

Strategic Plan 2020-2025: *Innopharma Transforms*

High-Tech Manufacturing

Pharmaceutical

MedTech

FoodTech

ICT
(Technology)





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FOREWORD

Dr. Ian Jones, Founder and
CEO, Innopharma Education



Our 2020 – 2025 Strategic Plan: *Innopharma Transforms* articulates a shared vision for Innopharma Education’s future. It is inspired by our potential contribution to the higher education landscape in Ireland and informed by extensive research and consultation with learners, staff, partner Higher Education Institutions (HEIs), industry representatives and other stakeholders.

The theme of transformation is central to this document and it is reflected first and foremost in the impact that our programmes have on our graduates’ career progression. Our adult learners, often regionally located, are up-skilling and re-skilling to maintain their employability in a global labour market that is rapidly transforming. Here in Ireland, a step change in the skills profiles demanded by employers is already occurring as the Industry 4.0 revolution gains pace across the national high-tech manufacturing sector. The advent of Industry 4.0 entails twin transitions towards climate neutrality and digital leadership, which the European Commission predicts will affect every part of our economy, society and industry. In this context, Innopharma Education is committed to graduating empowered lifelong learners who are able to navigate and advance their professional careers in changing environments.

This plan also reflects the transformations taking place in the higher education sector. The experience of the Covid-19 pandemic, the uncertainty of future US policy directions and an impending Brexit are sparking radical change. The delivery of quality assured programmes that support Irish industry in flexible, blended and online modes is now imperative. In meeting this need, we will realize our commitment to enabling true lifelong learning, and making a positive impact on the lives of our learners and their capacity to contribute to society. Innovative industry partnership models and collaborative approaches to programme delivery will augment the learning experience and enable us to respond with greater agility to the continually emerging needs of industry, our learners and society.

Our obligation as a higher education provider, perhaps more than ever before, is to act as an agent of transformation. As we mark the 10th anniversary of our founding and celebrate our achievements to date, we embark on the next steps in our journey. *Innopharma Transforms* sets out a comprehensive framework for that transformation, the growth we will achieve, and the contribution we will make in the years ahead.

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A LOOK BACK

Over the past decade, Innopharma Education have delivered on the promise of our founding vision. We have offered innovative and quality assured programmes of education and training, developed specifically to meet current and emerging needs in the Biopharma, MedTech, ICT and FoodTech industries.

Since 2010, we have successfully delivered those programmes in collaboration with TU Dublin – Tallaght Campus (formerly ITT, Dublin) and Griffith College at Levels 6 to 9 of the National Qualifications Framework (NFQ). We have supported significant numbers of full-time international students through their studies in Ireland, and we have developed an unrivalled number of industry partnerships, facilitating valuable work and job placements for our learners and graduates. Our programmes have met a demand for higher education and training across multiple regional locations and offered remotely-based learners the additional flexibility of online study options. In partnership with the State we have now graduated over 5,000 learners from publically funded strategic programmes, including the Labour Market Activation Fund, Springboard, Momentum and Springboard+. These programmes have enabled graduates to commence and re-enter employment equipped for the future.

Since our inception, our programmes have been designed to transform the career trajectories of our learners. In addition to equipping our graduates with in-demand and industry specific skills, we have taken a whole person approach to supporting professional growth. We have provided individualised mentoring and coaching, facilitated



work placements and assisted our graduates to obtain employment. We have developed learners' presentation and interview skills, guided them in CV preparation and helped them build their professional networks. This emphasis on transversal life skills was crucial to our graduates' success during Ireland's recovery from the impact of the 2008 global financial crisis crash, equipping them to find or progress to roles in high growth industries. These high impact teaching, learning and support strategies are core to our approach to programme delivery.

To date, our programmes have been offered through deliberate and strategic collaboration with other providers. Our partnership with TU Dublin – Tallaght Campus enables us to draw upon that HEI's recognised expertise in pharmaceutical and food science, and access world class lab facilities. In partnership, we are able to offer high quality programmes incorporating a focus on

pharmaceutical and food manufacturing. Similarly, our partnership with Griffith College leverages that institution's recognised expertise in the domains of business and management. This facilitates delivery of programmes that prepare graduates for supervisory, management and leadership roles in the BioPharma sector. These collaborations with high calibre institutions also enable us to deliver Innopharma Education programmes in regional centres across the country, including Dublin, Cork, Galway, Athlone and Limerick. Innopharma Education's learners benefit from the well-developed and quality assured services and supports offered by our partners. Moving forward, we will maintain these collaborations and nurture the valuable relationships we have developed with both TU Dublin – Tallaght Campus and Griffith College.



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LOOKING FORWARD

Innopharma Education graduates possess skills profiles that are highly sought after in the high-tech manufacturing sectors of Biopharma, MedTech, ICT and FoodTech. Those skills are crucial enablers of the *Industry 4.0* revolution that is currently transforming high-tech manufacturing and will be essential to maintaining Ireland's global competitiveness and agility in the years ahead.

