Safeguard Ireland’s manufacturing future

Establish an advanced discrete manufacturing centre of scale

Budget 2019
The Irish Medtech Association, the Ibec group which represents over 250 medical technology companies in Ireland strongly endorses the IDA Ireland, Enterprise Ireland, and Science Foundation Ireland (SFI) submission on the introduction of a new advanced discrete manufacturing centre in Ireland. This centre should have a physical presence, with the latest technology and equipment, outside of a traditional Higher Education Institutions setting. A budget of €42 million is required, which has been identified by the IDA research on the establishment of same.

The Government should invest strategically, with appropriate funding to support the industry need for the creation of a discrete Advanced Manufacturing Centre of significant scale relative to that of the UK’s Catapult centres or similar. A funding model the same as or similar to the 1:1:1 funding model, like a Research Technology Organisation (RTO) should be adopted, with the capability for significant scale. The focus should be on the higher Technology Readiness Levels (TRL) levels (5 – 7) to address the gap that currently exists in the research, development and innovation ecosystem.

It is the objective of the medtech industry to make Ireland THE global medtech hub. This cannot and will not be achieved without being on a level playing field with other competing markets, who already have advanced manufacturing centres of scale in place.
The aim is to catalyse business-to-business collaboration between FDI multinationals and SMEs (in particular manufacturers and equipment sub suppliers). The centre should have a strong focus on providing enterprise with the ability to perform technology validation, technology demonstration and system prototype demo in an appropriate environment.

Furthermore, the need to advance skills and knowledge in the area of advanced manufacturing is fundamental to progress and to future-proof the manufacturing industry in Ireland and provide the opportunity for companies to broaden the portfolio of products and functions within the business.

Government needs to re-evaluate funding and strongly consider re-directing funding or providing complementary funding to higher TRLs matching what is already provided to the lower TRLs, which will make greater impact on cost-competitiveness, jobs, and the overall economy.

What is Discrete Manufacturing?

It is an industry term which manufactures finished goods which are distinct items and can be easily identified, seen, felt. Essentially, a discrete product is something which is present at the end of the life cycle. Some of the examples are automobile, medical devices, toys, airplanes, etc.

It is contrasting to process manufacturing. It is categorised by discrete or separate unit production. The products would be produced in the combination of low volume and high complexity or vice-versa. It is an order based production process.

Components of discrete manufacturing:

- Planning of production
- Material requirement planning
- Planning of capacity requirement
- Management of quality
- Managing the inventory

Key features of discrete manufacturing:

- It consists of complex routings which have different sequence of work in different work centers.
- The semi-finished products are not usually sold and stored in the inventory
- The components are staged with the reference to the order received.
- Processing of status.
- Cost controlling based on order.
- It consists of various modes of production process.
- The bills of materials are efficiently managed.
- Integrated traceability helps in finding the prospective quality issues.
The manufacturing competitiveness landscape in Ireland

Ireland is a world leader in manufacturing and already boasts more than 4,000 businesses which employ more than 230,000 people and accounts for nearly a quarter of Ireland’s economic output. In Ireland the proportion of workers in high-tech manufacturing sectors is already three times the EU15 average and twice that of any other advanced manufacturing countries, including Germany.

The Irish Medtech Association has a strategic focus to support the Irish medtech industry of the future, to achieve the full potential of the cluster, and to maximise technological innovation across sectors to improve patient outcomes. In the context of manufacturing, Ireland is deemed one of five major global emerging hubs for medtech. However, the potential to lose this ranking is on the horizon is appropriate steps are not taken.

Globally healthcare providers are looking for more innovative solutions to provide value-based medical technologies to patients. With this comes the increased demand for research and development with time-to-market becoming one of the key drivers to staying competitive. Ireland needs to improve its market-focused research centre landscape, by supporting Irish enterprise research and innovation capabilities and infrastructure. Industry needs the appropriate translational capacity to bridge the gap between research and technology commercialisation.¹

¹. DJEI Strengthening Ireland’s Market-focused Research Centre Landscape, Technopolis Group 2015
While on the surface Ireland’s manufacturing competitiveness is good, now is not the time to be complacent in the face of changing economic landscape. There is a recognised gap in the manufacturing ecosystem in Ireland, which requires immediate support by the Government; namely the lack of near-term research and development funding to enable the discrete manufacturer’s the springboard to move to commercialisation of their products and provide greater Return on Investment (ROI). It is often too risky or resource intensive for individual companies to develop alone, and with 80% of medtech companies in Ireland being either SMEs or start-ups – the opportunity to utilise an advanced discrete manufacturing is key. The longer this gap exists the more exposed our industry is, in particular as we enter these times of economic uncertainty.

