euros after a generation of ownership," notes Kelly.

"We believe that in another generation's time the medtech sector will be a huge mainstay of Irish-owned business thanks to the resilience shown to date by medtech companies.

"It is harder to get a medtech company off the ground and it takes longer to build it up compared to a start-up in the IT sector for example. There are many steps to go through before bringing a product to market such as trialling and regulatory hurdles.

"There is huge capability in the medtech space with so many people having cut their teeth in multinationals.

"The satisfying thing from an EI perspective has been how the indigenous industry has responded in terms of moving with multinationals as they expand and become more demanding."

A new hub for health

Supported by Enterprise Ireland and the Health Services Executive, Health Innovation Hub Ireland (HIHI) facilitates and accelerates the commercialisation of innovative healthcare solutions.

Having started as a pilot in 2012 in Cork, the Health Innovation Hub (HIH) became a national entity last year, incorporating University College Cork, Cork Institute of Technology (CIT), National University of Ireland Galway and Trinity College Dublin and all of their associated hospital groups.

HIHI was officially launched in September of this year with the aim of driving collaboration between the health service and enterprise, leading to the development of new healthcare technologies, products, and services.

It is targeting two main groups – companies with healthcare innovations and employees working within healthcare who have developed their own concepts to address a need they encounter during their work day.

“We allow small companies to test and trial their products in an Irish healthcare environment with real patients, clinicians and staff. We also connect them with researchers with the expertise to help them to grow their technology,” explains Dr Tanya Mulcahy, Manager, HIH.

“What we hear from small companies is that they don’t know who to talk to within the healthcare system. They don’t seem to be able to access the people who can provide critical feedback on their products. This is something that we are very good at: introducing entrepreneurs and innovators to clinicians and academics where up to now such access didn’t exist. When we find the right team, we agree a project plan and manage this to completion.”

On the other side of this are the healthcare professionals, Mulcahy continues: “Staff in the healthcare system often have solutions to daily problems rattling around in their head but no time or knowledge to do more than think about them.

“We assess these ideas with a view to commercialisation. If something seems worthwhile and there is interest in it, we will link the idea generator with the appropriate research teams or even a company, to work with them to develop the product.”

HIHI has supported over 40 small companies to date across a broad range of healthcare technologies.

These include FastForm Medical, a Waterford-based company which has developed a wettable alternative to traditional resin casts. Another is NSilco, a start-up based in CIT which has developed an interactive real-time multi-disciplinary team management platform. NSilco’s solution is currently being used by two disciplines in Cork with a plan to roll out to others.

“We essentially use our knowledge of the system and the requirements of each company, product or idea to connect the right people with each other. The HIH is a neutral entity, not invested in the company, the innovator or the health system per se and therefore can engage, negotiate and coordinate projects with all parties.

“There’s no guarantee that the company or the innovation will be successful but if they are, and patients, healthcare and the economy are impacted then we’ve done our job well.”



Minister for Housing, Planning, Community and Local Government, Simon Coveney, TD; Tanya Mulcahy, Manager, Health Innovation Hub Ireland and Minister for Health, Simon Harris, TD.

“An important feature of these companies is how they have invested in modern equipment and lean operational practices. More recently, they have invested in their own capability to develop products.”



125 years of the Mater Hospital

Hospital innovation



Nearly half the staff at the Mater Hospital are trained as lean practitioners and increased industry engagement will be nurtured at its new innovation centre.

When it comes to innovation, The Mater Hospital in Dublin holds the belief that in order to deliver real and meaningful advances in healthcare technology, hospitals, universities and industry must work in close partnership.

According to CEO Gordon Dunne, the hospital has invested heavily over the past few years in developing processes with a view to re-engineering the service it provides.

It is currently turning one of the old buildings on the site into an innovation centre, which will bring industry and academia together with the hospital's clinical staff.

"The innovation centre will provide a unique setting where medtech companies can look at their process from inception through to delivery to the patient, cognisant of lean methodology from beginning to end," says Dunne.

The Mater Lean Academy was opened onsite in 2012 with the aim of improving healthcare quality and safety and generating efficiencies by applying the principles of lean engineering, management and science.

Mater Lean Academy courses are accredited by the hospital's academic partner University College Dublin (UCD). "We started out with ten people in a classroom in UCD. Now 1,200 of our 3,000 staff have been trained as lean practitioners," says lean manager Sean Paul Teeling.

"To date we have delivered 55 projects developed by lean practitioners which are helping to re-engineer the health service we provide."

The Mater Lean Academy is soon to introduce a 'buddy' programme which will send lean practitioners out into industry and bring company representatives with lean accreditation into the hospital in order to learn from each other's environments.

"The innovation centre will provide a unique setting where medtech companies can look at their process from inception through to delivery to the patient, cognisant of lean methodology from beginning to end."

1970

1979

March

Dana gives Ireland its first victory in the Eurovision Song Contest with *All Kinds of Everything*.

January

14 Catholic civilians are shot dead on Bloody Sunday when the British troops opens fire on rioters in Derry. Six months later, nine people are killed on Bloody Friday when the IRA detonates 20 bombs in Belfast city centre.

FUE, CII, and Chamber of Commerce jointly establish the Irish Business Bureau in Brussels in 1973.

February

Phil Lynott sings a rock version of *Whiskey in the Jar* on Top of the Pops.

July

Introduced in 1933, the marriage bar preventing women in the civil service from continuing to work post-marriage is finally lifted.

CII publishes a handbook for industry on efficient energy use in the wake of the 1973-1974 oil crises

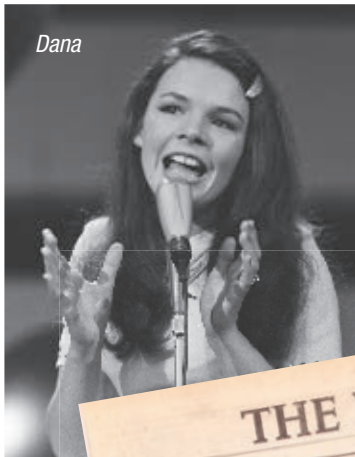
1970

1972

1973

1974

1975



Dana

Peter McLean performs the first 'live' kidney transplant in Jervis Street Hospital.

Baxter opens manufacturing operations in Castlebar, Co Mayo employing nine people.

Abbott Ballytinnan site in Sligo (which will become Abbvie) begins manufacturing hospital products including infusion sets, IV catheters, anaesthesia kits, ICU kits and pumps.



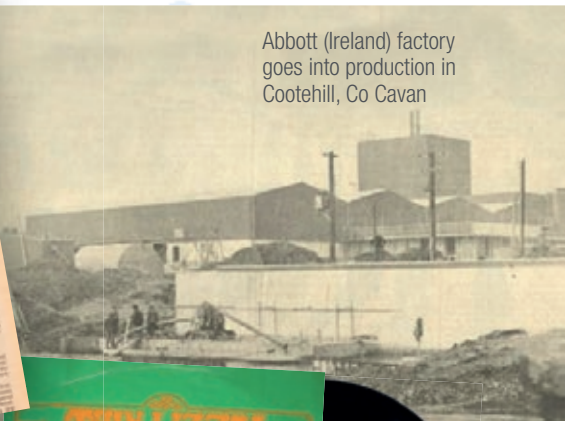
Maurice Neligan performs the first coronary artery bypass in the Mater Hospital.

Maurice Neligan performs the first coronary artery bypass graft in Ireland.



January 1973

Ireland joins the European Community along with Britain and Denmark.



Abbott (Ireland) factory goes into production in Cootehill, Co Cavan



1970

IDA Ireland encourages industry in export-oriented growth sectors such as electronics, engineering and pharmaceuticals to set up in Ireland. These developments foster a much more open economy and a strong growth in exports.

1975

Robert S. Ledley
invents first whole-
body CAT-Scan



September 1979

On a visit to Ireland, Pope John Paul II tells the audience at a youth mass in Galway, "Young people of Ireland, I love you".



1978

Over 86% of Irish firms employed less than 100 people and accounted for over 30% of jobs.

1976

1977

1978

1979

1976

Baxter completes
Phase 2 expansion
in Castlebar, Co Mayo

Travenol opens a plant in Swinford, Co Mayo. With 14 employees initially, the plant starts manufacturing the QuickCath-IV Catheter.

Shannon Coiled Springs Ltd, one of the Ireland's leading innovators in the field of high performance spring technology, is established in Limerick.



1979

Creganna is founded by Ian Quinn in Galway. The company opens a 3,000 sq ft facility offering specialist metal fabrication and coating technologies.



Abbott,
Ballytinnan,
Sligo

Innovation nation

A key objective of SFI's Agenda 2020 strategy is to develop a set of world-leading, large-scale research centres that will provide major economic impact for Ireland.

Established in 2000 by the Irish Government, Science Foundation Ireland (SFI) funds research in the areas of science, technology, engineering and mathematics (STEM). Having started out being focused on oriented basic research, its remit was broadened in recent years to incorporate applied research.

"SFI invests in excellent research projects that are internationally competitive and will be impactful in the Irish economy. The research has to be world-class, outstanding in terms of quality and relevant for what industry wants now and in the future," says Director General of SFI Professor Mark Ferguson.

"The research we fund supports industry requirements within a three-to-five year timeframe while also being visionary, incorporating projects extending over five to ten years. Industry is less likely to invest on its own in the longer-term projects as they are more speculative and higher risk."

Twelve SFI research centres have been established through an investment of €355m from Government through SFI and a further €190m from industry collaborators.

These centres link scientists and engineers in partnerships across academia and industry to address crucial research questions.

They aim to foster the development of new and existing Irish-based technology companies, attract industry that could make an important contribution to Ireland and expand educational and career opportunities in science and engineering.

CÚRAM, the National Centre for Research in Medical Devices, is one of the 12 SFI research centres. In recognition of the importance of the medtech sector to Ireland, it was established in 2015 at NUI Galway and officially launched in September (see CÚRAM panel).

"One of the most significant aspects of SFI research centres is the scale involved in each. Some 280 excellent people are collaborating at CÚRAM, which is near the medical devices cluster in Galway and brings together researchers from NUI Galway, University College Dublin, Trinity College Dublin and University College Cork," says Ferguson.



*Professor Mark Ferguson,
Director General, SFI*

“Each of our research centres must derive a minimum of 30% of funding from industry, which tells us that the research being carried out is relevant and there is deep engagement from industry partners. That builds trust and allows for a cross-fertilisation of ideas and the rapid exploitation of results.”

One of SFI’s priorities is to produce a pipeline of talented people for the private sector. More than 90% of the researchers that SFI funds will go on to work in the private sector, with less than 10% becoming next generation professors.

It runs a number of programmes with this in mind. For example, its Industry Fellowship Programme will fund the salary of an academic to spend up to one year full-time or two years part-time in a company either in Ireland or overseas.

Through its Partnership Programme, SFI collaborates with companies that want to carry out a specific piece of research which doesn’t fit neatly into any of SFI’s existing schemes.

“In order to build a good research-based economy you need stars who want to work on the cutting edge. They attract other students from Ireland and around the world,” says Ferguson.

“The scale at CÚRAM means it is a source of talent for companies looking to recruit. If a medical devices company wants to expand in Ireland for example, we know it can hire 10-20 talented people without damaging the centre’s work.”

Dedicated and smart

Researchers at CÚRAM are designing and manufacturing the next generation of ‘smart’ medical devices and implants to improve health outcomes and enhance quality of life for patients with chronic illnesses

With six academic partners and 24 industry partners, CÚRAM is establishing a global hub of research expertise in medical device technology from its base at NUI Galway, according to the centre’s director Abhay Pandit.

Industry partners include Aerogen, Boston Scientific, Cook Medical, Medtronic, Mylan, Neuravi and Stryker Instruments.

“CÚRAM aims to take the fruits of its research - new medical device products - to clinical trial, which will lead to job creation and spin-out medtech companies,” he says.

“Our innovative approach incorporates biomaterials, drug delivery, cell-based technologies, glycosciences and device design. The objective is to enhance, develop and validate both traditional and new combinational medical devices from molecular design stage to implant manufacturing.

“This brings together a comprehensive set of tools, expertise and perspectives to progress medical device research and its clinical application in each of our disease target areas.”

The target disease areas at CÚRAM include heart disease, Parkinson’s disease, diabetes, respiratory illness and musculoskeletal disease.

CÚRAM represents investment of €49m over six years from SFI and industry. A key area of success for the centre in its first year and a half has been the amount of funding secured by CÚRAM-funded investigators from the EU under Horizon 2020.

“To date, we have secured over €19m in direct funds from the EU, over €4.3m of which has been awarded directly to indigenous Irish industry. The funded projects will help to secure the future of the medtech sector through training and upskilling of researchers in medical device R&D,” says Pandit.

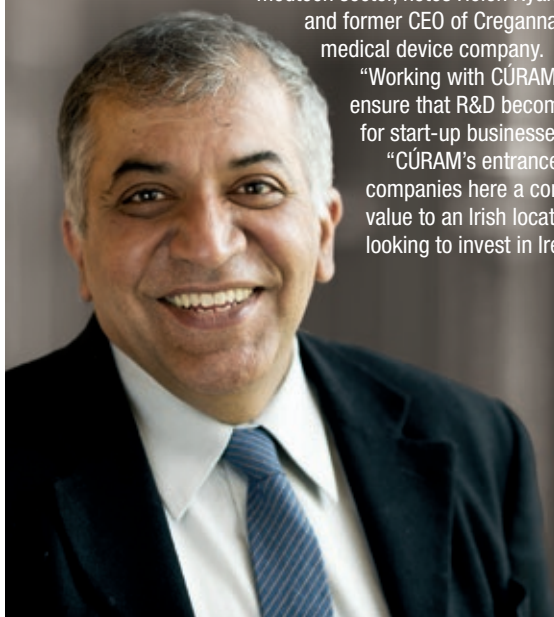
“In the long-term we may have minimally invasive injections instead of operations for back pain, electrodes which degrade within the body over time, or 3D printed muscles and tendons.

“This will not happen overnight, but the unparalleled combination of scientific, industry and clinical and regulatory expertise which CÚRAM facilitates will get us there in the coming years.”

The establishment of a national research centre like CÚRAM brings a huge advantage to the Irish medtech sector, notes Helen Ryan, Chair of the governing board of CÚRAM and former CEO of Creganna Medical, Ireland’s largest indigenous medical device company.

“Working with CÚRAM can help de-risk the R&D process and ensure that R&D becomes a much stronger part of the ecosystem for start-up businesses and SMEs.

“CÚRAM’s entrance into the Irish medtech space will give companies here a competitive edge and adds a huge amount of value to an Irish location for multinational medtech companies looking to invest in Ireland in the future.”



Abhay Pandit,
CÚRAM Director

“CÚRAM aims to take the fruits of its research – new medical device products – to clinical trial, which will lead to job creation and spin-out medtech companies.”

Tyndall National Institute

Tyndall National Institute in Cork is performing breakthrough research in photonics, electronics, micro-nano-technology and smart systems to deliver innovative solutions in medtech.

Its ICT for Health strategic programme is driving an ABC ecosystem (ie, combining academic, business and clinical stakeholders), in which Tyndall researchers are working with academic leaders, many of the top companies in medtech and pharma industries, and in collaboration with clinical experts.

“The capability of various Tyndall technology platforms can be leveraged into the development of minimally invasive surgical tools, in vitro, wearable and implanted diagnostic devices as well as therapeutic and drug delivery systems,” says Dr Paul Galvin, Head of ICT for Health Strategic Programmes at Tyndall (*pictured right*).

Established in 2004, the Tyndall National Institute is one of Europe’s leading centres in ICT research and development. It hosts over 460 researchers, engineers and support staff and has a network of over 200 industry partners and customers worldwide.