At the time of this strategic plan's release, the global economy is again entering recession and industries worldwide are grappling with the impact of the Covid-19 pandemic. It is therefore imperative that the higher education sector move to provide opportunities for learners to re-skill, up-skill and keep pace with the demands of a changing labour market. Our five year plan is focused on meeting some of these needs and responding to a key policy concern - that the advent of digitalisation in high-tech manufacturing has exposed a critical skills deficit in [Ireland's Industry 4.0 Strategy](#). That deficit must be addressed if Ireland is to weather the dual forces of a global recession and a digital revolution disrupting the high-tech manufacturing labour market.

With over ten years of cutting edge research and practice in the emerging areas of Digital Data Analytics, Advanced manufacturing, Automation, Industrial Internet of Things, Cloud Computing and Smart Sensors, Innopharma Education is well-positioned to address current and future gaps in higher education provision in these areas. Our established profile in these domains is augmented by our global industry networks and our close links to industry at home. In these rapidly developing fields, it is our expert profile, rather than that of any current collaborating partner, that stands out. For Innopharma Education, this is a logical and opportune juncture to progress toward delivering independently in those areas where our expertise and capability is unique. Our planned programmes will meet an increasingly urgent need and position our graduates at the vanguard of the Industry 4.0 revolution. Their expertise will enable them to contribute to and benefit from the sweeping changes transforming the sector.

Innopharma Education acknowledges that additional investment will be required to further our strategic development, and is committing the resources required to facilitate our success. The vision presented in Innopharma Transforms will be realized through a process that has already commenced. That process entails systematically building our capacity and organisational capability, and making judicious investments to ensure our learners are well-supported and our growth sustainable.

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THE INNOPHARMA HIGHER EDUCATION VISION

Our vision is to act as *agents of transformation*. We strive to transform the careers of our learners by developing their skills in areas that meet the current and future needs of the labour market. We strive to transform education by offering flexible programmes that utilise innovative learning technologies, and by collaborating closely with industry in programme design and delivery. In doing so, we strive to demystify the high-tech manufacturing sectors for lifelong learners, and produce competent, committed and reflective professionals with the confidence to transform their industries and contribute value to society.



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THE INNOPHARMA HIGHER EDUCATION MISSION

Our mission is to contribute value to our society by **re-skilling**, **up-skilling** and **life-skilling** our learners, enabling them to grow personally and professionally and build a better future for all.

- We **re-skill** mature learners and graduates of programmes in cognate disciplines. Such learners are able to draw upon their prior life-experience and learning as they prepare to work in new and highly specific industry environments. Upon graduation, they enter the employment market with skills profiles that are in high demand.
- We **up-skill** learners currently in employment, offering them access to programmes of education via part-time flexible study and innovative delivery methods. This future-proofs their skills profiles, ensuring they continue to be valued by employers in industries where processes are continually evolving.
- Above all, we **life-skill** our learners. Integral to all of our programmes is an emphasis on developing transversal skills and an orientation to lifelong learning. We offer extensive supports to learners to ensure they enter (or re-enter) the workforce empowered with enhanced self-awareness, networking and communication skills.

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INNOPHARMA EDUCATION'S CORE VALUES

Our values underscore our organisational culture, our strategic priorities and our decision-making.

We strive for *Excellence*

We are committed to quality and continuous improvement. That means taking a best practice approach to everything we do.

We act with *Integrity*

We are committed to honesty, transparency and upholding the highest ethical standards. That means being accountable to our learners, our staff, our partners, our stakeholders and the wider community.

We value *Diversity*

We are committed to inclusion, equity and mutual respect. That means actively working to eliminate bias and create an environment where every member of our community can excel.

We foster *Innovation*

We are committed to creativity, collaboration and problem-solving. That means continually seeking ways to optimize, enhance and add value to all our activities.

We nurture *Collaboration*

We are committed to mutual support, teamwork and cooperation. That means developing an open and participatory environment for our learners, partners and each other.



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THE CONTEXT OF OUR 2020 – 2025 STRATEGIC PLAN

Industry 4.0 – A Revolution in High-Tech Manufacturing

At this moment, digital technologies are transforming high-tech manufacturing around the globe. The digitalisation of manufacturing, widely known as Industry 4.0, draws upon technologies such as cloud computing, advanced sensors, artificial intelligence, machine learning, augmented reality and big data. This digital revolution is redrawing the boundaries of traditional manufacturing and creating new forms of competitive advantage in a sector that already directly employs over 227,000 people in Ireland, with more than 80% of that number located outside Dublin.

