The American Chamber of Commerce Ireland

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Retuning the growth engine

Developing an innovation base to secure Ireland's future

American Investment in Ireland

US companies have a US$61.5b (approx €50b) investment in Irish based operations (7.6% of all US investment in the EU & 3.5% worldwide). Today, an estimated 100,000 people are directly employed in over 580 US firms in Ireland while indirect employment in sub-supply industry & services has been estimated at over 225,000.

US firms contribute over €2.4b to the Irish Exchequer in corporate taxation and a further €13b in expenditure to the Irish economy in terms of payrolls, goods and services employed in their operations. The US is Ireland's top export destination and US firms based in Ireland export an estimated €57b of products and services from Ireland into world markets.

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The American Chamber of Commerce Ireland is the collective voice of US companies located in Ireland. The Chamber membership is proactive in promoting the importance of US investment to the Irish economy and keeps Irish decision makers focused on the factors contributing to the continued attractiveness of Ireland as a location for foreign direct investment (FDI).

Acknowledgments

I would like to thank all of the people who have participated in or contributed to the work of the Research and Development group. Many have given generously of their own time and continue to do so. The effort has of itself brought together a broad base of enthusiastic professionals with the energy and vision to drive change. While the paper will not represent every individual view it builds a coherent proposition on the back of excellent contributions and though leadership across a broad spectrum.

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The Research & Development Working Group

The American Chamber's Research and Development Working Group was established in 2005 to develop a sustainable and compelling R&D proposition for Ireland that will attract significant investment from US companies and create a dynamic between Multinationals and SMEs, which contributes unique value to both.

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Innovation is a major enabler to the successful growth of businesses and the economy in Ireland. As a nation we must deliver best in class practices and a culture that embraces and supports development so that Ireland is best placed to encourage foreign investment.

Bank of Ireland is proud to be associated with the American Chamber of Commerce in Ireland in developing this paper. Through this research we see that with the right innovation framework in place Ireland will continue to be best placed to support the flow of new opportunities for US companies.

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1_Introduction

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Introduction

Like all western economies, Ireland is at a crossroads in its economic development. In today's global trading environment, intense competition from emerging economies means we need to look to new areas of innovation and added value to sustain our economic success story. Put bluntly, Ireland needs to continue to offer something distinctive in order to attract multinational companies' innovation investment.

The Irish Government has already committed to creating the conditions for an advanced knowledge economy through initiatives such as the Strategy for Science, Technology and Innovation (SSTI), and the National Development Plan (NDP) 2007–2013. Now is a time of implementation to achieve these strategic aspirations

The American Chamber of Commerce Ireland believes the time is right for a new type of partnership between 'Ireland Inc.', the Irish Government, and the US multinational companies (MNCs) who have together enjoyed such successful working relationships to date here in Ireland.

This paper sets out our blueprint for this future success, which we've called 'Innovate Ireland'. It offers a vision – together with key action areas – for building an innovation and commercialisation base that should ensure Ireland stays on the path of sustainable economic growth. The aim is to create a 'virtuous circle' built on positive action in five key areas: education, research, convergence, commercialisation and fiscal policy (Figure 1). The American Chamber of Commerce Ireland believes it can be a powerful ally and catalyst in making this happen.

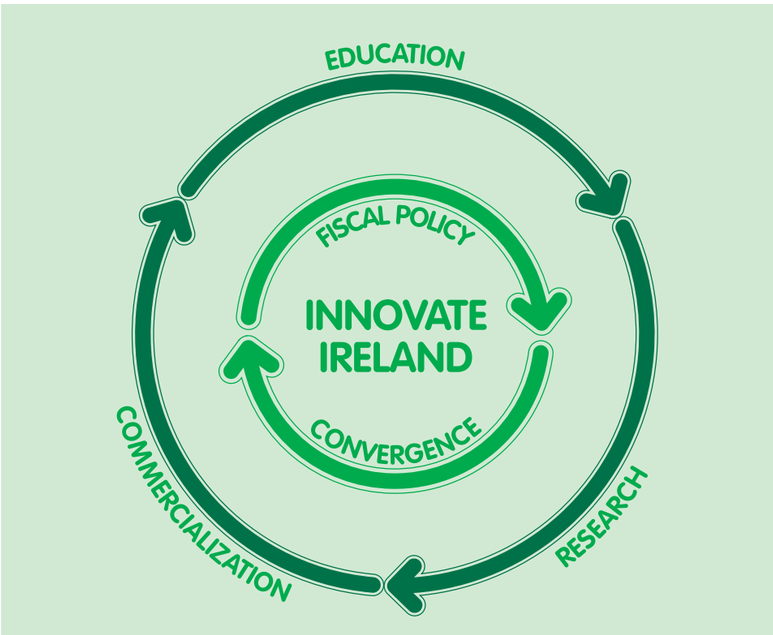

Figure 1. Creating a virtuous circle of innovation in Ireland

_It's all about trade

As an open island economy, Ireland is well used to playing the role of a global trading centre, with its unique gateway position in the trade of manufactured goods and services between the US and Europe. As globalisation drives more established manufacturing and service industries to best-cost bases outside the developed western economies, Ireland must evolve into new areas of innovation and commercialisation.

At the same time, Ireland has a great opportunity to maintain its close ties with US business and leverage its pivotal role in the European Union, fulfilling and ultimately exceeding its commitment to R&D specified in the Lisbon Agenda. The aim is to evolve the country into a vital global intellectual property (IP) 'trading post' in a number of areas of innovation that will make a real and lasting contribution to the economy by generating value, wealth and exports

_A new phase in our successful relationship

US companies have played a vital role in Ireland's economic success, and are a crucial part of the country's leading-edge manufacturing and services economy. These companies have enjoyed strong rates of return on investment here, and will continue to invest for as long as the economic rationale is clear. With this large stake in the country, US companies want Ireland to perform to the best of its ability to sustain current levels of economic activity and present new 'return on investment' opportunities.

This is why the American Chamber of Commerce Ireland is keen to drive the strategic partnership between 'Ireland Inc.' and multinational companies to develop Ireland as an attractive European location for innovation and commercialisation. A new dimension to this phase of US corporate engagement will be the relationship with small and medium-sized enterprises (SMEs).

At the core of this 'Innovate Ireland' initiative is a dynamic partnership between the multinational companies, indigenous SMEs, academia, the Government and the people of Ireland. It proposes that we jointly address the immediate need to develop a strong research base in Ireland, restructure the education system required to support it, and build the commercialisation infrastructure needed to strengthen the economy.

This report sets out the actions we believe need to be taken in five key areas:

- **Education** – investment in education is the strategic enabler of the new knowledge economy. Our goal is to see our ***education system in the top decile*** of OECD countries. Its ethos should be innovative, integrated, inclusive and driven by a desire to offer every individual the opportunity to contribute – at every stage of their lives – through ongoing investment in their development.
- **Research** – Ireland will continue to succeed in the global economy only if it can establish research and innovation as the basis of value creation, to provide an engine for economic growth. This requires a ***robust fourth level*** that underpins a significant strategic investment in ***collaborative strategic research platforms***. The ecosystem should offer a progressive IP environment, with incentives for innovation, risk-taking and entrepreneurship.
- **Commercialisation** – here the focus is to secure a return for Ireland on the investment made in education and research. This requires an innovative fiscal, legal and commercial ***framework to create robust global ventures***, by encouraging value creation and collaboration between large and small enterprises and education and research institutes.
- **Convergence** – the best opportunity for Ireland to exploit our base of existing Foreign Direct Investment (FDI) and indigenous resources is to ***identify and exploit emerging areas of technology and market convergence***. An example might be new intelligent medical devices drawing from the medical and information communications technology (ICT) sectors.
- **Fiscal policy** – Ireland's tax and incentive regime should support and ***encourage risk-taking, capability development, exploitation of IP, commercialisation and the investment by individuals in their own development***.

There is much work to be done to create the necessary vibrant innovation and commercialisation infrastructure. But if we start today, we believe Ireland can have this in place in the next 10–15 years. What is required is the buy-in of all stakeholders, together with the firm commitment from the Government.

While we have benefited significantly from the celtic tiger we can also understand the changing nature of this economic transition. The significant gains of the export driven phase has given way to the more uncertain consumer driven phase that we are currently experiencing. It clearly signals a need to move quickly to the next 'innovation-driven' phase, so that we can maintain the tiger economy. A strategy for an all-island approach, when building our innovation driven economy, provides unique and compelling opportunities and advantages.