Tyndall is host to both the Irish Photonic Integration Centre and the Microelectronics Circuits Centre Ireland and is a collaborator in the CONNECT Centre for Future Networks & Communications (Internet of Things) and the Insight Centre for Big Data Analytics.

In addition, Tyndall hosts researchers in residence from medtech companies such as Boston Scientific and Lake Region Medical, and has collaborations with over 70 clinical experts.

The ICT for Health Strategic Programme in Tyndall represents about 20% of the research activity of the institute.

“There is a very good understanding at Tyndall of the way the medtech industry is moving. This is especially true in the development of emerging smart medical devices which require integration of a range of novel sensors, components and materials for additional functionality, while ensuring the prerequisite miniaturisation and cost constraints of the application scenarios are fully addressed,” says Galvin.

Tyndall acts as a gateway for medtech customers, providing world-class facilities and expertise for the development of smart medtech solutions. It also helps to identify technologies and expertise from outside Tyndall where applicable, to ensure technology development is enabled in the most efficient and cost-effective manner possible.

“We put a team together based on the customer’s requirements, which could incorporate both internal and external researchers, industry partners as required such as contract manufacturers, industrial designers and component suppliers, as well as clinicians and clinical research facilities,” says Galvin.


An example of a medtech project completed at Tyndall was the development of a sensor-based guidewire incorporating a photonic solution in collaboration with Lake Region Medical.

With operations in Wexford and Galway, Lake Region Medical is one of the world’s largest manufacturers of medical guidewires, which are used in minimally invasive operations to provide endovascular access and place medical devices in the human body.



“The capability of various Tyndall technology platforms can be leveraged into the development of minimally invasive surgical tools, in vitro, wearable and implanted diagnostic devices as well as therapeutic and drug delivery systems.”





Graham Love,
HRB Chief Executive

Clinical catalyst

Having funded research teams in Ireland since 1986, the Health Research Board (HRB) upped the ante in recent years by building dedicated clinical research facilities on key hospital sites.

The Health Research Board is a statutory agency under the aegis of the Department of Health. As the lead agency in Ireland responsible for supporting and funding health research, information and evidence, its mission is to improve people's health and to enhance healthcare delivery.

The HRB allocates approximately €35m a year to research in Ireland's universities and health system, and manages a research awards portfolio in the region of €150m.

The five clinical research facilities are on hospital sites in Dublin, Cork and Galway (*see panel*).

Their aim is to provide all the critical elements for successful world-class patient-focused research, including infrastructure, experienced research and specialist support staff and the necessary quality and oversight programmes. Research is delivered across numerous clinical specialties.

"The HRB has been one of the main supply lines of talent into Ireland's medtech hub. Many of the people that were on HRB-funded research teams went on to work in companies such as Boston Scientific," says HRB chief executive Graham Love.

"There has been an upswing in this regard in the past few years following the building of clinical research facilities for studies and trials on key hospital sites in the country. Ireland needed proper infrastructure to allow major international studies to take place here and these facilities allow us to compete on an international level."

In addition to the facilities themselves, last year the HRB created Clinical Research Coordination Ireland (CRCI). Similar to a shared service centre, this is effectively a hub which connects all of these facilities and is designed to streamline the process if a company or academic wants to run a clinical trial.

An example of how this clinical research infrastructure works in practice has been the development of a technique that uses a medical device to remove large blood clots from the brain in stroke patients. Neuravi's EmboTrap developed in Galway is one the devices to use this technique, known as thrombectomy. Led by consultant neurologist Peter Kelly, thrombectomy it uses has become an international standard of care and has resulted in marked improvements in outcomes for patients with stroke.

"This is a wonderful therapy which is saving lives and the state money. It shows what can be achieved when medical device development technology is combined with good clinical testing," says Love.

"Medical devices have a much more rapid development timeline than a new drug. But they still need to be properly tested for safety and effectiveness in humans before being made available. If hospitals are going to adopt a standard of care they need clear data and HRB clinical research facilities allow that to happen."

Clinical Research Centres

HRB CRF-C

Health Research Board
Clinical Research Facility
Cork at University College
Cork and Mercy University
Hospital, Co Cork.

HRB CRFG

Health Research Board
Clinical Research Facility
Galway at University
Hospital Galway, Co
Galway.

Wellcome Trust

HRB CRF SJH

Wellcome Trust Health
Research Board Clinical
Research Facility at St.
James's Hospital, Dublin 8.

RCSI CRC

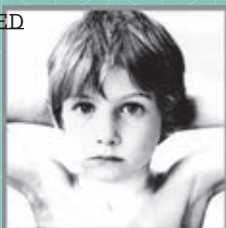
Royal College of Surgeons
Ireland Clinical Research
Centre at Beaumont
Hospital, Dublin 9.

UCD CRC

University College Dublin
Clinical Research Centre
at Mater Misericordiae
University Hospital,
Dublin 7 and St. Vincent's
University Hospital,
Dublin 4.

"The HRB has been one of the main supply lines of talent into Ireland's medtech hub. [...] There has been an upswing in this regard in the past few years following the building of clinical research facilities for studies and trials on key hospital sites in the country."

1980 1989



October

Boy is the debut studio album by Irish rock band, U2.

CII lobbied for the reduction of the corporation tax rate in its pre-budget submission. In 1981 the Government introduced 10% tax rate for manufacturing industries.

FUE held its first annual national conference on industrial relations in 1982. Guest speakers included the Taoiseach and European Commissioner, Ivor Richard.

September

Probably the most famous All-Ireland Football Final of all time, Seamus Darby's late goal denies Kerry's team five All-Ireland titles in a row.



Ryanair is founded, but doesn't begin operations between Waterford and Gatwick Airport until the following year.

1980

1981

1982

1983

1984

Baxter commences manufacturing Vialflex containers in Castlebar, Co Mayo.

Nipro Healthcare establishes operations in Wicklow and Waterford providing customers with a comprehensive process for large scale manufacture of medical devices.

CR Bard established a manufacturing facility for their cardiology business in Parkmore, Galway employing 30 people.

1983

Teleflex Medical Limited is established in Annacotty, Limerick to manufacture tubing and catheter products for large medical device companies.

The 1982 All-Ireland winning Offaly team



Teleflex's new modern site highlights their – and indeed the medtech industry's – journey since the company was set up in 1983



July 1985

Broadcast internationally to 1.9 billion viewers, Bob Geldof's Live Aid raises £150m for famine relief in Ethiopia.

1986

French cardiologists Puel and Sigwart implant first coronary stent

November

The Governments of Ireland and the UK sign the Anglo-Irish Agreement.

HRB Health Research Board

1985

1986

1988

1989

First heart transplant in Ireland carried out in the Mater Hospital by Maurice Neligan and Freddie Wood.

The Health Research Board, a statutory agency under the aegis of the Department of Health, is established to fund health research teams.

Travenol Laboratories SA formally changes its name to Baxter Healthcare SA following a merger with American Hospital Supply Corporation.

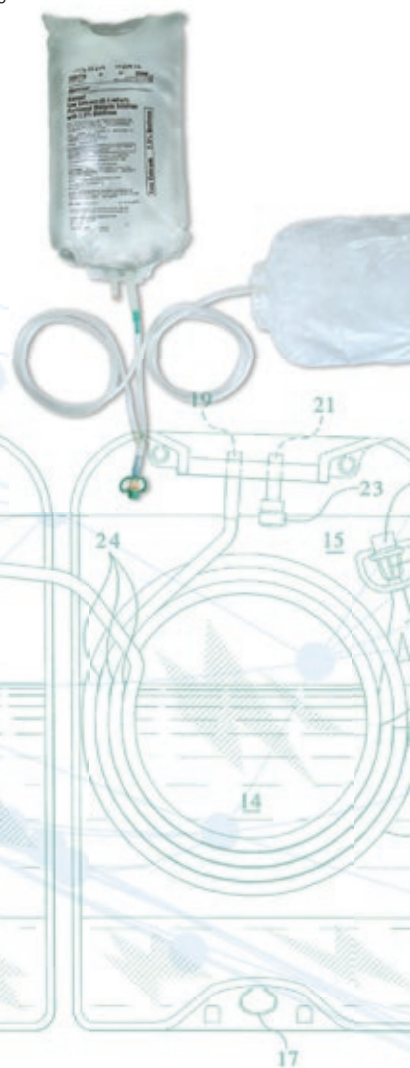
SCI, an electronics manufacturing services provider, starts operating in Fermoy, Co Cork with 16 employees.



1988

Baxter Castlebar starts production of Twinbag, a product that allows the patient to undergo a complete solution exchange without having any need to carry an empty bag on the body.

Taoiseach Garret Fitzgerald; British Prime Minister, Margaret Thatcher; and British Minister for Foreign Affairs, Geoffrey Howe at the signing of the 1985 Anglo-Irish Agreement



Getting connected

As the trend towards connected health accelerates globally, the future looks bright for Ireland to blaze a trail by bringing key players and innovators together.

Ireland is ideally placed to be a world leader in the provision of total connected health solutions as it has a highly networked ecosystem and the industry expertise required to embrace the convergence between health and the Internet of Things (IoT).

This is a belief held by many in the Irish medtech

sector, including Conor Hanley, President and CEO of Foundry Innovation & Research (FIRE1), a Dublin-based start-up which came out of The Foundry incubator in Menlo Park, California.

Having developed a novel remote monitoring device, Fire1 raised US\$7.5m this year from existing investors including venture capital firms

Lightstone Ventures and New Enterprise Associates as well as Medtronic.

Hanley was previously CEO and co-founder of University College Dublin spin-out company BiancaMed.

Acquired by ResMed in 2011, BiancaMed commercialised an innovative method to provide connected health solutions.

ResMed is a global leader in the development, manufacturing and marketing of medical products to combat sleep and respiratory disorders. Its research,

development and innovation facility in Dublin has played a key role in the development of a unique platform which brings the remote monitoring of patients with chronic diseases into the cloud.

This is the type of global investment which Hanley believes underpins Ireland's potential to be a centre of excellence for connected health.

"There is already quite a bit of activity in Ireland in the IoT-health space. A key development was the



*Conor Hanley,
President and CEO,
Foundry Innovation
& Research (FIRE1)*

“The critical mass of industries Ireland has – including IT, pharmaceuticals and gaming – will really allow us to contribute to IoT in health on a global scale.”

Ireland is home to:



10 of the world's top 10 ICT companies

9 of the world's top 10 biopharma companies



18 of the world's top 25 medtech companies

“The digital economy is estimated to be currently worth €12.3 billion or 6% of GDP in Ireland.”

establishment in 2015 of technology centre ARCH [Applied Research for Connected Health], which will encourage collaboration between industry and academia in this area," he says.

Supported by IDA Ireland and Enterprise Ireland, ARCH provides access to world class clinicians, academics and patient cohorts to explore and evaluate potential connected health solutions for the global market. Its list of industry partners includes companies from the medtech, healthcare, electronics and information technology (IT) sectors.

"The critical mass of industries Ireland has – including IT, pharmaceuticals and gaming – will really allow us to contribute to IoT in health on a global scale," says Hanley.

"The Irish medtech sector has already made good strides in terms of connecting its devices to the IoT. More needs to be learned about consumer design to ensure wearable medtech devices are engaging and easy to use. There is an opportunity for medtech companies to connect with top players in this area, such as Apple and FitBit, as they have well established operations in Ireland."

Conor Russell, Vice President of Operations, Boston Scientific Clonmel, agrees that Ireland can be a global leader in the development of smart medical devices that will empower both patients and physicians to more effectively treat today's chronic diseases.

Employing over 850 people, Boston Scientific's Clonmel plant develops and manufactures implantable pacemakers, defibrillators and neurological devices. These devices provide real-time data to physicians on physical activity, breathing and heart rate. This type of individualised data enables physicians to better understand, diagnose and treat patients effectively.

"The future of medicine and medical devices is very exciting. Digital trends in the smartphone era have made us

all accustomed to accessing tailored information and made us more connected. Now we are seeing the same trends in medicine and we are developing new healthcare solutions to leverage this technology," says Russell.

"Smart medical devices are becoming more prevalent as the industry advances. Patients are better educated

Ireland apart from other medtech hubs around the world, Russell adds.

"The fact that everybody is based within a few hundred miles of one another means that we can innovate and commercialise our new ideas quickly. With the right ecosystem and the right opportunities here in Ireland we can create a real global

manufacturers (OEMs) can extract innovation from local companies, which in turn will have a place in which to proliferate their technology."

Based in Dublin, BlueBridge Technologies is primarily focused on developing technologies for patient monitoring and point-of-care in vitro diagnostics.

Conor Russell, Vice President of Operations, Boston Scientific, Clonmel

"There is a real opportunity for Ireland to tap into different technologies and bring them together for the common purpose of solving patient or physician needs."

about their own health making a diagnosis that is individualised to that specific patient is a better solution for everybody involved."

Russell feels Ireland can be the world leader in connected health solutions.

"The ingredients are there. The country already has a very strong presence in both the pharmaceutical and information and communications technology (ICT) sectors. We have a highly educated and experienced workforce that can learn from one another," he says.

"Our skills are transferable - for example solutions provided by software engineers in the gaming industry can be adapted to provide better 3D visualisation tools for physicians in both cardiac or brain implants."

The close proximity of a talented labour force sets

powerhouse of innovation for the future of medical devices."

Garret Coady, CEO at BlueBridge Technologies, notes that small local companies will have an important role to play in driving innovation in connected health. "Larger companies will find it difficult to respond quickly to the sporadic fluctuating needs of consumers and the healthcare sector. A lot of what happens in terms of innovation in this area will rely on smaller companies to respond as they are more agile.

"In Ireland we have a cosy ecosystem where small start-ups employing two people can rub shoulders with CEOs of major blue chip medtech companies as well as top-level researchers. We have to exploit this platform further in the connected health space. Original equipment





*John O'Brien,
Chief Executive
Officer, S3 Group*

"Wearables are moving into the domain where they are being considered a medical device and are taking on more serious roles in the management of healthcare. In terms of product development, this means increased verification, validation, testing and compliance with regulations. Addressing this issue is our sweet spot," says Coady.

BlueBridge Technologies is involved in the development of mobile phone applications that communicate with sensors worn on the patient to deliver critical parameters in a real time fashion. This allows people to take greater ownership of their health as well as providing the caregiver with more extensive data pertaining to the health of the individual.

"It is a natural transition for medtech to converge with the IoT. However a lot of the large technology companies have stayed away from this so far because of the regulatory hurdles, costs and time involved," Coady observes.

"I believe more solutions such as the type of products we are working on for sensing will come out of Ireland. It is in a great position to create game-changing solutions in connected health as we already have pedigrees in software development/IT, pharmaceuticals and medical devices."

Time for transformation

John O'Brien, Chief Executive Officer of Irish company S3

Group, believes that the combination of connected medical devices and digital therapeutics will transform healthcare over the next few years.

"As healthcare costs continue to rise around the world there is an increased emphasis on measuring outcomes to evaluate the efficacy of treatments. For this new outcome-focused system to work you need to collect a lot of data, which needs to be analysed and transformed into insights," he says.

"The medtech industry is going to be at the centre of this data gathering to facilitate this trend towards payment for outcomes. A lot of the source data will come via connected medical devices such as inhalers or heart monitors.

"At the same time, healthcare is becoming more patient-centric. We are moving towards a system where the patient feels more informed and in charge of their own care. There will be a demand for personalised disease management programmes delivered via connected devices and services. A huge opportunity exists to create connected services around devices for patients, doctors and healthcare providers."

S3 Group's Connected Health division works with life science companies and healthcare providers to deliver digital health programmes. To date it has delivered programmes to over 100,000 patients in more than 40 countries.

"We are developing patient-centric solutions that place people at the centre of their own care and make sure that they are being looked after 24/7. When they wake up in the morning and look at their smart phone, we want them to feel in control, understood, informed and safe," O'Brien explains.