The impact of Industry 4.0 cannot be overstated. The applications of these technologies are sweeping and include, for example, predictive maintenance, improved decision-making in real time, accelerated process development and the capability to anticipate inventory based on production. In industry 4.0 environments, digital twins are providing virtual versions of plants and machines, pharmacokinetic modelling is predicting how molecular entities will react before they enter the body, and process modelling is predicting how chemical or biological materials will behave when produced at an industrial scale. The use of augmented reality is facilitating operator

compliance with procedures, while artificial intelligence-based methodologies are enabling model based control of manufacturing processes and tailoring sales activity. In short, this fourth industrial revolution is completely transforming the nature of global manufacturing value chains.

Industry 4.0 is also essential to the goal of climate neutrality. Currently, Europe's economy depends on energy-intensive industries, and modernising and decarbonising these industries using Industry 4.0 technologies is a clear priority. To lead this change, Europe will need to employ new industrial processes and clean technologies to reduce costs and improve market readiness. The digital sector will therefore be essential to achievement of the European Green Deal, both as a source of clean technology solutions and by reducing its own carbon footprint.

Ireland's Industry 4.0 strategy (launched in January, 2020) recognizes the contribution that Industry 4.0 adoption will make to the climate action agenda. Further, the strategy aims to position our nation as a competitive, innovation-driven manufacturing hub. However, that strategy identifies the impact of digitalisation on employment as a key policy concern, acknowledging that it will reshape the skills required from the workforce of the future.

A Critical Skills Deficit

Ireland is experiencing a critical skills deficit in BioPharma, MedTech, ICT and FoodTech, all of which are key sectors of our economy. This is a global deficit, not just a domestic one. Even India, with 2.5 million science and engineering graduates annually is experiencing a skills deficit for these sectors. There are currently 1 million vacancies across Europe for digital technology experts, and it has been estimated by the European Commission that in the next five years alone, 120 million Europeans will have to up-skill or re-skill.

This skills deficit has emerged because the digital technologies of the Industry 4.0 revolution are changing the face of industry and the way we do business. The new wave of advanced technologies pose equal risks and opportunities for our high-tech sectors, which at this moment have the opportunity to transform and excel. The technologies are creating new business models which will allow industry to be more productive and provide workers with new skills. However, we are at a moment of great uncertainty. As an island of manufacturers and developers, Ireland is at the heart of European and global high-tech manufacturing. Yet the obvious risks associated with the COVID-19 pandemic, Brexit and US corporate tax policy are creating instability and flux within the Irish economy. It is essential that industry in Ireland demonstrates agility and leads this change. To achieve this we must develop a flexible, tech-savvy labour force with the right digital and transversal skills.

Ireland is competing globally for BioPharma, MedTech, ICT and FoodTech foreign direct investment. The availability of an appropriately skilled workforce is fundamental to the decision by a multinational to develop and expand a business presence here. It has been identified by the Department of Education and Skills as a *'key selling point for Ireland in attracting foreign direct investment to locate in Ireland'*. Alarming, the European Commission reports that 70% of companies are delaying investments because they cannot find the people with the right skills. To attract future foreign direct investment, it is critical that the skills deficit in Ireland does not escalate any further.

To remain competitive, Ireland requires a workforce in possession of technical skills coupled with well-developed soft skills. We need workers with capabilities relevant to data reporting and team integration, an understanding of global BioPharma, MedTech, ICT and FoodTech dynamics, and the ability to solve problems and influence people. Over the next five years (2020-2024) Innopharma Education and our industry partners (including BioPharmaChem Ireland) estimate that there will be an additional 18,500 positions created within these sectors. These will be the backbone of our economic recovery following the COVID-19 pandemic, and the foundation of our future success.

As the European Commission has identified, the global race on the twin transitions (ecological and digital) will be based on frontier science and mastering deep technologies, with the next era of industry one in which the physical, digital and biological worlds are coming together. At Innopharma Education, our mission is to prepare our learners to navigate and propel the Industry 4.0 revolution in Ireland into that world of the future.

Our Team

In 2020, as this strategic plan is released, Innopharma Education employs on a national basis 35 experienced academic, administrative and support staff and over 50 associate lecturers and industry professionals. In addition to subject and domain expertise, our organisation has a depth of experience in accredited, quality assured programme management and delivery. Collectively, our team members have experience in the governance and executive management of education institutions, the development and validation of programmes of education and training (including for online and blended learning delivery), the supervision of research students and the development of learner support programmes and initiatives. Although many of our team members have brought significant experience into the organisation, we actively encourage and support all of our staff to engage in continuing professional development and contribute to organisational learning.

At Innopharma Education, we know that our core team have the capabilities needed to realize our ambitions, including our immediate goal of becoming a QQI accredited provider within our specific domains of expertise. We also have capacity to make the substantive additional investments in our organisational resource base that are required to offer our own accredited higher education programmes. Our strategic plan and associated operational plans set out the concrete steps we will take to expand our most important resource – our people – in the years ahead.



Our Programme Provision

Over the next five years, Innopharma Education will build on its mission of supporting learners to up-skill, re-skill and life-skill through the delivery of innovative, quality-assured and industry-aligned programmes of education and training.