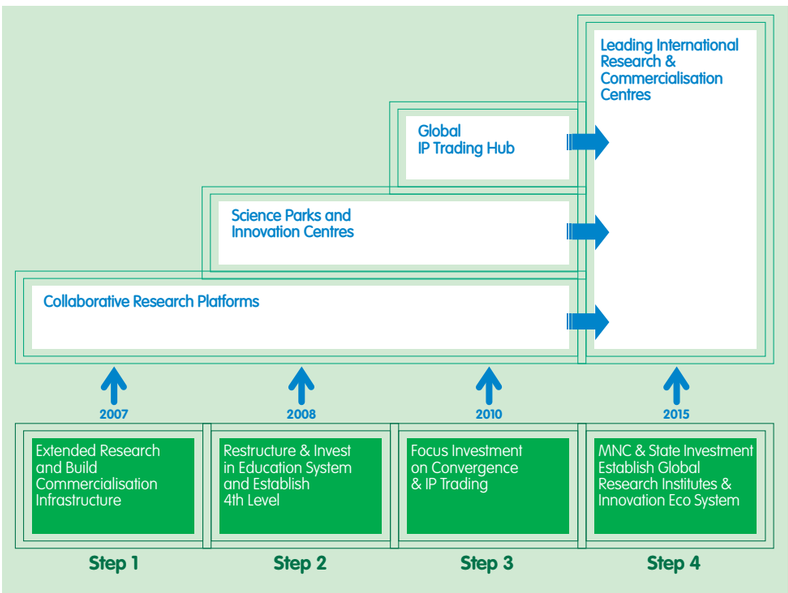

Figure 2. Stepwise process to address creation of 'Innovate Ireland' environment

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State of the nation

Over the past ten years or so, Ireland has enjoyed unprecedented levels of economic growth – per capita GNP growth increased three-fold between 1994 and 2004 – and set new levels for employment and standards of living. The country has turned around a decades-long trend and become an immigration destination.

In its Medium-Term Review 2003–2010, the Economic and Social Research Institute (ESRI) projected an average annual GNP growth rate of 5.4 per cent for the Irish economy through the second half of this decade; a view supported by Ireland's Department of Finance.

A key goal, as stated in the SSTI report, is that: "*Ireland by 2013 will be internationally renowned for the excellence of its research, and will be to the forefront in generating and using new knowledge for economic and social progress, within an innovation-driven culture.*" The American Chamber of Commerce Ireland's ambition is to support and accelerate the achievement of this goal by meeting the targets set in the Lisbon Agenda. Specifically, these include achieving four per cent GERD (approximately €6 billion) by 2013 – with half being BERD (Business Expenditure Research and Development) and half being Government spend – compared with €1.9 billion GERD (Gross Expenditure Research and Development) in 2005.

Now is the time to look towards the next phase in Ireland's economic development.

_Time to build a new value proposition

As the global economy develops, there is a strong shift towards services as a major driver of economic growth. Knowledge, and its application, are becoming increasingly important as a driver of economic development.

The pace of globalisation means that newly-industrialised economies have an ample supply of skilled labour, with much lower costs, that are competing for global investment. At the same time, western economies' cost bases have risen substantially in line with economic success. According to the National Competitive Council, Ireland's balance of payments has shifted to a deficit of 3% of GNP in 2005 and is expected to drop to 5% in 2007. Of further concern is an inflation rate above the EU25 average of 2.2 per cent.

Ireland's competitive rate of corporation tax (12.5%), which has been one of the factors that has helped attract so many businesses here, is now being emulated by governments in competing economies. Changes to EU state aid limits will restrict the amount of aid Irish enterprise receives from 2007 onwards.

While these globalisation challenges have been recognised from a trading point of view, they also need to be recognised and acted upon in terms of innovation and commercialisation. We need to evolve our value proposition.

Large corporates today are truly globally resourced enterprises (the American Chamber of Commerce Ireland estimates that there are 580 US firms and affiliates in Ireland): they are global economic players in their own right – often larger than some national economies – they are decentralised, multi-cultural, and go where the talent and money are. They are free to make use of pillars of knowledge around the world, and bring together skills and expertise into a cross-cultural economic entity.

This makes it all the more important to maintain strong and sustainable pillars of knowledge in Ireland, with good quality human capital and an attractive work and social environment – all working in harmony.

_Ireland's new innovation opportunity

The Irish Government has demonstrated its commitment to the continued development of Ireland as a modern, knowledge-based economy, through the National Development Plan (NDP expenditure of €184 billion 2007–2013) and the National Strategic Reference Framework (NSRF). The approach outlined in the Strategy for Science, Technology and Innovation (SSTI expenditure of €8.2 billion 2007–2013) report offers valuable pointers to the nation's future direction.

The sharing of ideas and best practice is fundamental to an innovation culture. We want to make it easier for corporates to license technology to smaller companies, and prevent good ideas falling by the wayside through lack of funding or management expertise. Strong relationships between Ireland's small companies and US corporates will not only ensure that good ideas come to life, but also gain access to a wider market.

With the right innovation framework in place, Irish SMEs and US corporates, with their own international 'intelligence', will find it easier to identify and exploit their collective asset base. Contract negotiations will also be speeded up so that innovations are commercialised and on the market quicker.

The new relationship we are proposing will give all stakeholders a mutually beneficial innovation environment. It will attract and encourage people with the right skills to develop, commercialise and trade the right technologies at the right time.

_Benefits for multinational companies

A new innovation ecosystem in Ireland along the lines we are proposing will provide multinational companies, wherever they are headquartered, with a unique value proposition for their research and commercialisation expenditure.

Corporates can extend their innovation capability, without any need for high investment in new facilities. Taking a proportion of their R&D budget (targeted at up to ten per cent) they can immediately access a portfolio of world-class research being undertaken by leading scientists and researchers. This access to a wider research ecosystem gives companies a strategic advantage and an opportunity to create new and disruptive technologies*.

One of the hallmarks of this research environment are the framework IP Agreements and fiscal incentives which encourage cross-industry collaboration on key research projects. It is a unique opportunity to explore new frontiers arising from convergent technologies and new emerging market needs.

Given the profile of past inward investment, Ireland is strategically positioned to exploit cross-industry and technology convergence opportunities for example, between medical devices, ICT and pharmaceutical sectors.

The new innovation ecosystem will enable multinational companies to access world class research at reduced cost and will enable the funding of innovation projects which would otherwise be un-affordable. In doing so they will increase the R&D substance of their operations in Ireland, in line with tax regulations, to improve profit retention.

Ireland's unique commercialisation environment offers shared utilisation of assets and resources, as well as shared risk through the supportive fiscal and legal framework. This provides revenue creation opportunities through licensing, technology transfer and extends the commercial reach through joint ventures or other contractual arrangements.

_Benefits to Ireland Inc.

A robust and progressive innovation ecosystem in Ireland will attract investment and encourage entrepreneurial risk taking – resulting in wealth creation and sustained economic growth. The base of MNCs will be broadened, as global enterprise seeks out innovation capacity in Ireland. A key feature will be the unique partnership with the USA – and the extension of the relationship with US multinationals into strategic long-term partnerships. These partnerships will include strategic alliances and joint ventures between MNCs themselves and between MNCs and SMEs; spin-out enterprises from MNCs and spin-ins from innovation and research clusters as new models of value creation emerge.

In any knowledge economy, success is built on deep capability. As a location that fosters innovation, Ireland will not only retain and develop its indigenous talent base, but will also be an attractive destination for researchers in search of a step-up in their careers. Entrepreneurs will be attracted by the opportunity to realise and harvest the results of innovation.

Building on the success of Science Foundation Ireland (SFI) in establishing Centres of Science Engineering and Technology (CSETs), we must extend the basis of collaborative research between multinational companies, SMEs and universities. The creation of the proposed competence centres should further support the innovation and commercialisation ecosystem and IP trading environment, and begin to facilitate the creation of a globally orientated and vibrant indigenous SME sector.

Turning this vision into reality is certainly a big challenge, but it is achievable. How does the American Chamber of Commerce Ireland see this innovation framework developing over the next 10–15 years?