A considerable amount of research has been done which substantiates the need for an advanced discrete manufacturing centre in Ireland: “Innovation 2020 identifies the Research and Technology Organisation (RTO) model as an effective mechanism for delivering R&D outputs to industry based on identified market needs. The typical funding model in RTOs (such as Fraunhofer in Germany) requires one third of funding to come directly from industry. … The area of advanced manufacturing is an area where a RTO would help to meet a critical enterprise need. There is a good base on which to build through one of the EI/IDA Technology Centres (Irish Manufacturing Research)”.

While, the Irish Medtech Association, welcomes recent investment announcements by Government of €15 million to Irish Manufacturing Research, creating Ireland’s first Research and Technology Organisation, along with €72 million in four SFI Research Centres – two in manufacturing; namely Deantús and CONFIRM – these still fall short of what is required. What is required must go beyond this in terms of scale, spread of activity and other characteristics to meet the needs of industry, to make the necessary impact required for a globally competitive medical technology industry.

The Irish Government must invest in new technologies and skills to reap the benefits from advances in manufacturing, or get left behind as the UK and US fight for manufacturing investment and jobs. Ireland is recognised as a global medtech hub, with 9 of the world’s top 10 medtech companies here and more than 38,000+ people working in the sector leading to career paths across Ireland and internationally. Now an additional 4,000 jobs are to be added in Ireland by 2020, according to a new report by the Irish Medtech Association Skillnet and Irish Medtech Association, the Ibec group representing the sector. Notably, nearly a third of these new jobs are to be in specialised areas of R&D and engineering, highlighting the importance of getting the right skills to maintain medtech’s reputation as the leading industry for innovation in Europe with over 13,000 patents filed in 2017.

The Government should invest strategically, with appropriate funding to support the industry need for the creation of an advanced discrete manufacturing centre of significant scale relative to that of the UK’s Catapult or similar. A funding model the same as, or similar to the 1:1:1 funded model like the Research Technology Organisation (RTO) with capability for significant scale should be adopted. The centre should focus on the higher technology readiness levels (TRL 5 – 7) addressing the gap that currently exists in the RDI ecosystem. This will help manufacturers to turn ideas into commercial applications by addressing the gap between technology concept and commercialisation.

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Global competition is eroding Ireland’s competitiveness

Global competition is already eroding Ireland’s manufacturing competitiveness. In the UK, the Catapult centres have an annual budget of £100 million\(^5\). The UK are already ahead of Ireland, it recognises that investment in technological advances will improve capabilities, add jobs and grow their economy. The UK’s RTO Catapult shows a considerable Return on Investment, and in 2015 every £1 of government core funding generated £15 of net benefits to the UK economy.\(^6\)

In the USA in 2016, $115 million from government was added to the $219 million in industry revenue through their Advanced Manufacturing centres in 2016. The total spend of the institutes is approximately $334 million\(^7\). In Germany, the Fraunhofer Institutes total annual research budget volume in 2017 was €2.3 billion\(^8\) and the EBD in Singapore will invest €3.2 billion for advanced manufacturing over 2016-2020\(^9\).

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5. https://www.ft.com/content/23cda064-6313-11e7-91a7-502f7ee26895
Key drivers of success

Time to market and product innovation

A recent medtech industry survey by PA Consulting showed that 66% of respondents stated that product innovation, and 56% said that time-to-market reduction, are top competitive drivers. The majority of respondents saw reusing technology (69% as lever for time, 65% as lever for cost), focusing on core competencies (50% as lever for both time and cost) and managing strategic partners and suppliers (50% as lever for time, 42% as lever for cost) as the most effective levers to reduce time and cost-to-market.  

Ireland needs to improve its market-focused research centre landscape, by supporting Irish enterprise research and innovation capabilities and infrastructure. Industry need the appropriate translational capacity to bridge research and technology commercialisation.  