As our programmes are designed in close consultation with industry partners, they will cater to both current and future labour market needs. For example, learners that acquire qualifications in our Advanced Manufacturing and Data Analytics programmes will be able to immediately leverage these to progress careers in the Pharmaceutical industry, which is rapidly transitioning to the Pharma 4.0 model. Our graduates' integrated skills will enable them to wrangle data that will inform process improvements, increase quality and decrease risk in the applied, high-tech context of pharmaceutical manufacturing.

Our programme provision is designed for the 'non-traditional' learner. Many are embarking on their higher education journey for the first time, re-skilling after an extended period in the workforce or a period of unemployment. Others are up-skilling to safeguard their continued employability and mobility in rapidly changing industries. For this reason, we aim to develop not only the applied technical skills, but the lifelong learning and transversal skills of our learners. This multi-dimensional approach to education will prepare our graduates to gain employment or promotion

in the high-tech manufacturing sector, where communication, problem-solving and interpersonal skills are increasingly demanded. To facilitate this, we offer generous academic, career and pastoral supports for learners that will empower them to start or progress their careers.

As many of our learners are located regionally and outside urban centres, our programmes are designed for high quality, blended delivery and are typically offered part-time. We provide a well-supported online environment and opportunities to attend remote teaching sessions as well as regularly scheduled face to face classes. We employ principled learning design and take a best practice approach to blended learning delivery. This enables us to achieve our mission by facilitating access to education for learners who may otherwise be excluded due to their location, or their work and family commitments.



Our Research and Innovation

In the continually emerging domains in which we work, research led and informed teaching and learning has never been more crucial. Over the past ten years we have benefitted from our close collaboration with Innopharma Technology, where a team of doctorate led experts have brought an exceptional level of domain knowledge and industrial expertise to our applied research agenda. At Innopharma Education, we have successfully leveraged this to inform our programme design and delivery.

Our research has attracted over €15 million of investment from European Union Funds, notably leading six Framework Programme 7 (FP7) projects and two Horizon 2020 projects. It has placed us on the cutting edge of developments in multiple areas of expertise, including developing innovative imaging and spectroscopic sensors and IIoT Smart Manufacturing frameworks, and has led to the publication of 50 plus peer reviewed papers. Our research profile has attracted high profile academic and industry collaborations nationally and internationally. We have collaborated with world-leading research groups from Purdue University, Rutgers University, University of Eastern Finland, University of Limerick, Technological University

Ghent, University College Cork, Trinity College Dublin, Technical University of Singapore and global pharmaceutical, food and fine chemical leaders like GSK, Pfizer, BMS, DMV Fonterra, Bayer, BASF, Johnson Matthey and Abbot.

These projects and collaborations continue to create numerous opportunities that we are able to leverage in our teaching and learning activity ranging from opportunities for students to participate in hands-on research to academic and industry-based exchanges, internships and guest lectures. As we move forward, our research and innovation agenda will continue to inform our programme design, engage our industry partners and enhance the Innopharma Education learner experience.



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OUR STRATEGIC PRIORITIES AT A GLANCE

1. Our Learners

Our learners will be supported to develop personally and professionally in an environment where diversity is valued and innovation is fostered.

2. Our Quality

Our systems and processes will be characterised by excellence and managed with integrity.

3. Our Delivery

Our leading edge curriculum will incorporate innovative learning design and be delivered by qualified subject expert academic staff.

4. Our Engagement with Industry

Our programmes will be industry led and informed to meet current demands and to anticipate future labour market needs. Our graduates will have skills profiles that are relevant, immediately marketable and durable.

5. Our People and Structures

Our team will focus on continuous improvement as they strive to implement the objectives of Innopharma Transforms in a manner that reflects the core values of our organisation.

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STRATEGIC PRIORITY 1: OUR LEARNERS

Objective 1.1

Ensure that our learners are at the centre of everything we do.

Key Actions

- Integrate learner representation and the learner voice to our system of governance
- Ensure that learners are prepared for sustainable employment and active citizenship.
- Regularly review our processes across the full learner life cycle to ensure they reflect the learner-centred, supportive ethos of the college.



Objective 1.2

Ensure that our learners have easy access to a comprehensive suite of support services and resources throughout their journey with us.

Key Actions

- Further develop operational plans for establishing and promoting learner support services across the full learner life cycle at Innopharma Education, identifying the specific commitments the college is making in this area and specifying the relevant timelines for key investments.
- Develop an accessible and user-friendly learner handbook that provides all Innopharma Education learners with direct links to all of the services, supports and resources available to them (internal and external; physical, virtual and remote).
- Systematically gather, review and action learner feedback on the effectiveness of the supports and resources offered.

Objective 1.3

Ensure that our learners graduate industry-ready, with enhanced career skills.