"Getting people to adhere to their medicine is a major challenge and many adherence levels are only at the 50% level. I believe that the combination of medtech connectivity and well-designed digital support programmes can actually change people's behaviour in this regard.

"You can see how this has happened with social media. Facebook, for example, has a deep understanding of human behaviour, knowing what makes people post, share and like pages. It caused a shift in the way people communicate with each other. I think these techniques will transfer into the healthcare space.

"The drive towards connected health is not an easy journey because at the end of the day you're trying to change how the entire healthcare system works. There is a lot of work to be done, but Ireland has all of the key ingredients needed to do extremely well in this space."



*Garret Coady,
CEO, BlueBridge
Technologies*

"In Ireland we have a cosy ecosystem where small start-ups employing two people can rub shoulders with CEOs of major blue chip medtech companies as well as top-level researchers."

1990 1999

June

David O'Leary scores the winning penalty and Packie Bonner makes a crucial save, helping Ireland beat Romania to reach the quarter-finals of the *Italia 90* World Cup.

December 1990

Mary Robinson becomes the first female president of Ireland.

January 1993

Ibec is established through the merger of the Confederation of Irish Industry and the Federation of Irish Employers.



Ireland enters the Celtic Tiger period which marks great economic growth for Ireland. It continues until 2007.

October

Seamus Heaney wins the Nobel prize for Literature, other Irish winners include Yeats (1923), Shaw (1925) and Beckett (1969)

November

The Divorce Referendum passes.

1990

1991

1993

1994

1995

David Bouchier-Hayes, Royal College of Surgeons in Ireland Professor of Surgery, leads team performing the first laparoscopic cholecystectomy – heralding the era of 'keyhole' surgery.

CR BARD in Galway files its first patent, for a device for use with a catheter.

A facility is established in Cork with 13 employees, which will be acquired by eye care company Alcon in 2000.

Dolmen, an Irish medical device design company, opens in Dublin.

Puritan Bennett Ireland establishes ventilator R&D facility in Galway.

Facility established in Galway under Contech Medical International Limited to provide packaging solutions for guidewires and catheters.

CR Bard started a R&D programme on coronary balloons at the Galway Facility which was to pave the way for the establishment of an R&D Centre of Excellence in the years to come.

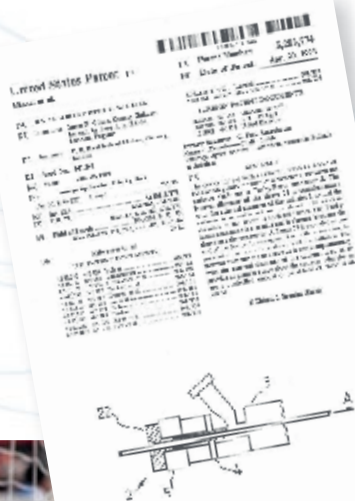
Abbott establishes its first diagnostics manufacturing facility in Sligo.

MedNova, a manufacturer of interventional cardiology equipment, is founded by former employees of CR Bard in Galway John O'Shaughnessy, Paul Gilson and Chas Taylor.

Boston Scientific acquires a site in Galway to establish its first Irish facility with an initial investment of US\$24 million.



CR Bard patent (1993)

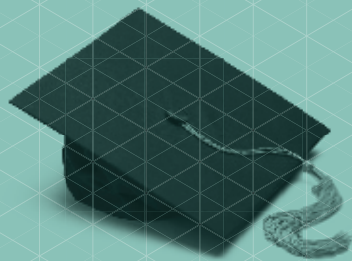


Packie Bonner

April 1994

The interval performance during the Eurovision Song Contest by *Riverdance* becomes a global sensation.





University tuition fees for undergraduates are abolished in Ireland to promote educational equality.

1996



1997

April 1998

The Good Friday Agreement is signed. As a result, the Northern Ireland Assembly is elected, to which powers are devolved in 1999 and a power-sharing Executive takes office.

Days before the referendum on the Good Friday Agreement, David Trimble and John Hume shake hands on stage at a U2 concert.

1998



January

Ireland replaces the Irish pound and adopts the Euro, though it doesn't come into circulation until three years later.



1999



Cook Medical begins construction of a manufacturing facility on a Greenfield site adjacent to the University of Limerick.

Contech Medical International moves from Mervue to 4,000 sq ft facility in Parkmore Business Park West in Galway.

Clearstream started as subsidiary of AngioDynamics, in Enniscorthy, focused on coronary stents and catheters.

Puritan Bennett Launches PB740 ICU Ventilator, the first R&D product from its Galway facility.

DePuy Synthes establishes plant in Ringaskiddy, Co Cork.

Boston Scientific acquires a 30 acre site in Cork and begins to build its second Irish facility.

Boston Scientific in Galway announces US\$60m expansion investment and officially opens an R&D centre there.

Aerogen, an Irish company, is founded by John Power in Galway having developed an innovative aerosol drug delivery system.

Dolmen has its first patent issued for a medical device – the Alliance Medical USA (no longer in business), patent for a minimally invasive surgical device.



Enterprise Ireland, the Irish Government agency responsible for the development and growth of Irish enterprises in world markets, is established.

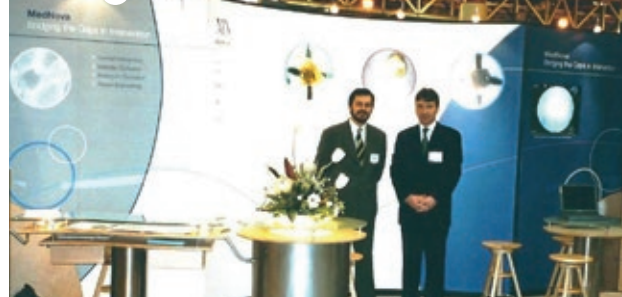
Cook Medical Limerick facility is officially opened. Subsequently the Limerick plant begins labelling operations for sister manufacturing sites.

Creganna enters the medical device industry, initially providing metal fabrication and specialist coating solutions for PTCA catheter hypotube shafts.

Caradyne, an Irish respiratory company, is founded.

Tech Group Europe, a contract manufacturer to the medical devices industry, is established in Dublin.

Arterial Vascular Engineering acquires the Galway operations of CR Bard.



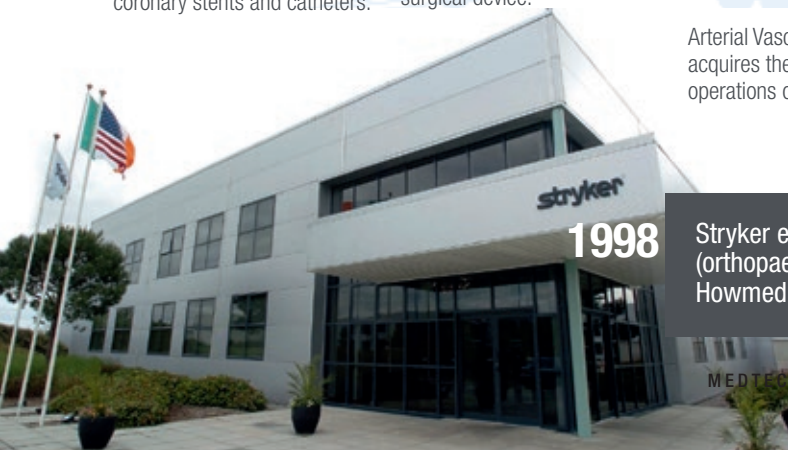
Medtronic establishes a state of the art facility in Galway, which is a centre of excellence for the development and manufacture of a number of the company's key medical technologies for the treatment and management of cardiovascular and cardiac rhythm disease.

Boston Scientific completes the build of a new 175,000 sq ft facility in Cork.

MedNova technology is showcased at the American College of Cardiology medtech conference in New Orleans.

Guidant, a vascular care company, is officially opened in Clonmel.

Baxter introduces Vialto to its Castlebar plant. In less than 10 years the plant will be making in excess of 80 million units of intravenous solutions from the new Vialto department.



1998

Stryker establishes two new greenfield manufacturing facilities in Cork (orthopaedics and cutting accessories) and through the acquisition of Howmedica acquires an orthopaedics manufacturing facility in Limerick.

Vibrant venture capital

Peter Sandys, managing partner at Seroba Life Sciences, has observed huge change in the medtech venture capital marketplace in Ireland in recent years.



Headquartered in Dublin, Seroba Life Sciences is a venture capital firm which invests in breakthrough healthcare technologies that promise to improve lives and make a difference worldwide.

It introduced the first venture capital fund dedicated to the life sciences sector in Ireland in 2002, which closed with €20m for seed and early stage investments. It is now on its third dedicated fund having closed a second in 2009 with committed capital of €75m to target lead or co-lead investments in Ireland, the UK and Western Europe.

“Our first significant investment was in 2007. We invested in Galway company, Novate, which was developing a new generation of IVC filters focused on addressing safety issues arising from existing device designs,” says Peter Sandys, managing partner at Seroba Life Sciences.

Seroba Life Sciences was the only venture capital company focused on the medical devices sector in Ireland until 2008 when it was joined by Fountain Healthcare Partners.

From then on an increasing number of innovative medtech companies began to seek regulatory approval in Europe.

“Regulations had become tighter in the US and there was a great deal of pressure on healthcare costs during the recession,” notes Sandys. “We began to see inward migration into Ireland.”

An example of this inward migration was PQ Bypass, a spin-out company from the Fogarty Institute for Innovation in California, which set up an Irish subsidiary following Seroba Life Sciences investment in 2012. PQ Bypass is developing new medical devices to treat peripheral vascular disease by creating a minimally-invasive percutaneous surgical bypass.

In the past few years there has been a flood of new medtech companies in Ireland relative to other markets as people left FDI multinationals to develop their own ideas and structures to drive innovation were established, according to Sandys.

In this regard, Sandys highlights Enterprise Ireland’s collaboration with the Mayo Clinic to bring research projects into Irish universities and the establishment of i360 medical, a spin-out company from the Royal College of Surgeons in Ireland focused on generating and commercialising new world-class healthcare technology solutions.

Last April, around 50 Irish medtech companies including X-Bolt Orthopaedics, Novate Medical and Mainstay Medical pitched for funding from venture capital firms at the Innovation in Medtech conference.

Mainstay Medical has received €30 million in funding to allow the business to commercialise in Europe and the United States and help improve the lives of millions of people who suffer from chronic low back pain.

Since it was set up in 2007, X-Bolt Orthopaedics has raised over €4 million in equity funding. The X-Bolt uses an expanding bolt to reduce the risk of complications in hip-fracture patients and results in substantial savings for hospitals.

The climate for venture capital funding in Ireland generally is strong. According to the Irish Venture Capital Association VenturePulse survey published in September, Irish high-tech SMEs raised a record €486m in the first half of the year, which is a 58% increase compared to the first half of 2015.

Over one third (38%) of funds in the second quarter were raised by eight companies in the life sciences sector.

*Peter Sandys,
Managing Partner,
Seroba Life Sciences*

Regulatory ready

Medical devices came under the Health Products Regulatory Authority's remit in 2001 and since then it has been focused on ensuring the sector is dealing with a consistent and balanced regulatory system.

The Health Products Regulatory Authority's (HPRA) role is to protect and enhance public and animal health through the regulation of medicines, medical devices and other health products.

The agency was originally founded as the National Drugs Advisory Board in 1966. It became the Irish Medicines Board in 1996 and since then its remit has expanded significantly.

It became the competent authority for medical devices in 2001 and its name was changed to the HPRA in 2014 to reflect the national regulator's broader remit and wider scope of functions and responsibilities across the health products sector.

"Regulation is important as it provides stability in the marketplace. In order to protect and enhance public health we have to ensure we have a regulatory environment that affords appropriate protection to patients and other

device users but also allows for the research and development of new technologies and their safe introduction onto the Irish market. This enhances the overall health system by giving people access to new treatment options," says Niall MacAleenan, Medical Device Lead at the HPRA.

As part of its efforts to develop and enhance the regulatory system, the HPRA regularly carries out audits and joint assessments of the work of European notified bodies with regulatory authorities in other European countries and representatives from the European Commission.

"These joint assessments make the regulatory system more consistent, effective and balanced. For medtech companies in Ireland, this results in greater certainty about the regulatory system – they know that if they put an application into a notified body, it will be assessed in a consistent way," says MacAleenan.

"The HPRA partners with European and international organisations as much as possible to promote regulatory cooperation, efficiency and harmonisation."

Regulation of medical devices at European level is set to ramp up over the coming years with the introduction of new legislation. The HPRA's task will be to ensure it is driving the implementation of new regulations and that all stakeholders are ready to introduce new requirements when necessary, notes MacAleenan.

The HPRA is very open to meeting with companies and health professionals, particularly if they are innovating and creating new products.

"This helps us to make sure that regulatory requirements and processes are as clear as possible, which hopefully facilitates the further development of these products," says MacAleenan.



*Niall MacAleenan,
Medical Device Lead, HPRA*

"For medtech companies in Ireland, this results in greater certainty about the regulatory system – they know that if they put an application into a notified body, it will be assessed in a consistent way."

An Ireland that

The Irish economy is on a growth trajectory and the business community is anticipating a population boom by 2040.

“One of the reasons we can expect the population to grow to 10 million by 2050 is the fact that Ireland has not missed the latest industrial revolution, industry 4.0.”

Ireland's most influential employer group Ibec expects the island of Ireland to reach a population of 10 million people by 2050 against a backdrop of an estimated 4% annual GDP growth in the Republic of Ireland over the next couple of decades.

The most recent figures from the 2016 census in the Republic of Ireland show that the population of Ireland has reached 4.76 million people.

This means that in the past 20 years, the population grew by 30%, the fastest rate of any other European country (bar Luxembourg). Initially, this was driven by high immigration. More recently however, it was due to high birth rates.

This means that the Republic of Ireland now has the youngest population in the EU, with more than half the population under 35 years of age.

CEO of Ibec Danny McCoy believes the target of reaching a population of 10 million people on the island of Ireland by 2050 is achievable: “Ireland is the only country in the world to have a lower population now than it did in the 1840s. On an all-island basis the population now stands at 6.6 million people, compared to 8 million in 1845,” he says.

“However, the Irish Famine [1845-1852] is not the main reason the population is as low as it is now. It is because Ireland missed out on the industrial revolution in the 19th Century as it remained an agrarian society.

“One of the reasons we can expect the population to grow to 10 million by 2050 is the fact that Ireland has not missed the latest industrial revolution, industry 4.0. Ireland is at the vanguard of this development and medtech companies are the champions of it, helping to drive a manufacturing renaissance across the island.

“Ireland's economic growth is being driven by increased productivity supported by capital investment and the skills of the workforce. When you combine this with the fast growing population there is every reason to be confident about future prospects.

“Within that landscape we see the medtech sector growing faster than the national average. The Irish economy has recovered and is well ahead of where it was pre-recession. The unemployment rate, at 7.8%, continues to fall and many sectors are already at full employment including

works

internationally traded services and agri-food.”

The effects on Ireland of the UK voting to leave the EU this year (known as Brexit) are as yet unclear. While there are possible threats such as the possible introduction of tariffs by the UK, McCoy sees opportunities for Ireland as a result of Brexit.

“Europe will have to change for the better if it wishes to retain a strong relationship with the UK, which I believe it does. If more flexibility in how the EU operates is brought in as a result, this will be good for Ireland.

“The UK is coming out of the EU, not leaving Europe. As its closest neighbour, this represents a huge opportunity for Ireland. The EU’s 500 million consumers are among the richest people in the world and Ireland is on their doorstep.”

Ireland recently joined the super league in terms of competitive economies, having jumped up the IMD world competitiveness rankings from 16th to seventh position this year.