** A technological innovation that overturns the existing dominant technology in the market.*

3_Contributing to a shared vision

3

Contributing to a shared vision

By 2020, we see Ireland as a leading global economy that has secured its position on the basis of significant investment in human capital, resulting in a vibrant base of global industry, research and commercial enterprise. The successful transition to a global hub for research and commercialisation across a range of new convergent technologies will have contributed to sustained economic growth and positively reinforced the culture and value system that underpins a balanced society.

Ireland will have developed significant 'brand equity' as a location for innovation in its strategic sectors, which include nanotechnology, pharmaceuticals, biosciences, medical devices, communications and renewable energy. The country will be known for innovation excellence in a number of these technology convergence areas, in which it will have built distinctive knowledge and capability. It will be a preferred global location for trading IP and technology and well recognised within the global innovation network.

Ireland will have successfully applied its cultural traditions of collaboration, co-operation and communication to these new areas of innovation. This culture will support a seamless and linked investment strategy across all stakeholders. People will be naturally prepared to innovate and commercialise; they will not be afraid to try new things.

Overall, Ireland will be an attractive place to live and work in terms of rewards, values and lifestyle.

The American Chamber of Commerce Ireland believes now is the time for bold policies to be put in place to ensure that the SSTI, the NDP and NSRF are a real success. The Chamber sees its role in this transition as positively engaging with the stakeholders and other industry groups; providing an objective, global perspective and being a catalyst for change.

This section of our paper offers our view of the steps that can be taken in each of the five priority action areas we have identified (education, convergence, research, commercialisation and fiscal policy). For each action area, we offer a vision of how Ireland will look in 10–15 years' time, together with the underlying principles and interventions that will help us get there.

_Education – learning as a way of life

By 2020, structured investment in education will have delivered a high-quality, flexible workforce that enables and transitions human resources as demand dictates. Ireland's education system will be more science-oriented and global in outlook, and in the top decile of developed nations. It will be accessible and flexible, enabling the working population to move into and out of the system as it adapts to changing skill requirements. The education ethos will provide every individual with life-long investment options in their own education and career development..

Strategic intent chart	Interventions required
Education system in the top decile	> Establish the quality of curricula and assessment in a global context > Reform of education system, including structure, governance, curriculum and performance > Investment in infrastructure and professional development > Specific policy required to increase third level participation in science, technology, engineering and maths (STEM) subjects
Lifelong learning as a strategic investment	> Provide for ongoing adult education to support the national strategy for science, technology and innovation (SSTI). > Investment in adult learning needs to be inclusive, available and flexible to benefit all > Invest in adult education to increase graduate and post-graduate levels in support of targeted science and technology investment > Target skill gaps by promoting career conversion programmes
Human capital investment aligned to economic growth	> Interactive and inclusive planning of education to adapt to changing economic drivers > Inclusive career system to encourage mobility between teaching, research and industry > Industry participation in the education system and investment > Promote wider population support for the doubling of education investment
Empower transformation from within	> Ownership by teaching professionals to align quality and output with the needs of a knowledge economy > Provide appropriate funding for outreach programmes in the promotion of STEM > Empower education management to creatively optimise facilities and resources > Engage teaching bodies in a renewed focus on professional development and targeted improvement in teaching standards > Encourage lateral thinking and innovation in schools > Invest in a science-literate society

_Education system in the top OECD decile

Ireland needs an education system that delivers high-quality innovation in a global context. That implies having a high-quality education system that is in the top ten per cent of the OECD education league table and more closely aligned to the future needs of *Ireland Inc.* The Expert Group on Future Skills Needs report shows Ireland having the lowest level of educational attainment of 12 key countries, based on 2004 OECD statistics.

In particular, we would like to see Ireland's third-level graduate output in the top decile of OECD countries, with a target to increase participation rate and specifically to increase the numbers of young people going from second to third level from approximately 60 per cent to 90 per cent by 2013. At the same time, we should set a target of creating 30,000 places in third-level education for adult learners to acquire primary degrees and progress to other targeted postgraduate or conversion programmes. A conservative estimate of the increased total spending on education would suggest a doubling of the current annual investment. The NDP investment must ensure a balanced approach to education and learning in the total population, focus on improved teaching methods and competence, and ensure a performance-driven managed system.

Since 1999, there has been an alarming drop in the number of children taking chemistry and physics – this trend has to be reversed to protect our innovation base.
There must be a specific focus on maths and science at all levels, with the recommendations of the Taskforce on Physical Sciences (2002) fully implemented.

3_Contributing to a shared vision

Exciting students about careers in science requires a significant overhaul of the secondary system and, in particular, the curriculum. Specifically, we want to stop the trend towards 'dumbing down' in course curricula. We need to get children excited about science and technology, and ensure students choosing more difficult subjects are rewarded within the current points system. Ideally, a more creative solution is required to reward students' creativity and provide an inherent incentive for choosing science subjects in the first place.

Teaching standards and methods need to be significantly improved, especially by rewarding performance and initiative. The system must provide ease of access, optimum use of all assets, practical modernisation/upgrade (with high-quality facilities and equipment, not just buildings), and technology that supports e-teaching. Investment in new laboratories and other facilities should be balanced with new ways of delivering education – including upgrading technology and integrating ICT and teaching methods into our schools.

Initiatives in this area – such as the use of MP3 technology to distribute lectures at the Sligo Institute of Technology – can be emulated at both second and third level, allowing students pick up lectures at a convenient time. The availability of technicians to support laboratories or the development of 'super-labs' where state-of-the-art resources could be shared would be of great value to teachers, reducing time spent on preparation and enabling more effective teaching.

Consideration should also be given to providing a flexible remuneration system that takes account of critical knowledge and experience in line with market reality. Inability to deal with the required flexibility within the public education system should prompt a debate on the merit of developing a private alternative.

_Lifelong learning as a strategic investment

Immediate correction of the second-level system would still leave a major shortfall of students, graduates and post-graduates to supply the fourth level and industry (the SSTI suggests a cumulative increase of 1050 researchers and 350 principal investigators in publicly funded research by 2013). There is an urgent interim requirement to fill the gap at both third and fourth levels, to double the number of science graduates.

While the current focus on attracting the best international students, graduates and post-graduates is critical to supporting our economy, we need to look to our own base of science and engineering professionals. Ireland needs to make lifelong learning an attractive option for working people. Ireland's participation rate in the 25 to 64 year-old category was approximately 20 per cent in the higher education category, compared with 50–60 per cent in other key economies, including the UK, Finland, Sweden, Denmark and the USA (OECD 2005), while our overall rate was below 10 per cent (compared with 20–30 per cent in other key economies. We need a new and realistic approach to adult learning for people seeking new and alternative qualifications. This will involve compensation for displaced income, and company and individual tax incentives will be key to encouraging every citizen to invest in their own development.

A national programme that focuses on the 're-profiling' of Ireland's workforce is urgently needed in support of the investments outlined in the SSTI and NDP, and to ensure an integrated set of initiatives and investments. The investment should take account of the industrial, social and personal requirements and promote a sharing of the investment between all the beneficiaries. This programme could be based on the many excellent initiatives already under way – such as the Future Skills Group, or the Programme for University and Industry Interface (PUII). Such a focus on rebuilding the infrastructure to make it flexible and modular is important as we develop new third-level courses.

With an ever-changing knowledge economy, opportunities should be provided for an easier interchange of science and engineering disciplines, without devaluing the necessary skill level required for that discipline. The time spent obtaining the necessary additional qualification should be minimised through appropriate modular education in specific, relevant areas. Continuing education in parallel with employment should be encouraged and facilitated.

_Human capital investment aligned to economic growth

Over the next 15 years, we believe Ireland can go through a process of discovery – both among children and adults – to build a society that is familiar and comfortable with science, engineering and technology. The education system, together with the new investments in an Interactive Science Centre (Kilmainham Science Exploration Station) and a National Science Gallery (Trinity College), will provide a forum for public debate, and encourage children to think laterally and innovatively, and promote and reward creativity in science and related subjects.

Our future success in science education will depend on how quickly we can move away from rote learning and instead focus on exciting students about the subject and rewarding thinking, learning and innovation.