Key Actions

- Develop our programmes to meet future labour needs in industry and develop tangible, applied skills among learners. In the immediate future, develop these with a focus on Advanced Manufacturing and Data Analytics.
- Expand, enhance and formalise our focus on life skills across all programmes to ensure that Innopharma Education programmes empower learners to engage fully in lifelong learning.
- Maintain and continue to develop our industry links, collaborations and partnerships. Leverage these to integrate industry events, guest lectures and presentations, site visits, job placements and other industry focused activities to the learner experience.



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STRATEGIC PRIORITY 2: OUR QUALITY

Objective 2.1

Further develop our quality assurance systems to encompass the full range of our current and planned activities within the 5 year cycle of this strategic plan.

Key Actions

- Establish a comprehensive set of Policies and Procedures aligned with the Core Statutory Quality Assurance Guidelines (2016) published by Quality & Qualifications Ireland (QQI).
- Action all feedback obtained from QQI and the Independent Panel Review process to achieve success in an application for approval for Initial Access to Validation.
- Ensure that the culture of quality embedded within the organisation is made visible within the organisation's documented processes, including the terms of reference for all units of governance and individual role descriptions.

Objective 2.2

Develop and commence delivery of a suite of industry-aligned programmes validated by QQI that meet a clear demand from learners.

Key Actions

- Develop and present programme documentation for validation by QQI that fully comprehends the Policies and Criteria for the Validation of Programmes of Education and Training (2017) published by Quality & Qualifications Ireland.
- Ensure that programme proposals are presented alongside evidence of academic/industry endorsement of the programme, as appropriate.
- Support all programme proposals with detailed quality and capacity plans; monitor and review the implementation of these following successful validation.

Objective 2.3

Develop our processes of self-evaluation, monitoring and review to support continual improvement and ensure excellence in all we do.

Key Actions

- Further develop processes for collecting, reviewing and responding to learner feedback on all aspects of their learning experience.
- Develop a systematic process for cyclical review and (if required) update of the quality assurance system and allocate responsibility for this internally.
- Invite appropriately qualified external individuals to inform decision-making and review activities within the organisation on a routine and ad hoc basis.



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STRATEGIC PRIORITY 3: OUR DELIVERY

Objective 3.1

Deliver high quality education and training programmes, characterised by excellence in teaching, learning and assessment.

Key Actions

- Further develop the overarching Teaching, Learning and Assessment (TLA) strategy, articulating the Innopharma Education philosophy and vibrant approach to lifelong learning that underpins our pedagogic practices.
- Formalise the processes for Induction and Continuing Professional Development of all academic staff to effectively facilitate their implementation of the TLA strategy.
- Ensure that programme specific TLA strategies are clearly articulated for all programmes proposed for validation.

Objective 3.2

Deliver programmes that utilise new and emerging e-learning technologies in a principled and effective manner, offering a high level of flexibility and support for learners.

Key Actions

- Further develop the Blended Learning strategy to ensure its full integration with the overarching TLA strategy.
- Develop and implement the operational plan for building capacity, resourcing and supporting Blended Learning.
- Integrate training in Innopharma Education's approach to Blended Learning to Induction and Continuing Professional Development for academic staff.
- Adopt a continual enhancement approach to Blended Learning that ensures tools are used effectively to support learner participation and interaction.

Objective 3.3

Deliver programmes that enable, support and promote lifelong learning and meet the education and training needs of diverse learners.

Key Actions

- Formalize our approach to developing transversal skills for lifelong learning within the TLA strategy and ensure this is reflected in programme design and development.
- Formalize the suite of extracurricular career development supports offered; ensure these are consistently promoted and available to all learners.
- Develop and design programmes flexibly for regional, blended and part-time delivery.
- Ensure learners in all locations and modes have access to a well-supported, high-quality and flexible learning experience that enables them to realize their full potential.



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STRATEGIC PRIORITY 4: OUR ENGAGEMENT WITH INDUSTRY

Objective 4.1

Maintain and strengthen our engagement with industry and stakeholders.

Key Actions

- Continue to actively participate in key industry and stakeholder events through bodies such as BioPharmaChem Ireland, IBEC and Regional Skills Fora as hosts, representatives or sponsors.
- Establish a framework for formalizing various levels of relationship, agreement and collaboration with our industry partners.
- Develop Innopharma Education's alumni network to leverage the potential of this for current learners.

Objective 4.2

Maximise the employment potential for Innopharma Education graduates by ensuring that the knowledge, skills and competencies developed by our learners reflect current and emerging industry needs.

Key Actions

- Actively engage leading industry practitioners in all aspects of programme design, delivery and assessment.
- Further develop links to industry through design and delivery of company specific training.
- Maintain a focus on emerging as well as current industry needs, taking into account the research, reporting and publication conducted by national and international bodies.

Objective 4.3

Maximise the potential pedagogic impacts of our engagement with industry for learners.