“One of Ireland’s goals for the future should be to keep a sharp eye on competitiveness as it is hard won but easily lost. As a wealthy economy, our

business model is strong. We have a huge balance of payments surplus which is better than the position in Britain. But we have to watch that we don’t allow gaps to develop between the UK and Ireland as it is by far our biggest competitor now,” says McCoy.

“The Government must make sure that the tax proposition is as aggressive as it needs to be – 12.5% corporation tax should be seen as the maximum, it might need to come down.”

Otherwise, if the ambition for the island to become home to 10 million people is to be realised, investment in the right areas will be crucial, McCoy adds.

“An island of 10 million people will require state-of-the-art infrastructure, the right skills mix and the level of income and economic activity to underpin such ambition.

“Designing a new Ireland – an Ireland that works – for business and citizens alike is no easy task, but it’s a job we all have a massive stake in. Through leadership, co-operation and common purpose, the spirit, vision and promise of being ambitious for a prosperous 10 million population can be fulfilled.”

“Ireland recently joined the super league in terms of competitive economies.”

Danny McCoy,
CEO, Ibec

2000
2004



Euro banknotes and coins are introduced in Ireland on 1 January 2002



November

The Doha Round of trade negotiations among the membership of the World Trade Organisation takes place with the aim of achieving major reform of the international trading system.

Google opens offices in Dublin's Docklands and is later followed by Facebook, the area becomes known as 'Silicon Docks' afterwards.

2000

2001

2002



Science Foundation Ireland is established by the Irish Government to fund research in the areas of science, technology, engineering and mathematics (STEM).

Royal College of Surgeons in Ireland is the first to develop an online surgical education programme (BeST) globally.

Tech Group Europe in Dublin starts intranasal device programme.

Clearstream Technologies Ltd is formed following a management buy-out.



Boston Scientific Galway announces new product development expansion.

DePuy Synthes establishes global supply chain function at its Cork plant.

Sanmina, an electronics manufacture, merges with SCL in Cork. The facility expands its services to include the manufacture of medical devices.

Operations for Medtronic's cardiac rhythm and disease management business were added to the growing operations in Galway.

Seroba Life Sciences launches the first venture capital fund dedicated to life sciences – the Irish BioSciences Venture Capital Fund, with €20m for seed and early stage investments.

(L-R) Former Tánaiste and Minister for Enterprise, Trade and Employment, Mary Harney; Gerry Murphy (left), Executive Director, Industrial Products & Europe of Enterprise Ireland; and Peter Sandys, Managing Partner of Seroba.



2000

The Irish Medical Devices Association (now the Irish Medtech Association) is established as part of Ibec



Creganna opens its first dedicated medical device facility in Parkmore, Galway.





2003 Special Olympics World Summer Games were hosted in Ireland.

January

The 120m tall Dublin Spire is unveiled as a replacement for Nelson's Pillar which was blown up in 1966.

2003



Ireland secure their first Triple Crown in 19 years

March 2004

Ireland becomes the first country in the world to introduce the smoking ban.

2004



Creganna Design group is established and grows to become the world's largest design partner for minimally invasive devices. A second Creganna facility opens in Parkmore Galway.

Cook Medical's plant in Limerick is expanded, adding a further 5,000 sq m of manufacturing, warehousing and office space. Products are shipped directly to hospitals throughout EMEA.

Tech Group Europe doubles clean room space at Dublin plant and announces 124 new jobs.

Stryker establishes R&D team in Cork for bone and soft tissue cutting devices.

Cook Medical consolidates various support functions throughout Europe at its new European Shared Service Centre in Limerick.

Abbott Diagnostics expands with the opening of a facility in Longford.

Caradine acquired by Respiration Inc.

Tech Group's Dublin facility completes major expansion, which adds an additional 40,000 sq ft of manufacturing capacity.

Boston Scientific Galway launches Taxus Express stent system into the US market.

Tyndall National Institute, one of Europe's leading research centres in ICT research and development and the largest research facility of its type in Ireland, is established.



Boston Scientific in Cork has shipped 1 million units and employs over 1,000 people.



A magnet for talent

After eight months working in AbbVie's plant in Ballytivnan in Sligo, Kevin Pickett is impressed by Ireland's credentials as a medtech hub thanks to its highly skilled workforce and focus on quality.

When Kevin Pickett's employer AbbVie highlighted the opportunity to work outside of Chicago where he was based he applied immediately and chose Ireland as his preferred destination.

Last January he took on the role of quality engineer at AbbVie's plant in Ballytivnan in Co Sligo, which is AbbVie's global centre of excellence for medical device manufacturing.

"Living and working internationally had always been an aspiration of mine to develop a global view of thinking, travel and learn new cultures," he says.

"Looking through our network of possible locations I could move to, Ireland seemed to be the best."

AbbVie announced in June 2015 that it was investing €40m in expanding the facility in Sligo, which produces drug delivery devices, including a pen-style injector used by patients worldwide receiving an AbbVie treatment indicated

for a range of auto-immune conditions. Around 170 people are employed at the site.

Pickett completed a degree in operations and technology management at the University of Wisconsin-Madison and also has certificates in leadership and supply chain management.

His roles at AbbVie in Chicago in supplier management and as a global warehouse analyst were his first jobs out of college. He had worked there for a year and a half before moving to Ireland.

One of the main things that has struck Pickett since working in Sligo is how skilled the workforce in the medtech sector is and the emphasis that is placed on tomorrow's leaders.

"AbbVie partners with local secondary schools and the Institute of Technology [IT] Sligo in encouraging young people to work in the medtech sector. The connection with local schools to develop a pipeline of talent is different to anything I have seen before," he says.

“Looking through our network of possible locations I could move to, Ireland seemed to be the best.”

Kevin Pickett,
Quality Engineer,
AbbVie

“I see Ireland as a hot spot for a lot of industries. The country has been at the forefront of international business news in recent years with top companies in technology and pharmaceuticals flocking here because of the focus on innovation and highly educated workforce.

“There is a huge focus on training at the AbbVie site and a lot of people are going back to college to do various courses. I believe that the international experience I am gaining here will open doors for me in my career,” says Pickett.

Pickett's role in Sligo is focused on continuous improvement and operational excellence in quality and manufacturing. For example,

he is responsible for leading quality lean initiatives such as Shingo Champion to increase product quality, systemic thinking and create customer value.

“Working for AbbVie in Sligo is rewarding every day. The products we manufacture make a remarkable impact on patients' lives. This is made clear through the interactions we have with patient organisations and other stakeholders,” he says.

“The company also has a focus on corporate responsibility. It supports community-based projects such as Week of Possibilities and our recent AbbVie Cycle Challenge from Sligo to Cork in aid of the Move4Parkinson's charity.”

International focus

Established in 1983, the Ibec Global Graduates programme places 80 graduates a year on paid work placements around the world with leading Irish companies over 12-24 months.

Each of its four graduate programmes combines on-the-job experiential learning and academic study leading to a Dublin Institute of Technology accredited postgraduate qualification. Sponsoring companies receive funding and access to a pre-screened network of the brightest graduates.

The Multinational and Global Graduates programmes were introduced to members of the Irish Medtech Association last year. The other two programmes are focused on tourism and food and drink.

The first graduate to be placed in the medtech sector on the Global Graduates programme is starting at Seabrook Technology Group this month. He will spend four months in the company's Cork office and then be transferred to Indianapolis for 12 months.

“The Ibec graduate programme has always focused on international experience. It is amazing to see the skillset the graduates come back with, particularly in terms of interacting with multidisciplinary teams and dealing with different cultures,” says Ibec executive and manager of the Global Graduates programme Stella Lacken.

“These programmes will help to build a new internationally-focused talent pool in the medtech sector.”



Driving the skills agenda

The availability of a skilled workforce has been a key asset of the Irish medtech sector for many years and the industry is particularly proactive in ensuring the talent and skills needed to support continued growth will be in supply.



*Padhraic McGinn,
General Manager,
Nypro Healthcare*

One of Ireland's key strengths as a medtech hub has been its ability to create a highly talented, adaptable and skilled workforce and this will be at the heart of its continued success over the coming years.

With 29,000 people working across more than 450 companies, Ireland has the second highest number of people working in the sector in the Europe per capita.

An Economist Intelligence Unit Benchmarking Competitiveness Report ranks Dublin as the best city in the world for human capital.

Ireland has the fourth highest proportion (51.7%) of 25-34 year olds with third level education in the OECD after Canada, Japan and Korea. The 2016 Leaving Certificate examination saw a rise in the number of students taking physics, chemistry and biology. This translated into a higher demand for third level science and technology courses.

The Irish Government launched its first Action Plan for Education in September, aimed at making the Irish education and training service the best in Europe by 2026. The actions in the plan include rolling out coding to primary schools from 2018, the teaching of computer science as a Leaving Certificate subject and the introduction of new languages such as Mandarin at second level.

The availability of key skills and the provision of industry specific, high quality, cost-effective training has been

identified as a key driver for success under the Irish Medtech Association's current strategy.

In its submission to the Action Plan for Education, the Irish Medtech Association's priorities included promoting employment in the medtech sector as a career option, for example by making it clearer which junior and senior cycle subjects are needed for medtech careers.

It also called for an international campaign to promote working in Ireland and a change in thinking around entrepreneurship in education to foster skills such as critical thinking, intelligent risk taking and collaboration.

"The medtech industry is working to identify its future skills needs and what the sector trends are. This involves close collaboration with policymakers, educators and within our own network to make sure the sector is well positioned for the future in that area," says Padhraic McGinn, general manager at Nypro Healthcare in Bray, Co Wicklow.

Operating in Ireland since 1980, Nypro Ireland currently employs around 450 people in Wicklow and Waterford. Nypro Ireland provides strategic pharmaceutical customers with a comprehensive process for early stage design and development, clinical build supply and final large scale manufacture of medical devices.

A division of Jabil Circuit, Inc, its strategy in Ireland combines world-class medical device development

design co-located within manufacturing facilities.

"Our people are the key element to our future success so we are investing a lot in that area. We are working to make sure our workforce is skilled in areas such as connected health, cyber security and regulatory affairs which are key drivers in the industry globally," says McGinn.

Nypro Ireland ensures its team has access to the best training programmes available, cross-skilling on electronic design with other sites in its network as well as degree and master's programmes.

Nypro Ireland's European Quality and Regulatory Affairs Director Niall O'Connor is currently completing the Medical Technology Regulatory Affairs Masters developed in conjunction with the Irish Medtech Association Skillnet.

Alcon, a global leader in eye care and a division of Novartis, recently celebrated 25 years at its plant in Cork where it employs 450 people.

Having starting with just 13 employees in 1991, Alcon Ireland has transformed into Alcon's European flagship manufacturing site for intraocular lenses (IOLs), which replace the eye's natural lens during cataract surgery. Alcon's IOLs are the most frequently implanted lenses worldwide, with more than 90 million implants since their introduction.

"We have always been able to hire good graduates in Ireland, which has supported Alcon's growth to date.

Working with Skillnets

Ireland's medtech sector is actively supported by training and upskilling through Skillnets, which was established in 1999 through the National Training Fund via the Department of Education and Skills.

As a model, Skillnets is quite unique on the world stage as it is an enterprise-led proposition, according to Skillnets CEO Paul Healy. Its board is comprised of a blend of employer representative bodies, employee representatives and representatives from the Department of Education.

"Member companies come together in networks, either based on sectors or regions. The approach is very much about defining and resolving the skills and training demands they have and delivering subsidised training based on that," he says.

"Skillnets is dedicated to training for people in employment. It has remained resilient and innovative as it has developed a core competence in responding to industry needs.

"We have recently hosted international delegations from the Philippines, Georgia and Russia on fact finding visits to see how the Skillnets model could be applied in their markets."

The Irish Medtech Association Skillnet was established in 2008 and has been extremely successful in developing niche bespoke programmes in direct response to industry needs in the medtech sector.

It provides training, upskilling and cross-skilling to medtech, pharmaceutical, biologics and biopharma manufacturers and has grown substantially in recent years – to date it has trained over 4,000 trainees and delivered over 20,000 training days to companies.

Last year the group developed the first full master's course in regulatory affairs in conjunction with NUI Galway and Sligo Institute of Technology. The Masters in Medical Technology Regulatory Affairs is designed to aid the conversion of people working in quality roles to regulatory affairs.

"The Irish Medtech Association has played a critical role in terms of developing training methodology throughout the lifetime of the Irish Medtech Association Skillnet. It has a strong steering group which is very close to the requirements of the sector and good at defining what the skill needs are. The calibre and quality of training through the Irish Medtech Association Skillnet has become very high," says Healy.

"The calibre and quality of training through the Irish Medtech Association Skillnet has become very high."

Paul Healy,
CEO Skillnets



"We have always been able to hire good graduates in Ireland, which has supported Alcon's growth to date."

"There is a demand for engineering and technical people who have quality and validation experience. Strong growth in companies is creating more job opportunities."

"As a country we need to continue to build on our ability to develop talent by encouraging even more students to study science and engineering and work closely with colleges in terms of gearing courses specifically to the sector, for example in the area of medical device regulations," says Jackie Murphy, General Manager of Alcon Ireland.

The Irish Medtech Association has done a lot of work in this area, for example, it co-hosts a stand at the BT Young Scientist annually, with Ibec group BioPharmaChem Ireland and member companies, to help to inspire students to pursue careers in science and technology. This year saw a record breaking number of entries, with particularly high numbers in areas where medtech performs well, such as Cork.

Another initiative the Irish Medtech Association and companies are involved is Smart Futures, the government-industry programme promoting

STEM careers to second-level students in Ireland. The volunteer programme offers free career talks to secondary schools across the country and to date, over 1,500 STEM volunteers and 92,000 students have engaged.

This year's Leaving Cert results saw an increase in the number of students achieving a C grade or above in higher level maths, at over 20% of all maths candidates. This is a significant improvement from under 13% five years ago. This positive trend is in line with the growing demand for science, technology, engineering and maths (STEM) courses at third level.

"We must do more to encourage female students to work in the sector to get best choices for hiring people. More than half of Irish women aged 25-35 have a third level qualification compared to four out of ten men. The uptake of STEM subjects among girls is generally lower than that of men, so we must diversify to attract the best talent."

Barry Comerford, CEO of Cambus Medical in Co Galway, is a strong advocate for skills development from an early age and at all levels to serve the medtech sector in Ireland.



Barry Comerford,
CEO, Cambus Medical



Jackie Murphy, General Manager, Alcon Ireland (centre) at the celebration of Alcon's 25th anniversary with Simon Coveney, TD, Minister for Housing, Planning, Community and Local Government

Having left school at 16 and trained as a fitter armourer in the Army Apprentice School, Comerford later did an MBA and is now chairman of the Irish Medtech Association's apprenticeship programme. With the first cohort of school leavers due to start in the coming months, this programme allows young people without third level education to train as manufacturing technicians and engineers in the industry.

Comerford co-founded Cambus Medical in Spiddal, Co Galway with John Farragher in 2006. Employing 102 people, the company specialises in technologically advanced hypotubes and micro components for minimally invasive medical devices.

"The ability to leverage collective knowledge across the industry is a particularly unique trait of the Irish medtech sector. There is a huge sense of collaboration across peer-to-peer companies and even among competing players in terms of driving the knowledge base," notes Comerford.

"There is a willingness among business leaders to engage and give some of their time to lead initiatives with the aim of continuing to build and attract a high quality talent pool in areas such as operational excellence and sales and marketing."