We need good science and maths teachers whose practical experience is current and relevant, and we believe that industry can play a greater role in supporting good teaching. Developing an integrated education–industry programme will encourage industry experts (current or retired) to commit to a part-time teaching regime, contributing lecture hours out of their work schedule in return for a teaching qualification

Industry should be encouraged to extend and integrate its existing outreach programmes and provide more 'practical' education support programmes. A good example is the Dublin Institute of Technology's Infinity Project, which links science and maths teaching to modern digital technology, provides resources for teachers and students, and significantly supports the teaching of science and maths.

Generating the necessary interest in STEM subjects, and encouraging the re-entry of adults into the education system, requires a concerted effort to develop a wider appreciation of the value of science and engineering to our economy. The association of STEM with Ireland's future economic well-being is critical, and is a prerequisite for the public support needed to double the national investment in our education system and infrastructure.

_Empower transformation from within

Education is the cornerstone of the new knowledge economy. The education system and infrastructure must be flexible and agile enough to respond to new challenges. Change needs to be prompt, without undermining the standard or principal of education, yet embracing the wider support and interests of all stakeholders.

The education system should facilitate and support the alignment and integration of all outreach and support initiatives that promote STEM as a genuine career path. It is essential that students make an informed choice about the broad range of opportunities available – and this requires effective industry–education engagement.

The funding formula must recognise the cost of training STEM students, and enable appropriate investment by the third-level institutes (estimated to double per head from €7.5k per annum to €15k per annum, to reach the top decile), so that the quality and quantity of graduates are improved through better standards and additional resources at postgraduate level. Facilitating an 'academic' and 'technical' stream through the third-level system and aligning the Institutes of Technology and the universities are absolute requirements. At the same time, we need to maintain the focus on the development of the teaching professionals themselves. We need to develop realistic opportunities for teachers' ongoing professional development, and reward participation.

Additionally we should recognise and celebrate the many excellent science teaching professional at all levels who demonstrate significant and extraordinary commitment to science. We should consider having specialist maths and science teachers at secondary level.

_Research – a distinct global brand

By 2020, Ireland's innovative research and industry base will have expanded and aligned with its strategic imperatives, benefiting from collaborative engagement and focused investment. 'Innovate Ireland' will be a distinct global brand for research that drives innovation and commercialisation and fuels economic growth. The State's commitment to research through SFI,PRTLI, SSTI and the investment in fourth-level education will have created a rich mix of public and private, globally recognised research institutes. Significant investment in science and research will have positioned Ireland as a science and technology leader, within an informed society.*

Strategic intent	Interventions required
Global reputation	> Promote 'Innovate Ireland' research brand globally > Establish collaborative links with global research networks > Ensure integrity, transparency and efficacy of global IP management and environment > Create a framework for commercialisation of research
Collaborative research environment	> Develop and expand the CSET model > Intensify and increase support for MNC/SME partnering in research and innovation > Further enable and accelerate incentives and support for industry/academia collaborative research > Establish Public–Private Partnership (PPP) to invest in research infrastructure, encouraging individual and local investment
Develop network of science parks	> Focused investment in cross-industry research > Encourage industry–academia research partnership to focus on high-quality research > Provide 'Innovate Ireland' research network through investment in Science and Technology Parks
Top decile in fourth-level qualifications	> Strategic investment to structure fourth level > Attract, develop and retain world-class researchers > Focused investment in infrastructure for basic and applied research > Investment in global technology, market and socio-economic intelligence to enable informed selection of research priorities > Establish meaningful career paths in research > Address HR gap by targeting key strategic skills internationally

** Programme for Research in Third-Level Institutions in Ireland.*

_Global reputation

Ireland needs to capitalise on the many excellent ongoing research initiatives, by capturing all such activities under a single 'Innovate Ireland' research brand. This would enable effective global promotion of the brand and encourage increased inward investment by MNCs. We need a national focus for international and national interest in the brand, so that the interest can be directed and responded to rapidly, and interested parties encouraged to participate and invest.

The development of Science and Technology Parks, centrally co-ordinated through a National Science and Research Institute, would greatly enhance our capability and reputation as a 'go-to place' for high-calibre collaborative research. This development – together with a unique IP and technology transfer environment that will ensure the integrity, transparency and efficacy of global IP and technology protection and management – will accelerate international collaboration with other global research networks.

The 'Innovate Ireland' brand would provide a retuned growth engine with a unique identity. This would provide an inherent networking and bridging capability across numerous science disciplines, ultimately bringing research output to commercialisation. This would embrace the essential qualities of convergence, collaboration, connectivity, agility and flexibility that would set Ireland's uniqueness apart.

As an element of the proposed 'Innovate Ireland' brand campaign, funding from the NDP (targeted at €8.2 billion for scientific research) should support an integrated public–private strategic 'research-to-commercialisation' plan that will articulate how the total investment will result in a world class commercialisation framework.

_Collaborative research environment

While endeavouring to develop its reputation as a 'go-to place' for research, Ireland needs to take its size and future resource base into account when determining research focus areas. Ireland cannot cover all technical areas in the research spectrum, and needs to balance available 'hot-spot' opportunities with resources and the potential for commercialisation.

The concentration and location in Ireland of many multinationals from a diverse set of scientific and engineering disciplines provides an excellent platform to develop such niche collaborative and convergent research.

The current investment in centres of excellence such as Tyndall and NIBRT provides a focus for research that is strategic in Ireland. Moreover, they present much needed resources and infrastructure to engage MNCs and particularly SME's in collaborative research.

The CSET model further demonstrates the significant industry interest in developing centres of expertise and investing in world-class explorative research ventures. The model has been very effective despite its relative infancy, and it will further benefit from a continuous review of best practice across the CSETs – enabling further development of its effectiveness and significantly expanding its capability. Enabling Science Foundation Ireland through the NDP to invest €1.4 billion, from a total allocation to scientific research of €8.2 billion makes a significant statement about the national intent and the opportunity. This activity will help intensify and increase support for partnerships between MNCs, SMEs and academia for research and innovation

There is an immediate need to use the base of US firms in Ireland as a means of growing the indigenous SME base (Ireland currently enjoys 3.5% of global US FDI: BEA, 2006). Substantial investment by US firms can trigger a new commercialisation ecosystem, which would also engage the third- and fourth-level education system as well as the SME sector. An early opportunity to seed credible research activity and build critical mass and long-term sustainability will be provided by the strategic engagement of US firms through initiatives such as the CSET programmes, specific joint ventures in research with public institutes (universities or State research), industry-led research networks and unique support for bilateral research ventures.

However, significant investment must be made in the development of the commercialisation infrastructure. One way to achieve this would be through Public Private Partnerships (PPPs), which could be established to invest in research infrastructure and encourage individual and local investment. Research capacity should also be strengthened within higher education institutions and institutes of technology. Existing infrastructure should be fully utilised, while investment in new buildings should be minimised in favour of upgrading facilities and investing in state-of-the-art equipment. Investments should not only address issues of national strategic importance, but should also examine how public programmes and public expenditure can be delivered efficiently and effectively.

The commercialisation of R&D by industry, specifically SMEs, requires significant additional funding at the product development and early marketing stage. The funding alternatives should include direct funding from: Enterprise (the NDP allocates €3.3 billion for enterprise development); the EU Seventh Framework Programme (the American Chamber of Commerce Ireland suggests a bold target for Ireland of at least three per cent of the planned FP7 spend of €50 billion); and government departments such as Health, Communications, Marine and Natural Resources, Environment and Agriculture & Food. It is important that investment is well targeted and not spread to thinly.

_Develop a network of science parks

In the new research environment, a national network of next generation Science and Technology Parks (Figure 3) should be built to replace today's industrial parks as the main infrastructure for the new knowledge economy. These parks could be co-located with academic and/or MNC innovation campuses to enable IP and technology transfer, facilitate collaborative applied research, and provide the infrastructure for product realisation and commercialisation. Co-location with third-level education institutions could also support the emergence of new graduate colleges and boost research resources and capabilities.

The Individual Science and Technology Parks would act independently from, yet retain strong and visible links to, third-level institutes and State research centres. Investment in such parks would be in line with IDA policy for the development of large serviced sites and support the national spatial plan. Individual Science and Technology Parks could specialise in one or more particular research areas, but should all link to one central Irish science and research entity (Figure 4). A National Science and Research Institute (inclusive of SFI) could act as the strategic core for 'All-Island' research activity, funding and co-ordinating our activities both nationally and internationally. In addition, this institute could showcase collaborative research activity from its network of research centres and associated science and engineering disciplines, represented through world-class projects. In essence, it would be a campus acting as a connection point for all the individual centres of excellence.