Key Actions

- Integrate a framework for Work Integrated Learning (WIL) to the overarching Teaching, Learning and Assessment Strategy that is inclusive of placements, projects, simulations, company visits and guest lectures.
- Actively promote the benefits of Work Integrated Learning, including the development of transversal skills to Innopharma Education learners and industry partners.



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STRATEGIC PRIORITY 5: OUR PEOPLE AND STRUCTURES

Objective 5.1

Review our organisational structure in line with our strategic expansion to ensure it is fit for purpose and implement necessary changes.

Key Actions

- Review and assess the Terms of Reference and function of all units of governance and the scope of individual roles and responsibilities.
- Maintain best practice in corporate governance, engaging appropriate levels of externality and ensuring that decision-making processes are clear, appropriate, transparent and documented.
- Maintain best practice in organisational development, with continual review and enhancement of our quality assurance system, human resources management, health and safety practices and internal monitoring.

Objective 5.2

Further develop our capacity by attracting, supporting and motivating an excellent team of academic and non-academic staff committed to quality service provision.

Key Actions

- Continue to reflect our core values (excellence, integrity, diversity, innovation and collaboration) in all of our practices. Promote our work environment and organisational culture as one that is inclusive, dynamic and team-oriented.
- Actively support the Continuing Professional Development of our staff through practices including mentoring, shadowing, coaching, attendance at seminars, support for further education and career support.

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CONCLUSION AND OUR ENABLERS

This strategic plan will be delivered by our people, led by our Executive Management Team.

- We will support our teams to align their work plans to the key actions identified in this strategy, and in doing so ensure the achievement of our five strategic priorities.
- We will ensure that the ambition of Innopharma Transforms is achieved by developing and implementing operational planning documents in each of our areas of Strategic Priority. These internal documents will set out in greater detail annual and five year Key Performance Indicators against which we will measure our success.
- We will enable and promote our teams to work in ways that reflect our Core Values and build upon our inclusive, dynamic and collaborative organisational culture.
- We will demonstrate our continued commitment to facilitating access to education for mature, part-time and regional learners by further developing and appropriately resourcing our online and blended delivery strategy.

- We will continually monitor the implementation of this strategy, and respond with agility to changes in the sector and environment.

At Innopharma Education, we look back with pride on the journey we have taken over the past decade. We celebrate the successes of our graduates, and the strong relationships we have built with our industry and HEI partners. We enjoy confidence in our increased capacity, in our team's internal capability and in our organisational maturity. We look forward, through the implementation of this strategic plan over the next five years, to transforming the future.



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Appendix

OVERVIEW OF BIOPHARMA, MEDTECH, ICT AND FOODTECH SECTORS

The BioPharma, MedTech, ICT and FoodTech sectors are key to the Irish economy – employing over 200,000 people (direct and indirect) and generating over €140B in exports annually.

The sectors can be described as follows:

BioPharma

Ireland's BioPharmaceutical sector includes the research, development, manufacture and supply of small molecule and large molecule products. The Biotech 'large molecule' sector is enjoying significant capital investment both in Ireland and internationally and this will continue. In addition to this, there is significant investment in virtual and supply chain pharma companies in Ireland. Finally, the 'small molecule' embedded pharma companies in Ireland (accounting for 50,000 direct/indirect jobs) are also realising significant growth in investment and employment through increased

sales of their products globally. They are however also witnessing a significant skills deficit for their predominantly difficult-to-manufacture powder-based processes which challenges their ability to sustain their growth trajectory as many of their current staff are migrating to biologics roles.

MedTech/Medical Device

Ireland's MedTech/MedDevice sector involves the design and manufacture of diagnostic, hospital/homecare, ophthalmic, orthopaedic, vascular and connected health solutions. The key industries are ophthalmics (where 33% of the world's contact lenses are manufactured in Ireland), vascular systems (80% of global stent production is carried out in Ireland), orthopaedics (hosting global leaders like Stryker, J&J, DePuy and Zimmer) and diagnostics (6 of top 7 diagnostics companies are located in Ireland, including Abbott Diagnostic and Beckman Coulter). The medtech sector is witnessing a significant skills deficit which challenges their ability to sustain their continued growth over the next five years.

ICT

“ICT” means Information and Communication Technology and refers to the combination of manufacturing and services industries that capture, transmit and display data and information electronically. For the purposes of this document we will focus particularly on the specialisation involved in data analysis, artificial intelligence modelling and advanced automation. Ireland has become the global technology hub of choice when it comes to attracting the strategic business activities of ICT companies. This has earned Ireland the reputation for being the heart of ICT in Europe. The industry employs over 37,000 people and generates €35 billion in exports annually.

Food Technology

This sector includes food ingredients, dairy, infant formula and cottage industries mushrooming up regionally. The key industries are food ingredients (with global leaders like Kerry and Glanbia), dairy (with companies such as Dairygold and Cadbury) and infant formula (with international companies such as, Nestlé, Danone and Abbott, where 1 in 5 babies in the world drink infant formula from Ireland). With the ending of milk quotas in 2015, the government report ‘Food Harvest 2020’ predicts a 50% growth in Irish milk output and a significant growth of the functional foods sector.