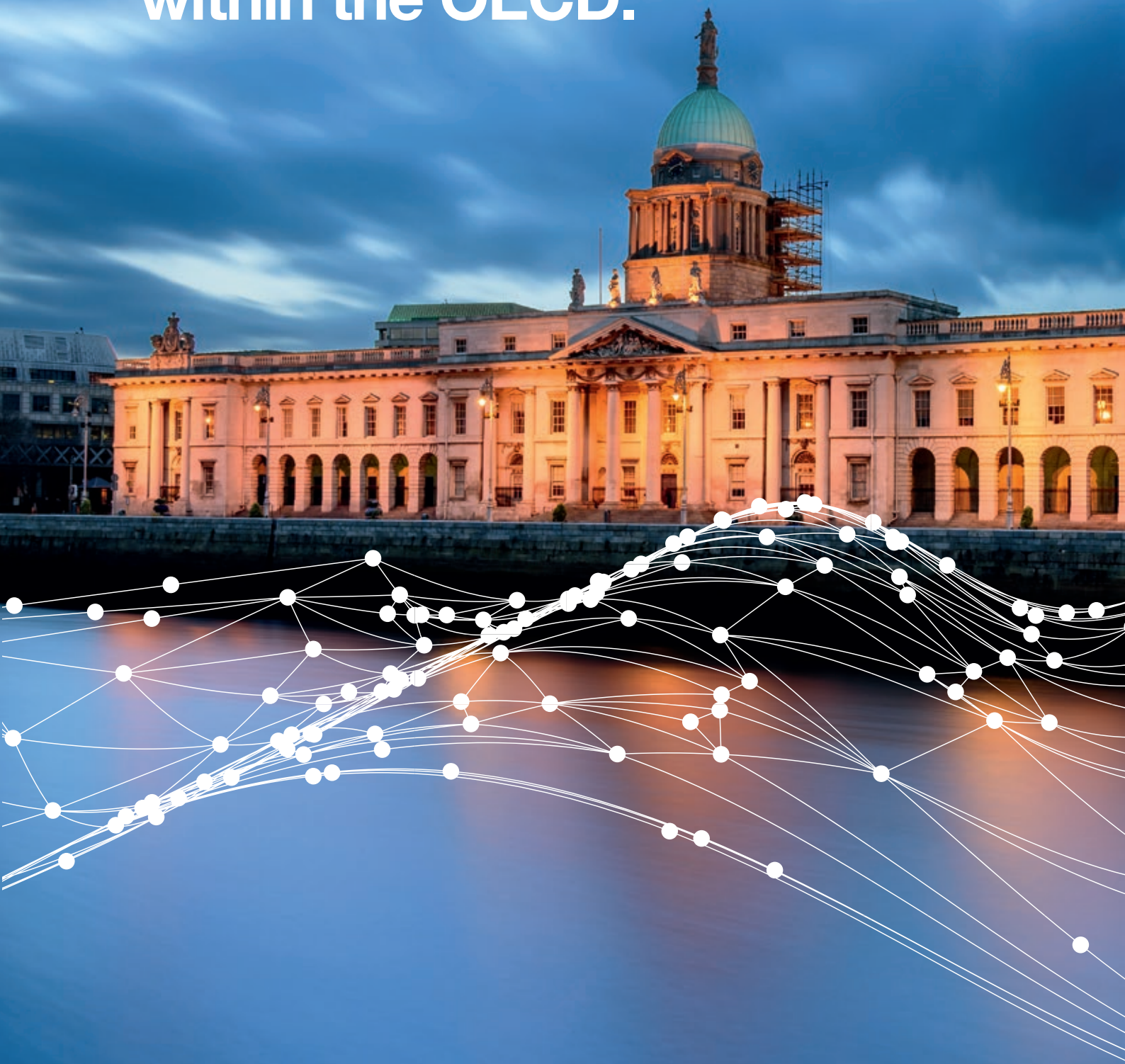
Cambus Medical employees have been delivering the science and technology modules of the Junior Achievement programme in Irish to local schools in Co Galway since 2009. The company has also welcomed hundreds of students into its facility for plant tours with the aim of piquing their interest in science and technology as a career.

In order to maximise the potential of medtech in Ireland in the next ten years, Comerford argues it should be made a strategic priority by Government with a ministerial position attached to it.

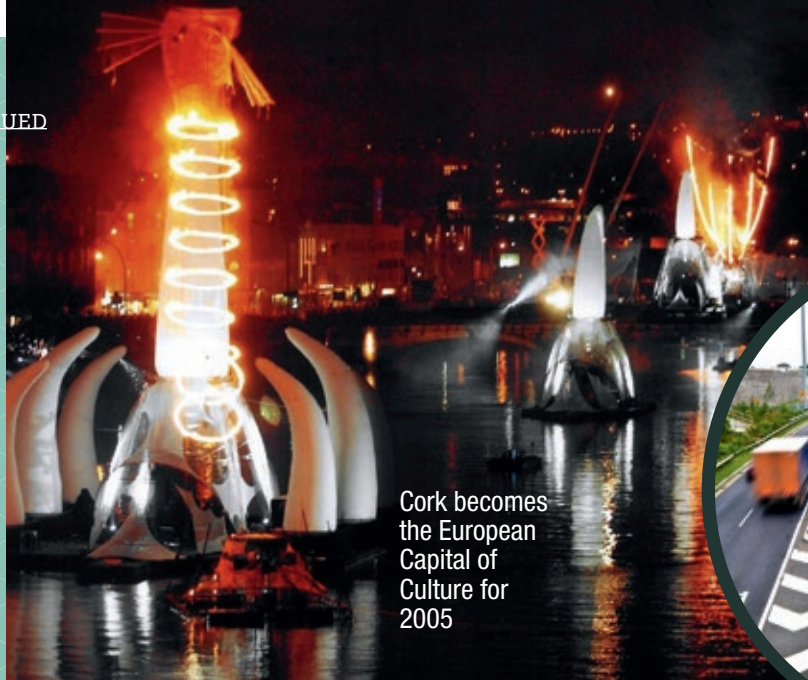
"Pharmaceuticals are already integrating with medical devices and biotechnology, electronics and mechanical devices are all converging. Given the amount of technological advances, talent and investment going into the sector, a ministerial position would help to make Ireland the de facto leader for medtech," he says.

"I spend a lot of my time visiting customers around the world and I don't see any reason why Ireland couldn't be the location of choice for international companies. We have many sustainable competitive advantages in the medtech space especially when it comes to talent, technology, business development and trust."

“Ireland has the highest proportion of science and engineering graduates within the OECD.”



2005
2009



Cork becomes the European Capital of Culture for 2005

2006

Dublin Port Tunnel is officially opened



2005

2006



Contech Medical International expands Galway footprint to 36,000 sq ft.

Baxter in Ireland receives Excellence Through People Award.

Tech Group becomes a wholly owned subsidiary of West focused on providing innovative development and manufacturing solutions for both the pharmaceutical and medtech markets.

Dolmen achieves its first international design award for a medical device – for market disruptor Ash Quicklook, the first in the global market of digitised magnification for low vision.

Shannon Coiled Springs sets up Shannon Micro Coil as a brand.

Medtronic's coronary drug eluting stent, Endeavor, was launched internationally. The Galway site becomes a strategic hub for customer engagement for the company's cardiac and vascular business.

Abbott invests €36m in the establishment of Diabetes Care in Donegal Town.

Boston Scientific acquires Guidant and continues to manufacture in Clonmel. Abbott takes over the vascular side and invests €30 million in a new state-of-the-art facility in Clonmel.

Cook Medical wins Irish Exporter of the Year Award.

Cambus Medical in Spiddal, Co Galway is co-founded by Barry Comerford and John Farragher. The company specialises in technologically advanced hypotubes and micro components for minimally invasive medical devices.

Alcon Ireland commences production of its AcrySof intra-ocular lens

Baxter Healthcare wins the inaugural Irish Medtech Awards Company of the Year Award 2007





2007

Scientists create embryonic stem cells from human skin

March

The Ireland rugby team, captained by Brian O'Driscoll, wins the Grand Slam.

2007

2008

2009

Creganna opens first design and manufacturing facility in the US.

Crospon, an Irish gastroduiagnostics company, is founded in Galway.

First Chair in Medical Education in Ireland at the Royal College of Surgeons in Ireland.

DePuy Synthes establishes innovation centre in Cork.

Teleflex, a provider of specialty medical devices for a range of procedures in critical care and surgery, establishes an operation in Athlone, Co Westmeath

Sanmina-SCI, an end-to-end design, manufacturing and logistics solutions provider, announces a €20m investment at its Cork facility.

Abbott acquires Irish company MedNova and launches its products in the US including embolic protection device Emboshield PRO

Dolmen receives medical design award for Cook Medical Scopedoc.

Creganna's Galway campus expands with the opening of a third facility at Parkmore, Galway.

Royal College of Surgeons in Ireland establishes first Chair in Translational Medicine in Ireland.

DePuy Synthes establishes Innovation Centre in Cork.

Alcon Inc's completes the first phase of its €15.6m expansion of its Irish operation and Alcon Laboratories Ireland Limited is opened in Cork.

Dolmen receives medical design award for Cook Medical Evolution Gun.



Cook Medical's Limerick plant is chosen as the global manufacturing base for its new ground-breaking drug eluting stent technology for the treatment of Peripheral Artery Disease.

Crospon's EndoFLIP lumen imaging system is CE marked and launched in Europe.

Boston Scientific Galway launches Promus Element stent system into Europe.

Baxter's combined heat and power plant in Castlebar comes into operation using natural gas.

Seroba Life Sciences launches its second venture capital fund with committed capital of €75m, greatly increasing the available funding for innovative medtech companies.



Abbott Ireland wins Irish Medtech Awards Company of the Year Award 2008



Crospon wins Irish Medtech Awards Company of the Year Award 2009



Global view

Ireland's medtech sector is truly global in its outlook, viewing the country as the ideal location from which to respond to the world's biggest healthcare challenge – rising costs due to demographics and chronic diseases.

In countries all over the world people are living longer thanks to medical advances. This is obviously a good thing, but the challenge it brings is that they are more likely to suffer chronic diseases and this means an increasing burden on healthcare.

For any new medical product or solution to be successful in today's world, it must improve the efficiency of an institution or clinician as well as result in better patient outcomes – for example, a reduction in infection or length of stay in hospital.

In Ireland, the medtech industry is united in its goal to meet this challenge head on through innovation and collaboration at all levels. Unlike in other industries where the domestic market is often seen as a test-bed for new products, medtech is addressing global problems with globally-relevant solutions.

Take Aerogen in Co Galway, for example, whose breakthrough technology in aerosol drug delivery is now being used in the intensive care units of 60% of the top 200 hospitals in the US.

Its proprietary vibrating mesh technology turns liquid medication into a fine particle mist, gently and effectively delivering drugs to the lungs of critically ill patients. It has won the Zenith Award for respiratory care excellence by the American Association of Respiratory Care three times in the past four years.

*John Power,
CEO, Aerogen*

"There is a drive towards healthcare economics on a global basis as the proportion of GDP spent on healthcare in so many markets is not sustainable. Medtech can respond to this challenge by ensuring products used in hospitals make a clinical difference but also bring down the cost of healthcare," says Aerogen CEO John Power.

"Years ago medical devices companies were solely dealing with clinical staff when talking about the adoption of their products. Now, they are also dealing with the accountants. That is good, as we should be able to show how products make a difference in the care of a patient in terms of cost."

In Aerogen's case, its aerosol drug delivery system reduces the length of time a patient needs to be on a ventilator. This means they recover faster and have a shorter stay in hospital.

In the coming months Aerogen will introduce a new product in global markets which has been shown to reduce admissions of asthmatic patients from accident and emergency departments.

"In the US it costs on average US\$500 to treat a patient with an asthma attack in an emergency room. With our product they can be treated and sent home. If the patient gets admitted to hospital the cost jumps up to an average of US\$5,000," notes Power.

"The main reason we have survived as a

medtech company has been the ultimate belief that the technology we were developing was going to be the best in the world. We had to be internationally focused from day one."

Power established Aerogen in Galway in 1997 having worked in multinationals and started up several businesses. Galway is the epicentre of the business responsible for all key functions including product design, process development, global marketing and logistics.

It has been the ideal location from which to grow the company to the point where it now has a total of 130 employees and close to €50 million in annual revenue, according to Power.

"The medtech cluster in Galway started when CR Bard established operations here in 1982 and it grew from there. There was a spark and the support of Enterprise Ireland, IDA Ireland and universities helped to turn that into a fire," he notes.

"Galway Mayo Institute of Technology and NUI Galway geared their output around the medtech cluster, which means there is a ready supply of young science and engineering graduates. We have been fortunate to have hired the best young talent.

"There is also now a research facility at University Hospital Galway, which is taking medtech solutions from the bench top to the patient. Aerogen is part of this growing ecosystem that will keep developing."

Irish medtech sector tackling diabetes

Diabetes is the priority area for global public health which has been identified by the World Health Organisation this year.

This disease impacts millions of people globally. In Ireland the rate for men has risen to 7.3% in 2014 (approximately 143,000) and 5.1% for women (approximately 110,000), according to a new worldwide study by *The Lancet* medical journal.

However, this worrying trend can be reversed and the Irish medtech sector is playing a key role in dealing with the problem.

"Sometimes the condition can be prevented and in other cases patients get a better outcome by learning to manage the condition," says Director of the Irish Medtech Association Dr Sinead Keogh.

"The Irish medtech sector is a global leader in developing treatment with as much as 25% of the world's diabetes sufferers getting injectable devices which are manufactured in Ireland. Additionally, advances in connected health mean that new technology, including apps empower patients to manage chronic conditions like this."



"The main reason we have survived as a medtech company has been the ultimate belief that the technology we were developing was going to be the best in the world."

The new healthcare economics

Aging populations and a rising demand for healthcare is a universal challenge which medtech companies in Ireland are closely attuned to.

Every year an estimated 648,000 people in the US develop infections during a hospital stay, and about 75,000 die, according to the Centers for Disease Control and Prevention (CDC). That's more than twice the number of people who die each year in car crashes.

This is a global trend which the medtech sector in Ireland is responding to by developing solutions focused on bringing down the cost for healthcare institutions by reducing patient complications.

Teleflex Incorporated are, for example, the only manufacturers on the global market of central and peripherally inserted central catheters (CVC & PICC) which help prevent the colonisation of pathogens on catheter surfaces, which are primarily responsible for healthcare-associated infections.

"A hospital acquired bloodstream infection costs on average US\$40,000 to treat, according to the CDC. Under the Patient Protection and Affordable Care Act [Obamacare], hospitals in the US are now being monitored in terms of their infection rates and penalised if they are underperforming in this regard," says Liam Kelly, president and chief operating officer at Teleflex (*pictured below*).

"Hospitals in the US are more like businesses now. They are focused on the overall healthcare economics argument and medtech companies need to demonstrate how the healthcare of the future will be funded through the use of their solutions.

"Anything that is happening in healthcare in the US will come on stream in Europe five years later and in eight to ten years everywhere else."

The emphasis on healthcare economics is driven by the biggest trend affecting healthcare around the world: demographics. People are living longer as medical devices and technology improve.

"Over the average American's lifetime, we estimate that 10% of the cost of their healthcare is spent between the ages of 50-65. In addition, according to census and claims data, every day in the US, 10,000 people pass into the 65-70 age bracket, and by 2040 over 20% of the US population are expected to be 65 and over," notes Kelly.

"It is a significant trend that the demographic of baby boomers are now moving north of the 65 age category. The same is true in Western Europe and all developed markets.

"The reality is that individuals need more healthcare but nobody has figured out how to pay for this in the future. Medtech companies in Ireland are addressing this challenge head on with innovative solutions that improve efficiency and patient outcomes like Teleflex."

Liam Kelly, President
and Chief Operating
Officer, Teleflex



“ Our track record in Limerick has shown how companies such as Cook Medical can really grow to become a key part of their corporate global infrastructure – not just an outpost as things were 25 years ago.”



Innovation from Limerick

One of the largest privately held global medical technology companies in the world, Cook Medical, has been present in Ireland for a similar length of time to Aerogen. Established in 1996, its Limerick facility employing 880 people gastroenterology and urology devices for global distribution.