Each Science and Technology Park would house an Innovation Centre and support the development of new ventures through access to large corporates, research laboratories, prototyping facilities, as well as support services such as finance, IP and legal services and marketing.

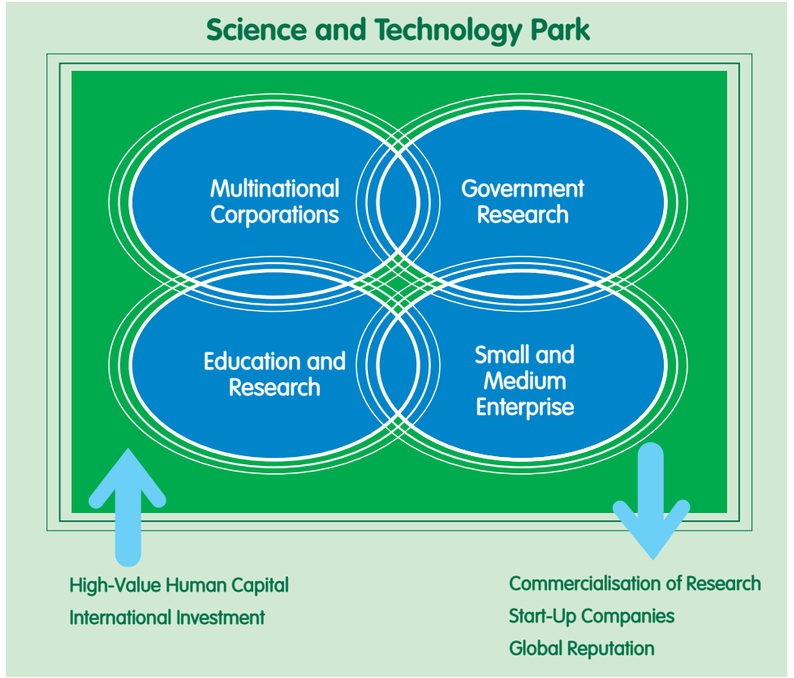

Figure 3. Next-generation Science and Technology Park

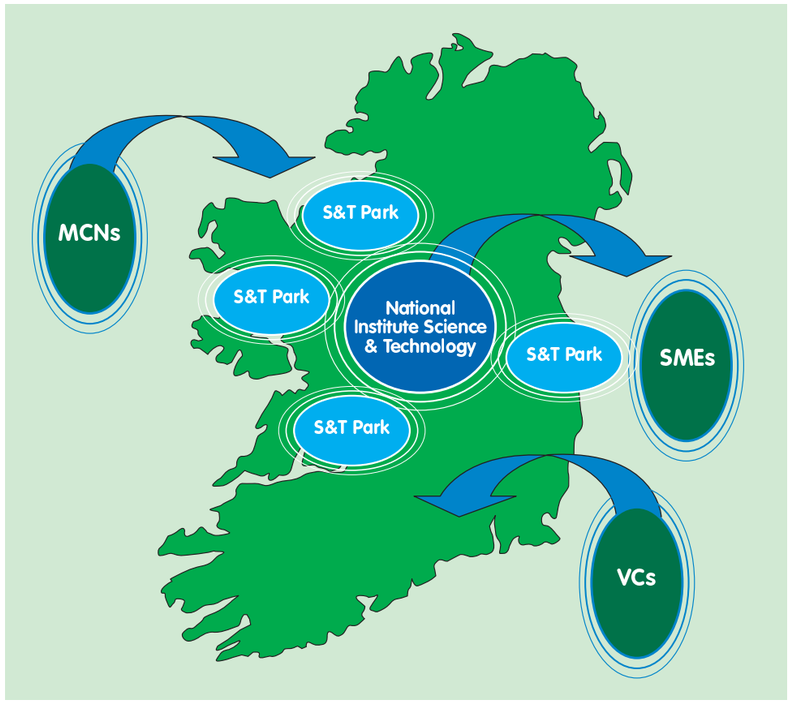

Figure 4. Central point of connectivity for Innovate Ireland and Science & Technology Parks

This model would provide an excellent platform for MNCs to access a concentration of collaborative R&D activity in Ireland with confidence. In addition, the research and commercialisation expertise generated would likely lead to new high-value technology spin-off companies.

The foundations for this proposal are in place through the successful evolution of the CSET model, and we need to build on this development and bring that model to the next level, so that we can attract the desired inward research investment.

_Top decile in fourth-level qualifications

Ireland should provide a base for world-class research and be a preferred location for careers in science and research. Research programmes should be aligned with the SSTI, be industry informed and linked, internationally credible, and led by internationally recognised researchers.

The targeted acquisition of research principals into Government-funded initiatives (Science and Technology Parks and CSETs) would help provide a world-class base of science and supervision for postgraduate programmes, building towards critical research mass and sustainability. Science Foundation Ireland, or a new National Science and Research Institute, should specifically focus on the search for top talent, with the necessary increased funding to broker deals to attract the best researchers.

The presence of eminent researchers will help to attract substantial investment from industry and venture capitalists, as there is a higher probability of success. These researchers can in turn attract high-quality people internationally to further their own research – currently Ireland has a substantial challenge in achieving the desired number of researchers required for a critical mass of a research activity to make Ireland Inc a viable entity for meaningful collaborative research.

The research environment should support the regeneration and transition of Ireland Inc. to a new technology and knowledge base. It can provide a basis for research integration within Europe and the establishment of a Europe-wide network of SMEs, connected by unique joint ventures in research.

Different qualification and skill enhancement programmes (for example, in marketing and intellectual property) should be made available to help generate a multi-skilled and flexible scientific workforce. Fourth-level post-graduates could acquire appropriate qualifications through the research centres, and integration of skills and technologies could be achieved through bridging within and across industry and academia. This would help differentiate the fourth-level qualification and associated skill sets in Ireland

Major amendments need to be made to the current employment contracts for post-doctoral positions. In order to attract and retain the necessary high-quality students for innovation and commercialisation, the research structure needs to be developed to allow for permanent research positions. Students at all levels in the education system will not be attracted to scientific and technological research if there is no security of employment or meaningful monetary reward for the skills being provided.

Assuming we generated the necessary interest in science now at junior level, there is still a major shortfall of students between now and when these students would transition through the education system to be available within the fourth level. Recognising that Ireland cannot wait nine years for these students to come through the educational system and qualify as postgraduates, there is an urgent requirement to fill the gap at both third and fourth level in the interim. This means Ireland must make research an attractive option for international students, graduates and postgraduates.

To do this, Ireland needs modern up-to-date research capabilities, together with attractive terms of employment and recognised global research leaders. The Irish model needs to be unique and attract the widest range of skills and talent necessary to support the Science and Technology Parks and facilitate the development, IP management and the marketing and sales of new products and services.

_Commercialisation – exploiting IP, people, assets and enterprise

By 2020, Ireland will be globally recognised as a high-competence environment for businesses and entrepreneurs seeking to exploit IP assets and resources. Ireland's unique collaborative environment will offer an integrated research-to-commercialisation process. It will foster a diverse and dynamic community of partners including MNCs; SMEs, entrepreneurs, higher education institutes and other publicly funded research bodies. This entrepreneurial environment will provide a vibrant hub for trading IP, transferring technology, securing strategic alliances and managing high-risk investment.

Strategic intent	Interventions required
Global exchange and foundry for exploiting IP and new technology	> Create internationally recognised centre for IP brokerage and networking hub for strategic collaboration > Create hub for international finance for technology commercialisation > Establish advanced commercialisation infrastructure – including international commercial law, marketing capability – to identify, build, exploit and prosecute synergies
MNC advantage and increased investment	> Encourage corporations to engage and exploit entrepreneurial activities within the Innovate Ireland ecosystem > Develop MNC operational mandates to exploit 'high-reward' disruptive business opportunities > Locate corporate capability to quickly build and exploit synergies, adapt to markets and adopt new business models > Leverage combined collaborative resources to rapidly identify, adapt to and advance new opportunities
Flexible funding models	> Provide extensive funding for all stages and levels of innovation to bring proof-of-concept to commercialisation for MNC and SME companies > Develop new business models and investment mechanisms to support different geared business ventures
Accessible infrastructure	> Develop accessible innovation centres both real and virtual campus models. > Leverage existing facilities and convert underutilised industrial infrastructure

_Global exchange and foundry for exploiting IP and new technology

Focusing on commercialisation through the Science & Technology Parks and Innovation Centres, particularly in areas of technological and market convergence will yield a return on the investment on basic and applied research and create wealth from knowledge and intellectual property. This focus and entrepreneurial ethos will differentiate Ireland among knowledge economies, and enable the country to create a global brand as a 'foundry' for technology translation.