Talent and continuous professional development

Ireland has one of the highest levels of third level graduates in the EU, and this has been a central pillar of Ireland’s winning formula for growth. This has been underscored by job creation and investment by the medtech sector. More than 9,000 jobs have been added in the past couple of years and major investments have been announced by leading multinationals which are expanding facilities here or setting up a strategic base here.  

The Irish Medtech Association’s Skillnet, conducted a Future Skills Needs Analysis on the Medical Technology Sector in Ireland to 2020, and identified five key industry disruptors, including; the emergence of new healthcare delivery models, advancements in ICT, cost containment, the need to serve lower-economic and emerging markets and increased regulation are significantly impacting the medtech industry in Ireland and internationally.  

According to A.T. Kearney’s 2014 report, ‘Medical devices: Equipped for the future?’, disruptors have the potential to cost the global medtech industry up to $34 billion if companies do not adapt to the changing landscape of the industry.  

11. DJEI Strengthening Ireland’s Market-focused Research Centre Landscape, Technopolis Group 2015  
Industry disruptors such as advanced manufacturing and connected health will require medtech companies to assess the skills of their existing employees, to ensure new hires have the required skills and competencies, and to assess the effectiveness of the training and education programme for their employees.

To continue to be successful Ireland must have the right talent in place and continue to focus on talent development. Cutting edge technology is changing rapidly and businesses in competing economies are experiencing significant productivity gains from new technologies like 3D printing, collaborative robots, data analytics and the Internet of Things. An advanced manufacturing centre with the most innovative technologies will provide an excellent training ground for the continuous professional development of current and future manufacturing professionals. This will support more established and formal models of training such as apprenticeships in a demonstrator environment.

While Budget 2017 assigned €35m increased funding to third level education, it must be noted that traditional third level programmes are not the only routes to careers funded by the Government. That is why the importance of having a world-class facility to support the practical upskilling of manufacturing professionals in the areas of additive, data analytics, industrial internet of things, cobots, simulation, cloud computing, systems integration, augmented reality, and cybersecurity cannot be underestimated. Already international medtech jurisdictions such as the UK, Germany, Singapore and the US are making strides with significant investment in research and technology organisations for manufacturing. For Ireland to compete globally, it must invest in the necessary and appropriate infrastructure to succeed.

**Access to cutting edge technology and demonstrator capability**

Manufacturing technology is advancing at an incredible pace, such that it is almost impossible for companies to stay ahead of the curve from a technological investment perspective. It is often too risky or resource intensive for individual companies to invest in the latest technologies alone, and with 80% of medtech companies in Ireland being either SMEs or start-ups the only solution is accessing these supports externally. Having a dedicated advanced discrete manufacturing centre will ensure companies are not left behind and can continue to compete globally.
Ireland’s research ecosystem

The gap in near-term research and development funding

As can be seen in Figure 1 (opposite), Ireland’s research ecosystem, there is a clear gap in the research continuum which is jeopardising the medtech industry’s future competitiveness. The longer this gap exists the more exposed our industry is, especially as we enter this period of economic uncertainty.

There is a notable lack of near-term research and development funding to help discrete manufacturers springboard products to commercialisation and provide greater Return on Investment (ROI). It is understandable therefore; that at the higher TRLs, firms can be reluctant to invest because such research must be conducted at scale in near real-world conditions and is consequently expensive. The solution is the creation of an advanced discrete manufacturing centre of significant scale; similar to Catapult in the UK or the Fraunhofer Institutes in Germany.

There is a very substantial demand for middle TRL research, and for short-term applied and contract research in Ireland. The market-oriented centres assessed have <2% market share. There is a large market for the provision of external RDI services to Irish companies, expected to grow to over €1 billion in 2018, especially in upper-middle and high TRL areas and short-term applied and contract research. It is clear, that there is a strong case for the state to co-invest in order to address these market failures.
Current Government RDI spend in Ireland

Figure 2 (next page) is taken from the 2015 Technopolis Group report entitled, ‘Strengthening Ireland’s Market Focused Research Centre Landscape’, and represented the then expected 2016 portfolio of the Irish state-funded centres research capacity in terms of Technology Readiness Levels (TRLs).