The original greenfield plot was established as a small-scale manufacturing and technology transfer site. After undergoing two expansions, it has become a hub for global R&D projects and business development at the Innovation Centre and the Europe Shared Service Centre respectively.

According to Bill Doherty, executive vice president of EMEA and Cook Ireland's first employee, Limerick is key to the company's global success story.

“The R&D side of the Limerick operation has been very important from a global perspective. The site has gone from developing a basic product to what we have today, which is much more in the realm of managing research with outside universities such as University of Limerick and other bodies,” he says.

The Limerick-based site is currently the sole manufacturing plant for the world's first approved drug-eluting stent for use in the superficial femoral artery. The R&D team in Limerick is currently working on the next generation of this product as well as on expanding Cook Medical's capabilities in endoscopy and urology product R&D.

“One of the advantages of Ireland being small is that it is easier to meet people. The

ecosystem has developed over the years, harnessing the main groups of players - industry, academia, physicians and hospitals. Together we are leveraging that strength to develop world-class products, bringing them all the way through from concept to being products that are commercially available,” says Doherty.

“Our Shared Service Centre really is the hub for Cook Medical's EMEA business, supporting our sales people, customers and distributors throughout the region. Our track record in Limerick has shown how companies such as Cook Medical can really grow to become a key part of their corporate global infrastructure – not just a manufacturing outpost.”

Bill Doherty, Executive Vice President of EMEA, Cook Medical with Minister for Jobs Mary Mitchell O'Connor during her visit to the company's Limerick site.

2010 2013

The Irish Centre for Manufacturing Research, a consortium of leading manufacturers and research groups, is founded to create game-changing improvements in productivity in light of Factory 4.0.

March

Ireland's Kevin O'Brien gets fastest century in Cricket World Cup history in an amazing victory over England in Bangalore.

2010

2011



Crospon's EndoFLIP lumen imaging system receives FDA clearance.

Royal College of Surgeons in Ireland is the first of any of the royal surgical colleges in the British Isles to elect a female president, Professor Eilis McGovern.

Dolmen receives medical design grand prix award for the Vasorum Celt ACD, which is used to close arterial puncture holes

Creganna acquires Tactx Medical, deepening its catheter capabilities and adding new facilities in California, Minnesota and Singapore.

May 2011

In a momentous week both US president Barack Obama and, for the first time in the history of the Republic, Queen Elizabeth II and the Duke of Edinburgh visit Ireland.

Abbott's Longford site manufactures its one billionth medical diagnostic test.

Contech Medical International in Galway is rebranded to Advant Medical.

Boston Scientific Galway launches Mustang catheter into global markets.

Dolmen begins partnership with BioInnovate.

Teleflex Medical announces plans to expand its manufacturing capability in Annacotty, Co Limerick and create up to 80 new jobs.

BioInnovate, a national medical technology innovation training programme, is introduced providing a neutral territory in which academia, clinicians and industry can collaborate to develop novel medical technologies.



Cook Medical wins Irish Medtech Awards Company of the Year Award 2011

Cappella Medical Devices wins Irish Medtech Awards Company of the Year Award 2010





President of the European Commission Herman Van Rompuy addressing over 100 Ibec members and invited guests at an event in Dublin.

The Manufacturing Development Forum is established by the Irish Government's Department of Jobs, Enterprise and Innovation.



Ibec rebrands



President of the European Commission Jose Manuel Barroso; Danny McCoy, CEO of Ibec; and An Taoiseach Enda Kenny at the Ibec CEO Conference

December

Ireland exits the bailout programme

Negotiations begin on the Transatlantic Trade and Investment Partnership, a proposed trade agreement between the EU and the US.

Ireland holds the Presidency of the Council of European Union in the first half of the year.



eu2013.ie

2012

2013

Wexford-based ABT Medical is acquired by Creganna, adding SmartForm™ balloon technology to Creganna's technology portfolio.

Boston Scientific Galway opens Customer Innovation Centre.

Dolmen receives medical design award for Ash Crystal, a handheld device for the low vision market, the first to transcend from B2C to B2B.

Cook Medical opens 800 sq.m state-of-the-art innovation centre in Limerick.



Abbott completes separation of research-based pharmaceuticals business. The site in Sligo is named AbbVie's centre of excellence for medical device manufacture.

Abbott develops a new diagnostic test to help doctors evaluate if a person is having a heart attack.

Advant Medical integrates Connex 350 3D printing to support innovation and development in Ireland.

Stryker establishes a new neurovascular manufacturing facility in Cork, following Stryker's acquisition of Boston Scientific's neurovascular division.

Boston Scientific's Cork site supports 41 product types across various medical disease states.

Dolmen receives medical design award for the Motech Careclip, a wearable technology-based device.

Tyndall National Institute in Cork develops strategic programmes in information and communications technology for health.

Lake Regional Medical wins Irish Medtech Awards Company of the Year Award 2012



Aerogen wins Irish Medtech Awards Company of the Year Award 2013

High fliers

Barry Slowey and William Hearne O'Sullivan are among the many Irish people of high calibre to be successful on the global stage.



*Barry Slowey, President,
Cook Endoscopy/
Cook Winston-Salem*

When Cook Medical first arrived in Ireland 20 years ago, Barry Slowey was the second person to be hired after Executive Vice President Bill Doherty to work at its new factory being built on a greenfield site in Limerick.

Dublin-born Slowey was recently appointed President of Cook Medical's Winston-Salem facility in North Carolina in the US, the global headquarters of the company's Endoscopy division.

Employing 12,000 people worldwide, and 850 at its Limerick facility, Cook Medical specialises in the development of minimally invasive technologies for vascular and non-vascular surgery.

In his new role, Slowey will lead the 1,000-strong team in managing the various functions of the North Carolina operation, including regulatory, quality, research and development (R&D), manufacturing

and finance as well as the global sales and marketing organisation.

A graduate of International Marketing from Dundalk Institute of Technology, Slowey became interested in an export-oriented career further to spending six months working at household appliances manufacturer Moulinex in France.

He first got a taste for the medtech sector while working at electronics company Philips Austria as International Marketing Manager of its Speech Recognition Division from 1992 to 1996.

"The speech recognition software being developed in Austria was focused on medical and legal applications. It was on the periphery of the medical devices sector, but I learned a lot about the principles of product development and the importance of understanding user requirements," says Slowey.

"The international experience I gained at Philips

"Back in 1996, we were starting a factory from scratch in Limerick but R&D activity was also integral to the operation from the beginning."

“There is something special about the talent and ingenuity that exists in Ireland. People have an innovative way of thinking that lends itself well to the medtech industry.”

*William Hearne O'Sullivan,
Director of Solutions,
Seabrook Technology Group*



along with having languages gave me the opportunity to join Cook Medical in Limerick in 1996 as European marketing manager.”

Slowey stayed at the Limerick plant for six years during which time he became European Sales and Marketing Manager for Endoscopy before moving to the US in 2002 to take on the role of Global Sales Director.

“Back in 1996, we were starting a factory from scratch in Limerick but R&D activity was also integral to the operation from the beginning. At the time a lot of new ideas were coming from the US and Cook Medical wanted to get closer to European physicians and work with them on new product development. Four of our ten employees in the first year were R&D engineers,” he explains.

“One of the things Cook Medical has always been conscious of in Ireland is how important it is to put down deep roots. Ireland is Cook Medical’s European headquarters as opposed to being just a manufacturing plant. Functions such as customer services, regulatory and quality have been consolidated in Limerick.”

Over his 20 years working with Cook Medical, Slowey has seen the medical technology sector develop into one of the world’s most innovative and advanced industries. Today it is seen as a key growth sector in global economies and Ireland is very well positioned in this context, he says.

“Most of the largest players are present, which creates a cluster where you can readily find people with the right industry experience and skills.

“It has a positive, self-fulfilling ecosystem – universities are developing graduates and courses to meet the industry’s needs and researchers are spinning off companies. The future in Ireland is on the R&D side – home-grown innovation and intellectual property will play a critical role in the medtech sector’s continued growth.”

Investment in innovation

Based in California, William Hearne O'Sullivan, Director of Solutions at Seabrook Technology Group, agrees that a continued focus on R&D capability will help to build on Ireland’s already strong reputation as a world leader in innovation.

“Investment in science, engineering, maths and technology [STEM] programmes in education and university-led research has been important. This ensures that an increased number of creative people enter the ecosystem and come up with their own next-generation medtech products,” he says.

“There is something special about the talent and ingenuity that exists in Ireland. People have an innovative way of thinking that lends itself well to the medtech industry.

“That is why you see so much foreign direct investment

by medtech companies. It has been proven time and again that if you invest in Ireland your company will continue to grow.”

Founded in 1989 in Cork, Seabrook Technology Group is a manufacturing and business software consultancy company. It specialises in providing and consulting on advanced technologies and innovative software for manufacturing organisations, in particular medical device manufacturers.

Hearne O'Sullivan joined the company in Cork in 2007 as a Manufacturing Enterprise Solutions (MES) Support Administrator having just completed his degree in Business Information Systems at University College Cork. He soon progressed to becoming an MES Consultant and from there was steadily promoted to reach director level.

Working on projects in the UK, Germany and the Netherlands gave Hearne O'Sullivan valuable international experience as well as key insights into the medtech industry.

“In 2009 I worked on the project to roll out a manufacturing execution system for Biotronik’s operation in Berlin. The plant was manufacturing the latest generation of pacemakers, which at the time were innovative. They had inbuilt GSM chips, which allowed alerts to be sent to physicians or emergency services from within a person’s body. Now Biotronik has a smart phone app that can monitor

a person’s heart from their pacemaker,” he says.

“My years in the Netherlands helped me to broaden my horizons and see medtech in a different light. The work included projects for a large semiconductor company, Infineon Technologies, which was producing a controller for use in trains and wind farms.”

Years later Hearne O'Sullivan worked on a project for biotechnology company Illumina where semi conductors were being used in the manufacturing of a DNA sequencing device. The wafers were made the same way as in the electronics industry but regulated as medical devices.

“Such experience has shown me how all manufacturing is becoming very hybrid. Biotechnology, electronics and pharmaceuticals all have to converge to produce the next generation of medical devices. There are so many innovative companies, all with different pieces to the puzzle.”

Hearne O'Sullivan’s decision to move to the San Francisco Bay Area in 2012 coincided with Seabrook Technology Group’s expansion into the US, where Illumina and Life Technologies are two of its largest customers now.

“We opened our first office in Indianapolis and I subsequently set up the California office. The expansion into the US has been a catalyst for the company’s growth since then,” he says.

Smooth operators

The origins of the Irish medtech sector lie in the establishment of basic manufacturing operations by FDI multinationals from the 1940s. The sector has evolved to the point where it has achieved the highest standards in operational excellence in manufacturing and R&D is becoming more embedded within companies.

“Ireland has a winning formula in medtech manufacturing – we need to stick to that and remain competitive. A lot of other countries want to emulate what Ireland has achieved.”

In the space of a few decades Ireland's medtech sector has developed from being focused on traditional manufacturing of basic non-invasive products to becoming a world leader in zero defect manufacturing for highly sophisticated medical devices.

Thanks to its outstanding track record in operational excellence, the sector is ideally positioned to embrace the latest advances in manufacturing such as industry 4.0.

This will involve new approaches such as advanced automation, vision systems and robotics all being connected and wrapped in a cloud platform that monitors and controls production.

Leaders within FDI multinationals share the view that one of the key lessons from the past that can be taken into the future is to maintain Ireland's operational excellence capability to ensure more research and development (R&D) is embedded into existing operations.

“Ireland has a winning formula in medtech manufacturing – we need to stick to that and remain competitive. A lot of other countries want to emulate what Ireland has achieved,” says Tony Kennedy, Senior Vice President Global Operations at Teleflex.

“The ingenuity of Irish people in the sector is also well reputed and core to the high standards achieved to date in manufacturing. It amazes me how many Irish people there are at a very senior level in major multinationals. This is a testament to the skills and capabilities that have come through the education system along with the innate inventiveness of Irish people.”

“Skilled and educated people are vital in the highly regulated medtech sector and there are a lot of skilled engineers with experience of manufacturing in the Galway medtech cluster.”

Teleflex is a global provider of specialty medical devices for a range of procedures in critical care and surgery. It has two operations in Ireland – one in Athlone, which is focused on the management of global operations and a manufacturing plant in Annacotty, Co Limerick where it soon will be opening a new R&D-based customer relationship centre.

In order for the Irish medtech sector to remain competitive, it is critical that there is much more ingrained research such as this within manufacturing operations, Kennedy contends.

“Medtech companies in Ireland need to understand clinical needs up-front and improve their interaction

with hospitals. Our biggest challenge in the next ten years will be to develop world-class clinical applications and bring forward key opinion leaders from the Irish healthcare system.

“If we can develop a world-class health service that is the source of the most current and innovative healthcare solutions, Ireland can become an early adopter of new technologies. Its clinicians would then be at the forefront globally in driving breakthroughs and the R&D within companies would sit alongside them.”

With this in mind, the Irish Medtech Association and the Irish Medtech Association Skillnet have developed a new Product Development

Best Practice Assessment Model devised by senior industry leaders from across the Irish-based medtech sector.

This easy to use model will help companies of all sizes and at different stages of their innovation journey develop their product development capabilities to better compete internationally. In so doing, it will help to fulfil the Irish Medtech Association’s ambition to make Ireland a global leader in innovation.

Piloted by four Irish Medtech Association member companies – Stryker, Aerogen, Siemens Healthcare Diagnostics and Bausch & Lomb – the new model allows companies to compare their current

practice with the key attributes of leading-edge principles.

Pioneering potential

Donal Balfe, Vice President, Operations, Europe & Asia, Medtronic, would like to see a major game changer in the treatment of diseases such as diabetes being developed, researched and brought to market from Ireland within the next ten years.

“I would like to see the medtech sector developing much more product from an R&D perspective and coming up with some disruptive solution that would change the paradigms of healthcare and how it is managed,” he says.



*Donal Balfe,
Vice President,
Operations,
Europe & Asia,
Medtronic*

"There is a lot of iterative design going on involving improvements on existing products. This is the way the industry is developing generally on a global basis. We have seen major disruptive changes in IT with companies such as Uber and Airbnb. However, this hasn't happened to the same extent in medtech."

Headquartered in Dublin, Medtronic is one of the world's largest medical technology, services and solutions companies. It employs over 4,000 people in Ireland and recently opened a new €13m manufacturing facility in Galway for its drug-coated balloon solution for the treatment of peripheral artery disease.

The decision to locate the new manufacturing facility in Galway was based on the existing high-tech capability and expertise at the site in drug-device combination products for Medtronic's coronary business.

"Skilled and educated people are vital in the highly regulated medtech sector and there are a lot of skilled engineers with experience of manufacturing in the Galway medtech cluster," notes Balfe.

"Medtech manufacturing in Ireland is a lot more 'sticky' than electronics or PC

manufacturing because of the regulatory requirements. The skills needed to steer products through the regulatory framework make it difficult to move operations from country to country. Ireland adds a lot of value in this area."

Balfe thinks the development of a game changing solution could be a watershed in terms of manufacturing in the country.

"If a disruptive product were to be developed here operations would have to scale up quickly. There would be little opportunity to put the manufacturing of this somewhere else because of the dynamic involved in increasing volumes to meet the market's needs and getting good quality products out to customers," he says.

"Galway has grown very quickly to become an established manufacturing location for cardiovascular catheters and stents. It is possible that a new breakthrough solution in terms of unmet healthcare needs could come out of this area."

Innovation in everything

According to James Winters, Vice President Manufacturing and Joint Reconstruction at

DePuy Synthes, innovation will be at the centre of everything the medtech sector in Ireland does in the coming years.