While the concept of an IP trading hub is simple, it requires a sophisticated infrastructure that extends from IP creation and management, through sophisticated commercialisation models and, where needed, an efficient legal system to address issues such as validity and enforcement of IP. There is a window of opportunity for Ireland to establish leadership in Europe as a global IP trading hub and gateway. Currently Ireland's participation in this activity is well below countries such as Germany, UK, USA and Japan.

This will attract investment and provide an impetus for MNCs to exploit the infrastructure. It will require the broadening of existing competencies and expertise to cover patent law, international commercial law and IP/technology transfer and management. It would provide the capacity to identify, structure, exploit and assert IP licences and agreements internationally. The ability to broker IP, proactively facilitate trading of IP and supporting innovation would be core to establishing Ireland's credibility as a trading hub.

_MNC advantage and increased investment

The development of a unique commercialisation environment would present a distinctly different proposition to MNCs considering investing in Ireland. The participation of new and existing MNCs and SMEs, coupled with the availability of entrepreneurs and funding, would provide a commercialisation ecosystem to complement the innovation environment outlined in the previous section.

The new commercialisation ecosystem would assist companies of all sizes who want to extend their strategic reach or mandate. It would provide access to other technology companies within the network who could market and license their IP and technology, in combination with various legal instruments, arrangements and strategies for acquisition. It would also enable MNCs to enhance their portfolio of products and technology efficiently and enable them to quickly identify and adapt to new technologies and applications that support competitiveness and market advantage. Further, it would support the development of indigenous companies and multinationals, and would support the achievement of the targets set in the SSTI (Table 1, below).

To gain unique competitive advantage, the ecosystem would need to be formed quickly and so build quickly on Ireland's investments in R&D innovation and IP laws. It would need to market the distinct value propositions to MNCs as to how and where they could invest in IP internationally. It would need to encourage the participation of new and existing MNCs and SMEs, empower entrepreneurs and fund innovative enterprises. In view of the convergence in science and technology, it would need to offer an ecosystem capable of exploiting innovation across a broad spectrum of technologies and markets.

The commercialisation ecosystem would help existing enterprises extend their strategic mandate. It would provide networks for collaborative innovation and provide access to research institutions and other companies, offering technologies or services to facilitate the marketing their capabilities and exploit or license their IP and technology. The new ecosystem would enable MNCs to adapt quickly and through their Irish subsidiaries and operations provide a way to enhance their portfolio of new technologies and adapt them to existing or new applications in a way that extends their competitiveness and market advantage.

Year	2003	2013
Business Investment in R&D (BERD) (constant prices)	€1.076 billion	€2.5 billion
Number of Indigenous Companies with meaningful R&D activity (>€100,000)	462	1050
Number of Indigenous Companies performing significant R&D (>€2m)	21	100
Number of Foreign Affiliate Companies with minimum scale R&D activity	213	520
Number of Foreign Affiliates Companies performing significant R&D	60	150

Table 1. R&D performance and targets to 2013 (source: SSTI).

The new ecosystem would help MNC operations in Ireland to adopt a leading role in the development of products and markets within their organisation. It would support the initiation and development of world-class indigenous companies in technology through participation at a higher level in the world of innovation. This will require MNCs to introduce new corporate capability that can quickly build and exploit synergies to build their mandate in Ireland. This strategy will appeal to existing and new companies and cater to international and indigenous competitors and collaborators alike. Developing an infrastructure that supports a future focus and the exploitation of various research platforms, while concentrating on world-class execution in the global marketplace, will create an additional attraction – particularly for the international investment community.

Engagement in this ambitious and progressive environment will enable MNCs to explore and expand new business models and commercial arrangements that will lead to new forms of investment. Missing the opportunity to engage could inhibit their growth and mean they miss a market or product opportunity.

_Flexible resourcing models

In the envisaged ecosystem, research and commercialisation stakeholders would operate in synergy. Entrepreneurs, individuals or companies would interact efficiently with suppliers and markets to quickly and profitably commercialise the ideas, innovations and IP that emerge from the research ecosystem, with the support of Innovation Centres (Figure 5). Key to creating this unique business environment will be structured partnering and collaborative agreements supported by flexible resourcing models.

Collaborative interaction in the ecosystem will create a more informed and supportive environment. It will increase the probability of success for new ventures through informed technology selection, availability of key competence and access to market channels. It will dramatically improve the risk–reward profile, encourage earlier investment and increase the size and effectiveness of seed capital investment.

The funding requirements of a new or growing enterprise can be reduced through the provision of technology or IP through a favourable commercial licensing arrangement that is encouraged through novel tax incentive schemes.

_Accessible infrastructure

Providing an advanced integrated infrastructure – enabled by an enlightened and proactive leadership and organisation with the relevant technical and business competencies – is essential in founding an effective commercialisation system. By being effective at commercialising R&D, this infrastructure will differentiate Ireland's brand in the global league of knowledge economies and attract individuals and corporations.

This strategy will appeal to existing and new companies and cater to international and indigenous competitors and collaborators alike. Developing an infrastructure that supports a 'future-focus' and the exploitation of various research platforms – while concentrating on world-class execution in the global marketplace – creates an additional attraction, particularly for the international investment community.

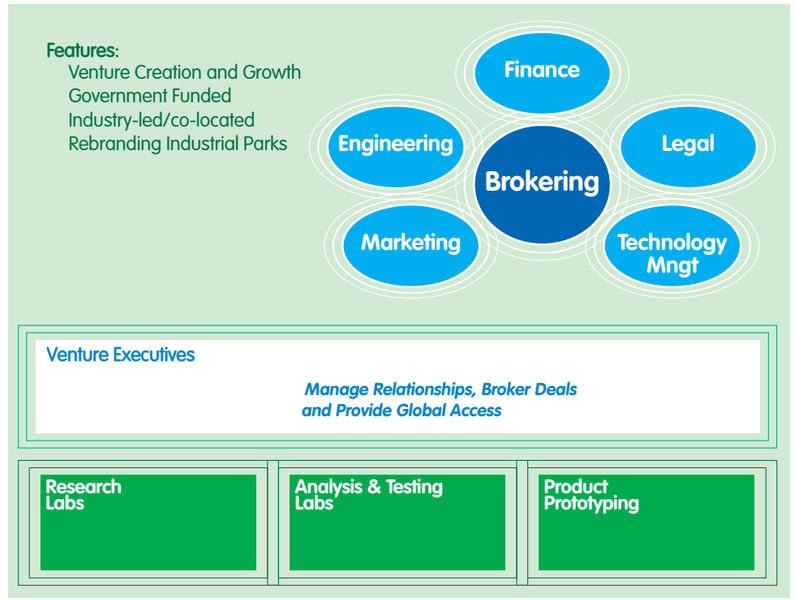

Figure 5. Innovation Centre within a science park.