These industries are **key to the continued success of the Irish economy** – as is demonstrated by the continued investment of greater than €250M in R&D over the next five years in these sectors through various academic-driven Research Centres and Technology Centres.

There are a number of challenges facing Ireland with regards to skills. Ireland is experiencing a **critical skills deficit** in key Industries to our economy – particularly in BioPharma, MedTech, ICT and FoodTech. This is a global deficit, not just a domestic one. Even India, with 2.5 million science and engineering graduates annually, are experiencing a skills deficit for these sectors. Therefore the challenge of a critical skills deficit cannot be significantly resolved through attraction of non-Irish skilled talent. The availability of such ‘talent’ has been identified by the Department of Education and Skills as a *‘key selling point for Ireland in attracting foreign direct investment to locate in Ireland’*.



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KEY STATISTICS



€73 billion

Annual exports in Euro of **pharma and biotech products** from Ireland worldwide



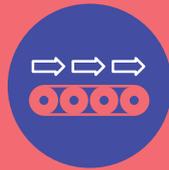
50,000+

number of people directly employed in **(Bio)Pharma industries** in Ireland



25,000

Number of people directly employed in **medical device sector** in Ireland



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Ireland's ranking as a net exporter of **pharmaceutical products** in the world



€35 billion

Annual exports in Euro of **ICT products** from Ireland worldwide



200,000+

number of people directly employed in **High-Tech Manufacturing** in Ireland



100,000+

number of people directly employed in both **pharmaceutical and food & beverage manufacturing and processing industries** in Ireland

Over the next five years (2020-2024), following a review of the recently published ‘Future Skills Needs of the Biopharma Industry in Ireland’ and engagement with biopharma (small molecule and biologics), medtech and foodtech companies all over Ireland, Innopharma estimate, as part of a post-COVID recovery, that there will be an additional **23,350 positions** created within these sectors. At least **3,000** of these will be at **operator/technician** level. The growth trajectory for jobs within the BioPharma and MedTech sectors between 2018-2024 are outlined in table 1.

Table 1: Growth of Skills BioPharma, MedTech, ICT and FoodTech 2020-2024

	2020	2021	2022	2023	2024	Totals
BioPharma	1,900	1,800	1,700	1,700	1,600	8,700
Medtech	750	600	650	650	650	3,300
ICT	1,500	1,700	1,900	1,500	1,500	8,100
Foodtech	650	650	650	650	650	3,250
Total	4,800	4,750	4,900	4,500	4,400	23,350



Through consultation with numerous BioPharma, MedTech, ICT and FoodTech companies over the past 12 months, Innopharma have generated a breakdown of specific skills needed over the next five years to support the continued growth within the biopharma and medtech sectors. They are outlined in table 2.

Table 2: List of Specific skills / roles (and estimates)

Operator/technician/data analyst level	Estimated number of roles annually (2020-2024)
Manufacturing Operators/Technicians	2,250
Technology Specialists	320
QC Analysts	450
Business Specialists	300
Validation Specialists	240
QA Specialists	320
Regulatory Specialists	140
Biologics Expertise (upstream) – technologists	200
Biologics Expertise (downstream) – technologists	300
Commissioning, Qualification and Validation (CQV) specialists	500
Automation Specialists – SCADA supporting machine to machine connectivity	1,200
Utilities Engineers	120
Facilities Engineers	65
Technology Transfer Specialists	50
Data Analysts	1,300
Software programmers and IS – Enterprise Software Expertise	3,500
Artificial Intelligence Modellers	1,100

A description of these roles are outlined below:



Manufacturing Operators and Technicians

Responsibilities: Operation of biopharma or medtech manufacturing equipment, execution of manufacturing schedules.

Potential changes for role over coming years: hybridization of operator/technician roles with craft/maintenance. Taking responsibility for front-line trouble shooting and maintenance.



Technology Specialists

Responsibilities: Development scale-up and transfer of biopharma and medtech manufacturing processes. Support of instrument and equipment qualification.

Potential changes for role over coming years: migration towards additional data analytics activities.



QC Analysts

Responsibilities: Completion of analysis of intermediate and finished products (biopharma and medtech).

Potential changes for role over coming years: transition of responsibilities from lab to manufacturing floor.



Business Specialists

Responsibilities: Support of business tenders, engagement with suppliers, planning manufacturing schedules.

Potential changes for role over coming years: Additional global-type roles and centralized services, requiring additional awareness of overarching biopharma and medtech dynamics.



Validation Specialists

Responsibilities: Generate, execute and write-up validation protocols. These responsibilities span instrument and equipment qualification, process validation, cleaning validation and computer systems validation.

Potential changes for role over coming years: migration towards additional data analytics activities as new FDA and EU guidelines focusing on continued process verification take effect.