A global leader in orthopaedic and neurological solutions, DePuy Synthes employs approximately 1,000 people in Ireland at its manufacturing site, Global Supply Chain and Innovation Centre in Ringaskiddy. The site also opened a new €53.2m, 320,000 sq ft plant expansion at its site in Ringaskiddy, Co Cork in June 2015. The state-of-the-art manufacturing facility includes a medical device test methods centre of excellence laboratory.

"Ongoing innovation in the Irish medtech sector will not only apply to product development, but also business models and the supply chain to make sure we deliver in terms of better patient outcomes," he says.

Benchmarking excellence

Against this backdrop, Ireland's continued success as a medtech hub is going to depend on the ability to adapt quickly as the pace of innovation accelerates.

Several medtech manufacturing sites in Ireland have been awarded Shingo

accreditation for operational excellence which is like the Noble prize for manufacturing. This makes us a leader in Europe.

DePuy Synthes in Cork, Abbott in Tipperary and Longford and Boston Scientific in Galway and now Boston Scientific in Cork have all received the Shingo Gold award. Covidien/Medtronic in Co Westmeath and Lake Regional Medical in Co Wexford have achieved Shingo Bronze Award status.

The systems and tools introduced by the Irish plants as well as the programmes delivered by the Irish Medtech Association Skillnet in areas such as lean manufacturing and continuous professional development have helped deliver sustainable solutions, not just temporary boost in results.

For example, at Abbott Clonmel the lead time from manufacturing to customer was reduced by 85% in a six-year timeframe at the same time as a double-digit reduction in product unit costs was achieved.

Abbott in Clonmel was the first site outside the US and the first in Europe to win the Shingo prize, in 2014. DePuy Synthes in Cork won the same year.

"We want to share our journey in areas where we have a strong track record, such as sustainable production while reducing carbon emissions. Such an open door and willingness to share with other companies to improve operations is hard to find anywhere else in the world."

The fact that Irish sites have achieved Shingo status has helped to drive increased collaboration in the medtech sector overall in terms of operational excellence. For example, industry members of the Irish Medtech Association have devised the MÓR Benchmark Model for use as a best in class model for companies to measure themselves in areas of lean manufacturing.

Abbott Diagnostics in Longford is the most recent Irish manufacturing site to receive the Shingo prize, in February 2016, further to the plant winning the Medtech Company of the Year title at the Irish Medical Technology Industry Awards in December 2015.

"We have already had 30 visits and more than 300 people from different companies in the Irish medtech sector visit our site since winning the Shingo prize. We want to share our journey in areas where we have a strong track record, such as culture, operational excellence, leadership behaviours and strategic alignment, all of which drive strong collaboration and employee engagement," says

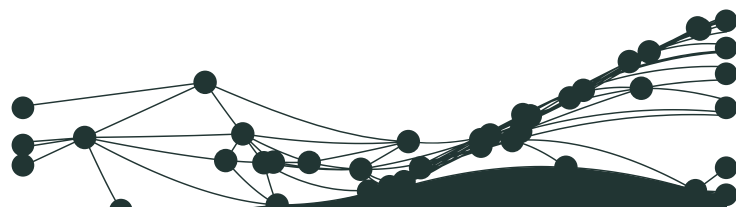
Ciaran Corcoran, Longford Site Director for diagnostics at Abbott.

"We, in turn, get assessed by the visitors, which helps us identify other ways to improve. We also get to visit the other sites and it is this benchmarking that's key to innovation, idea generation and a guide to what else is feasible. This collaborative environment and willingness to share among Irish based companies is hard to find anywhere else in the world.

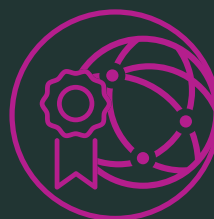
"Innovation is a key driver at Abbott, where our goal is to help people live their best possible lives through the power of health, working to help people live not just longer, but better.

"The pace of innovation and technology is moving exponentially. The biggest learning we can take from the past is to be ready for the future – it will arrive faster than we can imagine, and so we must anticipate and keep making new discoveries. We have a very strong collaborative medtech ecosystem in Ireland and we know what the future looks like, so it's our responsibility as an industry to set ourselves up for long-term and sustainable success."

*Ciaran Corcoran, Longford Site Director,
Diagnostics, Abbott Diagnostics*



Some key facts about medtech manufacturing

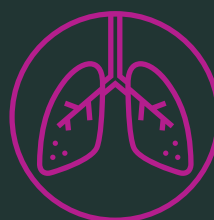


As the second largest exporter of medtech products in Europe, Ireland supplies

95 of the world's top 100 countries
(ranked by GDP)

Over 25% of the world's population that have diabetes

rely on injection devices made in Ireland.



Around 50% of ventilators

in acute hospitals worldwide are manufactured in Ireland.

One third of the global supply

of contact lenses are made in Ireland.



2014
2016

Enterprise Ireland establishes the Irish Manufacturing Research centre, with the aim of making Ireland a world leader in advanced manufacturing operations.

2014

Abbott's vascular manufacturing facility in Clonmel is awarded the Shingo Prize for operational excellence.

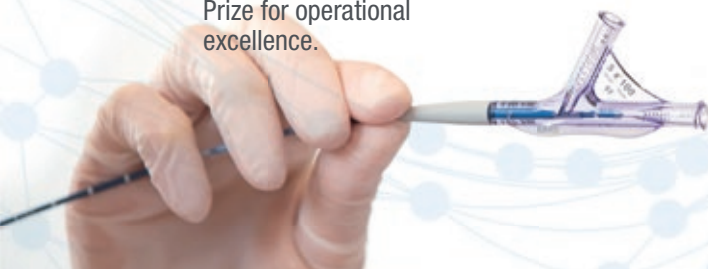
Precision Wire Components Inc. is acquired by Creganna, expanding the company's global footprint with new Oregon and Costa Rica facilities and adding wire and coil capabilities to the technology portfolio.

DePuy Synthes' Cork plant is awarded the Shingo Prize for operational excellence.

Stryker constructs and opens an innovation centre in Cork.

Advant Medical purchases injection moulding company Wayglen to support vertical integration and manufacturing in Ireland.

Sanmina commences major investment in high volume class 8 clean room's and automated high volume assembly and SMT equipment.



October 2015

Ireland becomes first country in the world to introduce same-sex marriage through a public vote and the Irish Government passes the Gender Recognition Act.

2015



Creganna opens a new 100,000 sq ft facility in Minnesota, supporting growth in structural heart and electrophysiology therapies.

Abbott Finance Shared Services opens in Cherrywood, Dublin in December 2015.

DePuy Synthes opens second building at Cork site.

Boston Scientific Galway launches SYNERGY coronary stent system in the US.

Advant Medical increases employment to 150 worldwide.

Abbvie in Ireland expands with US\$44m investment. Its Ballytinnan site has 150 employees and achieves ISO 14001, OHSAS 18001 and ISO 50001 certifications.

System Label wins the Print Business Innovation Award at the Irish Print Awards for the Incereb neonatal EEG sensor.

Multi-Color Corporation enters the Irish labelling market acquiring New Era Packaging.

Tech Group opens its extension in Dublin. The increased footprint (from 80,000 sq. ft. to 92,000 sq. ft.) facilitates the commencement of two major contract manufacturing programmes which include four automation lines.



Nypro Healthcare wins Irish Medtech Awards Company of the Year Award 2014



Abbott Diagnostics wins Irish Medtech Awards Company of the Year Award 2015



March 2016

The main Easter Sunday State Commemoration Ceremony for the 100th anniversary of the 1916 Rising took place in Dublin City Centre

February

David Harte is named 2015 goalkeeper of the year by the International Hockey Federation having helped Ireland qualify for the Olympics for the first time since 1908.

June

The UK narrowly votes in favour of Brexit. Ibec calls for Ireland to be involved in negotiations to reflect our unique relationship.

August

Brothers Gary and Paul O'Donovan win first rowing medal for Ireland at the Olympics with silver medal in the lightweight double sculls.

Galway is announced as the European Capital of Culture 2020



2016



Launch of the Irish Medtech Excellence Awards 2016 marking ten years celebrating innovation and excellence in the sector

Abbott's diagnostics manufacturing facility in Longford is the second Abbott facility to receive the prestigious Shingo award.

Cook Medical gets planning permission for a new building for its European Shared Services Centre from Limerick County Council and An Bord Pleanála.

Creganna Medical is acquired by TE Connectivity, a US\$12bn global technology leader.

Crospon Group gets its tenth US patent.

Boston Scientific opens a new process development laboratory in Cork and its new European Capital Repair Centre in Clonmel. Every 5 seconds one of the 9 million Boston Scientific devices designed and manufactured in Ireland is used in a life transforming procedure somewhere in the world.

The Health Innovation Hub is officially launched with the aim of driving collaboration between the health service and enterprise, leading to the development of new healthcare technologies, products, and services.

Multi-Color Corporation acquires System Label and Cashin Print to provide the healthcare market with complete labelling and booklet solutions.

Dolmen opens its first overseas office in the UK to focus on medical design services.

Alcon celebrates 25 years in Ireland, following a total investment of €70m since 2009. It employs 450 people in Cork.

CÚRAM, the National Centre for Research in Medical Devices, is officially opened in Galway.

The Irish Medtech Association launched its 2020 strategy 'The Global Medtech Hub' internationally at AdvaMed 2016, 17-19 October, which sees as many as 2,500 medtech professionals and 1,000 companies attend.

The Irish Medtech Association makes attracting and developing talent a priority. The association was joined by Stryker and Cook Medical to showcase medtech at the BT Young Scientist which saw 50,000 visitors and 4,500 student competitors in 2016.

The Irish Medtech Association participates in the second annual European MedTech Week to raise awareness about how medtech saves and improves lives. Minister for Health Simon Harris TD delivers the keynote at a special event in RCSI.

TREG and AMBER announce the creation of a multi-layered 3D porous scaffold called ChondroColl designed to help the body's own cells regenerate damaged joints.

IMDA rebrands. The new name – Irish Medtech Association – highlights the strategic shift in the past 15 years from medical devices to broader medical technology and solutions, including software and services.



Irish Medtech
Association
Ibec



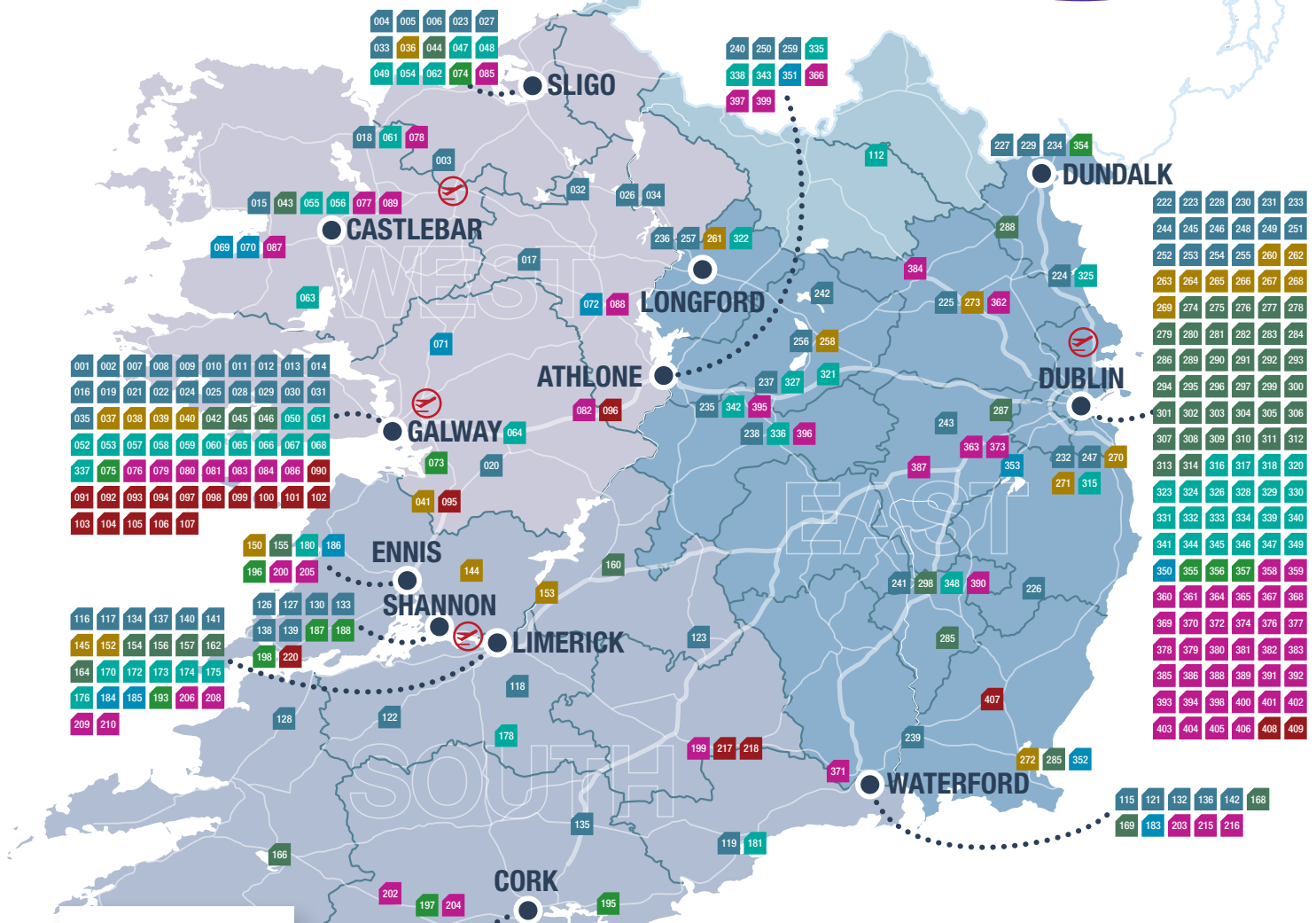
Mapping our world-class medtech sector

CREATED BY



Irish Medtech Association
Ibec

The Irish Medtech Association is the Ibec group that represents the medical technology industry in Ireland.