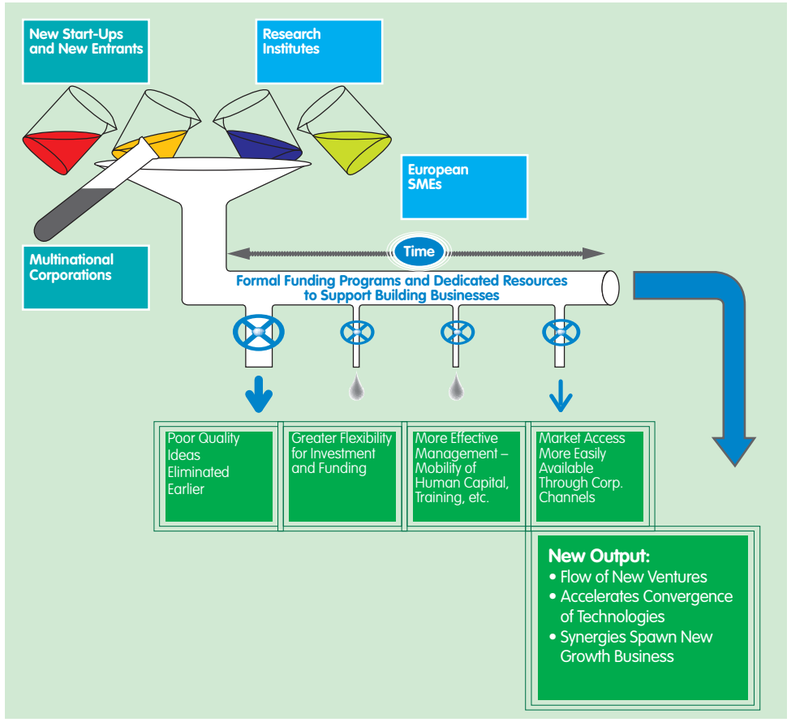

Figure 6. Innovation Pipeline.

Core to the proposal is an upgrading and conversion of existing industrial parks and facilities to extend the science and research campuses already described to include innovation centres and technology parks. These Innovation Centres (Figure 5) will provide a 'sandbox' environment with a set of tools and practices that facilitate commercialisation and provide the necessary expertise and experience to complement effective exploitation. They will focus on the building of an 'Innovation Pipeline' that seeks to maximise the assets and value added and reduce barriers to the success of new ventures (Figure 6).

The centres would pre-screen programmes to better align the product of research toward commercial outcomes – for example, identifying market opportunities and technology gaps that might warrant or match planned research investment. The centres will offer a full range of skills and services required in areas such as IP management, finance, market screening and technology evaluation.

The innovation centres would offer enterprise mentoring – for example from an MNC to an SME, or vice versa – through executive sponsors and exchange with complementary business backgrounds, or through executive shadowing. They could manage the human and other resources to support new start-up ventures and empower enterprise and innovation.

The innovation centres would provide linkage and encourage innovative approaches to risk- and reward-sharing. They would be resourced to exploit synergies and identify complementary needs, introduce partners and explore commercialisation opportunities. They could be closely linked to and partner with many competing or non-competing corporations and academic institutions on the Island and overseas.

The commercialisation ecosystem should be capable of deploying best practice, even in highly regulated sectors, while being able to adapt to changing technologies and business models.

There is an immediate need to empower a strategic group to develop and design the commercialisation infrastructure – including its incorporation and governance structures. Such a group would greatly facilitate and enhance the establishment of an advanced commercialisation infrastructure, and increase the chances of strategic objectives being met – both for the country and industry.

_Convergence – unique value propositions

By 2020, Ireland's substantial investment in nano-science and its application in ICT, biotechnology and materials will have positioned Ireland as a leader in unique areas of innovation. The careful, market-oriented selection of convergent technology and application opportunities will have provided the impetus for a significant increase in foreign and indigenous investment in research, innovation and human capital. Convergence will have enabled Ireland to further exploit its asset base in health, environment, agriculture & food, marine, and energy in support of developing new indigenous industries.

Strategic intent	Interventions required
Differentiate and focus research and innovation	> A strategic national programme of research across science disciplines and industry sectors > Select areas of nano science and technology that can deliver unique solutions from converged technologies > Invest in multi-disciplinary teams to research new applications and products based on cross-sector IP and technology
Create new enterprise	> Promote collaborative applied research that attracts companies from different industry sectors > Provide licensing incentives and seed capital to small ventures exploiting new convergent applications > Invest in international market intelligence to exploit convergent technologies > Provide specific infrastructure to enable cross-sector and State investment to generating enterprise through convergence > Share technology, human capital, equipment and facilities in support of new enterprise
Creative development of key national assets	> Identify convergent technology roadmaps appropriate to agriculture & food, marine, health, environment and energy > Extend Ireland's innovation system to link the above sectors > Promote convergence return on investment opportunity through public–private partnership

Market and technology convergence provides the opportunity for Innovate Ireland, enabling a more balanced, viable basis for sustained growth from commercial investment and indigenous assets.

Ireland's asset base provides excellent convergence opportunities, and a chance to focus the country's innovation environment as globally unique. Opportunities for convergence across the public and private domains exist in agriculture/bioenergy, energy/marine, digital/personal health, pharma/hospital care and renewable energy/regeneration. These will all exploit Ireland's new-found ability to work flexibly and collaboratively across disciplines and institutions in a way that is tightly connected to industry.

Critical to differentiating Ireland's research portfolio will be identifying niche areas where Ireland can establish leadership and excellence. One key opportunity to further anchor the existing FDI base lies in taking advantage of existing CSETs and accelerating their expansion and integration. As collaborators in this cross-industry research, corporate partners have a unique opportunity to explore new applications and commercial opportunities.

A good example of a collaborative and convergent opportunity is already emerging through the cooperation between three major CSETs:

- Biomedical Diagnostics Institute (BDI) at Dublin City University (to advance the next generation of bio-medical devices that will improve the quality of people's lives)
- Centre for Research on Adaptive Nanostructures and Nanodevices (CRANN) at Trinity College Dublin (to advance the application of nano-science and nano-technologies, through a multi-disciplinary team, to support other areas of R&D)
- Centre for Telecommunications Value-chain Research (CTVR) at Trinity College Dublin (to advance the next generation of telecommunication technology, techniques and tools, in the context of the future value-chain).

The programmes – individually and collectively – provide rich opportunities for Ireland to develop emerging convergent solutions in health and nanomedicine.

The advanced biodiagnostic applications being researched by BDI, enabled through new nanotechnologies researched by CRANN and supported by new radio frequency (RF) communications applications developed through CTVR, together present numerous commercialisation opportunities in new emerging markets such as telemedicine.

Harvesting this investment means addressing the complex issues of IP and technology transfer. The process of exploitation also needs to be supported by an evolved infrastructure and new models for collaborative exploitation.

New enterprises will be created through the development of novel enterprise models that exploit robust collaborative relationships between research institutions, MNCs and small indigenous technology companies.

Ireland's unique relationship with MNCs will create the opportunity to access relevant international market intelligence in order to exploit convergent technologies effectively. It also provides insights to future technology and downstream access to global markets.

Engagement in collaborative research – through direct and 'in-kind' investment – enables MNCs to contribute IP, technology and other corporate assets (such as equipment, facilities and people/expertise) to the exploration of innovative convergent solutions. The application and delivery of the solutions will often be through a new enterprise initiative, opening the way for further corporate investment and diversification in Ireland and the development of new indigenous SMEs.

The new innovation environment as described earlier will help accelerate the development of a new base of small high tech ventures who will require proactive 'brokering' and support in areas such as funding, deal making and the scaling up of infrastructure (as described in the earlier section on commercialisation). Focused investment in convergent technologies will drive the growth of spin-outs, SMEs and start-ups and can usefully leverage national resources in areas such as Marine, Agriculture, Energy and the Environment. The opportunity for evolving technology ventures to leverage resources and apply their technology solutions to national challenges – in areas such as sustainable energy, clean environment and affordable health – will create a beta-test environment and increase the opportunity for the venture to be a sustainable global enterprise.

The development of convergent roadmaps through public and private engagement provides a basis for attracting new industry investment and focusing public investment. A development strategy that is in lock-step with the technology convergence roadmaps requires the strategic alignment of all the State agencies (including the IDA, Enterprise Ireland, SFI and Forfas).

_Fiscal policy – continuing the pro-business tradition

By 2020, Ireland's fiscal policies will have built on its pro-business tradition and evolved a tax and incentive system that supports rapid growth of human capital, intellectual assets and R&D capability. The public–private investment model will have evolved to attract significant private investment in world-class infrastructure for education, research and commercialisation. Fiscal policy will encourage high-risk global investment and continue to encourage a new base of technology enterprise that sustains economic growth

Strategic intent	Interventions required
Incentivise innovation	> Maintain 12.5 per cent corporation tax > Extend R&D tax credit system > Incentivise dynamic IP trading environment > Leverage patent royalty exemption scheme > Extend public–private partnership funding model to research
Expand human capital	> Incentivise individual and corporate investment in next level up education

As a small, open economy, our overall competitiveness relies on a number of elements. We know at first hand that the basis of our competitive advantage in Ireland is shifting. The elements that served us well in getting to where we are today will not in themselves be enough to sustain and enhance our competitive position.