QA and Regulatory Specialists

Responsibilities: Generation and review of regulatory impacting documentation.

Potential changes for role over coming years: migration towards additional data analytics activities and more global opportunities for global, centralized services roles as pharma services companies expand their footprint in Ireland.



Biologics process specialists (upstream)

Responsibilities: Development and on-going support of upstream biologics processes. Identification and implementation of PAT within these complex processes.

Potential changes for role over coming years: potential for consolidation of upstream and downstream skillsets as biologics industry matures in Ireland.



Biologics process specialists (downstream)

Responsibilities: Development and on-going support of downstream biologics processes. Identification and implementation of PAT within these complex processes.

Potential changes for role over coming years: migration towards additional data analytics activities and for consolidation of upstream and downstream skill sets as industry matures in Ireland.



Commissioning, Qualification and Validation (CQV) Engineers

Responsibilities: Completion of CQV tasks particularly as part of the readiness/start-up phase of new facilities. There is going to be a significant shortage of these skill sets over the coming three years in Ireland.

Potential changes for role over coming years: Once this peak phase of CQV is complete, it is likely that these highly skilled engineers will migrate into more sustainable roles as technology and validation specialists within biopharma facilities.



Automation Engineers

Responsibilities: As the trend towards Industry 4.0 and machine to machine connectivity takes hold of the biopharma and medtech sectors, there will be a need for a greater number of automation engineers in Ireland to support our dense manufacturing network.

Potential changes for role over coming years: the automation engineers role will migrate towards understanding cloud based architectures and data transition from machine to cloud and back again.



Utilities Engineers

Responsibilities: Qualification and maintenance of key utility systems like purified water, steam, compressed air for development and manufacturing sites.

Potential changes for role over coming years: there will be a greater demand for these skill sets over the next five years as the number of biologics facilities and their requirement for sterile environments expand.



Facilities Engineers

Responsibilities: Managing the cleaning and maintenance of the building services within a biopharma or medtech facility.

Potential changes for role over coming years: there will be requirement for additional skills as the number of development and manufacturing facilities expand. The trend towards outsourced management of building facilities (and potentially utilities) may change the dynamic and requirement for these skill sets over time.



Data Analysts

Responsibilities: Management of data from entity discovery, research and development, clinical trials, scale-up and commercial manufacturing is becoming a vital aspect of the biopharma and medtech sectors.

Potential changes for role over coming years: the ability to understand data handling (including transfer, storage, interrogation and reporting) architectures is going to become crucial to the successful transition of Ireland to a high-value commodity developer and manufacturer. These data handling skills will support the expansion of current trends like continuous manufacturing, process analytical technologies, 'Quality by Design' and real time process understanding and control.



Software programmers and IS – Enterprise Software Expertise

Responsibilities: Management of the specifications, installation and maintenance of Enterprise Software architecture – the IS backbone of a high-tech manufacturing facilities. Software programmers will be needed for development of data acquisition, analysis, control modelling and advanced automation initiatives. In addition Software programmers will be required to fuel continued growth of the broader ICT and services sectors in Ireland.

Potential changes for role over coming years: there will be a proliferation in the need for software programmers and engineers as the industries of biopharma, medtech and ICT converge over the next 10 years. The development of these hybrid skills will benefit the competitiveness of the biopharma, ICT and medtech sectors significantly.



Injection Moulding Technicians

Responsibilities: Operating and tending metal or plastic molding, coremaking, or casting machines to mold or cast metal or thermoplastic parts or products.

Potential changes for role over coming years: Advances in 3D printing technology and automation. Understanding the role of 3D printing and applications.



Quality Assurance Technician

Responsibilities: Assesses manufacturing processes that support compliance with safety standards and FDA requirements. Assesses production measures to promote customer/patient safety and accurate performance of the final product.

Potential changes for role over coming years: Advances in 3D printing technology for new product innovation. Automation and the effects on production. Knowledge of the Harvest 2020 strategy.



Maintenance Technician

Responsibilities: Complete preventive maintenance prerequisites on mechanical equipment to ensure smooth operation of production lines so that production is operating at 100% efficiency at all times.

Potential changes for role over coming years: Advances in 3D printing technology for new product innovation. Automation and the effects on production.



Warehouse Operator

Responsibilities: Receives, stores, picks and dispenses raw materials or finished products.

Potential changes for role over coming years: Greater understanding of IT systems and a strong mathematical ability.

In addition to the technical skills outlined above, it is reasonable to state that they will need to be **coupled with soft skills focusing on data reporting, team integration, understanding global BioPharma, MedTech, ICT and FoodTech dynamics, problem solving and influencing people.**

Ireland is competing globally for BioPharma, MedTech, ICT and FoodTech foreign direct investment. The availability of an appropriately skilled workforce with the skills outlined above is fundamental to the decision by a multinational to develop and expand a business presence in Ireland.

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