- Contract research, development, design and/or manufacturing
- Diagnostic
- Health Software
- Hospital and/or homecare products
- Ophthalmic
- Orthopaedic
- Service
- Vascular

PRODUCED IN ASSOCIATION WITH



West Region

CONTRACT RESEARCH, DEVELOPMENT, DESIGN AND/OR MANUFACTURING

- 1 Advant Medical
- 2 Advant Moulding
- 3 Alpha Precision
- 4 Amcor Flexibles Sligo
- 5 Arrotek Medical
- 6 Avenue Mould Solutions Ltd
- 7 Cambus Medical
- 8 Caragh Precision
- 9 Clada Medical Devices
- 10 Cortech Medical
- 11 Creganna Medical
- 12 Custom Equipment Solutions Ltd
- 13 Dawnlough Ltd
- 14 DiaNia Technologies Ltd
- 15 Fort Wayne Metals Ireland Ltd

- 16 Galway Tool And Mould Ltd
- 17 Harmac Medical Products
- 18 INBLEX Plastics
- 19 Irish Micro Mouldings Ltd
- 20 Itronik Interconnect Ltd
- 21 Lake Region Medical (International Research & Development Centre)
- 22 M & M Qualtech Ltd
- 23 MB Mediprint
- 24 Metal Improvement Company
- 25 Outsource Technical Concepts Ltd
- 26 Prior PLM Medical
- 27 ProTek Medical Ltd
- 28 Proxy Biomedical Ltd
- 29 Riteway Precision Engineering Ltd
- 30 Saotharlann Chonamara Teo
- 31 Synecco Ltd
- 32 Vention Medical Ireland Ltd
- 33 Verus Precision
- 34 VistaMed
- 35 Vornia Ltd

DIAGNOSTIC

- 36 Abbott Ireland Diagnostic Division
- 37 Alere International Ltd
- 38 Beckman Coulter Biomedical
- 39 Enterasense
- 40 Fannin Ltd
- 41 Natus Manufacturing Ltd

HEALTH SOFTWARE

- 42 Emedia
- 43 Full Health Medical
- 44 Socrates Healthcare Ltd
- 45 SyncroPhi Systems Ltd
- 46 VASGARD

HOSPITAL AND/OR HOMECARE PRODUCTS

- 47 Abbott Ireland
- 48 Abbott Nutrition Ltd
- 49 AbbVie Medical Device
- 50 Aerogen Ltd
- 51 AeroSurgical Ltd
- 52 AOTI
- 53 Arc Devices Ltd
- 54 B.Braun Hospicare Ltd
- 55 Baxter Healthcare SA
- 56 Baxter Healthcare SA
- 57 Bio Medical Research Ltd
- 58 Crospon Ltd
- 59 Envast Ltd
- 60 Gate Dental Services Ltd
- 61 Hollister ULC
- 62 Hospira
- 63 Idoman Teoranta
- 64 Lifewave Europe
- 65 Medtronic
- 66 Mylan Teoranta
- 67 Pointec Medical
- 68 Vysera Biomedical Ltd
- 337 Janisys Ltd

OPHTHALMIC

- 69 Abbott Medical Optics
- 70 Allergan
- 71 Transitions Optical Ltd
- 72 Moss Vision

ORTHOPAEDIC

- 73 APOS Ltd
- 74 Firefly Orthoses Ltd
- 75 Zimmer Biomet

SERVICE

- 76 Anecto Ltd
- 77 Cashin Print
- 78 Charles River Laboratories Ireland Limited
- 79 CLS Medpharma
- 80 Embricon Ltd
- 81 Hospicode Ltd
- 82 KPW Print
- 83 Lip (Diagnostic Services) Ltd
- 84 NeliPak Healthcare Packaging
- 85 Orreco Ltd
- 86 Specialised Sterile Environments (SSE)
- 87 Synergy Health Ireland Ltd
- 88 System Label
- 89 Volox Europe

VASCULAR

- 90 4Tech Cardio Ireland
- 91 Apica Cardiovascular
- 92 ArraVasc Ltd
- 93 Boston Scientific Galway
- 94 Capsos Medical
- 95 CareFusion Manufacturing
- 96 Creagh Medical Ltd
- 97 Delcath Systems Inc
- 98 Embo Medical
- 99 Goodman Medical Ireland
- 100 Marvao Medical Devices
- 101 Medtronic
- 102 Merit Medical Ireland Ltd
- 103 Neuravi
- 104 Novate Medical Limited
- 105 Vascular Solutions Zerusa Ltd
- 106 Vervan Medical Ltd
- 107 Vivasure Medical Ltd

North Region

CONTRACT RESEARCH, DEVELOPMENT, DESIGN AND/OR MANUFACTURING

- 108 Moll Industries Ireland Ltd
- 109 Phillips-Medize Ireland
- 110 Zeus Industrial Products (Ireland) Ltd

DIAGNOSTIC

- 111 Abbott Diabetes Care Donegal

HOSPITAL AND/OR HOMECARE PRODUCTS

- 112 Abbott Ireland Nutrition Division

SERVICE

- 113 Bemis Healthcare Packaging
- 114 Randox Teoranta

South Region

CONTRACT RESEARCH, DEVELOPMENT, DESIGN AND/OR MANUFACTURING

- 115 APS Materials
- 116 BD Gencell
- 117 Croom Precision Medical Ltd
- 118 Designwise Automation Ltd
- 119 Euroflins Medical Device Testing
- 120 Excelsy Technologies Ltd
- 121 FastForm Research Ltd
- 122 Filtertek – An ITW Medical Company
- 123 Firebird Medical Ltd
- 124 Flextronics Ireland
- 125 Flextronics Ireland
- 126 Gentian Services Ltd
- 127 Hi-Life Tools
- 128 Listal Ltd
- 129 Merck Millipore Ireland Ltd
- 130 Molex Ireland
- 131 MTD Precision Engineering Ltd
- 132 Nypro Healthcare Waterford
- 133 Pharddiag
- 134 RR Donnelley
- 135 Sammina
- 136 Schivo Precision Ltd
- 137 Shannon MicroCoil Ltd
- 138 Smart Electronics Ltd
- 139 Smithstown Light Engineering Ltd
- 140 Takumi Precision
- 141 Teleflex Medical
- 142 West Pharma

DIAGNOSTIC

- 143 Audit Diagnostics
- 144 Beckman Coulter Ireland Inc
- 145 Crescent Diagnostics LTD
- 146 Metabolomic Diagnostics
- 147 Neonatal Diagnostics
- 148 Radisens Diagnostics
- 149 Raman Diagnostics
- 150 Roche Ireland Ltd
- 151 SensL Technologies Ltd
- 152 Serosep Ltd
- 153 Technopath Manufacturing

HEALTH SOFTWARE

- 154 Advanced Manufacturing Control Systems (AMCS)
- 155 BodyTab Ltd
- 156 Clinical Support Information Systems Ltd
- 157 ClniSynergy Ltd
- 158 Crest Solutions Ltd
- 159 DB MATTERS
- 160 Doctot
- 161 Epic Solutions Ltd
- 162 i360 Hygiene
- 163 Independent Data Management Ltd
- 164 Kneat Solutions Ltd
- 165 Lincor Solutions Ltd
- 166 Portable Medical Technology Ltd
- 167 Realtime Technologies Ltd

- 168 Relate Care
- 169 Rigney Dolphin Ltd

HOSPITAL AND/OR HOMECARE PRODUCTS

- 170 Adhesives Research Ireland Ltd
- 171 AventaMed
- 172 Bioquell Global Logistics
- 173 Class Medical
- 174 Cook Medical
- 175 Deviate Aspire
- 176 Fleming Medical Ltd
- 177 GE Healthcare Global Manufacturing Site 1
- 178 Irema Ireland
- 179 PMD Solutions
- 180 Vitalograph (Ireland) Ltd
- 181 Young Microbrush Ireland Ltd

OPHTHALMIC

- 182 Alcon Laboratories Ireland Ltd
- 183 Bausch + Lomb Ireland
- 184 Essilor
- 185 Johnson & Johnson Vision Care
- 186 Organic Lens Manufacturing

ORTHOPAEDIC

- 187 Archway Orthotics Limited
- 188 Celgen Tek Ltd.
- 189 DePuy Synthes Ireland
- 190 PPL Biomechanics
- 191 SOTA Prosthetics and Orthotics Ltd
- 192 Stryker
- 193 Stryker
- 194 Stryker
- 195 Tecomet Ireland
- 196 TOG Orthotics
- 197 Tornier Orthopedics Ireland Ltd (Wright Medical Group)
- 198 Zimmer Biomet

SERVICE

- 199 Acorn Regulatory
- 200 AIP Thermoform Packaging
- 201 Crest Solutions
- 202 DGP Group
- 203 EC Labels Ltd.
- 204 Eurofoil Teo
- 205 Fahy Analytical Ltd
- 206 Firecrest Clinical Ltd
- 207 Imstec GmbH
- 208 Kneat Solutions Ltd
- 209 M & Q Packaging
- 210 Olympus Biotech Ireland
- 211 Pharma-Bio Serv
- 212 Qualtech Pharma Ltd
- 213 QUMAS Ltd
- 214 Seabrook Technology Group Ltd
- 215 Sightrisk Ltd
- 216 Tegan Innovations Ltd
- 375 EtQ Ltd

VASCULAR

- 217 Abbott Ireland Vascular
- 218 Boston Scientific Clonmel
- 219 Boston Scientific Cork Ltd
- 220 DMC Medical Ltd
- 221 Stryker

East Region

CONTRACT RESEARCH, DEVELOPMENT, DESIGN AND/OR MANUFACTURING

- 222 Adama Innovations
- 223 Allied Automation Ltd.
- 224 AmRay Medical
- 225 AQF
- 226 Automatic Plastics Ltd
- 227 Belluram Precision Engineering Ltd
- 228 Bioplastech Ltd
- 229 Blueacre Technology Ltd
- 230 BlueBridge Technologies
- 231 Curtiss Wright
- 232 Design Partners
- 233 Dolmen Design
- 234 Endura Coatings Ltd
- 235 Europharma Concepts
- 236 Finesse Medical Ltd
- 237 Innovative Polymer Compounds IPC
- 238 Kelpac Medical Ltd
- 239 Lake Region Medical

- 240 M & V Medical Devices Ltd
- 241 Medioplast
- 242 Mergon International
- 243 MGS Mfg Group Ireland Ltd.
- 244 Movement Industrial Design
- 245 neoSurgical Ltd
- 246 Novaerus Ltd.
- 247 Nypro Healthcare
- 248 Oceana Therapeutics Ltd
- 249 Opko Ireland R&D Limited
- 250 PPD Development Ireland Ltd
- 251 Pressco Ltd
- 252 Profector Life Sciences
- 253 Renishaw Electronics
- 254 Specialty Coating Systems
- 255 Tech Group Europe Ltd
- 256 Technical Engineering Group
- 257 Tool and Plastic Industries Company Ltd
- 258 Trend Technologies Mullingar Ltd
- 259 Utah Medical Products Ltd

DIAGNOSTIC

- 260 Aalto Bio Reagents Ltd
- 261 Abbott Ireland Diagnostic Division
- 262 Biosensia Group Limited
- 263 DiaSorin Diagnostics Ireland Ltd
- 264 EKF Diagnostics
- 265 Enzolve Technologies Ltd
- 266 KJaya Medical Ireland Ltd
- 267 Medtronic
- 268 Quest Diagnostics
- 269 Siemens Healthcare Diagnostics Manufacturing
- 270 Tcoag
- 271 Trinity Biotech Plc
- 272 Waters Technologies Ireland Ltd
- 273 Welch Allyn Ltd

HEALTH SOFTWARE

- 274 Ace Health Innovations Ltd
- 275 Air Liquide Healthcare Ireland Ltd
- 276 Beats Medical
- 277 SilverCloud
- 278 Captec Ltd
- 279 Cerner Ireland Ltd
- 280 Clindox Ltd.
- 281 Clinical Trial EndPoint (CTEP) Ltd
- 282 Clintech Health Care Ltd
- 283 dabl
- 284 DMF Systems Ltd
- 285 Emergency Response Ltd
- 286 Global Diagnostics Ltd
- 287 HealthComms
- 288 Heart Rhythm International
- 289 Helix Health Ltd
- 290 IMS MAXIMS
- 291 IncaClinic
- 292 Incaplex Ltd
- 293 InsulCheck
- 294 INTEL – Digital Health Group
- 295 LZ Lifesciences
- 296 MANITex
- 297 Manitex Ltd
- 298 Netcare Wellness
- 299 Neuromod Devices Ltd
- 300 Ocucu Ltd
- 301 Tickerfit
- 302 Oneview Healthcare
- 303 OpenApp
- 304 PMI Software Ltd
- 305 Presidion
- 306 ResMed
- 307 S3 Group Ltd
- 308 SensorMind Ireland
- 309 Shimmer
- 310 Sláinte Healthcare
- 311 Swiftqueue Technologies Ltd
- 312 Tele Health Services Ltd
- 313 Two-Ten Health Ltd
- 314 Valentia Technologies Ltd

HOSPITAL AND/OR HOMECARE PRODUCTS

- 315 Advanced Surgical Concepts
- 316 Allogen Biotech
- 317 AltaScience
- 318 Arann Healthcare
- 319 ArcRoyal Ltd
- 320 Ardoo Caresafe Ltd
- 321 Astora Women's Health
- 322 B Braun Longford
- 323 B Braun Medical Ltd
- 324 BD Penel Ltd
- 325 BD Penel Ltd
- 326 Centric Health
- 327 Critical Healthcare Ltd

- 328 ENBIO Ltd
- 329 Euro-Cast (Ireland) Ltd
- 330 Fannin Healthcare
- 331 Fresenius Medical Care (Ireland) Ltd
- 332 Gabriel Scientific Ltd
- 333 Glanta Ltd
- 334 Incereb Ltd
- 335 Innocoll Technologies Ltd
- 336 Integra Lifesciences Ireland Ltd
- 338 KCI (an Acclity Co)
- 339 Mallinckrodt Pharmaceuticals
- 340 McKesson Ireland
- 341 Meditec Medical Ltd
- 342 Medtronic
- 343 Medtronic
- 344 Miravex Ltd
- 345 Siemens Healthcare Medical Solutions Limited
- 346 Smartsplint
- 347 Trulife Ltd
- 348 VascoCare Medical Ltd
- 349 Vasorum Ltd

OPHTHALMIC

- 350 Abbott Medical Optics
- 351 Athlone Optical
- 352 Carl Zeiss Vision Ireland Ltd
- 353 Rupp + Hubrach Optik GmbH

ORTHOPAEDIC

- 354 Allard UK
- 355 Mainstay Medical Ltd
- 356 SurgaColl Technologies Ltd
- 357 X-Bolt Orthopaedics

SERVICE

- 358 3M Ireland
- 359 Abbott Ireland
- 360 Allergan Pharmaceuticals Ireland
- 361 Anecto Ltd
- 362 AQF Ltd
- 363 Ash Technologies Ltd
- 364 Autocal (Ireland) Ltd
- 365 Baxter Shared Services & Competencies Ltd
- 366 Bioclin Research Laboratories
- 367 Catalant Pharma Solutions
- 368 Claymon Biomimnis
- 369 Colorman (Ireland) Ltd
- 370 Connexion Medical Ltd
- 371 Consort Case Company (Ireland) Ltd
- 372 DQS Ireland Limited
- 373 DSV Solutions
- 374 Essentra Packaging Ireland Ltd
- 376 Fountain Healthcare
- 377 GE Healthcare Sales And Service Support
- 378 ICON Research
- 379 IMEC Technologies
- 380 Integra Lifesciences
- 381 Java Clinical Research Ltd
- 382 KCI Medical
- 383 Komax Systems LCF SA
- 384 MDI Medical
- 385 Mead West Vaco
- 386 Medtronic
- 387 ModusLink Kildare
- 388 Mylan Dublin Respiratory
- 389 Omega Teknika Chefaro Ireland
- 390 OptiCal Sciences
- 391 Quintiles Ireland Ltd
- 392 Sealpack Labelling Systems
- 393 Seroba Life Sciences
- 394 Specialised Sterile Environments (SSE)
- 395 SteriPack
- 396 Synergy Health Ireland Ltd
- 397 Teleflex Medical Europe Ltd
- 398 Venn Life Sciences Ltd
- 399 Zenith Adhesive Components
- 400 Fannin Ltd
- 401 Homecare Medical Supplies
- 402 i360 Medical
- 403 Multivac Ireland Ltd
- 404 SA Partners Consultancy
- 405 SysCom Project Management
- 406 VWR International Ireland

VASCULAR

- 407 ClearStream Technologies Ltd (CR Bard)
- 408 NeuroTronik Ltd
- 409 PQ Bypass

While the coordinators have made every effort to ensure that the information in this map is accurate, we do apologise for any inconsistencies. Stakeholders who wish to amend map, please contact Irish Medtech on 01 6051529 or imda@bec.ie. It is anticipated that updates will be supported on an ongoing basis and completely at the discretion of Irish Medtech.

Date of Publication: February 2016. E&OE.

About Ibec

Ibec is the national voice of business in Ireland. The organisation and its sector associations, work with government and policy makers nationally and internationally, to shape business conditions and drive economic growth. Ibec's strength lies in its diversity. We offer our members a range of professional services and training on human resource management, occupational health and safety, employee relations and employment law.

www.ibec.ie

Join the conversation by tweeting @ibec_irl





Irish Medtech
Association
Ibec





Irish Medtech
Association
Ibec