_Incentivise innovation

Our tax system has underpinned economic growth in the past. We have low corporate tax rates; we have an established, pro-business political environment; and we currently enjoy a regulatory environment that is conducive to economic growth. We must maintain these advantages, which have underpinned our responsiveness and flexibility to date. The current corporation tax rate of 12.5 per cent must be maintained with certainty as to its continuity into the future to 2025, and beyond. Any uncertainty or suggestion of a change in policy in this area would have a detrimental effect on our perceived competitiveness relative to other countries that are emulating Ireland's low direct tax regime.

The incremental R&D tax credit, which was introduced in 2004, was intended to encourage investment in R&D and to support the higher level of risk-taking implicit in R&D investment. The low corporation tax environment does not support undertaking R&D in Ireland and from a competitive perspective, many countries offer attractive R&D tax credit incentives. Evidence to date suggests that the take-up of the tax credit has been slow. Companies find it cumbersome to administer and are doubtful about its effectiveness over time, given its incremental nature. Extension of the base year to 2009, is a stop-gap measure and does not assist companies making long-term investment and tax planning decisions. The American Chamber of Commerce Ireland recommends that the R&D tax credit be reviewed in a comprehensive evaluation and competitive analysis of what measures should be taken to ensure Ireland is a preferred location for R&D, intellectual property ownership, licensing and trading.

Historically, Ireland has not been a preferred location for US MNCs to locate, register and trade intellectual property (IP). The Patent Royalty Exemption has been used in certain sectors, but not widely enough. We believe there is greater potential to use this Exemption for its original purpose of encouraging and rewarding innovation. Individuals and teams who create, access and leverage IP that results in commercial gain, should be entitled to share the rewards in a tax-beneficial way.

Furthermore, fiscal measures in respect of IP should be used as an incentive to US MNCs both to locate IP in Ireland and to provide access to IP to SMEs – which would support recent initiatives by Enterprise Ireland. We recommend that a new approach to the fiscal treatment of IP should be evaluated as part of the comprehensive evaluation of the R&D Tax Credit recommended above. In the same way that promotion of research is critical to fill the pipeline, support for commercialisation is essential to create the right dynamic for wealth creation.

_Expand human capital

Building human capital in science and technology is the single greatest challenge facing Ireland Inc. Up-skilling needs to become part of our culture and lifelong learning ethos. Many professionals in science, engineering and other disciplines, along with middle and senior managers in industry, would be prepared to invest 2–3 years in undertaking a degree, masters degree or PhD if they could survive the loss of income. One simple and effective mechanism to encourage the pursuit of first degrees, master degrees and PhDs would be to provide a tax rebate of up to €50k per annum for a maximum of two years for someone who is prepared to undertake and qualify in a prescribed third- or fourth-level qualification. Since these individuals would return to the workplace and command higher salaries, the scheme would become self-funding over time. Furthermore, to encourage those who are not in the workforce to take the opportunity to pursue relevant qualifications, the rebate should be provided in such a way that the funder or sponsor (spouse, parent, etc.) of an individual who themselves cannot take advantage of relief can claim the rebate.

The IMD World Competitiveness Report 2005 stated, "A sound environment for competitiveness can be defined by taxation or business legislation. It is not however sufficient. The real engines of competitiveness and economic success remain science, innovation, technology, education and entrepreneurship: all are intertwined." Ireland, with its unique MNC/SME industry base profile, has the opportunity to promote research and innovation and through collaborative partnerships between academia, SMEs and MNCs – particularly in convergence sweet-spots – to harvest the long-term benefits of commercialisation.

4

Summary – a stepwise process of engagement

Achieving the vision set out in this paper requires a lot of work in several key areas. This cannot be done overnight, but is eminently achievable. The American Chamber of Commerce Ireland envisages a stepwise process of increasing engagement (Figure 7).

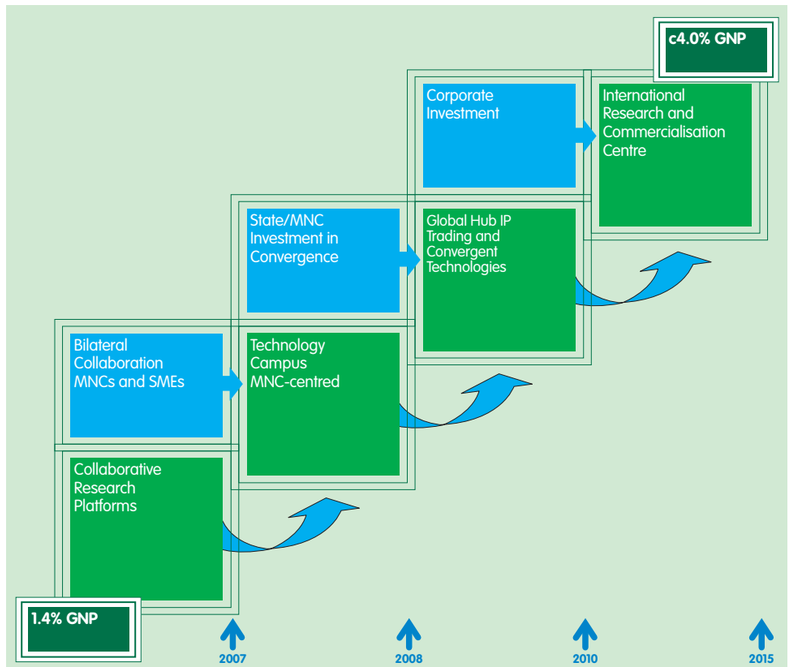

Figure 7. Stepwise process of increasing engagement

We believe this is a realistic and attainable process to take us from today's R&D investment levels of 1.4 per cent of GNP (2004) to a world-class level of four per cent of GNP by 2013.

A guiding principle is to build on what is already working today – the new innovation ecosystem must be a logical extension of what we already have in place. While current support and funding models are a necessary part of the picture, they are not yet sufficient to encourage the step-changes we are looking for.

We have a good working model that promotes collaboration between industry and academia in the form of CSETs. These collaborative research platforms together with the research centres of excellence (such as Tyndall & NIBRT) need to be substantially extended and bring in other smaller research players and investors. The model needs to be more sustainable and evolve into a more independent infrastructure that can sustain itself and be an engine for growth.

Central to this model is an ability to commercialise the IP and technology emerging from next generation Innovation Centres and Science and Technology Parks. Harvesting the R&D investment and extending it through the routine commercialisation of human capital, assets and technology, creating enterprise and economic growth through a virtuous circle.

The State will be able to directly support the endeavour by identifying real opportunities and looking for real solutions, in areas such as health and the environment. Partnerships with multinational companies can provide the win–win situation we are all looking for. The State can gain the benefit of the innovation itself while supporting start-up ventures that have the ambition and potential to be global. These ventures, together with globally recognised research centres and hubs, will drive high-value employment and tax revenues.

With our desired innovation infrastructure in place, Ireland will create a sustainable flow of new opportunities by accelerating the convergence of new technologies. Innovative thinking in the public and private sectors, together with synergies between industries, government and academia will help to spawn new growth businesses.

Realising this vision will require new support systems and strategic agreements between a number of parties. Innovation Centres will be at the heart of new Science and Technology Parks, securing strategic agreements, attracting investment from corporates and spawning new ventures. They will provide the proactive support and brokering to build new start-ups, attract other new entrants, provide the opportunity to spin out companies from large corporates, and populate the new Science and Technology Parks with a host of SMEs – both indigenous and international. The result will be an exciting playing field for the creation, trading and exploitation of IP that attracts higher levels of investment, better management and higher-quality human capital – and reduce Ireland's dependence on specific large multinational investments.

The American Chamber believe that Ireland has an opportunity to position itself as the innovation hub of Europe. Having built our economy on the export drive of the 90's and managing the current consumer boom, we must firmly set our minds to the implementation of the policies that will sustain the national economy ahead. As US multi-nationals we have both contributed to and benefited from the Celtic Tiger, and it is in our mutual interest to ensure its continuation. Discussion and debate on strategy must quickly give way to collective action by all the stakeholders. The creation of a new dynamic knowledge economy requires not only vision but determined leadership from within, to take bold steps, make hard choices and invest for the future.

The American Chamber and its members will do our part.