Outside the domains of Tyndall, NIBRT, and Teagasc, there is little state-funded activity in the centres beyond TRL 3. The bulk of the research that is being performed is relatively distant from market.

The graph shows that Ireland has left itself exposed in terms of discrete manufacturing research and development capability. In 2017, Government investment in Research & Development amounted to €768 million*. However, it is a quite apparent the funding is directed at the lower TRLs which essentially would not provide the most immediate return on investment in line with industry’s requirements.

In Ireland, applied research and experimental development is largely being funded by the private sector, where it almost exclusively takes place. This presents companies with risks in terms of removal of focus on core competencies, therefore the requirement to outsource to an RTO provides total R&D expenditure (GERD) in basic research, applied research, and to a lesser extent experimental development, is lower than in the UK, the Netherlands, France, Denmark, Belgium, Austria, Germany, Sweden and Finland.

Unlike overseas comparators, centres in Ireland spend only small portions of their resources on typical near-market focused R&D and services such as consultancy, contract research services, and short-term applied research. Thus, leaving Ireland exposed in terms of near-to-commercial capability. In fact, this comes at a time when the most recent Irish Medtech Association member survey (representing 15,766 employed across the medtech sector in Ireland) that; a third of multinational FDI companies claim their company has plans to introduce/expand commercial activity based out of Ireland, of those 9 in 10 companies claim there are initiatives underway to drive this objective.

Two key drivers highlighted by 66% of member companies are, establishing or increasing marketing activity within the global organisation, and an increased ability to secure new product development to future-proof the business in Ireland.
Summary

In the Irish Medtech Association, it’s our vision to make Ireland a global leader in innovative patient-centred medtech products and solutions; to achieve this facilitating cross-sector convergence is essential.

The FDI manufacturing sector here currently spends an estimated €771 million on R&D annually. But more needs to be done to help companies to increase the level of sophistication and complexity of their R&D activities, as well as expand their mandate to include R&D ownership for complete market segments and global product portfolios. However, currently funding is overwhelmingly directed at the lower TRLs which do not provide the most immediate ROI or reflect industry’s requirements.

The creation of an advanced discrete manufacturing centre of significant scale will offer discrete manufacturing businesses of all sizes and from all relevant sectors access to world-class equipment, expertise and collaborative opportunities. This will in turn, help manufacturers to turn ideas into commercial applications by addressing the gap between technology concept and commercialisation.

Therefore, we strongly propose that Government re-evaluate funding and strongly consider re-directing funding or providing complementary funding to higher TRLs matching that which is already provided to the Lower TRLs, to give Ireland its own world-class centre for advanced manufacturing of scale, which will make greater impact on cost-competitiveness, jobs, and the overall economy.

“The FDI manufacturing sector here currently spends an estimated €771 million on R&D annually.”
The economic contribution of Ireland’s medtech sector is of increasing importance.

Ireland is well positioned to capitalise on global medtech market which is forecast to grow €435 billion by 2022, it’s:

- A global medtech hub with 9 of the world’s top 10 medtech companies having a base here
- The number one location for medtech foreign direct investment in Europe
- Spans 450 medtech companies, including leading contract manufacturers, designers and service providers
- As many as 60% of businesses are homegrown and 80% are either start-ups or SMEs
- Ireland is the second largest exporter of medtech products in Europe with €12.6 billion in exports
- The highest employer of medtech professionals in Europe, per capita, with many as 38,000 already working in the sector and 4,000 jobs to be added by 2020
- Ireland has the most Shingo Prizes for operational excellence of any country, per capita, in the world
- A very significant 68% companies do R&D and spend €181 million on R&D annually
- Nearly two out of three medtech companies have commercial capabilities here and a third of FDI multinationals plan to expand or introduce new commercial operations

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About the Irish Medtech Association

The Irish Medtech Association is the business association within Ibec representing the medtech sector. The Irish Medtech Association has more than 250 members and represents over 80% of the employment in the sector. The Irish Medtech Association’s broad focus is to promote and support an environment that ensures the sustainable development and profitable growth of our multinational and small to medium size medtech companies. The Irish Medtech Association is led by a Board of Industry CEOs and Executive Leaders. Strategy implementation is coordinated through working groups and taskforces.

www.irishmedtechassoc.ie